



UC Davis Academic Calendar 2012-2014*

	Fall 2012	Winter 2013	Spring 2013	Fall 2013	Winter 2014	Spring 2014
Registration Guide and Registration appointment times available	May 7	Oct 29	Jan 28	May 6	Oct 28	Jan 27
Pass 1 Registration (assigned appointments) Pass 2 Registration (assigned appointments)	May 14 Aug 27	Nov 5 Nov 26	Feb 4 Feb 25	May 13 Aug 26	Nov 4 Nov 18	Feb 3 Feb 24
Last day to: • Pay fees to avoid classes being dropped. Students with an unpaid balance will be dropped from classes • Petition for classification to resident status	Sep 15	Dec 15	Mar 15	Sep 15	Dec 15	Mar 15
Quarter begins	Sep 24	Jan 4	Mar 28	Sep 23	Jan 3	Mar 27
Instructional Startup Activities	Sep 24-26	Jan 4	Mar 28	Sep 23-25	Jan 3	Mar 27
Instruction begins • Last day to file for PELP	Sep 27	Jan 7	Apr 1	Sep 26	Jan 6	Mar 31
Last day to: • Make final late payment of registration fees with penalty • Drop 10-day-drop courses • Change student status (part-time/full-time)	Oct 10 vith penalty	Jan 18	Apr 12	Oct 9	Jan 17	Apr 11
Last day to add courses	Oct 12	Jan 23	Apr 16	Oct 11	Jan 22	Apr 15
Last day to drop 20-day-drop courses	Oct 24	Feb 4	Apr 26	Oct 23	Feb 3	Apr 25
Last day to: • Opt to take courses on a P/NP or S/U basis • Change units in a variable unit course	Oct 31	Feb 11	May 3	Oct 30	Feb 10	May 2
Instruction ends	Dec 7	Mar 18	Jun 6	Dec 6	Mar 17	Jun 5
Final examinations	Dec 10-14	Mar 19-23	Jun 8, 10–13	Dec 9-13	Mar 18-22	Jun 7, 9–12
Quarter ends	Dec 14	Mar 23	Jun 13	Dec 13	Mar 22	Jun 12
Commencement	Dec 15		Jun 14–16	Dec 14		Jun 13-15
Academic and Administrative Holidays	Nov 12 Nov 22–23 Dec 24–25 Dec 31–Jan 1	Jan 21 Feb 18	Mar 29 May 27	Nov 11 Nov 28–29 Dec 24–25 Dec 31–Jan 1	Jan 20 Feb 17	Mar 28 May 26
Filing for Candidacy (Graduation)						
Filing period for those who expect to complete work for a bachelor's degree to file for candidacy with the Registrar †	Jun 1-Oct 10	Nov 7–Jan 18	Feb 1–Apr 12	Jun 1–Oct 9	Nov 7–Jan 17	Feb 1–Apr 11
Last day to file minor with the Dean's Office # Undergraduate Admission	Oct 10	Jan 18	Apr 12	Oct 9	Jan 17	Apr 11
Last day to file an application for admission scholarships	Nov 30, 2011	Jul 30, 2012	Oct 31, 2012	Nov 30, 2012	Jul 29, 2013	Oct 31, 2013
Last day to file a readmission application with the Office of the University Registrar to return to undergraduate status	Jul 31, 2012	Oct 31, 2012	Jan 31, 2013	Jul 31, 2013	Oct 31, 2013	Jan 31, 2014

Summer Sessions 2012

Aug 6-Sep 14 Jun 25-Aug 3

Summer Sessions 2013

Jun 24-Aug 2 Aug 5-Sep 13

Financial Aid Filing Period

- Priority filing period for grants, loans, work-study and California Student Aid awards for 2013–2014; Jan 1–Mar 2
- Filing period for undergraduate scholarship application for 2013–2014: Oct 1–Jan 9, 2013

Key to Symbols

- **change;** check the appropriate *Registration Guide.* * Dates are subject to
- Filing period for students graduating:
 • Sep 2012, is May 14–
 Jul 6
- Sep 2013, is May 13– Jul 1
- Sep 2014, is May 19– Jul 7
- Deadline to file a minor program with Dean's Office for students graduat-
- - ing:
 Sep 2012, is Jul 8
 Sep 2013, is Jul 1
 Sep 2014, is Jul 1



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IT IS THE RESPONSIBILITY OF THE INDIVIDUAL STUDENT TO BECOME FAMILIAR WITH THE ANNOUNCEMENTS AND REGULATIONS OF THE UNIVERSITY PRINTED IN THIS GENERAL CATALOG AND IN THE REGISTRATION GUIDE.

The University of California, Davis, will provide assistance to the visually impaired regarding the information contained in this catalog. Questions should be directed to the office or department concerned.

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FROM THE CHANCELLOR

Welcome to UC Davis. We're delighted you've chosen our campus as the place to pursue your academic goals. All of us—faculty, staff and alumni—are committed to helping you toward their successful attainment.

In the time you spend at UC Davis, you will acquire knowledge and skills that will help you shape the rest of your life. In whatever program you study, you will receive an exceptional education and a degree that is respected by graduate schools and employers around the world. Our philosophy of learning, discovery and engagement means that you will graduate with an academic foundation strengthened by research and internships. It also ensures that you will understand how your learning is relevant to the greater world. UC Davis has a century of commitment to public service and seeking solutions to today's critical issues, and we encourage you to integrate these goals into your educational plan.

Students who get involved love UC Davis! While you're here, you'll make lifelong friends and have experiences that will determine the direction of your growth as a human being and as a member of the larger community in which you live. It's your passion and vision that energize and inspire the campus and make your time here meaningful.

We are very proud of UC Davis. Our alumni have made significant and lasting contributions to society as leaders in government, business, technology, media and the arts. They share their knowledge and resources with the campus and help students build social and career networks before they graduate. Members of our faculty have won MacArthur genius grants, Pulitzer prizes, Fulbright scholarships and election to the nation's top academies of the arts and sciences. They connect to students in the classroom, through freshman seminars and through research, arts and honors activities.

UC Davis continues to grow and offer new opportunities. Residence halls and dining facilities, a multipurpose stadium, new math and sciences buildings and the Mondavi Center for the Performing Arts are a few of the developments that reflect our commitment to offering the best educational experience available.

Together, we are using our talents and ingenuity to build a community that honors our diversity as individuals and reflects our belief in a shared set of values. I'm happy you're joining our community.

Congratulations on becoming an Aggie!

Linda Katehi Chancellor

ADDRESS DIRECTORY

University of California One Shields Avenue Davis, California 95616 (530) 752-1011; main campus number http://www.ucdavis.edu

Visitor Services Office

Buehler Alumni and Visitors Center (530) 752-8111 (Campus tours, maps and information)

Campus Information Center

Memorial Union (530) 752-2222

Offices of the Chancellor and Provost

Fifth Floor, Mrak Hall (530) 752-2065

College of Agricultural and Environmental Sciences

150 Mrak Hall (530) 752-0108

College of Biological Sciences

202 Life Sciences (530) 752-0410

College of Engineering

1050 Kemper Hall (530) 752-0553

College of Letters and Science

200 Social Sciences and Humanities Building Academic Counseling: (530) 752-0392

Graduate Studies

250 Mrak Hall (530) 752-0650

Graduate School of Management

Gallagher Hall (530) 752-7658

School of Law

King Hall (530) 752-0243

School of Medicine

4610 X Street, Sacramento (916) 734-7131

School of Veterinary Medicine

Surge IV (530) 752-1360

Office of Summer Sessions

1350 Surge III (530) 752-7622

University Extension

1333 Research Park Drive (530) 757-8777

News Service

334 Mrak Hall (530) 752-1930

Legal Analyst—Residence Matters

University of California Office of the President 1111 Franklin Street, 8th Floor Oakland, CA 94607-5206

Admissions

Undergraduate Undergraduate Admissions

178 Mrak Hall (530) 752-2971

Education Outreach Program (EOP)

Office of Admissions 175 Mrak Hall (530) 752-2971

Graduate Office of Graduate Studies Admissions

250 Mrak Hall (530) 752-0650

School of Law Admissions Law

115 King Hall (530) 752-6477

Graduate School of Management Admissions Management

Gallagher Hall (530) 752-7658

Medicine

School of Medicine Admissions and Outreach 4610 X St., Suite 1202, Sacramento, CA 95817 (916) 734-4800

Veterinary School of Veterinary Medicine Admissions

114 Haring Annex Medicine (530) 752-1383

Office of the University Registrar

(530) 752-3639 TDD: (530) 752-5149

Financial Aid Office

Dutton Hall Undergraduate: (530) 752-2390 Graduate: (530) 752-9246 Student Employment: (530) 752-0520

Undergraduate Education

Mrak Hall, 5th Floor (530) 752-6068

Undergraduate Scholarship Office

Dutton Hall (530) 752-2804

Fellowships and Graduate Scholarships

Graduate Studies **Dutton Hall** (530) 752-7481

Teaching and Research Assistantships

Write to department or group concerned.

Associated Students of the University of California, Davis (ASUCD)

347 Memorial Union (530) 752-3632

Student Disability Center

54 Cowell Building (530) 752-3184 TTY: (530) 752-6833

Student Health & Wellness Center

Student Health & Wellness Center (530) 752-2300

Student Housing Office

160 Student Housing (530) 752-2033

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DEGREES OFFERED BY UC DAVIS

Undergraduate majors are administered by the colleges of Agricultural and Environmental Sciences (A&ES), Biological Sciences (CBS), Letters and Science (L&S), and Engineering. Professional studies are administered by the schools indicated. All graduate programs are administered by the Office of Graduate Studies. The list below indicates the major or discipline, the degree(s) offered and the school or college offering the major.

Degrees offered: A.B.—Bachelor of Arts, B.S.—Bachelor of Science, Certificate, Credential, M.A.—Master of Arts, M.A.S.—Master of Advanced Studies, M.B.A.—Master of Business Administration, M.Ed.—Master of Education, M.Engr—Master of Engineering, M.E.A.—Master of Fine Arts, M.P.H.—Master of Public Health, M.P.V.M.—Master of Preventive Veterinary Medicine, M.S.—Master of Science, Ed.D.—Doctorate in Education, D. Engr.—Doctor of Engineering, Ph.D.—Doctor of Philosophy, J.D.—Doctor of Law, LL.M.—Master of Laws, M.D.—Doctor of Medicine, D.V.M.—Doctor of Veterinary Medicine. * = Admissions suspended Fall 2012. † = Fall 2012 admissions closed to freshman applicants; open to transfer applicants; Fall 2013 admissions open to undergraduate applicants at all levels. † = graduate degree offered under Engineering; **Master's degree offered only en route to Ph.D.

Aerospace Science and Engineering	Biomedical Engineering	Computer Science
B.S.† Engineering	B.S., M.S., Ph.D Engineering	B.S L&S
African American and African Studies	Biophysics	Computer Science
A.BL&S	M.S.**, Ph.D CBS	M.S., Ph.D Engineering
Agricultural and Environmental	Biostatistics	Computer Science and Engineering
Chemistry	M.S., Ph.D L & S	B.S Engineering
M.S., Ph.D A&ES	Biotechnology	Cultural Studies
Agricultural and Resource Economics	Biotechnology Bi.SA&ES	M.A.**, Ph.D L&S
M.S., M.S./M.B.A, Ph.D A&ES	Business Administration	Design
Agricultural and Environmental Education	M.B.A Graduate School of Management	A.B., M.F.A L&S Dramatic Art
B.S	Cell Biology	A.B., M.F.A L&S
American Studies	B.S CBS	East Asian Studies
A.BL&S	Chemical Engineering	A.B L&S
Animal Behavior	B.S., M.S., Ph.D Engineering	Ecological Management and
Ph.D., M.S.** CBS	Chemical Engineering/Materials	Restoration
Animal Biology	Science and Engineering	B.S
B.S., M.S., Ph.D A&ES	B.S Engineering	Ecology
Animal Science	Chemical Physics	M.S., Ph.D
B.S	B.SL&S	Ecology (Joint Doctorate with San
Animal Science and Management	Chemistry	Diego State University)
B.S A&ES	A.B. or B.S., M.S.**, Ph.D L&S	Ph.D
Anthropology	Chicana/Chicano Studies	Economics
A.B. or B.S., M.A., Ph.DL&S	A.B L&S	A.B., M.A.**, Ph.D L&S
Applied Mathematics	Child Development	Education
M.S., Ph.D L&S	M.S	M.A., Ph.D., Ed.D., Credential School
Applied Science Engineering	Chinese	of Education
M.S., Ph.D Engineering	A.B L&S	Electrical and Computer Engineering
M.S., Ph.D Engineering Applied Physics	Civil and Environmental Engineering	B.S./M.S., M.S., Ph.D Engineering
M.S., Ph.D Engineering Applied Physics B.S L&S	Civil and Environmental Engineering M.S., M.Engr., Ph.D., D.Engr.,	B.S./M.S., M.S., Ph.D Engineering Electrical Engineering
M.S., Ph.D Engineering Applied Physics B.S L&S Art History	Civil and Environmental Engineering M.S., M.Engr., Ph.D., D.Engr., Certificate Engineering	B.S./M.S., M.S., Ph.D Engineering Electrical Engineering B.S.† Engineering
M.S., Ph.D. Engineering Applied Physics L&S B.S. L&S Art History A.B., M.A. L&S	Civil and Environmental Engineering M.S., M.Engr., Ph.D., D.Engr., Certificate Engineering Civil Engineering	B.S./M.S., M.S., Ph.D Engineering Electrical Engineering B.S.† Engineering Electronic Materials Engineering
M.S., Ph.D	Civil and Environmental Engineering M.S., M.Engr., Ph.D., D.Engr., Certificate Engineering Civil Engineering B.S Engineering	B.S./M.S., M.S., Ph.D Engineering Electrical Engineering B.S.† Engineering Electronic Materials Engineering B.S.* Engineering
M.S., Ph.D. Engineering Applied Physics B.S. L&S Art History A.B., M.A. L&S Art Studio A.B., M.FA. L&S	Civil and Environmental Engineering M.S., M.Engr., Ph.D., D.Engr., Certificate Engineering Civil Engineering B.S Engineering Classical Civilization	B.S./M.S., M.S., Ph.D Engineering Electrical Engineering B.S.† Engineering Electronic Materials Engineering B.S.* Engineering English
M.S., Ph.D. Engineering Applied Physics B.S. L&S Art History A.B., M.A. L&S Art Studio A.B., M.FA. L&S Asian American Studies	Civil and Environmental Engineering M.S., M.Engr., Ph.D., D.Engr., Certificate Engineering Civil Engineering B.S Engineering Classical Civilization A.B L&S	B.S./M.S., M.S., Ph.D Engineering Electrical Engineering B.S.† Engineering Electronic Materials Engineering B.S.* Engineering English A.B., M.A., Ph.D L&S
M.S., Ph.D. Engineering Applied Physics B.S. L&S Art History A.B., M.A. L&S Art Studio A.B., M.FA. L&S	Civil and Environmental Engineering M.S., M.Engr., Ph.D., D.Engr., Certificate Engineering Civil Engineering B.S. Engineering Classical Civilization A.B. L&S Clinical Nutrition	B.S./M.S., M.S., Ph.D Engineering Electrical Engineering B.S.† Engineering Electronic Materials Engineering B.S.* Engineering English A.B., M.A., Ph.D L&S Entomology
M.S., Ph.D. Engineering Applied Physics B.S. L&S Art History A.B., M.A. L&S Art Studio A.B., M.F.A. L&S Asian American Studies A.B. L&S Atmospheric Science	Civil and Environmental Engineering M.S., M.Engr., Ph.D., D.Engr., Certificate Engineering Civil Engineering B.S. Engineering Classical Civilization A.B. L&S Clinical Nutrition B.S. A&ES	B.S./M.S., M.S., Ph.D. Engineering Electrical Engineering B.S.† Engineering Electronic Materials Engineering B.S.* Engineering English A.B., M.A., Ph.D. L&S Entomology B.S., M.S., Ph.D. A&ES
M.S., Ph.D. Engineering Applied Physics B.S. L&S Art History A.B., M.A. L&S Art Studio A.B., M.EA. L&S Asian American Studies A.B. L&S Atmospheric Science B.S., M.S., Ph.D. A&ES	Civil and Environmental Engineering M.S., M.Engr., Ph.D., D.Engr., Certificate Engineering Civil Engineering B.S. Engineering Classical Civilization A.B. L&S Clinical Nutrition B.S. A&ES Clinical Research	B.S./M.S., M.S., Ph.D. Engineering Electrical Engineering B.S.† Engineering Electronic Materials Engineering B.S.* Engineering English A.B., M.A., Ph.D. L&S Entomology B.S., M.S., Ph.D. A&ES Environmental Horticulture and Urban
M.S., Ph.D. Engineering Applied Physics B.S. L&S Art History A.B., M.A. L&S Art Studio A.B., M.FA. L&S Asian American Studies A.B. L&S Atmospheric Science B.S., M.S., Ph.D. A&ES Avian Sciences	Civil and Environmental Engineering M.S., M.Engr., Ph.D., D.Engr., Certificate Engineering Civil Engineering B.S. Engineering Classical Civilization A.B. L&S Clinical Nutrition B.S. A&ES Clinical Research M.A.S. School of Medicine	B.S./M.S., M.S., Ph.D. Engineering Electrical Engineering B.S.† Engineering Electronic Materials Engineering B.S.* Engineering English A.B., M.A., Ph.D. L&S Entomology B.S., M.S., Ph.D. A&ES Environmental Horticulture and Urban Forestry
M.S., Ph.D. Engineering Applied Physics B.S. L&S Art History A.B., M.A. L&S Art Studio A.B., M.EA. L&S Asian American Studies A.B. L&S Atmospheric Science B.S., M.S., Ph.D. A&ES Avian Sciences M.S. A&ES	Civil and Environmental Engineering M.S., M.Engr., Ph.D., D.Engr., Certificate Engineering Civil Engineering B.S. Engineering Classical Civilization A.B. L&S Clinical Nutrition B.S. A&ES Clinical Research M.A.S. School of Medicine Communication	B.S./M.S., M.S., Ph.D. Engineering Electrical Engineering B.S.† Engineering Electronic Materials Engineering B.S.* Engineering English A.B., M.A., Ph.D. L&S Entomology B.S., M.S., Ph.D. A&ES Environmental Horticulture and Urban Forestry B.S. A&ES
M.S., Ph.D. Engineering Applied Physics B.S. L&S Art History A.B., M.A. L&S Art Studio A.B., M.FA. L&S Asian American Studies A.B. L&S Atmospheric Science B.S., M.S., Ph.D. A&ES Avian Sciences M.S. A&ES Biochemical Engineering	Civil and Environmental Engineering M.S., M.Engr., Ph.D., D.Engr., Certificate Engineering Civil Engineering B.S. Engineering Classical Civilization A.B. L&S Clinical Nutrition B.S. A&ES Clinical Research M.A.S. School of Medicine Communication A.B., M.A., Ph.D. L&S	B.S./M.S., M.S., Ph.D. Engineering Electrical Engineering B.S.† Engineering Electronic Materials Engineering B.S.* Engineering English A.B., M.A., Ph.D. L&S Entomology B.S., M.S., Ph.D. A&ES Environmental Horticulture and Urban Forestry B.S. A&ES Environmental Policy Analysis and
M.S., Ph.D. Engineering Applied Physics B.S. L&S Art History A.B., M.A. L&S Art Studio A.B., M.F.A. L&S Asian American Studies A.B. L&S Atmospheric Science B.S., M.S., Ph.D. A&ES Avian Sciences M.S. A&ES Biochemical Engineering B.S. Engineering	Civil and Environmental Engineering M.S., M.Engr., Ph.D., D.Engr., Certificate	B.S./M.S., M.S., Ph.D. Engineering Electrical Engineering B.S.† Engineering B.S.* Engineering B.S.* Engineering B.S.* Engineering English A.B., M.A., Ph.D. L&S Entomology B.S., M.S., Ph.D. A&ES Environmental Horticulture and Urban Forestry B.S. A&ES Environmental Policy Analysis and Planning
M.S., Ph.D. Engineering Applied Physics B.S. L&S Art History A.B., M.A. L&S Art Studio A.B., M.EA. L&S Asian American Studies A.B. L&S Atmospheric Science B.S., M.S., Ph.D. A&ES Avian Sciences M.S. A&ES Biochemical Engineering B.S. Engineering Biochemistry, Molecular, Cellular, and	Civil and Environmental Engineering M.S., M.Engr., Ph.D., D.Engr., Certificate Engineering Civil Engineering B.S. Engineering Classical Civilization A.B. L&S Clinical Nutrition B.S. A&ES Clinical Research M.A.S. School of Medicine Communication A.B., M.A., Ph.D. L&S Community and Regional Development B.S. A&ES	B.S./M.S., M.S., Ph.D. Engineering Electrical Engineering B.S.† Engineering B.S.* Engineering B.S.* Engineering English A.B., M.A., Ph.D. L&S Entomology B.S., M.S., Ph.D. A&ES Environmental Horticulture and Urban Forestry B.S. A&ES Environmental Policy Analysis and Planning B.S. A&ES
M.S., Ph.D. Engineering Applied Physics B.S. L&S Art History A.B., M.A. L&S Art Studio A.B., M.EA. L&S Asian American Studies A.B. L&S Atmospheric Science B.S., M.S., Ph.D. A&ES Avian Sciences M.S. A&ES Biochemical Engineering B.S. Engineering Biochemistry, Molecular, Cellular, and Developmental Biology	Civil and Environmental Engineering M.S., M.Engr., Ph.D., D.Engr., Certificate Engineering Civil Engineering B.S. Engineering Classical Civilization A.B. L&S Clinical Nutrition B.S. A&ES Clinical Research M.A.S. School of Medicine Communication A.B., M.A., Ph.D. L&S Community and Regional Development B.S. A&ES Community Development	B.S./M.S., M.S., Ph.D. Engineering Electrical Engineering B.S.† Engineering B.S.* Engineering B.S.* Engineering B.S.* Engineering English A.B., M.A., Ph.D. L&S Entomology B.S., M.S., Ph.D. A&ES Environmental Horticulture and Urban Forestry B.S. A&ES Environmental Policy Analysis and Planning B.S. A&ES Environmental Science and
M.S., Ph.D. Engineering Applied Physics B.S. L&S Art History A.B., M.A. L&S Art Studio A.B., M.F.A. L&S Asian American Studies A.B. L&S Atmospheric Science B.S., M.S., Ph.D. A&ES Avian Sciences M.S. A&ES Biochemical Engineering B.S. Engineering Biochemistry, Molecular, Cellular, and Developmental Biology M.S., Ph.D. CBS	Civil and Environmental Engineering M.S., M.Engr., Ph.D., D.Engr., Certificate Engineering Civil Engineering B.S. Engineering Classical Civilization A.B. L&S Clinical Nutrition B.S. A&ES Clinical Research M.A.S. School of Medicine Communication A.B., M.A., Ph.D. L&S Community and Regional Development B.S. A&ES Community Development M.S. A&ES	B.S./M.S., M.S., Ph.D. Engineering Electrical Engineering B.S.† Engineering B.S.* Engineering B.S.* Engineering English A.B., M.A., Ph.D. L&S Entomology B.S., M.S., Ph.D. A&ES Environmental Horticulture and Urban Forestry B.S. A&ES Environmental Policy Analysis and Planning B.S. A&ES Environmental Science and Management
M.S., Ph.D. Engineering Applied Physics B.S. L&S Art History A.B., M.A. L&S Art Studio A.B., M.F.A. L&S Asian American Studies A.B. L&S Atmospheric Science B.S., M.S., Ph.D. A&ES Avian Sciences M.S. A&ES Biochemical Engineering B.S. Engineering Biochemistry, Molecular, Cellular, and Developmental Biology M.S., Ph.D. CBS Biochemistry and Molecular Biology	Civil and Environmental Engineering M.S., M.Engr., Ph.D., D.Engr., Certificate	B.S./M.S., M.S., Ph.D. Engineering Electrical Engineering B.S.† Engineering B.S.* Engineering B.S.* Engineering B.S.* Engineering English A.B., M.A., Ph.D. L&S Entomology B.S., M.S., Ph.D. A&ES Environmental Horticulture and Urban Forestry B.S. A&ES Environmental Policy Analysis and Planning B.S. A&ES Environmental Science and
M.S., Ph.D. Engineering Applied Physics B.S. L&S Art History A.B., M.A. L&S Art Studio A.B., M.F.A. L&S Asian American Studies A.B. L&S Atmospheric Science B.S., M.S., Ph.D. A&ES Avian Sciences M.S. A&ES Biochemical Engineering B.S. Engineering Biochemistry, Molecular, Cellular, and Developmental Biology M.S., Ph.D. CBS Biochemistry and Molecular Biology B.S. CBS	Civil and Environmental Engineering M.S., M.Engr., Ph.D., D.Engr., Certificate Engineering Civil Engineering B.S. Engineering Classical Civilization A.B. L&S Clinical Nutrition B.S. A&ES Clinical Research M.A.S. School of Medicine Communication A.B., M.A., Ph.D. L&S Community and Regional Development B.S. A&ES Community Development M.S. A&ES Comparative Literature A.B., M.A., Ph.D. L&S	B.S./M.S., M.S., Ph.D. Engineering Electrical Engineering B.S.† Engineering B.S.* Engineering B.S.* Engineering B.S.* Engineering English A.B., M.A., Ph.D. L&S Entomology B.S., M.S., Ph.D. A&ES Environmental Horticulture and Urban Forestry B.S. A&ES Environmental Policy Analysis and Planning B.S. A&ES Environmental Science and Management B.S. A&ES
Applied Physics B.S. L&S Art History A.B., M.A. L&S Art Studio A.B., M.FA. L&S Asian American Studies A.B. L&S Atmospheric Science B.S., M.S., Ph.D. A&ES Avian Sciences M.S. Engineering B.S. Engineering B.S. Engineering Biochemistry, Molecular, Cellular, and Developmental Biology M.S., Ph.D. CBS Biochemistry and Molecular Biology B.S. CBS Biological Sciences	Civil and Environmental Engineering M.S., M.Engr., Ph.D., D.Engr., Certificate Engineering Civil Engineering B.S. Engineering Classical Civilization A.B. L&S Clinical Nutrition B.S. A&ES Clinical Research M.A.S. School of Medicine Communication A.B., M.A., Ph.D. L&S Community and Regional Development B.S. A&ES Community Development M.S. A&ES Comparative Literature A.B., M.A., Ph.D. L&S Comparative Pathology	B.S./M.S., M.S., Ph.D. Engineering Electrical Engineering B.S.† Engineering B.S.* Engineering B.S.* Engineering B.S. Engineering English A.B., M.A., Ph.D. L&S Entomology B.S., M.S., Ph.D. A&ES Environmental Horticulture and Urban Forestry B.S. A&ES Environmental Policy Analysis and Planning B.S. A&ES Environmental Science and Management B.S. A&ES Environmental Toxicology
M.S., Ph.D. Engineering Applied Physics B.S. L&S Art History A.B., M.A. L&S Art Studio A.B., M.F.A. L&S Asian American Studies A.B. L&S Atmospheric Science B.S., M.S., Ph.D. A&ES Avian Sciences M.S. A&ES Biochemical Engineering B.S. Engineering Biochemistry, Molecular, Cellular, and Developmental Biology M.S., Ph.D. CBS Biochemistry and Molecular Biology B.S. CBS Biological Sciences A.B or B.S. CBS	Civil and Environmental Engineering M.S., M.Engr., Ph.D., D.Engr., Certificate	B.S./M.S., M.S., Ph.D. Engineering Flectrical Engineering B.S.† Engineering B.S.* Engineering B.S.* Engineering B.S. English A.B., M.A., Ph.D. L&S Entomology B.S., M.S., Ph.D. A&ES Environmental Horticulture and Urban Forestry B.S. A&ES Environmental Policy Analysis and Planning B.S. A&ES Environmental Science and Management B.S. A&ES Environmental Toxicology
M.S., Ph.D. Engineering Applied Physics B.S. L&S Art History A.B., M.A. L&S Art Studio A.B., M.FA. L&S Asian American Studies A.B. L&S Atmospheric Science B.S., M.S., Ph.D. A&ES Avian Sciences M.S. Engineering B.S. Engineering B.S. Engineering Biochemistry, Molecular, Cellular, and Developmental Biology M.S., Ph.D. CBS Biochemistry and Molecular Biology B.S. CBS Biological Sciences A.B or B.S. CBS Biological Systems Engineering	Civil and Environmental Engineering M.S., M.Engr., Ph.D., D.Engr., Certificate Engineering Civil Engineering B.S. Engineering Classical Civilization A.B. L&S Clinical Nutrition B.S. A&ES Clinical Research M.A.S. School of Medicine Communication A.B., M.A., Ph.D. L&S Community and Regional Development B.S. A&ES Community Development M.S. A&ES Comparative Literature A.B., M.A., Ph.D. L&S Comparative Literature A.B., M.A., Ph.D. L&S Comparative Pathology M.S., Ph.D. School of Veterinary Medicine	B.S./M.S., M.S., Ph.D. Engineering Electrical Engineering B.S.† Engineering B.S.* Engineering B.S.* Engineering English A.B., M.A., Ph.D. L&S Entomology B.S., M.S., Ph.D. A&ES Environmental Horticulture and Urban Forestry B.S. A&ES Environmental Policy Analysis and Planning B.S. A&ES Environmental Science and Management B.S. A&ES Environmental Toxicology B.S. A&ES
M.S., Ph.D. Engineering Applied Physics B.S. L&S Art History A.B., M.A. L&S Art Studio A.B., M.F.A. L&S Asian American Studies A.B. L&S Atmospheric Science B.S., M.S., Ph.D. A&ES Avian Sciences M.S. A&ES Biochemical Engineering B.S. Engineering Biochemistry, Molecular, Cellular, and Developmental Biology M.S., Ph.D. CBS Biochemistry and Molecular Biology B.S. CBS Biological Sciences A.B or B.S. CBS	Civil and Environmental Engineering M.S., M.Engr., Ph.D., D.Engr., Certificate	B.S./M.S., M.S., Ph.D. Engineering Flectrical Engineering B.S.† Engineering B.S.* Engineering B.S.* Engineering B.S.* Engineering Full English A.B., M.A., Ph.D. L&S Futomology B.S., M.S., Ph.D. A&ES Environmental Horticulture and Urban Forestry B.S. A&ES Environmental Policy Analysis and Planning B.S. A&ES Environmental Science and Management B.S. A&ES Environmental Toxicology B.S. A&ES Environmental Toxicology B.S. School of Veterinary M.S., Ph.D. School of Veterinary

Evolution, Ecology, and Biodiversity	Managerial Economics	Physics
A.B. or B.S CBS	B.SA&ES	A.B. or B.S., M.S., Ph.D L&S
Exercise Biology	Master of Professional Accountancy	Plant Biology
A.B. or B.S	M.P.AcGSM	A.B. or B.S., M.S., Ph.D CBS
Exercise Science	Materials Science and Engineering	Plant Pathology
M.S.*	B.S., M.S., M.Engr., Ph.D Engineering	M.S., Ph.D
Family Nurse Practitioner/Physician	Maternal and Child Nutrition	Plant Sciences
Assistant	M.A.S	B.S
Credential School of Medicine	Mathematical and Scientific	Political Science
Fiber and Polymer Science	Computation	A.B., M.A.**, M.A./J.D., J.D., Ph.D. L&S
B.S	B.S L&S	Political Science—Public Service
Film Studies	Mathematics	A.B L&S
A.B L&S	A.B. or B.S., M.A., Ph.D L&S	Population Biology
Food Science	Mechanical and Aeronautical	
B.S., M.S., Ph.D	Engineering	M.S.**, Ph.D
Forensic Science	M.S., Ph.D., Engineering	Preventive Veterinary Medicine
M.S UNEX	Mechanical Engineering	M.P.V.M School of Veterinary Medicine
French	B.S.†Engineering	
	Mechanical Engineering/Materials	Psychology
A.B., Ph.D L&S	Science and Engineering	A.B. or B.S., M.A.**, Ph.D L&S
Genetics	B.S Engineering	Public Health
B.S., M.S., Ph.D CBS	Medicine	M.P.H School of Medicine
Geography	M.D School of Medicine	Religious Studies
M.A., Ph.D A&ES	Medieval and Early Modern Studies	A.B L&S
Geology		Russian
A.B. or B.S., M.S., Ph.D L&S	A.B L&S	A.B L&S
German	Microbiology	Science and Technology Studies
A.B., M.A., Ph.D L&S	A.B. or B.S., M.S.**, Ph.D CBS	A.B L&rS
Health Informatics	Middle East/South Asia Studies	Sociology
M.S School of Medicine	A.B L&S	A.B., M.A.**, Ph.D L&S
History	Molecular, Cellular, and Integrative	Sociology—Organizational Studies
A.B., M.A.**, Ph.D L&S	Physiology	A.B L&S
Horticulture and Agronomy	M.S., Ph.D CBS	Soils and Biogeochemistry
M.S., Ph.D	Music	M.S., Ph.D
Human Development	A.B., M.A., Ph.D L&S	Spanish
B.S., Ph.D A&ES	Native American Studies	A.B., M.A., Ph.DL&S
Hydrologic Sciences	A.B., M.A., Ph.D L&S	Statistics
M.S., Ph.D	Natural Sciences	A.B. or B.S., B.S./M.S., M.S., Ph.D L&S
Hydrology	B.S L&S	Study of Religion
	Neurobiology, Physiology, and Behavior	M.A., Ph.D L&S
B.S	B.S CBS	
Immunology	Neuroscience	Sustainable Agriculture and Food Systems
M.S., Ph.D School of Veterinary Medicine	M.S.***, Ph.D CBS	
	Nursing Science and Health-Care	B.S
Individual Major	Leadership	
A.B., B.S	M.S., Ph.D Betty Irene Moore	A.B L&S
International Agricultural	School of Nursing	Textiles
Development	Nutrition Science	M.S
B.S., M.S	B.S	Textiles and Clothing
International Relations	Nutritional Biology	B.S.‡
A.BL&S	M.S., Ph.D	Transportation Technology and Policy
Italian	Optical Science and Engineering	M.S., Ph.D Engineering
A.BL&S	B.S.* Engineering	Veterinary Medicine
Japanese	Performance Studies	D.V.M School of Veterinary
A.BL&S	M.A.**, Ph.D L&S	Medicine
Landscape Architecture	Pharmaceutical Chemistry	Viticulture and Enology
B.S	B.SL&S	B.S., M.S A&ES
Law		Wildlife, Fish, and Conservation
J.D., LL.M School of Law	Pharmacology and Toxicology	Biology
Linguistics	M.S., Ph.D School of Veterinary Medicine	B.S
A.B., M.A., Ph.D L&S	Philosophy	Women's Studies
•	A.B., M.A.**, Ph.D L&S	A.B L&S
	A.D., WI.A. , I II.D LQ3	

MINOR PROGRAMS OFFERED BY UC DAVIS

Minor programs are offered by the College of Agricultural and Environmental Sciences (A&ES), the College of Biological Sciences (CBS) and the College of Letters and Science (L&S). The College of Engineering (ENGR), the School of Education (SOE) and the Graduate School of Management (GSM) each offer one undergraduate minor. The list below indicates the minor program, the offering department (if the department name is different than the name of the minor) and the college offering the minor.

African American and African Studies	
Aging and Adult Development (Human &	:
Community Development)	
Agricultural Pest Management	
Agricultural Systems and Environment (P	
Sciences)	
American Studies	. L&S
Animal Science—Animal Biology	A&ES
Animal Science—Animal Genetics	A&ES
Animal Science—Aquaculture	A&ES
Animal Science—Dairy/Livestock	A&ES
Animal Science—Equine	A&ES
Anthropology	. L&S
Applied Biological Systems Technology	
(Biological & Agricultural Engineering)	A&ES
Applied Computing & Information System	
(Plant Sciences)	
Art History	
Art Studio	
Asian American Studies	
Atmospheric Science (Land, Air, and Wate	er
Resources)	A&ES
Avian Sciences (Animal Science)	
Biological Sciences	
Biomedical Engineering	ENGR
Chemistry	
Chicana/Chicano Studies	1.875
Chinese (East Asian Languages and	. Las
Cultures)	. L&S
Classical Civilization (Classics)	1.85
Communication	
Community Development	. Las
(Human & Community Development)	A&ES
Community Nutrition (Nutrition)	
Comparative Literature	1.875
Computer Science	
Construction Engineering and	. LCC
Management (Civil Engineering)	FNGR
Contemporary Leadership	A&FS
Dramatic Art (Theatre and Dance)	LATS
East Asian Studies	I & S
Economics	
Education	. 30E
Agricultural Engineering)	
Emanus Dalias	ENGR
Energy Policy	LINGK
English	. L@5
Environmental Geology (Geology)	. L@S
Environmental Horticulture (Plant Sciences)	A&FS
CETAILL SCIENCES (ACCES

Environmental Policy Analysis & Planning
(Environmental Science and Policy) A&ES
$Environmental\ Toxicology \dots \dots A\&ES$
Evolution, Ecology and Biodiversity $\ldots\ldots$ CBS
Exercise Biology (Neurobiology, Physiology, and Behavior)
Fiber and Polymer Science (Textiles and
Clothing)
Film Studies L&S
Food Service Management (Nutrition) A&ES
Forensic Entomology (Entomology) A&ES
FrenchL&S
Fungal Biology and Ecology
(Plant Pathology)
Geographic Information Systems (Biological
& Agricultural Engineering) A&ES
Geographic Studies (Environmental
Design)
GeologyL&S
Geophysics (Geology) L&S
German L&S
Global and International Studies
(Humanities) L&S
Greek (Classics) L&S
HistoryL&S
History and Philosophy of Science (Science
& Technology Studies)L&S
Human Development (Human & Community
Development)
Human Physiology (Neurobiology, Physiology,
and Behavior)
$Human \ Rights \ (Religious \ Studies) \ldots \ldots L\&S$
Hydrology (Land, Air, and Water
Resources)
Insect Biology (Entomology) A&ES
Insect Ecology and Evolution
(Entomology) A&ES
International Agricultural Development
(Human & Community Development) A&ES
International Science Studies (Land, Air, and
Water Resources)
Italian L&S
Japanese (East Asian Languages and
Cultures) L&S
$Jewish \ Studies \ (Humanities) \ \dots \dots L\& S$
Landscape Restoration (Plant Sciences). . A&ES
Latin (Classics)L&S
Latin (Classics)L&S Latin American and Hemispheric StudiesL&S
Latin (Classics)L&S

Luso-Brazilian Studies (Spanish and
Portuguese) L&S
Managerial Economics (Agricultural and
Resource Economics)
Materials Science ENGR
MathematicsL&S
Medical–Veterinary Entomology
(Entomology)
Medieval and Early Modern Studies L&S
Middle East/South Asia Studies L&S
Music L&S
Native American Studies L&S
Nematology
Neuroscience (Neurobiology, Physiology, and
Behavior) CBS
Nutrition and Food (Nutrition) A&ES
Nutrition Science (Nutrition) A & ES
Oceanography (Geology) L&S
Optical Science & Engineering ENGR
Philosophy L&s
Physics L&s
Plant Biology CBS
Political Science L&S
Precision Agriculture (Biological
and Agricultural Engineering)A&ES
Professional Writing (University Writing
Program) L&s
Psychology L&S
Quantitative Biology and Bioinformatics
(Biological Sciences) CBS
Religious Studies L&S
Russian L&S
Science and Society
Sexuality Studies L&S
Social and Ethnic Relations (African American
and African Studies, Asian American Studies,
Native American Studies, Women and Gender
Studies) L&S
Sociology L&S
Soil Science (Land, Air, and Water
Resources)
SpanishL&S
Statistics L&S
Technology Management
Textiles and Clothing
War-Peace Studies (International
War-Peace Studies (International Relations)L&S
Watershed Science (Land, Air, and Water
Resources)
Wildlife, Fish and Conservation Biology . A&ES
Women's Studies L&TS
vyomens singles TATS



INTRODUCTION

INTRODUCTION

Telcome to UC Davis. Founded as the University Farm amid the fertile fields of the state's Central Valley, UC Davis initially emerged as an acknowledged international leader in agricultural, biological, biotechnological and environmental sciences and has now gained similar recognition for excellence in the arts, humanities, social sciences, engineering, education, health sciences, law and management. U.S. News & World Report ranks UC Davis 9th among public universities nationally and the campus is among a select group admitted into the prestigious Association of American Universities (AAU). Membership in this group of 59 institutions of higher learning is by invitation only.

The campus owes much of its strength to its deep traditional roots in agriculture and the impressive diversity of academic programs that emerged from this foundation. A distinguished faculty of scholars and scientists, a treasured sense of community and a dedication to the land-grant values of creative, responsive and innovative teaching, research and public service are hallmarks of UC Davis, as is interdisciplinary collaboration; many faculty hold cross-departmental appointments and students are challenged to explore the relationships between fields of study.

THE UNIVERSITY OF CALIFORNIA

UC Davis is one of 10 campuses of the University of California, which was chartered as a land grant college in 1868 and has become the country's premier system of public higher education. Together, the campuses have an enrollment of more than 200,000 students, with more than 1.4 million alumni living and working around the world. Some 150 laboratories, extension centers, research and field stations strengthen teaching and research while providing public service to California and the nation. The collections of the more than 100 UC campus libraries are surpassed in size in the United States only by that of the Library of Congress.

A Place for Learning

Providing a rich and challenging learning experience for undergraduate and graduate students is critical to UC Davis' mission and is a cherished commitment of the campus. Several programs support this aim, including a \$35,000 prize awarded to a faculty member each year by the UC Davis Foundation in recognition of outstanding undergraduate teaching and scholarly achievement and a campuswide Davis Honors Challenge program through which students elect special courses and have closer contact with faculty.

UC Davis offers more than 100 undergraduate majors and 86-plus graduate programs in the College of Agricultural and Environmental Sciences, the College of Biological Sciences, the College of Engineering and the College of Letters and Science. UC Davis' six professional schools—the School of Education, the School of Law, the Graduate School of Management, the School of Medicine, the Betty Irene Moore School of Nursing, and the School of Veterinary Medicine—are a combination unique within the University of California system.

A Place for Discovery

Research is an integral part of teaching at UC Davis. Faculty members share their research findings in the classroom and students learn firsthand about discovery while working with professors in the laboratory and field. A number of undergraduate research pro-

grams offer students the opportunity to work on a research project in a faculty laboratory, in some cases as early as their freshman year.

Research at UC Davis supports California's economic, intellectual and social development. The campus's varied research programs explore and seek solutions to today's critical issues in areas such as agriculture, resource management, the environment, health, medicine, engineering, business, the economy and public policy. UC Davis scholars also explore the intellectual frontiers of the physical, biological and social sciences, the humanities and the arts.

The campus's reputation has attracted a distinguished faculty of scholars and scientists in all fields. UC Davis ranks 10th in research funding among public universities in the United States, receiving more than \$682 million in 2008-2009.

Life in Davis

Life at UC Davis is as diverse as the members of our university community. Students enjoy sports, community internships, public service, outdoor activities, concerts and clubs. And, through running several key campus services and sharing their opinions with leadership, they are integral players in the life of the institution.

In 2007, UC Davis made the transition to Division I of the National Collegiate Athletic Association. UC Davis sponsors 13 varsity sports for women and 9 for men. Thirty-six club sports, organized by students, compete against other area colleges and amateur clubs are recreational and focus on skill development and social interaction. Intramural sports annually draw some 14,500 students who participate in 57 different men's, women's and coed activities.

Some 70 percent of UC Davis students interested in gaining work experiences participate in internships locally, nationally and globally through the campus's Internship and Career Center, among the largest campuswide academic internship programs in the country. UC Davis is known for its student-run facilities; the Coffee House, the radio station KDVS and the Unitrans bus service provide paid employment and real-world experience to hundreds of students each year.

A cultural center in the region, the Robert and Margrit Mondavi Center for the Performing Arts features internationally known artists and speakers and showcases offerings of the university's music and theatre and dance departments. Museums and galleries-all 10 of them-house valuable teaching, research and general interest collections that range from the Bohart Museum of Entomology's insects to contemporary Native American art at the C.N. Gorman Museum.

Through the Campus Community Book Project, faculty, students and staff each year read a book that challenges their own assumptions as a way to create a better sense of community. Cultural days held each spring celebrate Native American, Asian Pacific, African American, Hispanic and Latino, and mixed heritage.

A city of more than 65,000 people, Davis is known as an environmentally aware, physically fit and socially innovative community. The city was named best bicycle community in the U.S. by the League of American Bicyclists (the only city ever to receive platinum recognition) and has more than 103 miles of dedicated bike lanes and paths and nearly 500 acres of parks and greenbelts. Davis' proximity to Sacramento, the state's capital, to Lake Tahoe

and to the San Francisco Bay Area makes it easy to take advantage of big-city attractions while enjoying the lifestyle of a university town.

Davis offers high-performing K-12 schools, cultural amenities for a variety of tastes and plentiful recreational activities. A twice-weekly farmers market offers a variety of locally grown produce, flowers and fresh-baked goods.

VISITING THE CAMPUS

Visitor Services Office Buehler Alumni and Visitors Center (530) 752-8111; http://visit.ucdavis.edu/

Saturday tours depart from the Buehler Alumni and Visitors Center at 11:30 a.m. and various other times during peak recruitment seasons. Campus is closed on Sundays. Weekday tours depart at 10 a.m. and 2 p.m (PST). Register for tours one week in advance by calling (530) 752-8111 or at http://visit.ucdavis.edu. If you have questions about application procedures or entrance requirements, write or visit Undergraduate Admissions in 178 Mrak Hall.

THE UNDERGRADUATE COLLEGES

The College of Agricultural and Environmental Sciences

College Office 150 Mrak Hall (530) 752-0108; http://www.caes.ucdavis.edu

The College of Agricultural and Environmental Sciences offers a diverse program of majors and courses and is committed to education that emphasizes a spirit of discovery. Based on the premise that tomorrow's citizens will need to anticipate, understand and solve emerging societal problems and contribute to the discovery and application of new knowledge, the college fosters:

- Critical thinking and an appreciation for diversity in thought and approaches to problem solving
- An ethos of lifelong learning—of teaching oneself and others while confronting challenges and solving problems
- An ability to move beyond either/or thinking and to pursue innovative and integrative understanding of the agricultural sciences, environmental sciences and human sciences
- Intellectual skills that prepare individuals to secure a life-affirming physical and cultural environment based on sound, respectful management of resources
- A commitment to serve the public with informed and openminded dedication to understanding, critiquing and addressing complex societal needs and interests

The college is proud of its rich agricultural history. From this foundation, it has expanded its educational offerings to encompass programs that highlight interconnections among the environment, plant and animal sciences, biological sciences and human sciences. Through a wide array of major programs, the college prepares high-potential students for advanced studies in diverse disciplines

and leadership in such arenas as public policy; research and development; managerial and natural resource economics; agricultural systems; environmental protection, safety and design; human nutrition, health and development; and the food, fiber, textile and apparel industries.

Undergraduate students enjoy early contact with faculty advisers, graduate students and postgraduate researchers, enriching and broadening the educational experience of all.

Several levels of academic advising are available that are designed to enhance your undergraduate experience. Advisers help you plan your courses, meet degree requirements and take maximum advantage of the resources available at UC Davis. You are encouraged to meet regularly with your assigned faculty adviser and with the Advising Associates and departmental peer advisers. Through a shared commitment to education for service to society, college faculty, staff and students work together to improve the relationship between humanity and the natural world.

The College of Biological Sciences

Dean's Office 202 Life Sciences (530) 752-0410; http://biosci.ucdavis.edu

The mission of the College of Biological Sciences is to prepare students to fully engage and actively participate in all areas of the exciting and rapidly expanding field of biology. Courses offered by the college span the basic biological disciplines of biochemistry, behavior, cell biology, evolution, ecology, genetics, physiology and neurobiology and apply these concepts to the study of microbes, plants and animals ranging from genetic model organisms to humans. Recent additions to the curriculum, including courses in genomics, bioinformatics and computational biology, reflect the profound changes sweeping biology as new technologies enable new areas of research.

Coursework in the college's majors is rich in hands-on laboratory instruction as well as lectures and seminars. Every department in the College offers laboratory courses in the Sciences Laboratory Building—a state-of-the-art facility featuring advanced instrumentation and a student-friendly environment. In addition, many students in the college participate in laboratory research and internships that enable them to bridge classroom experiences to life beyond the university.

Biology is integral to a multitude of career options. Whether interested in a professional career in the health sciences, research, education, environmental work, business, law, administration, pharmaceutical sales or communications, students in the College of Biological Sciences receive the attention and preparation they need to excel in their chosen field.

To learn more about the nine majors offered through the College of Biological Sciences, see our website at http://biosci.ucdavis.edu, select Students, then Undergraduate Students, and then select Learn about the Majors Offered.

University of California, Davis Principles of Community

THE UNIVERSITY OF CALIFORNIA, DAVIS, is first and foremost an institution of learning and teaching, committed to serving the needs of society. Our campus community reflects and is a part of a society comprising all races, creeds, and social circumstances. The successful conduct of the University's affairs requires that every member of the University community acknowledge and practice the following basic principles:

WE AFFIRM THE DIGNITY inherent in all of us, and we strive to maintain a climate of justice marked by respect for each other. We acknowledge that our society carries within it historical and deep-rooted misunderstandings and biases, and therefore we will endeavor to foster mutual understanding among the many parts of our whole.

WE AFFIRM THE RIGHT of freedom of expression within our community and also affirm our commitment to the highest standards of civility and decency towards all. We recognize the right of every individual to think and speak as dictated by personal belief, to express any idea, and to disagree with or counter another's point of view, limited only by University regulations governing time, place, and manner. We promote open expression of our individuality and our diversity within the bounds of courtesy, sensitivity, and respect.

E CONFRONT AND REJECT all manifestations of discrimination, including those based on race, ethnicity, gender, age, disability, sexual orientation, religious or political beliefs, status within or outside the University, or any of the other differences among people which have been excuses for misunderstanding, dissension, or hatred. We recognize and cherish the richness contributed to our lives by our diversity. We take pride in our various achievements, and we celebrate our differences.

E RECOGNIZE that each of us has an obligation to the community of which we have chosen to be a part. We will strive to build a true community of spirit and purpose based on mutual respect and caring.

The "Principles of Community" were prepared and adopted after extensive discussion within the campus community about the need for a statement that reflects UC Davis' commitment to a learning environment characterized by diversity, understanding and the acceptance of all people. This statement of common principles was published on April 20, 1990, carrying the endorsement of Chancellor Theodore L. Hullar and the leadership of the Davis Division of the Academic Senate, the Academic Staff Organization, the UCD StaffAssembly, the UCDMC Staff Assembly, the Associated Students of UC Davis (ASUCD), and the Graduate Student Association.

Mission Statement:

Philosophy of Purpose

UC Davis, a foremost public research university, is committed to advancing the human condition by improving the quality of life throughout California, across the nation and around the world. Since its founding in1908, UC Davis has been dedicated to the land-grant tradition, which holds that the broad purpose of a public university is service to people and society. For more than a century, we have prepared and inspired students, identified some of society's most pressing problems, and worked to shape solutions to those very challenges. As we look to the future, the university's mission reflects those achievements and our enduring responsibility.

That mission is to generate, apply and share knowledge to improve quality of life throughout our communities and around the globe. To that end, UC Davis is committed to developing and sustaining leading programs in the arts, humanities, biological and physical sciences and social sciences—disciplines at the core of all universities; agricultural and environmental disciplines and engineering; and professional studies in education, law, management, medicine, nursing, and veterinary medicine.

In all of these programs, the campus integrates three purposes: teaching students as a partnership between faculty mentors and young scholars; advancing knowledge and pioneering studies through creative endeavors, research and scholarship; and applying that knowledge to address the needs of the region, state, nation and globe.

Several guiding principles reinforce the campus's dedication to excellence in such critical areas as student learning, the breadth and depth of a liberal arts education, academic freedom, shared governance with faculty, and the advancement of the campus community.

Our undergraduate education couples the central elements of a liberal education with considerable opportunities for personal development and academic enrichment through programs for undergraduate research, internships, and student life. Through our graduate programs, UC Davis is on a course to redefine the role of a leading public research university, enhancing our wide range of specialized academic fields with the distinctive graduate group structure, which permits students to pursue lines of inquiry that cross traditional disciplinary lines.

With our academic strengths and land-grant mission in mind, and the aspiration of being a transformative, world-class university at heart, UC Davis abides by the following commitments:

- Inspire and support excellence, and the success and engagement of our students, faculty, staff and alumni to learn, experiment and achieve to their full individual and collective potential.
- Foster a bold and innovative spirit in our teaching, research and public service.
- Expand our land-grant mission, so that our pursuit of knowledge and our engagement with partners will serve the state and nation, and address the emerging challenges of an interdependent, global society.
- Affirm our abiding commitment to diversity, as represented in our community and in our perspectives, as foundational elements of our excellence. We shall celebrate our cultural and intellectual richness and be resolute in advancing inclusion and equity in our community.
- Partner in economic development with those individuals, foundations, government entities, businesses and philanthropic organizations that are actively engaged in improving the economy of the region, state and nation, and the quality of life for all.
- Promote a community characterized by respect, integrity, openness and responsiveness, and by consultation and collaboration, in which we are invested in our collective welfare and the responsible, sustainable stewardship of our resources.

The life of UC Davis extends beyond teaching and study to service to the region, state, nation and the world, through cooperative extension to agriculture and education; the multifaceted UC Davis Health System; educational programs of UC Davis Extension; faculty, staff and student volunteerism; and athletic and cultural programs for the campus and community. Proximity to the state capital gives urgency and opportunity to outreach to and collaboration with state agencies and the Legislature.

Above all, UC Davis remains committed to its human values: caring and personal relationships, and collaborative and thoughtful work. These special qualities are sustained by intellectual strength within a collegial community whose members share a deep desire for teaching and learning, and an abiding commitment to discovering and applying new knowledge for one principal purpose: service to society.



Educational Objectives for Students

The Educational Objectives for Students were adopted by the Academic Senate in April 2002. They articulate our aspirations for student learning; help to establish campus priorities and guide decision making related to student development; and guide academic programs in the review of how their classes and course requirements interact with the goals to demonstrate educational effectiveness.

• Develop effective communication skills:

Written, oral, interpersonal, group

• Develop higher cognitive skills:

Critical thinking, creativity, analytical ability

• Cultivate the virtues:

Ethics, responsibility, honor, tolerance, respect for others, empathy

Develop focus and depth in one or more disciplines

• Develop leadership skills:

Ability to stimulate and direct collaborative learning and collaborative action

• Develop a global perspective:

Broad intellectual and cultural experience through active engagement, an understanding of the interactions among the individual, society, and the natural world

• Prepare for lifelong learning:

Independent thinking and learning, learning to find information, asking the right questions

The College of Engineering

Dean's Office 1050 Kemper Hall (530) 752-1979; http://engineering.ucdavis.edu http://www.facebook.com/UCDEngineering

The College of Engineering at UC Davis is among the top engineering colleges in the nation.

With a strong record of academic excellence, a rich tradition of interdisciplinary research and a diverse and distinguished faculty, the College's undergraduate program has earned a place among our nation's top twenty public undergraduate colleges of engineering and among the top forty public university graduate engineering programs.

With an enrollment of 3,460 undergraduates and 1,250 graduate students, the College is one of the largest undergraduate engineering colleges in the University of California system.

We have 201 engineering faculty, with 18 current and emeriti members named to the National Academies of Engineering, Science and Medicine.

Our eight departments offer the greatest number of ABET accredited majors (12) in the University of California system.

The Engineering Accreditation Commission of ABET (http://www.abet.org) accredits the following programs:

- Aerospace Science and Engineering
- Biochemical Engineering
- Biological Systems Engineering
- · Chemical Engineering
- · Civil Engineering
- · Computer Engineering
- Electrical Engineering
- Electronic Materials Engineering (not accepting new students)
- Materials Science and Engineering
- Mechanical Engineering
- Optical Science and Engineering (not accepting new students)
 The Engineering Accreditation Commission and the Computing

Accreditation Commission of ABET accredit the following program:

• Computer Science and Engineering

The following programs are not accredited by a Commission of ABET:

- Biomedical Engineering
- Chemical Engineering/Materials Science and Engineering
- Mechanical Engineering/Materials Science and Engineering

The College maintains a long-standing commitment to undergraduate students, preparing them to contribute to the engineering professions as well as ongoing engineering research. To that end, our academic programs balance the fundamentals of engineering theory with practice, visionary research with practical application—preparing students for entry into engineering practice and graduate-level research.

Undergraduate research experiences and mentoring services smooth the transition from undergraduate to graduate study at UC Davis. Undergraduates are able to intersect with faculty and graduate students from ten (10) graduate engineering programs as well as researchers from a broad spectrum of disciplines university-

wide. Award-winning faculty researchers strive to develop more effective, real world solutions to society's most complex problems in the uniquely friendly, open society of collaborative, cross-disciplinary and rigorous scholarship for which UC Davis is widely known. Undergraduates have opportunities to be contributing members of this rich learning environment.

In the proud tradition of America's great land-grant research universities, the UC Davis College of Engineering integrates teaching, research and service to society. While advancing the leading edge of engineering knowledge, the College trains the next generation of engineers who will make a difference in our world.

The Department of Applied Science instructs students in broad areas of scientific technology and offers an innovative program for undergraduates in optical science and engineering that prepares students for careers in industry, national research laboratories to pursue graduate work leading to advanced degrees.

The Department of Biological and Agricultural Engineering combines study in engineering with instruction in the biological sciences to solve challenging environmental and technical problem.

The Department of Biomedical Engineering educates students in a highly interdisciplinary combination of the biological sciences and engineering as this combination applies to medicine.

The Department of Chemical Engineering and Materials Science offers curricula integrating knowledge of chemistry, biological sciences or materials science and engineering that enable students to solve problems in both current and future manufacturing technologies or to analyze the structure, properties and behavior of materials.

The Department of Civil and Environmental Engineering educates students to plan and design safe and sustainable infrastructure systems that have a direct impact on the quality of human life and on health and human productivity.

The Department of Computer Science offers programs in all aspects of design and use of computer hardware and software systems. The department also plays a significant service role for programs throughout the campus.

The Department of Electrical and Computer Engineering offers programs in research and education crucial for the continued success of high technology industries in California and the nation, preparing students to design, analyze and use electronic and computer systems effectively.

The Department of Mechanical and Aerospace Engineering educates students in the design and manufacture of complex engineering systems for transport, industry or energy and to design, manufacture and operate aircraft and aerospace structures.

Every effort has been made to provide engineering students with the maximum flexibility consistent with rigorous professional education standards. The key to flexibility is academic advising. You are expected to attend the New Student Orientation program, held the summer before your first quarter on campus. New Student Orientation sessions can give you the information you need to make your academic experience both rewarding and effective. As an incoming student, you will be given the name and office hours of your departmental staff adviser; you should arrange to meet with your adviser before you register for courses for the first time. Academic and peer advisers in the Undergraduate Advising Office, in 1050 Kemper Hall, supplement departmental advisers.

Undergraduate education in engineering at UC Davis serves as a sound basis for beginning professional practice in engineering design and development, as a preparation for careers in corporate or governmental operations and as a foundation for graduate study. To these ends, the college emphasizes fundamental sciences to give students the maximum postgraduate flexibility. In order to remain relevant in a quickly changing technical world, engineering education must be based on fundamentals or rapidly become obsolete.

Engineers will continue to face new challenges in the race to improve the quality of life for everyone and keep our state and nation competitive in the global marketplace.

As part of one of the nation's 76 land-grant institutions, UC Davis Engineering's mission is to help maintain the United States' technical leadership and advance technology for the benefit of everyone.

The College of Letters and Science

Undergraduate Education and Advising Office 200 Social Sciences and Humanities Building (530) 752-0392; http://www.ls.ucdavis.edu

The College of Letters and Science provides students with the opportunity to actively engage the central academic disciplines of the university. The largest of the four undergraduate colleges at UC Davis, the College of Letters and Science offers the majority of the campus's general education courses, more than 50 major programs of study and thousands of courses per year across a broad range of subject areas. Its nearly 500 faculty members are organized into three Divisions—Humanities, Arts and Cultural Studies; Mathematical and Physical Sciences; and Social Sciences. The college confers Bachelor of Arts (A.B.), Bachelor of Science (B.S.) and Bachelor of Arts and Science (B.A.S.) degrees.

The College of Letters and Science is a community of scholars and students sharing a commitment to liberal education rather than to specialized, vocationally-oriented training. The college exposes you to the worlds of human experience, of ideas, of artistic accomplishments and of matter and things. Within this curriculum you are able to explore a variety of academic fields, engage in the pursuit of fundamental knowledge and gain the capacity for independent study and thought. By learning to think carefully and critically, you will be able to continue the ongoing process of education that begins in the classroom but continues over a lifetime. You will have learned how to learn—the ultimate objective of a liberal arts education.

The educational goals of the college are reflected in the three primary groups of requirements established by the faculty: the English Composition Requirement, the Foreign Language and Area Requirements and the Major Requirements.

The English Composition Requirement ensures that you are well versed in written communication skills.

The Foreign Language and Area Requirements provide you with a broad background of knowledge, guide you in an exploration of the interdependencies of knowledge and acquaint you with other cultures.

The College of Letters and Science acknowledges the value of language learning and encourages students to acquire proficiency in a foreign language before graduating from UC Davis. The goals of language learning are the following: communicating complex ideas in the target language; acquiring understanding of a variety of cultural perspectives and differences; fostering intercultural communicative competence; gaining access to cultural production from another time and place; enhancing knowledge of other disciplines through the target language; recognizing the nature and structure of languages, including one's own; and developing the capacity to participate actively in multilingual communities both at home and abroad.

The Major Requirements provide you with intellectual depth and competence in a selected area of study.

The college has a well-developed system of faculty advisers, professional staff advisers and student peer advisers who are available for individual consultations with undergraduates in a variety of settings, from the college undergraduate education and advising office to departmental offices to campus residence halls.

The strength of the college lies in the faculty's commitment to advancing the frontiers of human knowledge through research, artistic expression and other creative endeavors and to the effective communication and application of that knowledge through teaching and public service. Together, faculty and students in the College of Letters and Science create a climate that enables students to achieve their highest potential.

GRADUATE STUDY

Office of Graduate Studies 250 Mrak Hall (530) 752-0650; http://gradstudies.ucdavis.edu

Graduate students at UC Davis have the opportunity to work with and learn from accomplished faculty, recognized for their contributions to research in their fields. The Office of Graduate Studies oversees 90 graduate programs leading to master's and doctoral degrees, which together enroll more than 4,000 graduate students. Many graduate programs are offered through graduate groups, an interdisciplinary concept that allows students to study and work with faculty in interrelated areas to broaden their intellectual experiences; see Graduate Studies, on page 110.

PROFESSIONAL STUDY

UC Davis has six professional schools-the School of Law (J.D.), the School of Medicine (M.D.), the School of Veterinary Medicine (D.V.M., M.P.V.M.), the School of Education (M.A., Ph.D., Ed.D.), the Betty Irene Moore School of Nursing (M.S., Ph.D.), and the Graduate School of Management (M.B.A.). These schools and programs are described in later chapters.

ACADEMIC RESOURCES

The University Library

(530) 752-6561; http://www.lib.ucdavis.edu

The University Library at UC Davis is one of the premier research libraries in North America. In addition to Peter J. Shields Library, there are three other University Library facilities: the Physical Sciences & Engineering Library, the Loren D. Carlson Health Sciences Library, and the F. William Blaisdell Medical Library in Sacramento. The combined collections of the various University Library facilities total more than 3.9 million volumes. An extensive variety of journal titles, government documents, maps, microfilms, media, and other formats are also part of the collection. The law library, administered by the School of Law, is located in King Hall.

Shields Library houses the collections in the humanities, arts, social sciences, biological sciences, agricultural sciences, mathematics and computer science. The Physical Sciences & Engineering Library collections support teaching and research in engineering, chemistry, geology and physics. The Carlson Health Sciences Library serves the Schools of Medicine and Veterinary Medicine and programs in public health. The Blaisdell Medical Library at the UC Davis Medical Center provides a clinical collection serving the hospital and clinics as well as the Schools of Nursing and Medicine.

The University Library's HARVEST catalog identifies campus library resources, while the MELVYL online catalog identifies the library collections at UC Davis and the other nine UC campuses. The HARVEST catalog, MELVYL and other online resources, including full-text journals can be searched in the libraries and remotely via the Internet. Research workstations are available for patron use in all library facilities. The campus wireless network is available within all libraries and connects authorized laptop users to library and campus resources and services.

Information about library services, full text electronic books and journals, and important subject-specific Internet sites are available at the Library's website. The Library provides classes on the use of the HARVEST catalog, MELVYL and subject specific electronic journals and databases. Librarians are available for consultation to effectively and efficiently identify and use information resources for research projects and dissertations.

UC Davis Arboretum

Arboretum Headquarters (530) 752-4880; http://arboretum.ucdavis.edu

The 95-acre UC Davis Arboretum is a living museum with a documented collection of more than 22,000 trees, shrubs and perennials from Mediterranean-climate areas throughout the world, displayed in a series of gardens along Putah Creek's historic north fork. The Arboretum has winding paths for walkers, joggers, or bicyclists, benches where visitors can sit and enjoy the view, and picnic tables for casual gatherings. Demonstration gardens of drought-tolerant flowering perennials and collections of oaks, acacias, conifers, and eucalyptus, along with trees native to the site, are resources for teaching and research. Outstanding plant collec-

tions include Shields Oak Grove, Mary Wattis Brown Garden of California native plants, Ruth Risdon Storer Garden: A Valley-Wise Garden, T. Elliot Weier Redwood Grove, and Arboretum Terrace home demonstration garden. Arboretum education programs promote sustainable and environmentally-appropriate gardening practices. Internships are available in nursery management, land-scape design and maintenance, environmental education, Integrated Pest Management (IPM) and Geographic Information Systems (GIS).

Information and Educational Technology

IT Express 182 Shields Library (530) 754-HELP (4357); ithelp@ucdavis.edu

Information and Educational Technology (IET) provides a wide range of services and support to undergraduate and graduate students. For more information, and to access those services, see the online Student Computing Guide at http://studentcomputing.ucdavis.edu/.

Taking Care of Business Online

- Enroll in classes, add or drop courses, view and print your class schedule
- Access course grades
- · View and print your unofficial academic record
- Check balances, view bills, make payments, and manage your student account
- · Apply for and view financial aid awards
- Chart and plan your degree; see http://sisweb.ucdavis.edu/
- Make campus bookstore purchases; see http:// bookstore.ucdavis.edu/

Learning and Teaching with Technology

- Manage coursework and collaborate online with SmartSite.
 You'll be able to communicate online with your instructors and
 fellow students; collaborate on papers and projects; manage
 your assignments and study with classmates; or just set up your
 own project site; see http://smartsite.ucdavis.edu
- Searchable electronic databases. Find them at Shields Library.
 You'll have free, easy access from on- or off-campus; see http://www.lib.ucdavis.edu
- iTunes, YouTube and podcasting. Digital audio recording equipment is installed in several lecture halls, and portable digital recorders are available for loan from IET-Academic Technology Services (Surge II). Audio and video podcasting services are available to all instructors and campus groups; see http://itunes.ucdavis.edu http://itunes.ucdavis.edu
- Classroom technology. All 128 general assignment classrooms have audio, network and projection capabilities, and include a projector, CD player, DVD player, VCR, built-in microphone and laptop hook-up. Classrooms with more than 50 seats also have assistive hearing systems; see http://iet.ucdavis.edu/rooms/classrooms.cfm

The Essentials: Computers, E-mail, Software, Labs

• **E-mail.** Every student has a free Gmail-based e-mail account; see http://davis.ucdavis.edu

Computer purchases. Our recommendations can help guide your purchases. Financial aid is available for qualified applicants; see http://computerownership.ucdavis.edu. To buy computers and accessories at the campus bookstore, see http://bookstore.ucdavis.edu/

- Software. Free licenses for Sophos anti-virus and Endnote bibliographic software. Other programs are available free of charge or at a discount; see http://my.ucdavis.edu/software
- **Multimedia.** You'll want to check out the video, audio, and graphic design software, as well as printers, scanners, etc., in the IET Media Lab; see http://hartmedialab.ucdavis.edu
- **Computer rooms.** There are 12 computer classrooms and six computer labs distributed around the campus, providing access to PCs, Macs and printing services. Some labs have both Mac and PC computers, and many have extended hours during the week; see http://iet.ucdavis.edu/rooms
- **Printing.** All computer rooms are equipped with printers, and six rooms also have color printing; see http://clm.ucdavis.edu/rooms/printing. You may also send a print job from your computer, over the Internet, to any printer in the five open-access computer labs; see http://wirelessprinting.ucdavis.edu

Networking

- Wireless Internet. MoobilenetX is the campus secure wireless network. You can access it throughout much of the central campus, including Shields Library and the Memorial Union. For access requirements and instructions, see http://wireless.ucdavis.edu
- **Wired Internet.** You can also access the Internet by connecting to open-access network access modules (NAMs), located in many study areas and libraries. Students living on campus can connect directly to the Internet from their rooms by using ResNet, the high-speed residence hall network. Each residence hall also has a computer center with computers, printers, and scanners; see http://www.housing.ucdavis.edu/computers/

Security

Computer security. Blocking computer viruses and preventing unauthorized access to computing systems are important parts of campus computing life. Keep up with campus security efforts, review instructions on how to maintain your computer system, and guard against security problems, including compromised passwords and identity theft; see http://security.ucdavis.edu.

Technical Support

IT Express. Free computing help with almost anything related to campus tech, call (530) 754-HELP (4357) or see http://itexpress.ucdavis.edu.

Computer maintenance & repair. Consulting and repair services (fees apply) for help with viruses and malware; software installation, patching and maintenance; data recovery; etc.; see http://itps.ucdavis.edu/.

All information above is current as of spring 2012. For the latest updates and tech news, please see the Student Computing Guide at http://studentcomputing.ucdavis.edu/.

RESEARCH PROGRAMS AND RESOURCES

Organized Research Units

Organized Research Units (ORUs) are campuswide interdisciplinary research programs that further the university's missions of teaching, research and public service, but do not offer courses of instruction. Members of an ORU come from more than one department and normally from more than one school, college division.

Air Quality Research Center

3047-3053 Bainer Hall (530) 754-8374 Anthony Wexler, Director; aswexler@ucdavis.edu /http://airquality.ucdavis.edu/

Air pollution adversely affects health, welfare and ecosystems directly or indirectly. Atmospheric pollutants reside in either the gas phase, such as ozone or benzene, or the particulate phase, such as soot or sulfuric acid. Researchers at UC Davis employ measurements in the field and in laboratories, theoretical approaches, mathematical models, and policy analysis to tackle state, federal and intercontinental air quality problems. The center is composed of over 60 faculty and research staff from six schools and colleges across campus, so takes a broad, interdisciplinary approach to air quality problem solving.

Bodega Marine Laboratory and Reserve

Bodega Marine Laboratory PO. Box 247 Bodega Bay, CA 94923 (707) 875-2211; Fax (707) 875-2009 ucdbml@ucdavis.edu; http://bml.ucdavis.edu

The Bodega Marine Laboratory is dedicated to research and teaching in marine science. Research areas include: Ecology and Evolution—invasive species, biodiversity, community ecology, etc., Coastal Oceanography—upwelling, estuaries and land runoff, nearshore hydrodynamics, ocean observing, Ocean Healthdevelopmental and reproductive toxicology, shellfish health, environmental assessment, Physiology—comparative physiology and biochemistry, reproductive physiology, seagrass and seaweed physiological ecology, Conservation—fisheries management, marine protected areas, endangered species restoration, Climate Change—ecological impacts, ocean acidification, paleoceanography). Well-equipped facilities feature running seawater in two classrooms and many laboratories, a marine science library, lecture hall, housing facilities, computer labs, state of the art microscopy imaging facility, experimental climate change facility, greenhouses, experimental freshwater system for anadromous/estuarine invertebrate and fish studies, network of automated environmental sensors on marine and terrestrial habitats, 42-foot research vessel and various small boats, and a dive locker and air station. Faculty teach a number of undergraduate and graduate courses during the academic year and summer session. The laboratory is located in Bodega Bay, Sonoma County, 100 miles west of Davis.

The Bodega Marine Reserve, part of the UC Natural Reserve System, is 362 acres of remarkably diverse habitats, including an excellent rocky intertidal zone, sand beaches, saltmarsh, lagoon tidal flats, freshwater marsh, coastal prairie and dunes. The reserve also administers adjacent subtidal sand and rock habitats in a marine life refuge. Areas of research include a broad spectrum of field studies of plants and animals in coastal marine, intertidal and terrestrial ecosystems.

California National Primate Research Center

Primate Center (530) 752-0447; http://www.cnprc.ucdavis.edu

The California National Primate Research Center (CNPRC) investigates selected human health problems for which the nonhuman primate is the animal model of choice. Research programs include brain, mind and behavior, reproductive sciences and regenerative medicine, respiratory diseases, infectious diseases, immunology, stem cell biology, gene therapy, genetics and a variety of biomedical collaborative research projects. Self-sustaining breeding colonies of macaques are available for study of behavior and spontaneously occurring disorders.

Center for Health and the Environment

(530) 752-1340; http://che.ucdavis.edu/

The Center for Health and the Environment (CHE) coordinates and engages in interdisciplinary research on environmental agents, including chemicals and radiation, and health outcomes in humans, animals and other organisms. Researchers conduct epidemiologic studies in human populations, as well as experiments in whole animals, organisms, cells and molecules. Research on the development of agents for population control of humans and wildlife seek to mitigate the adverse effects of overabundance on the environment. Studies on toxic, radioactive, mutagenic, carcinogenic and teratogenic compounds are carried out in special animal holding facilities. Laboratories are equipped for studies in analytical chemistry, biochemical toxicology, cell and molecular biology, endocrinology, inhalation toxicology, morphology and reproductive and developmental biology. The Center houses a major university-wide program and federally funded center in occupational and agricultural medicine, nanotechnology and, a School of Medicine program in reproductive biology.

Crocker Nuclear Laboratory

 $(530)\ 752\text{-}1460;\ http://crocker.ucdavis.edu$

The Crocker Nuclear Laboratory is an interdepartmental laboratory for the application of nuclear science to a variety of disciplines, including air pollution and visibility, nuclear physics and chemistry, medical therapy with proton beams, material damage studies, and the effect of background and extraterrestrial radiation on electronic components.

Institute for Data Analysis and Visualization

2343 Academic Surge (530) 752-2387 Kenneth Joy, Director; kijoy@ucdavis.edu

The mission of the Institute is the integration of research efforts at UC Davis in data analysis and visualization. The Institute draws students and faculty from a variety of departments and colleges, allowing researchers to work together on real-world, applied problems that deal with the massive data analysis and visualization problems encountered in science, engineering, and other fields. The integration of the two fields, especially in biological applications of high throughput biological assay data such as gene expression arrays, proteomics, metabolomics and NMR spectroscopy, produce methods that impact a substantial number of scientific fields. In neuroscience, computer science, computational science, computational physics, and engineering applications, the Institute

contributes data exploration and problem-solving methods through visualization, computer graphics, data analysis, and expressive interfaces that enable discovery and analysis from massive information streams. The collaborative efforts of the faculty and students of the Institute enable the University to address a wide-variety of application areas and contribute methods that enable scientists and engineers to make decisions from their data.

Institute of Governmental Affairs

Robert Huckfeldt, Director 360 Shields Library (530) 752-2042; Fax (530) 752-2835; http://www.iga.ucdavis.edu

The Institute of Governmental Affairs (IGA) serves as a research base for social science faculty at UC Davis. IGA serves approximately 60 faculty from 10 campus departments as well as scholars visiting from throughout the United States and around the world.

Located in the core of the UC Davis campus, IGA houses eight formal research programs: Center for International Data; Center for State and Local Taxation; Center for the Evolution of the Global Economy; Conflict Processes Group; Economy, Justice and Society (EJS); Migration Dialogue; the Network Sciences Group; the Public Opinion Workshop, and the Rural Economies of the Americas Program (REAP).

Specialized services include grant advising, preparation and administration; research program development; library and data services; social science computing, programming and statistical consulting; seminar, workshop and conference organization; and much more. The institute sponsors an active public affairs program and enhances the education of students by providing research opportunities. IGA serves as the UC Davis liaison to the systemwide program, Institute on Global Conflict and Cooperation (IGCC) and the All-UC Group in Economic History.

Institute of Transportation Studies

2028 Academic Surge (530) 752-6548 Dan Sperling, Director; dsperling@ucdavis.edu http://www.its.ucdavis.edu

The Institute of Transportation Studies conducts multidisciplinary research on complex problems related to traffic congestion and local and global pollution and disseminates research results to the broader academic and professional community. Research priorities are travel behavior, alternative-fueled vehicle technology and policy, energy and environmental projects and advanced vehicle and highway systems. About 60 faculty members and 130 graduate students from more than 13 academic disciplines, including four Engineering departments, Economics, Environmental Science and Policy, Ecology, Agricultural and Resource Economics, and the Graduate School of Management, participate in the research activities of the Institute. The Institute administers a graduate program in Transportation Technology and Policy, and a number of research centers, including the U.S. DOT Sustainable Transportation Center (STC), the UC Davis Energy Efficiency Center (EEC), the UC Davis Plug-In Hybrid Electric Vehicle (PH&EV) Center, the Sustainable Transportation Energy Pathways (NextSTEPS) program, the UC Davis Western Cooling Efficiency Center, the China Center for Energy and Transportation, and the Urban Land Use and Transportation Center (ULTRANS).

Nanomaterials in the Environment, Agriculture and Technology (NEAT)

4415 Chemistry Annex (530) 752-3292 Alexandra Navrotsky, Director; anavrotsky@ucdavis.edu/http://neat.ucdavis.edu/

NEAT is a multidisciplinary research and education program which links the fundamental physics, chemistry, and engineering of small particles and nanomaterials to several challenging areas of investigation including (1) applications in ceramic, chemical, electronic, environmental, and agricultural technology, (2) environmental transport and transformation and resulting roles in environmental pollution and remediation, (3) interactions with the biosphere, especially microorganisms and (4) effects on health.

John Muir Institute of the Environment

Mark Schwartz, Director (530) 754-9135

The John Muir Institute of the Environment (JMIE) supports innovation and discovery aimed at solving real-world environmental problems. The institute's faculty are committed to strengthening the scientific foundation for environmental decision making through collective entrepreneurship, a team-oriented approach that recognizes the complexities of environmental problems and the societal context in which they occur. JMIE champions science and technological innovation, provides campus-wide leadership, hosts centers and projects, and seeds research and educational initiatives to solve real-world environmental problems. The institute links science and technology to policy by providing the intellectual setting for interactions between researchers, regulatory agencies, policy-makers and the public.

Program in International and Community Nutrition

Kathryn G. Dewey 3253 Meyer Hall (530) 752-1992; Fax (530) 752-3406; kgdeweykgdewey@ucdavis.edu http://picn.ucdavis.edu

Faculty members of the Program in International and Community Nutrition are studying the epidemiology and causal mechanisms of the major nutritional problems of human populations in low-income countries and in disadvantaged ethnic minority groups in the United States, with the ultimate objective of planning, implementing and evaluating programs to ameliorate these problems. Current areas of research include maternal and child nutrition, control of micronutrient deficiencies, determinants of food intake, nutrition and infection, nutritional assessment, and food and nutrition programs and policy.

ADDITIONAL RESEARCH CENTERS AND RESOURCES

Adult Fitness Program

UC Davis Sports Medicine Program (916) 734-6805

The UC Davis Adult Fitness Program is designed to help individuals improve their health and physical fitness to prevent disease and improve quality of life. Our team of exercise specialists includes sports medicine physicians, exercise physiologists and nutritionists trained by UC Davis Sports Medicine, Exercise Biology and Nutrition Faculty in exercise testing and prescription and sports nutrition. This program exists to provide a public health service to the university and surrounding communities; to provide clinical learning opportunities for UC Davis students; to provide opportu-

nities to study the benefit of exercise and proper nutrition in the prevention of disease and assist individuals in evaluating their progress through discounted repeat testing and evaluation.

Advanced Highway Maintenance & Construction Technology (AHMCT) Research Center

Academic Surge 1003 (530) 752-5981 Steve Velinsky, Director; savelinsky@ucdavis.edu Bahram Ravani, Director; bravani@ucdavis.edu http://www.ahmct.ucdavis.edu/

In cooperation with state, federal, and private agencies, the Center performs applied and basic research leading to the development of innovative technologies in the areas of highway and civil infrastructure construction, maintenance, and operations, and the ultimate deployment of these technologies. The focus is on safety, mobility, lean operations, reliability, and minimizing environmental impacts. To achieve this, we leverage and combine Advanced Automation and Robotics, Information Technology, Sensing and Mechatronics, Design and Sustainability, Life Cycle Analysis, and Advanced Communication and Computer Technologies.

We also help Caltrans access university and industry research, maintain a leadership position in maintenance and construction technology, access federal and pooled funds for research, test and evaluate new technologies, improve the Caltrans public image as a technology-oriented organization, and train students and professionals in transportation operations and technology.

Advanced Transportation Infrastructure Research Center Facility (ATIRC)

West Campus John Harvey, Director (UCPRC); jtharvey@ucdavis.edu

The UC Davis Advanced Transportation Infrastructure Research Center (ATIRC) project provides a facility for two research programs: the UC Pavement Research Center (UCPRC) and the Advanced Highway Maintenance and Construction Technology Research Center (AHMCT). Research at the UCPRC at ATIRC includes accelerated pavement testing of new types of materials and pavement structures using the Heavy Vehicle Simulators, laboratory specimen preparation and testing, and analyses. ATIRC houses the UC Davis staff of the UCPRC.

Agricultural Sustainability Institute

Thomas P. Tomich, Director 143 Robbins Hall (530) 752-3915; Fax (530) 752-2829; asi@ucdavis.edu/http://asi.ucdavis.edu/

The Agricultural Sustainability Institute (ASI) provides a hub that links initiatives and education in sustainable agriculture and food systems across all divisions of the College of Agricultural and Environmental Sciences at UC Davis, across the University of California, and with other partners across the state, nation, and planet. ASI includes:

- Advising and internship coordination for the UC Davis undergraduate major in Sustainable Agriculture and Food Systems
- UC Davis Student Farm
- UC Davis Russell Ranch Sustainable Agriculture Facility
- UC ANR statewide Sustainable Agriculture Research & Education Program (SAREP)
- The Inter-institutional Network on Food, Agriculture and Sustainability (INFAS), a national academic network

California Agricultural Experiment Station

College of Agricultural and Environmental Sciences (530) 752-1610

The California Agricultural Experiment Station has branches on the UC Davis, UC Riverside and UC Berkeley campuses. The UC Davis branch includes approximately 400 faculty and CE Specialists, mostly in the College of Agricultural and Environmental Sciences, but also in the College of Biological Sciences and the School of Veterinary Medicine. In addition to laboratory facilities, it has approximately 3,000 acres devoted to field research in the environmental and crop sciences, as well as facilities to support animal and long-term experimental research. The Experiment Station supports faculty in research involving agricultural production, food processing, nutrition, animal care and disease prevention, consumer sciences and community development and in natural resources and ecosystem science management, with an emphasis on maintaining and improving environmental quality of both natural and managed ecosystems.

Center for Advanced Laboratory Fusion Science and Engineering (CALFUSE)

Hertz Hall; Lawrence Livermore National Laboratory 1104 Engineering III; 3182-1209 Kemper; 160 Walker (530) 754-9069 Neville Luhmann, Director; ncluhmann@ucdavis.edu David Hwang, Director; dqhwang@ucdavis.edu http://calfuse.ucdavis.edu/

The purpose of Center for Advanced Laboratory Fusion Science and Engineering (CALFUSE) is to promote interaction between research and educational components, both within the University, and between the University, the National Laboratories, and, industrial laboratories. To accomplish this role, the Center requires a physical presence at the actual research sites. For this reason, the organizational centers of the ORP/ORU are co-located on the main UC Davis campus, and in Hertz Hall at the Livermore satellite campus. Fusion research is an extremely broad education and research field, encompassing topics that cut across numerous engineering, science, and policy disciplines. The initial set of topics includes plasma accelerators, high energy particle accelerators, plasma diagnostics (specifically, millimeter wave and Terahertz technology developments), advanced computing, advanced materials, and energy policy. The Center invites participation from all fields that may have relevance to fusion education and research.

Center for Biophotonics Science and Technology

2700 Stockton Blvd., Suite 1400 Sacramento, CA 95817 (916) 734-8600 Dennis Matthews, Director; dlmatthews@ucdavis.edu http://cbst.ucdavis.edu/

Research and development applications utilizing biophotonics-the science of using light to solve problems in biology and medicine. Applications of biophotonics range from using light to non-invasively measure blood oxygenation, identify cancer cells for diagnosis or guiding treatment, sequencing DNA, and developing superresolution light microscopes for studying the inner workings of cells

Center for Child and Family Studies

Center for Child and Family Studies (main office in West House) (530) 752-2888; http://ccfs.ucdavis.edu

The Center for Child and Family Studies (CCFS) houses the Early Childhood Laboratory (ECL), a research, teaching and demonstration laboratory of the Division of Human Development and Family Studies in the Department of Human and Community Develop-

ment. At the ECL, students enrolled in human development courses learn observational techniques and participate with peers, children, parents and professionals in developmental programs for infants through preschoolers. Students study early development in a naturalistic setting, linking research and theory to principles of interaction and learning about developmental differences. Selected undergraduate students participate in faculty and graduate student research at the laboratory. The CCFS also houses several research and outreach facilities, including the Eichhorn Family House.

Center for Computational Fluid Dynamics

2132 Bainer Hall (530) 752-0580 Department of Mechanical and Aerospace Engineering; http://mae.ucdavis.edu/research/cfd/

The Center uses modern computation facilities, including a Massively Parallel Supercomputer, to explore complex motions of fluids. Applications are to fluid flows and aeronautics, including mesh generation, analysis and design of aerodynamic configurations, transonic flows, turbulence modeling, electromagnetism, chemically reacting flows, biological fluid dynamics computations, and wind energy research.

Faculty and students are working on many aspects of this growing field, including structured and unstructured grid generation and adaptation; finite volumes and finite element schemes, convergence acceleration of iterative techniques; numerical solution of Euler and Navier-Stokes equations; accurate simulation of time-dependent problems for unsteady aerodynamics, gas dynamics and electromagnetics; numerical simulation of fluid problems with heat and mass transfer; numerical studies of combustion and chemically reacting turbulent flows; turbulence and modelings; and flow simulation in turbomachinery. Emphasis is placed on fundamental concepts in the physics and numerics of problems that cover a wide range of practical industrial applications.

Center for Geotechnical Modeling

2655 Brooks Road (530) 752-7929 Ross W. Boulanger, Director; rwboulanger@ucdavis.edu http://cgm.engineering.ucdavis.edu/

The center performs research in the broad area of geotechnical engineering, but focuses on earthquake engineering problems such as effects of ground shaking and liquefaction and soil-foundation-structure interaction for buildings, bridges, dams, tunnels, and port facilities. The center performs numerical simulations using advanced computational tools, develops design procedures and new techniques for site characterization, but emphasizes physical modeling using one of the world's largest and most advanced geotechnical centrifuge facilities. The centrifuge is available for shared use by researchers from around the country and is supported by the George E. Brown, Jr., Network for Earthquake Engineering Simulation.

Center for Information Technology in the Interest of Society (CITRIS)

3179 Kemper Hall (530) 752-7063 Nina Amenta, Director; http://ucdavis.citris-uc.org

CITRIS is one of the California Institutes of Science and Innovation involving a partnership between four UC campuses (UC Davis, UC Berkeley, UC Merced and UC Santa Cruz).

The Center for Information Technology Research in the Interest of Society (CITRIS) creates information technology solutions for many of our most pressing social, environmental, and health care

problems. CITRIS was created to "shorten the pipeline" between world-class laboratory research and the creation of start-ups, larger companies, and whole industries.

CITRIS facilitates partnerships and collaborations among more than 300 faculty members and thousands of students from numerous departments at four UC campuses (Berkeley, Davis, Merced and Santa Cruz) with industrial researchers from over 60 corporations. Together the groups are thinking about IT in ways that have not been thought of before. They see solutions to many of the concerns that face all of us today, from monitoring the environment and finding viable, sustainable energy alternatives to simplifying health care delivery and developing secure systems for electronic medical records and remote diagnosis, all of which will ultimately boost economic productivity. CITRIS represents a bold and exciting vision that leverages one of the top university systems in the world with highly successful corporate partners and government resources.

Center for Mind and Brain

267 Cousteau Place, Davis, CA 95618 (530) 297-4651 Steven J. Luck, Director; http://mindbrain.ucdavis.edu/

The Center for Mind and Brain is an interdisciplinary research center that is dedicated to understanding the nature of the human mind. Our scientists probe the mind using state-of-the-art approaches from the social, biological, engineering, and medical sciences. Our core research areas include attention, development and aging, memory, multisensory integration, music, and disorders of mind and brain. We focus on both discovering the fundamental principles of the healthy human mind and understanding and treating conditions such as autism, schizophrenia, and Alzheimer's disease.

Center for Molecular Genomic Imaging (CMGI)

451 Health Sciences Drive (530) 754-8960 Simon Cherry, Director; srcherry@ucdavis.edu http://imaging.bme.ucdavis.edu/

The Center for Molecular Genomic Imaging (CMGI) offers the research community state-of-the-art imaging technologies for in vivo and specimen imaging. With the use of increasingly sophisticated animal models of human disease, imaging studies can provide new insights in many areas of biomedical research, including oncology, cardiology, neuroscience and pharmacology. Molecular and genomic imaging plays an important role in advancing basic science investigations, as well as in the development of new diagnostic and therapeutic approaches for use in the clinical setting. CMGI provides and supports positron emission tomography (microPET), single photon emission computed tomography (microSPECT), x-ray computed tomography (microCT), magnetic resonance imaging (MRI), and optical (bioluminescent and fluorescent) scanning procedures for non-invasive imaging of animals or specimens. In addition, a satellite facility at the California National Regional Primate Center houses a microPET scanner for imaging non-human primates. CMGI operates a biomedical cyclotron and radiochemistry facility for synthesizing radiotracers for PET and SPECT imaging. CMGI staff provide services that include consultation, protocol planning and experimental design, animal handling and physiologic monitoring, injection of contrast agents and radiopharmaceuticals, scanning, data reconstruction and visualization, image analysis and data backup. A full service animal vivarium adjacent to the imaging suites is available for housing

research animals. CMGI facilities are open to all researchers at UC Davis, and are also open, on a space-available basis, to external researchers.

Center for Neuroscience

Cameron Carter, Director 1544 Newton Ct., Davis, CA 95618 (530) 757-8708; Fax (530) 757-8827; http://www.neuroscience.ucdavis.edu

The Center for Neuroscience is an interdisciplinary unit that serves as the focal point for the study of the neurosciences at UC Davis. Faculty affiliated with the Center are from 13 departments and sections. The center sponsors a seminar series, conferences and symposia, distributes a quarterly newsletter, provides research space for center members and supports graduate students, postdoctoral scholars and distinguished visitors.

Faculty and students are engaged in the study of brain mechanisms responsible for normal human cognitive and perceptual processes and in the study of fundamental aspects of nerve cell function and development. A core group of cognitive neuroscientists uses various imaging techniques and electrophysiological techniques to study both the normal and lesioned cerebral cortex to understand how the normal brain controls behavior. Other faculty members use either animal models to understand how information is processed in the brain or simple systems to study the fundamental biology of nerve function and development and disorders affecting them.

Center for Population Biology

Storer Hall (530) 752-1274
Jay Stachowicz, Director; jjstachowicz@ucdavis.edu
http://cpb.ucdavis.edu

The UC Davis Center for Population Biology (CPB) aims to advance understanding of the fundamental ecological and evolutionary processes that control the origins and maintenance of biological diversity, at all levels of organization ranging from molecules to ecosystems. Our activities promote integrative, multidisciplinary research in population biology through collaborations, mentorships, workshops and meetings. Faculty in the Center are drawn from nine academic departments and three colleges (Biological Sciences, Agriculture and Environmental Sciences, and Letters and Sciences).

Center for Science and Innovation Studies

1246 Social Sciences and Humanities Building & 1127 King Hall http://innovation.ucdavis.edu/

The Center for Science and Innovation Studies (CSIS) studies the many dimensions of the process of technoscientific innovation. We focus predominantly on the upstream spectrum of innovation—from the design, articulation, and funding of research programs to the patenting and publication of their outcomes—paying particular attention to the process, practices, instruments, and techniques of innovation and to the conceptual and practical problems of knowledge transfer. Through detailed case studies (contemporary as well as historical), CSIS analyzes the role that training, cultural background, and cross-disciplinary mobility play in the emergence of innovation, as well as the new institutional, technical, and social arrangements that sustain it (from innovative laboratory architecture and university-industry configurations, to distributed and cyberinfrastructure-based collaborations, to alternative systems of publication and new metrics of quality and performance assessment). Intellectual property (both traditional

regimes and more recent platforms like free software, open source, science commons, and norm-based reward systems) is a central focus of CSIS, as are issues pertaining to bioprospecting and the access to and reward of traditional knowledge.

Computer Security Laboratory

2063 Kemper Hall; seclab-contact@cs.ucdavis.edu
Matt Bishop, Hao Chen, Karl Levitt, Felix Wu, Directors;
bishop@ucdavis.edu, levitt@ucdavis.edu, wu@ucdavis.edu, hchen@ucdavis.edu
http://seclab.cs.ucdavis.edu/

The mission of the UC Davis Computer Security Laboratory is to improve the current state of computer and information security and assurance through research and teaching. The Security Lab investigates security problems in the network infrastructure, in computer security, and in information assurance in general. Current projects include intrusion detection and response, vulnerabilities analysis, software security, security of various routing and network protocols (especially wireless network protocols), cellular network security, election and electronic voting system security, data sanitization, and malware analysis and defense. The Security Laboratory also researches and detects malicious code (viruses, worms, time bombs, etc.) in programs and detects attempts to penetrate or misuse computer systems. Research projects are supported by corporate and government organizations.

Genome Center

Genome and Biomedical Sciences Facility (530) 754-9648 Richard Michelmore, Director; rwmichelmore@ucdavis.edu http://genomecenter.ucdavis.edu

The UC Davis Genome Center integrates experimental and computational approaches to address questions at the forefront of genomics and bioinformatics. The Center is housed in a new research building with state-of-the-art computational and laboratory facilities. The Center has recruited 16 research faculty and established five technology cores that serve the whole campus. The five service cores are DNA Technologies, Expression Analysis, Proteomics, Metabolomics, and Bioinformatics. These technology service cores have been established to provide researchers with access to the latest technologies on an at-cost, as-needed basis. Further details are available from the website.

Health Sciences Research Laboratories

The Health Sciences Research Laboratories are biological science facilities with research staff and assistance for faculty, staff and students.

Animal Surgery Laboratory

Buildings H and J; Center for Laboratory Animal Science (530) 752-7756; latalken@ucdavis.edu esdavisucdavis.edu

This unit is a surgical research facility in compliance with NIH, AAALAC and USDA standards. Instruction in surgical techniques is available including multiple training stations for larger groups. Surgical instruments, drapes, anesthesia machines, scrub suits, and equipment for monitoring vital signs and physiologic parameters are available. Staff are available to perform or assist with both survival and non-survival surgical procedures depending on the investigator's requirements. Staff are also available for post-operative care, data and sample collection as required, and assistance with preparation of the IACUC Protocol for Animal Care and Use.

Human Performance Laboratory

164 Hickey Gym (530) 752-0965

The Human Performance Laboratory (HPL) was founded in 1963 and has a long history of basic and applied research and outreach in exercise physiology, biomechanics and sports psychology. The HPL has been involved in a variety of research areas since its inception including metabolism, heat stress, fluid balance, injury prevention, body composition and health benefits of physical activity and fitness. The HPL is represented by full-time and adjunct faculty members with varying research backgrounds and scientific interests. The HPL facilities allow measurement of a comprehensive list of human performance characteristics. Investigators have access to advanced data acquisition systems for evaluation in the areas of biomechanics, motor learning, environmental physiology, cardiopulmonary and thermoregulatory physiology, human nutrition and exercise and muscle metabolism. Specific technologies and capabilities include a biochemistry lab, extensive computing facilities, high speed 3-D video motion analysis, ground reaction force measurement, ultrasound imaging, a temperature and humidity controlled environmental chamber and systems for measurement of oxygen consumption, body composition and psychomotor performance. The HPL meets the needs of today's creative researcher and has the capacity to assist in answering tomorrows research questions.

Humanities Institute

Carolyn de la Peña, Director Molly McCarthy, Associate Director 227 Voorhies Hall (530) 752-2295; Fax (530) 752-4263

The UC Davis Humanities Institute (DHI) is an interdisciplinary research center that fosters intellectual collaborations and facilitates access to resources for faculty and graduate students who are actively engaged in research and teaching in the humanities, the arts, cultural studies and the humanistically oriented social sciences. It advocates for the humanities within the UC Davis community and works with funding agencies to secure individual and programmatic resources for HArCS faculty. To explore emerging research areas and provide collaborative opportunities for faculty and graduate students, the Institute sponsors faculty research seminars on designated themes, interdisciplinary research clusters, multi-campus research groups, and initiatives in the digital humanities. The Institute also organizes conferences, workshops and lectures and provides partial funding for events that serve humanities scholars at UC Davis. The Institute is also the home of the California Cultures Initiative, which supports scholarship on regional issues and works to build connections between humanities scholars at UC Davis and the surrounding region.

Institute for Ultra-Scale Visualization

2121 Kemper Hall; 530) 754-8579 Kwan-Liu Ma, Director; http://www.ultravis.org

The SciDAC Ultra-Scale Visualization Institute, established in 2006, is a research, education, and outreach effort sponsored by the DOE SciDAC program. The Institute's mission is to address the upcoming peta and exa-scale visualization challenges facing computational science and engineering. The Institute fosters the exchange of knowledge between universities, DOE laboratories, and industry to make advanced visualization an integrated component in scientific discovery. The Institute revolutionizes the very

process of scientific discovery by equipping scientists with tools that shed light on the knowledge hidden in previously incomprehensible datasets.

Mann Laboratory

105 Mann Laboratory Trevor Suslow, Faculty Contact Lee Ann Richmond, Facility Manager and Safety Officer (530) 754-8313; Fax (530) 752-4554

Plant scientists in the Louis K. Mann Laboratory study the physiology, biochemistry, microbiology and molecular biology of preharvest and harvested fruits, ornamentals, and vegetables to improve and maintain their quality and safety during harvest, storage, processing, distribution and marketing. The three current faculty and two Emeritus Faculty housed in this facility are members of the Department of Plant Sciences and one USDA/ARS research scientist. Research and extension activities are supported by students, postdoctoral researchers and visiting scientists. Research includes s basic plant molecular biology, plant physiology, applied postharvest biology and technology, produce safety microbiology, and practical storage technologies for horticultural crops, including whole and lightly processed products. Results are of interest to other researchers in the plant sciences and food science as well as to growers, shippers, transportation and logistics providers, marketers and consumers of fresh fruit and vegetables. This Special Postharvest Facility is a CAES resource and is Possible sources of e. coli contamination in fruits and vegetables, how the bacterial diseases might be transmitted to consumers and what industry is doing to prevent microbial contamination of crops.equipped with 18 controlled-temperature rooms, eight research laboratories, specialized postharvest analytical equipment, advanced rapid test equipment for human pathogens, and a small conference room.

Materials Science Central Facilities

Kemper Hall; lower level rooms 108-163 http://www.matscicf.ucdavis.edu/

Central Facilities is a group of eight laboratories that provide many essential resources for the faculty, students and researchers. Major equipment at MSCF includes a Scintag XDS-2000 powder diffractometer, a SEM (Philips FEI XL30 SFEG) a TEM (Phillips CM-12), and a TEM/STEM (JEOL 2500 SE). MSCF is also fully equipped for metallography and electron microscopy sample preparation including an ion milling system. These laboratories provide an infrastructure to serve the wide range of ongoing research activities in this department, as well as other campus departments and institutions. All equipment is available to users from both within and outside UC Davis at hourly rates. The instruments are also key part of our laboratory teaching program. Students get to use professional, research-grade instruments to do modern, sophisticated experiments similar to those they will be doing in their future employment.

Natural Reserve System

The Barn John Wingfield, Director (530) 752-6949; http://nrs.ucdavis.edu; http://nrs.ucop.edu

The UC Davis campus administers five reserves that are available for teaching and research.

 Bodega Marine Reserve, located at Bodega Bay, 100 miles west of campus, consists of both terrestrial and coastal marine habitats including grasslands, dunes, freshwater and brackish marshes, mudflats, sandy beaches, rocky intertidal and subtidal areas. There are facilities for overnight and longer stays; see Bodega Marine Laboratory and Reserve, on page 23.

- Jepson Prairie Reserve, located in Solano County 13 miles south of Dixon, consists of native California bunchgrass grasslands, vernal pools, playa lakes and freshwater sloughs.
- Donald and Sylvia McLaughlin Reserve, located near Clear Lake about 70 miles northwest of campus, consists of Inner Coast Range habitat with a mix of serpentine and non-serpentine soils. The reserve has a facility for long-term overnight stays with a well-equipped kitchen, full bath and a camping area for class groups.
- Quail Ridge Reserve consists of Inner Coast Range habitat located about 30 miles west of campus on a peninsula jutting into Lake Berryessa. The reserve has facilities for overnight stays with a well-equipped kitchen, full bath and camping areas for groups.
- Stebbins Cold Canyon Reserve, located about 24 miles west of campus, has representative populations of several different plant communities found in California's Inner and Outer Coast Ranges.

The university maintains 37 reserves throughout the state, many of which are available for teaching and research.

Northern California Nanotechnology Center

West Wing Kemper Hall; Office1125 Kemper Hall; (530) 754-9518
Jeff Feerer, Interim Manager; http://ncnc.engincering.ucdavis.edu/

The Northern California Nanotechnology Center (NCNC), a research/teaching/industry facility for nanotechnology and microfabrication, is housed in the College of Engineering at UC Davis. NCNC is a world class center for the synthesis, fabrication, and analysis of nanoscale devices and materials for applications in:

- Electronic devices
- Medicine
- Biology
- Environment
- Optics

Opened in 2004, the Northern California Nanotechnology Center operates a 10,000+ square foot class 100 cleanroom laboratory. The laboratory is available for use by UC Davis faculty, students and staff on a recharge basis. Students, research staff and research faculty may use the facility after they have completed appropriate training/certification. Researchers from private industry are also invited to use the facility by becoming an Industrial Affiliate.

Nuclear Magnetic Resonance Facility

Medical Sciences 1D (530) 752-7677; http://www.nmr.ucdavis.edu

The Nuclear Magnetic Resonance Facility provides access to state-of-the-art NMR instrumentation for spectroscopy and imaging to researchers in the biological, medical and physical sciences. At present, the facility operates ten spectrometers of varying purposes and capabilities at field strengths from 300 to 800 MHz. Applications include structural characterization of organic molecules, determination of protein structure and dynamics, imaging and in vivo spectroscopy of small animals, plants, and materials, and spectroscopy of solids. The Facility also has workstations for off-

line data processing. Three full-time staff members are available to assist campus researchers in utilizing the instrumentation. A training course, Biological Chemistry 230, is offered in the fall quarter.

UC Pavement Research Center

3153 Engineering III; (530) 754-6409 John Harvey, Director, UC Davis Site; jtharvey@ucdavis.edu http://www.ucprc.ucdavis.edu

The UC Pavement Research Center (UCPRC) uses innovative research and sound engineering principles to improve pavement structures, materials and technologies. Work at the UCPRC focuses on asphalt and concrete pavements, including design, materials, rehabilitation, life cycle, maintenance and reconstruction; pavement cost analysis and strategy selection, effects of pavement activities on traffic in urban areas, pavement performance modeling and environmental life cycle assessment for pavements.

Social Science Data Service

105 Social Sciences and Humanities Building (530) 752-4009; http://www.ssds.ucdavis.edu

The Social Science Data Service (SSDS) is a unit in the Division of Social Sciences. SSDS provides quantitative computing and consulting services in support of faculty and graduate students involved in social science research on the UC Davis campus. SSDS provides consulting services for the wide range of software used by social scientists and assists with questions regarding the use of SSDS computers and statistical and data-related programming. SSDS manages a UNIX system and a PC research lab used for quantitative social science computing.

Sustainable Transportation Energy Pathways (NextSTEPS)

Institute of Transportation Studies, UC Davis Joan Ogden, Director; jmogden@ucdavis.edu Paul Gruber, Manager; pwgruber@ucdavis.edu http://steps.ucdavis.edu

NextSTEPS is a four-year (2011-2014) research consortium that addresses the technical, operational, logistical, and strategic issues related to the transition to an alternative fuel-based economy. The program comprises 100+ interdisciplinary research projects addressing the potential transportation energy pathways: electricity, hydrogen, biofuels, and fossil fuels. These pathways are analyzed and compared across program threads: consumer demand and travel behavior; innovation and business strategy; infrastructure system analysis; environmental, energy and cost analysis; vehicle technology evaluation; policy analysis; and integrative scenarios and transition strategies.

The program draws upon research methods from a broad range of academic fields including: vehicle engineering and design, systems analysis and operations research, chemical and mechanical engineering, lifecycle cost and emissions analysis, market research, sociology and anthropology, economics and business strategy, and policy analysis.

The overarching program goal of NextSTEPS is to generate new insights about the transitions to a sustainable transportation energy future and disseminate that knowledge to decision-makers in the private sector and governmental agencies so that they can make informed technology, investment, and policy choices.

Tahoe Environmental Research Center (TERC)

UC Davis Administration Office; Watershed Sciences Building; (530) 754-8372

TERC site Laboratories in Incline Village, NV (775) 881-7560 Geoffrey Schladow, Director; gschladow@ucdavis.edu http://terc.ucdavis.edu/

The Tahoe Environmental Research Center is dedicated to research, education and public outreach on lakes and their surrounding watersheds and airsheds. Lake ecosystems include the physical, biogeochemical and human environments, and the interactions among them. The Center is committed to providing objective scientific information for restoration and sustainable use of the Lake Tahoe Basin and freshwater ecosystems worldwide.

UC Agricultural Issues Center

252 Hunt Hall; (530) 752-2320; agissues@ucdavis.edu http://www.aic.ucdavis.edu

The UC Agricultural Issues Center is a university-wide research and outreach unit with core competencies in economics while drawing on expertise from many disciplines. The center focuses on California's agricultural issues related to science and technology, international trade and markets, agribusiness trends, rural-urban issues, natural resources and the environment, human resources and agricultural policy.

UC Davis Center for Plant Diversity

Formally the UC Davis Herbarium Dr. Dan Potter, Director; Ellen Dean. Curator 1026 Sciences Laboratory Building, Department of Plant Sciences (530) 752-1091;http://herbarium.ucdavis.edu

The UC Davis Center for Plant Diversity provides information on the names, uses, toxicity and distribution of plants. Anyone can visit the Herbarium to use its dried plant collections (300,000 specimens), botanical library and microscopes, but a phone call is suggested to make sure staff will be available to assist you. The collections are used most commonly to check plant identifications, but they are also used by campus faculty and students for teaching and research in plant systematics and ecology. Herbarium staff answer hundreds of public service requests each year (especially identification of weeds and poisonous plants). Collections include vascular plants, bryophytes, lichens and algae. The majority of these specimens are angiosperms (flowering plants), mainly from California, but the collections are worldwide in scope, with strong holdings from North America, Ecuador, Baja California and regions with Mediterranean climate regimes. The herbarium is well known for its collection of weeds and poisonous plants, although it also has world-class collections of grasses, oaks and spurges. The Herbarium's support group, the Davis Botanical Society, hosts a wide range of botanical events, workshops and trips each year.

UC Davis Energy Institute

2028 Academic Surge, University of California, Davis; (530) 754-8566 Bryan Jenkins, Director; energy@ucdavis.edu http://energy.ucdavis.edu

The Energy Institute at UC Davis is home to energy research and education programs of the University of California, Davis, and was established in 2007 to help accelerate the global transformation to a sustainable energy future. The Energy Institute is structured to coordinate UC Davis' world-class campus strengths in energy research, education and outreach for the purpose of fostering new innovations, expanding public service and informing decision

making around new energy solutions. The Energy Institute encompasses critical areas of UC Davis' energy research—including renewable and sustainable energy systems, energy efficiency, fuels and transportation, infrastructure, environment and economics. The Energy Institute is actively targeting the demand for well-trained energy professionals. A proposed energy graduate group will offer M.S. and Ph.D. degrees with comprehensive education in energy in the areas of energy science and technology and energy management and policy.

UC Davis J. Amorocho Hydraulics Laboratory (JAHL)

Dept. of Civil and Environmental Engineering; (530) 752-2385 M. Levent Kavvas, Director; mlkavvas@ucdavis.edu http://jahl.engr.ucdavis.edu/

UC Davis J. Amorocho Hydraulics Laboratory's research areas include engineering hydraulics, fisheries protection, and ecological and environmental hydraulics. UC Davis JAHL was built to perform hydraulic modeling studies for the California State Water Project in the 1960s. It has been conducting hydraulic investigations through scaled physical models, prototype models and numerical models to provide modeling service to federal, state, local water agencies and private entities. By means of the recently constructed large flume which has a circulation capacity of 200 cfs, it is now possible to perform prototype physical modeling studies at the laboratory. Recently conducted research include hydraulics and fish behavior assessment study of unscreened diversions, study of the roughness characteristics of native plant species in California floodplain wetlands, sturgeon passage study, debris removal/trashrack/traveling screen study, fish treadmill

study of fish behaviors near long fish screens, Devil Canyon power plant afterbay hydraulics, and Gorman Creek flood control channel hydraulics, etc. UC Davis JAHL has been actively participating in the development of solutions to fish protection technologies for the Bay Delta river system. Researchers in UC Davis JAHL, including fish biologists and hydraulic engineers, have many years of experience on testing Sacramento River and Bay Delta fish species under various hydraulic and environmental conditions. They also have extensive experience in handling invasive water plant species that occur in the Delta fish facilities, such as Egeria. Researchers at UC Davis JAHL, with the help of the state and federal agencies, have been pursuing the application of new fish protection technologies and developing a better understanding of the hydraulic and biological issues in the Sacramento River and Bay Delta system.

X-Ray Crystallographic Laboratory

James C. Fettinger, Ph.D. Department of Chemistry (530) 754-7822

The X-Ray Crystallographic Laboratory, located in the Department of Chemistry, provides crystal structure determinations for researchers. Single crystals from all branches of chemistry are studied. The laboratory is equipped with three single crystal Bruker X-ray diffractometers, an APEX Duo equipped with both Cu and Mo anode sources, and two Mo source systems, an APEXII and a SMART1000. The laboratory also possesses a stereo-microscope. All instruments have variable low temperature systems including the capability of cooling the crystal to 5K. Consultation and collaboration on a variety of single crystal related projects can be arranged.



UNDERGRADUATE ADMISSIONS

UNDERGRADUATE ADMISSIONS

Undergraduate Admissions One Shields Avenue University of California Davis, CA 95616-8507 (530) 752-2971; Fax (530) 752-3712 http://admissions.ucdavis.edu

APPLYING TO UC DAVIS

Apply for admission online at http://universityofcalifornia.edu/apply.

The initial filing periods to apply for undergraduate admission and scholarships at UC Davis are as follows:

QuarterInitial Filing Period (prior year)FallNovember 1-30Winter*July 1-31Spring*October 1-31

*UC Davis is rarely open to new applicants for winter and spring quarters.

For up-to-date details regarding winter and spring quarters, and tips on completing the UC application for admission and the personal statement, see http://admissions.ucdavis.edu/apply.

After applying, transfer students are required to update their grades and course records online through the Transfer Academic Update (TAU) to ensure that the campuses have the most current academic information available. For details and deadlines, see http://universityofcalifornia.edu/admissions/how-to-apply/after-you-apply.

APPLICATION FEES

The application fee of \$70 for domestic students and \$80 for international students entitles you to apply to one University of California campus. If you want to apply to more than one UC campus, you must pay an additional fee for each campus you select. These fees are not refundable. Applicants will be prompted to pay the fee(s) before submitting the online application. If you submit a check or money order, it should be made payable to the Regents of the University of California.

The University of California will waive application fees for up to four campuses for qualified students who otherwise would be unable to apply for admission. Students who qualify for fee waivers and who select more than four campuses must pay \$70 for each additional choice. To be accepted for the application fee waiver program, you must meet specific requirements related to your family income and size. The fee waiver program is for United States citizens and permanent residents only. You can apply automatically for a fee waiver on the online application. For details, see http://www.universityofcalifornia.edu/admissions/how-to-apply/application-fees.

ADMISSION AS A FRESHMAN

The University of California defines a freshman applicant as one who is either currently enrolled in, or has graduated from, a high school and has not registered in a regular session at any collegiate-level institution since high school graduation. An applicant who has completed college courses while in high school or in a summer session immediately following high school graduation is considered a freshman applicant.

The University of California will accept the California High School Proficiency Examination or the General Education Development (GED) Certificate awarded by any State's Department of Education in lieu of the regular high school diploma. However, you must also meet all other university entrance requirements (subject, scholarship and examination).

Admission requirements for California residents are different from those for nonresidents. Nonresidents must meet higher scholarship requirements.

Meeting UC admission requirements does not guarantee admission to UC Davis. Due to limited enrollment space and the extraordinary size and academic strength of the UC Davis applicant pool, many qualified candidates are not offered admission. Applicants who are admitted generally well exceed UC admission requirements. The selection criteria that UC Davis considers as part of its comprehensive review process for each UC applicant are available at http://admissions.ucdavis.edu/admission/freshmen/fr_selection_process.cfm.

UC Freshman Admission Requirements for California Residents

A California resident applying to UC as a freshman has two paths to satisfy the university's admission requirements:

- Statewide Path
- Local Path, also known as Eligibility in the Local Context (ELC)

Statewide Path

Most students attain UC admission through the statewide path. Under this pathway, the top nine percent of graduating students in California according to the UC admissions index are guaranteed admission to a UC campus. To be eligible, you must satisfy the following subject, scholarship and examination requirements.

Subject Requirement: "a-g"

The following courses must be completed with a *C* grade or better, and for California residents, must be on your high school's UC-approved course list. View your school's UC-approved course list at http://ucop.edu/doorways. If you submit courses from an out-of-state school, Undergraduate Admissions will determine if your courses fulfill the Subject Requirement. At least 11 of the 15 units (one unit equals one year of study) defined by the "a-g" requirements must be taken prior to the senior year.

Courses taken in the 9th grade and completed with a grade of *C* or better can satisfy a subject requirement; however, the grades will not be used in computing your grade point average. If you receive a grade of *D* or lower in any "a-g" course, you have not satisfactorily completed the subject requirement until you repeat the course (or, in some cases, complete a more advanced course) with a grade of *C* or better.

a. History/Social Science—2 years required

One year of United States history, or one-half year of United States history and one-half year of civics or American government; and one year of world history, cultures and geography.

b. English (or Language of Instruction)—4 years required

If attending a foreign high school where instruction is not in English, literature/composition courses in the native language may be substituted.

c. Mathematics—3 years required; 4 years recommended

Must include algebra, geometry and second-year advanced algebra

d. Laboratory Science—2 years required; 3 years recommended

Must include at least two of these three subject areas: biology, chemistry, physics.

e. Language other than English (LOTE)—2 years; 3 years recommended

The second year or higher of the same language must be completed to fulfill this requirement (e.g., Spanish I and Spanish II, not Spanish I and French I).

f. Visual and Performing Arts (VPA)—1 year required

One year-long course of VPA chosen from the following: dance, drama/theater, music, visual art.

g. College Preparatory Electives-1 year required

Choose from UC-approved college preparatory electives.

Scholarship Requirement

The Scholarship Requirement is satisfied if your GPA is 3.000 or higher (weighted by honors/AP/IB/college course bonus points) in "a-g" courses with no grade lower than a *C*.

The UC freshman statewide path is determined by a combination of grade point average (GPA) in "a-g" courses and the UC score total, which is a conversion of the scores you earned on the ACT Plus Writing *OR* SAT Reasoning Test.

If your GPA is 3.000 or higher and you achieve the qualifying UC score total that corresponds to your GPA on the UC Admissions Index you meet the statewide path. The UC Admissions Index is available at http://universityofcalifornia.edu/admissions/freshman/california-residents/admissions-index/, along with an online calculator you can use to assess if you are in the top nine percent of California high school graduates.

Your UC GPA calculation is determined by assigning point values to the grades you earn in "a-g" subjects completed in the 10th and 11th grades, including summer sessions after 9th and prior to 12th grade. Courses completed in the 9th grade with a *C* grade or better will be used to meet the Subject Requirement, but will not be calculated into your UC GPA.

Examination Requirement

Freshman applicants are required to take:

• The ACT Plus Writing

OR

• The SAT Reasoning Test

Highest scores from one sitting will be used.

SAT Subject Tests are no longer required and UC Davis will consider SAT Subject Tests only if they benefit the applicant; some UC campuses recommend that applicants take certain SAT Subject Tests.

Applicants for fall must take the required test no later than December of the previous year—official scores must be received by

the end of January. You are responsible for making sure that testing agencies send your scores to the University of California.

Make arrangements to take the required ACT Plus Writing exam with your high school or at the ACT website at http://www.act.org. The UC Davis ACT code is 0454. You may make arrangements to take the required SAT Reasoning Test or optional SAT Subject Tests through the College Board website at http://www.collegeboard.org. The UC Davis College Board code is 004834.

Local Path

Under this pathway, also referred to as *Eligibility in the Local Context (ELC)*, the top nine percent of graduating students at each participating California high school are guaranteed admission to a UC campus. To be eligible, you must complete a specific pattern of 11 UC-approved units before prior to your senior year. More information about ELC is available online at

http://universityofcalifornia.edu/admissions/freshman/california-residents/local-path.

Admission by Examination

If you do not meet the UC admission requirements for the Statewide Path or the Local Path, you may be able to qualify for admission to UC by examination. It is rare that an applicant is selected for admission to UC Davis based on test-score eligibility alone. To be eligible by examination:

- You must achieve high scores on the ACT Plus Writing or SAT Reasoning Test AND two SAT Subject Tests in two different subject areas
- You must achieve a UC score total, as calculated by the UC Admissions Index, of at least 410 for California residents and 425 for nonresidents.
- In addition, you must earn a minimum UC score of 63 on each component of the ACT Plus Writing or SAT Reasoning Test *AND* on each SAT Subject Test. Calculate your UC score at

http://universityofcalifornia.edu/admissions/freshman/california-residents/admissions-index.

You cannot qualify for admission by examination if you have completed 12 or more units of transferable coursework at a college or university following high school graduation or if you have taken transferable college courses in any subject covered by the SAT Subject Tests before taking the exams.

UC Freshman Admission for Nonresidents

Applicants who are not California residents must attain a 3.400 GPA or higher in the "a-g" required courses, meet the examination requirement and achieve the qualifying UC score total of at least 425 as calculated by the UC Admissions Index. The UC Admissions Index is available at http://universityofcalifornia.edu/admissions/freshman/california-residents/admissions-index. You can also be considered for UC freshman admission by examination; please refer to the criteria described in Admission by Examination, above.

Transfer Credit

Transfer credit may be granted to a freshman applicant for an acceptable college course taken while still in high school when an official transcript is received from the college that conducted the course and the course is deemed UC-transferable.

Advanced Placement (AP) Examinations

Transfer credit is granted for each College Board Advanced Placement (AP) examination completed with an official score of 3, 4 or 5. The credit will be part of the minimum 180 quarter units you need in order to receive a bachelor's degree. The credit from the AP examinations may also be used to satisfy specific degree requirements.

To learn how many units you may receive for an AP examination, see College Board Advanced Placement (AP) Examination Credit, on page 36—use the Credit Toward Degree column heading. How those units will be applied toward specific degree requirements in each college is explained for each exam category. Please note that the courses for which AP credit has been granted may not be used as a substitute for courses required as part of the UC Davis General Education Requirement; see General Education Requirement, on page 95.

In general, you may not earn university credit for college courses or International Baccalaureate (IB) transfer credits that duplicate credits already earned through AP. There are, however, a few exceptions to this general rule. Since it is often difficult to know exactly which UC Davis course you should take when you have earned AP credit, you should talk with an academic adviser in your major department or dean's office before selecting and enrolling in classes.

A Guide for Students with Advanced Placement (AP) Credit for a UC Davis Course

In general, you may not earn university credit for college courses that duplicate credit already earned through Advanced Placement (AP). There are, however, a few exceptions to this general rule, indicated in the chart entitled College Board Advanced Placement (AP) Examination Credit, on page 36 and summarized below.

If you have AP credit for the following UC Davis course:	Can you take the same course at UC Davis?
Art History (AHI) 1A, 1B, 1C	No
Art Studio (ART) 2, 5	No
Biological Sciences (BIS) 10	No
Chemistry (CHE) 2A	Yes
Chemistry (CHE) 10	No
Economics (ECN) 1A, 1B	No
Engineering: Computer Science (ECS) 30	No
English (ENL) 3	No
French (FRE) 3, 21, 22	No
German (GER) 3, 20, 21	No
History (HIS) 4A, 4B	Yes
History (HIS) 4C	No
History (HIS) 17A, 17B	Yes
Latin (LAT) 2	No

Mathematics (MAT) 12	No
Mathematics (MAT) 16A, 17A, 21A	Yes
Mathematics (MAT) 16B, 17B, 21B	Yes
Music (MUS) 10	No
Physics (PHY) 1A, 1B	No
Political Science (POL) 1, 2	No
Psychology (PSC) 1	No
Spanish (SPA) 21, 22, 23, 24	No
Statistics (STA) 13	Yes
University Writing Program (UWP) 1	No

NOTE: Courses for which AP credit has been granted may not be used as substitutes for courses required as part of the UC Davis General Education Requirement.

International Baccalaureate (IB) Examinations

UC Davis recognizes the International Baccalaureate (IB) examinations for college credit. Higher Level examinations presented with official scores of 5, 6 or 7 receive 8 quarter (5.3 semester) units of degree credit and, in specific instances, are deemed comparable to various lower-division courses. Students completing the International Baccalaureate (IB) diploma with a score of 30 or above will receive a maximum of 30 quarter (20 semester) units. The credit will apply toward the minimum 180 quarter units needed to receive a bachelor's degree.

To learn how many units you may receive for an acceptable IB examination, see International Baccalaureate (IB) Higher Level Examination Credit, on page 40—use the Credit Toward Degree column. The chart also specifies which UC Davis lower-division course an IB examination is comparable to. Please note that the courses for which IB credit have been granted may not be used as a substitute for courses required as part of the UC Davis General Education Requirement; see General Education Requirement, on page 95.

In general, you may not earn university credit for college courses that duplicate credit earned through IB. Similarly, students will not receive duplicate credit for comparable AP examinations if granted IB transfer credit. Each college may have special restrictions on the use of IB examinations—please check with you dean's office and department adviser to determine any restriction in their use toward breadth requirements and lower-division major course requirements before selecting and enrolling in classes.

College Board Advanced Placement (AP) Examination Credit

	Comment *			 Biological Sciences 2A is the first course taken by most students majoring in the Life Sciences. 	* Although Chemistry 2A may be taken for full credit; students are strongly encouraged to enroll in the 2AH, 2BH, 2CH sequence.	1	1	1	* 4 transferable unit max. for both Computer Science exams.	* 4 transferable unit max, for both Computer Science exams, • Credit for Computer Science and Engineering 30 may fulfill prerequisite for Computer Science and Engineering 40 w/ instructor consent.	st 4 transferable unit max. for both Computer Science exams.	* 8 transferable unit max. for all English exams. • Satisfies university Entry Level Virting Requirement.	* 8 transferable unit max, for all English exams. • Satisfies university Entry Level Writing Requirement.	* 8 transferable unit max. for all English exams. • Satisfies university Entry Level Virting Requirement.	* 8 transferable unit max, for all English exams. • Satisfies university Entry Level Writing Requirement.	1	1	*8 transferable unit max, for French Language and French Language and Culture exams. Max, credit awarded to the exam with the highest scores.	*8 transferable unit max, for French Language and French Language and Culture exams. Max. credit awarded to the exam with the highest scores.	*8 transferable unit max. for French Language and French Language and Culture exams. Max. credit awarded to the exam with the highest scores.	*8 transferable unit max. for French Language and French Language and Culture exams. Max. credit awarded to the exam with the highest scores.	*8 transferable unit max, for French Language and French Language and Culture exams. Max, credit awarded to the exam with the highest scores.	*8 transferable unit max. for French Language and French Language and Culture exams. Max. credit awarded to the exam with the highest scores.	
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9	Engineering Biological Sciences	1	- 1	1	1	1	I	1	1		Φ .	1	1	1	1	1	1	I	ı	I	I	ı	I	1
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	UC Davis Course Equivalencies	Art History 1A, 1B, 1C	ı	Biological Sciences 10	Chemistry 2A	Chemistry 10	ı	Political Science 2	ı	Engineering Computer Science 30	ı	English 3, University Writing Program 1	1	English 3, University Writing Program 1	1	ı	History 4B, 4C	French 22	French 21	French 3	French 22	French 21	French 3	upper division
	IGETC Area ³	3A or 3B	3A or 3B	5B w/lab	5A w/lab	5A w/lab	3B and 6A	4H	ı	ı	ı	₹	1	1A or 3B	1A or 3B	5A w/ lab	3B or 4F	3B and 6A	3B and 6A					
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	Examination 1	Art History	Art History	Biology	Chemistry	Chemistry	Chinese Language and Culture	Comparative Government and Politics	Computer Science A	Computer Science AB	Computer Science AB	English - Language and Composition	English - Language and Composition	English - Literature and Composition	English - Literature and Composition	Environmental Science	European History	French Language	French Language	French Language	French Language and Culture	French Language and Culture	French Language and Culture	French Literature

College Board Advanced Placement (AP) Examination Credit

* 8 transferable unit max. for all Mathematics-Calculus exams.

• Credit for Mathematics 1 6A, 174 or 2 1A equivalents may fuffil prerequisite for Mathematics 1 6B, 178 or 2 1B.

• If student elects to register in Mathematics 12, 16A, 17A or 2 1A, s/he is subject to the Mathematics Placement Requirement (MPR). For details, visit math.ucdavis.edu/undergrad/math_placement/ * 8 transferable unit max. for all Mathematics-Calculus exams.

* A Mathematics 164, 168, 1774, 178, 214 or 218 equivalents may fulfill prerequisites for Mathematics 168, 166, 178, 176, 218 or 216.

• If student elects to register in Mathematics 12, 164, 174 or 218, s/he is subject to the Mathematics 10 (1900). For details, visit math, ucdavis, edu/undergrad/math, placement/ * 8 transferable unit max. for all Mathematics-Calculus exams.
• If student elects to register in Mathematics 12, 16A, 17A or 2 1A, s/he is subject to the Mathematics Placement Requirement (MPR). For debails, visit math.ucdavis.edu/undergaad/math_placement/ * 8 transferable unit max. for all Mathematics-Calculus exams.

* Cardi for Mathematics 1 64, 174 or 2 1 A equivalents may fuffill prerequisite for Mathematics 1 64, 178 or 2 1 B.

* If student elects to register in Mathematics 12, 164, 174 or 2 14, s/he is subject to the Mathematics Placement Requirement (MPR). For details, visit math.ucdavis.edu/undergrad/math.placement/ *8 transferable unit max. for German Language and German Language and Culture exams. Max credit awarded to the exam with the highest scores. *8 transferable unit max. for German Language and German Language and Culture exams. Max credit awarded to the exam with the highest scores. *8 transferable unit max. for German Language and German Language and Culture exams. Max credit awarded to the exam with the highest scores. *8 transferable unit max. for German Language and German Language and Culture exams. Max credit awarded to the exam with the highest scores. *8 transferable unit max. for German Language and German Language and Culture exams. Max credit awarded to the exam with the highest scores. *8 transferable unit max. for German Language and German Language exams. Max credit awarded to the exam with the highest scores. * 8 transferable unit max. for all three Physics exams. * 8 transferable unit max. for all three Physics Letters and Science 1 ٩ ٥ ٩ ٩ ٩ ٩ ٩ ī COLLEGE OF 1 **Biological Sciences** ٥ 4 4 Agricultural and Environmental Sciences UC Davis Area SZ Š Š SZ 呈 SZ SZ SS SS 료 료 료 료 료 료 SS 료 료 료 료 w/ Classics adviser Consult w/ Classics adviser German 21 or consult w/adviser Mathematics 16C, 17C or 21C 178 Mathematics 16A, 17A or 21A Mathematics 16B, 17B or 21B German 22 or consult adviser German 21 or consult adviser German 20 or consult adviser German 20 or consult adviser German 22 or consult adviser Continuing UC Davis Course Consult w/ advise Consult w/ adviser Mathematics 16B, or 21B Economics Consult Duplicate Credit Allowance ⁴ 12: No; 16A, 16B, 17A, 17B, 21A, 21B; Yes 12: No; 16A, 17A, 21A: Yes 12: No; 16A, 17A, 21A: Yes ž ŝ ŝ ž ŝ ŝ ž ž ŝ ŝ ŝ Mathematics 12, 16A, 17A or 21A Mathematics 12, 16A, 17A or 21A Mathematics 12, 16A-16B, 17A-17B or 21A-21B UC Davis Course Equivalencies Economics 1B Economics 1A German 20 German 20 Physics 1A, 21 German 21 German 3 German 3 Music 10 German Latin 2 3B and 6A 5A w/ lab 3B and 6A IGETC Area 3 4E 4B 2A 54 ×/ 2A 2A 2A 4B H-S UCH NC∙N UC-M NC-₩ UC.H UC.H UCH UC-H UC-H UC-B NC.H UC-H NC.H UC-B NC-₩ UC-B UCH UC-S UC.S Credit Toward Degree; Quarter Units * & * * * * & * ***** * & * & * ω ω 4 4 ∞ 5, 4, 3 5, 4, 3 5, 4, 3 5, 4, 3 5, 4, 3 Score 4,3 5,4 2 က 2 4 2 က က Japanese Language and Culture German Language and Culture German Language and Culture German Language and Culture Italian Language and Culture Mathematics - Calculus BC ^ Mathematics - Calculus AB Mathematics - Calculus AB Calculus Human Geography German Language German Language German Language Macroeconomics Microeconomics Latin Literature Mathematics . Music Theory Examination Latin (Vergil) Physics B Physics B

College Board Advanced Placement (AP) Examination Credit

Comment *	* 8 transferable unit max. for all three Physics exams.	* 8 transferable unit max. for all three Physics exams.	* 8 transferable unit max. for all three Physics exams.	* 8 transferable unit max. for all three Physics exams.	I	I	ı	ı	ı	ī	ı	ı	I	* 8 transferable unit max. for all three Studio Art exams. Campus articulation revised effective with the May 2012 AP exam.	* 8 transferable unit max. for all three Studio Art exams. Campus articulation revised effective with the May 2012 AP exam.	* 8 transferable unit max. for all three Studio Art exams. Campus articulation revised effective with the May 2012 AP exam.	• Satisfies university American History and Institutions requirement.	• Satisfies university American History and Institutions requirement.	1
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Engineering Biological Sciences	ı	1			1	1	ı	-1	ı	1	I	1		<u> </u>	-				<u> </u>
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Continuing UC Davis Course	I	I	I	I	I	1	Spanish 24 or consult w/adviser	Spanish 23 or consult w/adviser	Spanish 22 or consult w/adviser	Spanish 100 or consult w/adviser	Spanish 24 or consult w/adviser	I	1	I	I	I	I	I	I
Duplicate Credit Allowance	ĝ	1	I	1	2	1	Š	ž	^o Z	ž	ž	Yes	1	Ž	ı	1	ž	Yes	I
UC Davis Course Equivalencies	Physics 1A	1	I	1	Psychology 1	1	Spanish 23	Spanish 22	Spanish 21	Spanish 24	Spanish 23	Statistics 13	ı	Art Studio 2	ı	1	Political Science 1	History 17A, 17B	I
IGETC Area ³	5A w/lab	5A w/lab	5A w/lab	5A w/lab	4	4	3B and 6A	3B and 6A	3B and 6A	3B and 6A	3B and 6A	2A	2A	ı	I	1	4H	3B or 4F	3B or 4F
UC Eligibility Area ²	UC-S	nc-s	UC-S	nc-s	UC-B	UC-B	H-OO-H	NC-H	NC-H	NC-H	NC-H	M-OU	NC-W	ı	ı	1	UC-B	UC-B / H	UC-B / H
Credit Toward Degree; Quarter Units	*	*4	*4	*4	4	4	80	ω	ω	ω	80	4	4	* &	* &	* &	4	ω	œ
Score	5,4		4			က				5, 4		4		5, 4		4,3	5, 4, 3	5, 4, 3	5, 4, 3
Examination 1 Se	Physics C1-Mechanics 5,	Physics C1-Mechanics 3	Physics CILElectricity/Magnetism 5,	Physics CILElectricity/Magnetism 3	Psychology 5	Psychology 4,	Spanish language 5	Spanish Language 4	Spanish Language 3	Spanish Literature 5,	Spanish Literature	Statistics 5,	Statistics 3	Studio Art [Drawing Portfolio] 5,	Studio Art [Drawing Portfolio] 3	Studio Art [2-D Design Portfolio; 5, 3-D Design Portfolio]	United States Government and 5, Politics	United States History 5,	World History 5,

College Board Advanced Placement (AP) Examination Credit

Note: This is not a comprehensive list as new tests are possible. If your exam is not listed, it will be determined by adviser consultation.

Exam:

 Exams disconfinued after May 2009; Computer Science AB, French Literature, Italian, Latin Literature
 Exams disconfinued after May 2011: French Language, German Language.
 Students who take the Calculus BC exam and earn a subscore of 3 or higher on the Calculus AB portion will receive credit for the Calculus AB exam, even if they do not receive a score of 3 or higher on the BC exam. The Calculus BC/AB subscore satisfies (GETC Area 2A.

* UC Transfer Admission Area:
 * UCB-Elehavioral and Social Sciences, UCE=English, UCH=Humanities, UCM=Math, UCS=Biological and Physical Sciences
 * UCE: If English AP test score of 3.4, 5 was achieved prior to completing any transferable English composition course(s), 8 dm into of transferable composition requirements (UCE) are activated to the AP exam, and none of two English Composition requirements (UCE) are activated and English and English and English interaction with scores of 4 or 5 as UWP 1 and English 3 therefore we will not allow transfer credit for any duplicabed English courses.
 * Composition with scores of 4 or 5 as UWP 1 and English 3 therefore we will not allow transfer credit for any duplicabed English courses.

• See www.assist.org, Help Topics: UC Transfer Admis Eligibility for details related to UC Transfer Admission Courses.

IGETIC Area:

• Each AP exam may be applied to one IGETIC area as satisfying one course requirement, with the exception of Language other than English (LOTE).

• There is no equivalent AP exam for the Area 1B. Critical Thinking / Composition requirement.

• The equivalent AP exam for the Area California community college adviser and www.assist.org.

• For dealist regarding GETIC certification, see your California community college adviser and www.assist.org.

Help Topics: IGETIC. Suddents entering UC Davis with partial IGETIC certification should contact their dean's office.

Duplicate Credit Allowance for Coursework/Exams:
The university does not appeared live acid for duplicate college coursework or AP/IB exams, whether taken before or during enrollment at the university. Exceptions to this policy are indicated in this column. We encourage students who have AP credit to speak with an accademic adviser in their major department or dean's office to determine which courses will provide the greatest benefit.

UC Davis Area:

EN=English FL=Foreign Languages SS=Social Science

HU=Humanities NS=Natural Sciences

* UC Davis College Area Requirements:
 a. Periorily satisfies Area (Preacht) requirements for the A.B. degree.
 b. A units of credit loward Natural Sciences Credit or Preparatory Course Work allowed for science majors for each Natural Sciences exam passed, except 8 units of redit allowed for Mathematics BC and Physics B exams.
 c. Satisfies A lower-division units of the English Composition requirement.
 c. Satisfies A lower-division units of the English Composition requirement.
 e. Exam exverts units rowers the Taglish Composition requirement.
 e. Exam exverts units roward the Unrestricted Electives requirement.
 f. Language exams (except for Latin), and the Literature exams in French and Spanish, satisfy the Fareign Language requirement.
 f. Language and Culture exams do not satisfy the Fareign Language requirement.

UC Davis Pattern Of General Education: Courses for which AP credit has been granted may not be used as a substitute for courses required as part of the UC Davis GE Requirement; see Advanced Placement (AP) Examinations on page 35 and page 42.

International Baccalaureate (IB) Higher Level Examination Credit

Although Chemistry 2A may be taken for full credit, students are strongly encouraged to enroll in the 2AH/BH/CH sequence. Satisfies the university Entry Level Writing Requirement
 A score of 6 or intigher on the Standard Level [SL] All
 English exam also satisfies the university Entry Level Writing
 English exam also satisfies the university Entry Level Writing
 Requirement, though it does not result in any course credit. Satisfies the university American History and Institutions requirement. þ Biological Sciences 2A is the first course students majoring in the life sciences. g, h g, h g, h g, h Letters and Science ı ī O 1 Ф Ф ī Φ 1 1 1 **Biological Sciences** 1 ٩ 1 ı Φ 1 Φ Φ Agricultural and Environmental Sciences UC Davis Area ³ 글 글 SS NS R S 글 글 呈 呈 글 呈 SZ Š SS \mathbb{Z} \mathbb{Z} Ш SS 료 교 료 료 교 료 교 교 Determined by dept. or major adviser Determined by dept. or major adviser Determined by dept. or major adviser rmined by dept. or major adviser or major adviser Determined by dept. or major adviser ned by dept. or major adviser Determined by dept. or major adviser Determined by dept. or major advise Determined by dept. or major advise Determined by dept. or major advise Continuing UC Davis Course ned by dept Determ Deter Dete History 17A, 17B UC Davis Course Equivalencies ² Economics 1A and 1B French 1, 2, 3 French 21, 22 Chemistry 2A German 1, 2 German 1, 2 French 21, 22, 23 Italian 4, 5 History 4C History 6 3B or 4F 3B or 4F 3B or 4F 5A w/o lab 3B or 4F 3B or 4F 58 w/o lab 5A w/o lab 3B and 6A φ 4E ٧ 4B 38 3B 1 Credit Toward Degree; Quarter Units ω ω ω ω ω ω ω ω ω ω ω ω ω ω ω ω 5, 6, 7 5, 6, 7 5, 6, 7 5, 6, 7 5, 6, 7 5, 6, 7 5, 6, 7 5, 6, 7 5, 6, 7 5, 6, 7 5, 6, 7 5, 6, 7 Score 5, 6, 5, 6 B (non-native language; for English, see "English" above) B (non-native language; for English, see "English" above) A1 (native language; for English see "English" above) A1 (native language; for English see "English" above) A2 (second language; for English see "English" above) A2 (second language; for English see "English" above) A1 (native language; for English see "English" above) A2 (second language; for English see "English" above) Classical Languages IB Area History History History English English English History ı East / South Asia and Oceania Business and Management Design Technology Computer Science Classical Greek Islamic World English A2 German A1 German A2 Examination French A2 Geography German B English A1 Chemistry French A1 French B Italian A 1 Italian A2 English B Americas Europe Africas Dance

International Baccalaureate (IB) Higher Level Examination Credit

			_																
		If student elects to register in Mathematics 12, 16A, 17A or 27 LA, 4/he is subject to the Mathematics Placement Requirement (MRR). For details, visit math. ucdavis.edu/undergrad/math_placement/	If student elects to register in Mathematics 12, 16A, 17A or 27 A, sylve is subject to the Mathematics Placement Requirement [MRR]. For details, visit math. ucdavis.edu/undergrad/math_placement/	If student elects to register in Mathematics 12, 16A, 17A and 22 A, $_{\rm A}$ /nF is subject to the Mathematics Placement Requirement [MRR]. For details, visit math ucdavis edu/undergrad/math_placement/															
ı	Φ	g, h	g, h	g, h	4	ı	g, h	ı	1	ı	ı	1	ı	Φ	ı	ı	1	ı	1
	1	1	1	1	1	1	1	1	1	1	1	1	1		1	ı	1	1	1
-1	Φ	ı	1	1	4	1	1	ı	1	ı	1	1	1	Φ	1	ı	1	1	1
	1	1	1	1	1	ı	1	ı	1	ı	1	ı	1	ı	1	ı	1	ı	1
చ	Η	SZ	SZ	SZ	H	SS	SZ	H	료	Ħ	SS	SS	H	Ħ	료	н	呈	呈	1
ı	Determined by dept. or major adviser	Determined by dept. or major adviser	Determined by dept. or major adviser	Determined by dept. or major adviser	Determined by dept. or major adviser	Determined by dept. or major adviser	Determined by dept. or major adviser	1	1	1	Determined by dept. or major adviser	Determined by dept. or major adviser	I	Determined by dept. or major adviser	1	1	1	ı	ı
ı	Latin 1, 2, 3	Math 21A, 21B (credit for one math series only)	Math 17A, 17B (credit for one math series only)	Math 16A, 16B (credit for one math series only)	Music 10	Philosophy 1	Physics 1AB or 10	1	1	ı	Psychology 1	I	1	Spanish 28	1	1	1	I	1
6 A	ı	2A	2A	2A	ı	ı	5A w/o lab	3B and 6A	3B and 6A	6 A	4	ı	3B or 4F	3B and 6A	3B and 6A	6	3A	ı	ı
ω	∞	∞	∞	ω	ω	ω	ω	ω	ω	ω	ω	ω	ω	ω	ω	ω	ω	ω	30
5, 6, 7	5, 6, 7	K .	5, 6, 7	, 6, 7	7,6,7	5, 6, 7	5, 6, 7	5, 6, 7	5, 6, 7	, 6, 7	7,6,7	5, 6, 7	5, 6, 7	5, 6, 7	5, 6, 7	5, 6, 7	5, 6, 7	5, 6, 7	30 pts. or higher
B (non-native language; for English, see "English" above)	Classical Languages 5,	,	3,	- 5,	. 5,	. 5	ι, γ	A1 (native language; for English see "English" above)	A2 (second language; for English see "English" above)	B (non-native language; for English, see "English" above)	. 5,	. 5	History 5.	A1 (native language; for English see "English" above)	A2 (second language; for English see "English" above)	B (non-native language; for English, see "English" above)	. 5	. 5	® ō.£
Italian B	Latin	Mathematics	Mathematics	Mathematics	Music	Philosophy	Physics	Portuguese A 1	Portuguese A2	Portuguese B	Psychology	Social & Cultural Anthropology	South Asia and the Middle East	Spanish A 1	Spanish A2	Spanish B	Theatre Arts	Visual Arts	IB Diploma

Note: This is not a comprehensive list as new tests are possible. If your exam is not listed, it will be determined by adviser consultation.

• For details regarding IGETC certification, see your California community college adviser and www.assist.org, Help Topics: IGETC. Students entering UC Davis with partial IGETC certification should contact their dean's office.

2 UC Davis Course Equivalencies and Credit Allowance for Duplicate Coursework/Exams:
The university does not generally award full credit for duplicate college coursework or AP/IB exams, whether taken before or during enrollment at the university.
We encourage students who have IB credit to speak with an academic adviser in their major department or dean's office to determine any restrictions and which courses will provide the greatest benefit.

FL=Languages SS=Social Science 3 UC Davis Area: HU=Humanities NS=Natural Sciences

EN=English

UC Davis College Area Requirements:
 a. Satisfies first half of English Composition requirement.
 b. Satisfies A lower-division units of the English Composition requirement.
 c. Exam A. Statisfies first course loward English Composition requirement of French and Latin exams satisfy the Foreign language equirement for A.B. degree e. Freign Language equirement (A.B. degree) satisfied by the following exams: French A1, A2, B. thalian A1, Latin, Spanish A1.
 f. Music exam partially satisfies Area (Breadth) requirement for A.B. degree.
 g. 4 units of realt toward Natural Sciences.
 h. Credit or Preparatory Course Work allowed for Mathematics and Physics exams.

UC Davis Pattern Of General Education:
Courses for which IB credit have been granted may not be used as a substitute for courses required as part of the UC Davis GE Requirement; see International Baccalaureate (IB) Examinations on page 35 and page 42.

ADMISSION AS A TRANSFER STUDENT

The University of California defines a transfer applicant as a student who has been a registered student in a regular term at a college, university or in college-level extension classes since graduating from high school. Summer session attended immediately following high school graduation is excluded in this determination. If you are a transfer applicant, you may not disregard any of your college records and apply for admission as a freshman.

UC Davis gives highest priority to junior-level transfer applicants from California community colleges. To apply to majors in the Colleges of Biological Sciences, Engineering and Letters and Science, students must be junior-level applicants with a minimum of 90 quarter (60 semester) units of UC-transferable coursework, including courses in progress or planned. In the College of Agricultural and Environmental Sciences, junior-level applicants will be given highest priority, but lower-division applicants may be considered if space allows.

Meeting the transfer admission requirements for UC does not guarantee admission to UC Davis. Due to limited enrollment space, transfer applicants who are admitted generally well exceed UC admission criteria. Foremost is the applicant's academic performance and preparation for the selected college and major. To be competitive, you must maintain a GPA of 2.800 or higher. In some cases, personal characteristics, experiences and circumstances will also be considered.

Applications far exceed the number of spaces available in majors such as biotechnology, communication, international relations, psychology, viticulture and enology and all majors in the Colleges of Biological Sciences and Engineering. Applicants must complete specific lower-division major preparation courses with a specific GPA in the major and an overall required GPA.

To view our selective majors and their specific requirements for admission, see http://admissions.ucdavis.edu/admission/transfers/tr_selection_process.cfm.

UC Transfer Admission Requirements for California Residents

To be eligible for admission to UC as a junior transfer student, you must fulfill both of the following criteria:

- **1.** Complete 90 quarter (60 semester) units of UC-transferable credit with a minimum 2.400* GPA. No more than 21 quarter (14 semester) units may be taken Pass/No Pass.
- **2.** Complete the following seven UC-transferable college courses, earning a grade of *C* or better in each course:
- Two courses in English composition;
- One course in mathematical concepts and quantitative reasoning;
- Four courses chosen from at least two of these subject areas: arts and humanities, social and behavioral sciences, and physical and biological sciences.

Each course must be worth at least 4-5 quarter (3 semester) units. Completing the Intersegmental General Education Transfer Curriculum (IGETC) before transferring to UC may satisfy the required seven-course pattern for UC admission, depending on the courses you take. For more information, see http://www.assist.org.

Alternatives for Satisfying UC Transfer Admission Requirements

If you were eligible for admission to UC when you graduated from high school—meaning you satisfied the subject, scholarship and examination requirement—or were identified by UC during the senior year as Eligible in the Local Context (ELC) and completed the Subject and Examination Requirements by your senior year, you are eligible to transfer with a minimum C (2.000)* average in your UC-transferable college coursework.

If you met the Scholarship Requirement in high school, but did not satisfy the 15-course Subject Requirement, you must take UC-transferable college courses in the missing subjects, earn a $\it C$ or better in each required course and maintain a 2.000 GPA to be eligible to transfer.

UC Transfer Admission Requirements for Nonresidents

The UC transfer admission requirements for nonresident transfer applicants are very similar to those for California residents. Nonresidents must have a GPA of 2.800* or higher in all UC-transferable college coursework.

*Please note that meeting UC admission requirements does not guarantee admission to UC Davis. To be a competitive candidate for admission, you must have an overall GPA of 2.800 or higher.

Transfer Credit

Coursework from other colleges and universities is considered UC-transferable if the applicant completed the course at an institution that is recognized by the University of California. In addition, the coursework must be comparable to courses and levels offered within the University of California.

A total of 105 quarter (70 semester) UC-transferable units toward a university degree may be earned at a community (two-year) college. You can find information about transferable credit from California community colleges at http://www.assist.org. Only subject credit will be granted for courses taken in excess of this amount.

If you have completed 120 quarter (80 semester) units or more of UC-transferable four-year college units or a combination of community college and four-year college units, your admission is subject to approval by the respective dean for majors in the Colleges of Agricultural and Environmental Sciences, Biological Sciences and College of Letters and Science.

Advanced Placement (AP) Examinations

Transfer credit is granted for each College Board Advanced Placement (AP) examination completed with an official score of 3, 4 or 5. To learn more, see Advanced Placement (AP) Examinations, on page 35, and College Board Advanced Placement (AP) Examination Credit, on page 36.

International Baccalaureate (IB) Examinations

UC Davis recognizes the International Baccalaureate (IB) examinations for college credit. Higher Level examinations presented with official scores of 5, 6 or 7 receive 8 quarter (5.3 semester) units of degree credit and in specific instances are deemed comparable to various lower-division courses. Students completing the International Baccalaureate (IB) diploma with a score of 30 or above will receive a maximum of 30 quarter (20 semester) units. The credit will apply toward the minimum 180 quarter units needed to

receive a bachelor's degree. To learn more, see International Baccalaureate (IB) Examinations, on page 35 and International Baccalaureate (IB) Higher Level Examination Credit, on page 40.

Limited Status

Students in limited status are those whose special achievements qualify them to take certain university courses toward a definite and limited objective.

Currently the Colleges of Agricultural and Environmental Sciences, Biological Sciences, Engineering and Letters and Science do not consider limited status applicants. As an alternative, you may wish to consider enrolling in our UC Davis Extension Open Campus program.

Second Baccalaureate

Applicants who have a bachelor's degree substantially equivalent to one granted by the University of California, are considered as an undergraduate seeking a second bachelor's degree. Admission under this status will require a superior academic record and clear evidence of a change in objective. The College of Engineering will consider applicants if their first degree is not in engineering and if they complete the lower-division engineering program at a California community college. Admission to the College of Engineering requires approval of the Assistant Vice Chancellor of Undergraduate Admissions and dean of the college. You must submit the online UC undergraduate application for admission and scholarships during the appropriate UC filing dates. The Colleges of Agricultural and Environmental Sciences, Biological Sciences and Letters and Science do not consider second baccalaureate applicants.

UC Intercampus Transfer

If you are an undergraduate student currently or previously registered at another UC campus and have not since been registered in a non-UC institution, you may apply for transfer to the UC Davis campus. Filing dates, the application, fees and admission and selection requirements are the same as those listed for new transfer applicants. For current UC students who wish to attend UC Davis as an intercampus visitor and plan to return to their home UC campus, see the Intercampus Visitor Program, on page 76.

ADMISSION AS AN INTERNATIONAL STUDENT

International students attend the University of California, Davis, from many countries around the world. There were over 100 different countries represented on the UC Davis campus in the 2011-2012 academic year, by an international student population of approximately 1,800 students, as well as approximately 2,500 international faculty and researchers.

International Freshman Applicants

Non-immigrants studying in the United States must meet the same requirements as domestic California and non-California residents. Students studying outside the United States must complete secondary school, earn superior marks in academic subjects, sit for the UC required exam and may be required to demonstrate English proficiency. For more information, see http://admissions.ucdavis.edu/international.

International Transfer Applicants

International students applying to transfer to UC Davis from California or U.S. colleges or universities are considered for admission using the same transfer admission criteria as domestic students. Applicants who have attended foreign only and/or a combination of foreign and domestic colleges and universities will be evaluated using courses and grades from both institutions.

Priority admission consideration is given to prospective California community college transfer students, including international students, who are prepared to begin their junior or third year of study. Coursework from other colleges and universities is considered UC-transferable if the applicant completed the course at an institution that is recognized by the University of California and when the coursework is comparable to courses offered within the University of California. For more information, see http://admissions.ucdavis.edu/international.

Required International Academic Records

International students are responsible for providing UC Davis with official academic transcripts and/or certificates beginning with secondary school records. College and university records should indicate subjects taken; grades or marks earned; rank in class; number of academic terms per year; number of weeks in each academic term; and number of hours per week devoted to lecture and laboratory. Certifications must be provided for any university or government examinations the student has undertaken. Note: It is not possible to disregard any college or university coursework undertaken within the United States or abroad.

English Proficiency

Applicants must demonstrate English proficiency if they have been studying in the United States for less than two years, English is not their native language, and/or the language of instruction prior to study in the United States was not English. Applicants may demonstrate proficiency in one of the following ways:

- Complete two UC-transferable college courses (3 semester or 4–5 quarter units each) in English composition with C grades or better at an accredited U.S. college or university.
- Achieve a minimum score of 550 on the paper-based Test of English as a Foreign Language (TOEFL) or 213 on the computer-based TOEFL or 80 on the Internet-based TOEFL. For more information, see http://www.toefl.org.
- Achieve a minimum score of 7 (academic module) on the International English Language Testing System (IELTS).
- Achieve a minimum score of 560 on the Writing component of the SAT Reasoning Test.

AFTER YOU APPLY FOR ADMISSION

A few weeks after you apply, the University of California will notify you that your application has been received and processed. UC Davis will also notify you once the application has been received at our campus. At this time you should use your UC Davis Student ID to create a MyAdmissions account online at http://myadmissions.ucdavis.edu. You will be able to use this secure website to check your application and admission status at the UC Davis campus only.

Students admitted to UC Davis can use MyAdmissions to check deadlines and event dates, review their financial aid and scholarship awards (MyAwards) and accept our offer of admission. Admitted students who wish to officially accept our offer of admission must submit their Statement of Intent to Register (SIR) and complete all pre-enrollment tasks, such as:

- MyAwards—Financial Aid Notice and Scholarships
- Student Housing
- Orientation (fall admits only)
- Statement of Legal Residence (SLR)
- High School Transcripts
- College/University Transcripts
- AP/IB Examination Results
- · Test Scores
- Requests for I-20 or DS-2019
- International Records
- Accommodation for a Disability (if applicable)
- Health Insurance Requirement
- Hepatitis B Statement

After applying, transfer students are required to update their grades and course records at the online UC Transfer Academic Update (TAU) to ensure that the campuses have the most current academic information available prior to an admission decision. For details and deadlines, see http://universityofcalifornia.edu/admissions/how-to-apply/after-you-apply/update-transfer-application.

Required Academic Records for All Students

You must accurately report all examination scores, as well as high school and any college/university work undertaken within the United States or abroad.

Freshman applicants are required to submit official scores for the following examinations:

- ACT Plus Writing OR
- SAT Reasoning Test And
- SAT Subject Tests (if taken)

For more information regarding ACT, see http://www.act.org; the UC Davis ACT code is 0454. For more information regarding SAT, see http://www.collegeboard.org; UC Davis College Board code is 004834.

If you are admitted to UC Davis, you are expected to arrange to have all of your official final transcripts to be sent to Undergraduate Admissions by the deadline. You do not need to submit official transcripts before this time, unless requested. All students must provide official final:

- · High school transcripts
- · College transcripts

All students completing the following examinations will be required to submit official scores:

- Advanced Placement (AP)
- International Baccalaureate (IB)

International applicants will be required to submit official scores for the following examination:

- TOEFL OR
- IELTS

Submit official documents and test scores to:

Undergraduate Admissions University of California One Shields Avenue Davis, CA 95616-8507

SPECIAL PROGRAMS

Deferred Enrollment

The Deferred Enrollment program allows newly admitted undergraduate students to postpone their initial enrollment at UC Davis for up to one year. The purpose is to allow time to pursue other non-academic activities and opportunities that will assist students in clarifying their educational goals (e.g., travel, job opportunities, non-collegiate experience, time to resolve personal or medical problems). Students are not allowed to enroll in any coursework at another college or university during this time.

To be eligible for Deferred Enrollment, you must return your affirmative Statement of Intent to Register (SIR) with the deposit by the deadline, and satisfy all university admission and entrance requirements and provide all official transcripts and examination scores. After submitting the SIR, you can browse our deferred enrollment FAQs and apply for deferred enrollment through your MyAdmissions website. You must also submit a \$70 processing fee within seven days of submitting your deferred enrollment application.



FEES, EXPENSES AND FINANCIAL AID

FEES AND EXPENSES

Give careful consideration to the total financing of your university education. If you will need funds beyond those that you and your family can provide, you should apply for financial aid well in advance of enrollment. The deadlines for applying for financial aid (grants, loans, Work Study and scholarships) are listed on the following pages.

The most up-to-date student fee information is available at http://budget.ucdavis.edu/studentfees. Every student must pay the quarterly fees, and any amounts charged to the student account, in full by the fee payment deadline listed in the Registration Guide. A Deferred Payment Plan (DPP), which allows students to pay quarterly student and housing fees in three monthly installments, or semester fees in four monthly installments, is available.

Course Materials Fees

Students may be charged fees in some courses for the use, rental or consumption of materials, tools or equipment, or for the costs of materials or services necessary to provide a special supplemental educational experience. For example, course materials fees may cover the purchase of chemicals and glassware for a science laboratory or art supplies for an art studio class. They might also cover film rentals, field trips, or the purchase or rental of specific equipment. Courses that may be subject to the course materials fee are listed in the *Registration Guide*.

Part-Time Students

Students approved for enrollment on a part-time basis pay the same fees as full-time students, but pay only one-half of Tuition. Part-time nonresidents pay one-half of the Nonresident Supplemental Tuition. The Petition to Change Status Form should be filed with the Office of the University Registrar in 12 Mrak Hall. The petitions must be filed on or before the 10th day of instruction for the term in which the reduction is to be applied.

UC Employee-Student Fees

Reduced fees are available to UC career employees and certain UC retirees who are qualified for admission to the university. The employee-student must file a petition the Employee-Student Reduced Fee Authorization Form with the Office of the University Registrar in 12 Mrak Hall for the reduction of fees. The form must be filed on or before the 10th day of instruction for the term in which the reduction is to be applied. Employee-students pay one-third of the full-time Registration Fee and one-third of the full-time Tuition. Employee-students also pay the Memorial Union Fee and the Student Facilities Safety Fee.

Employee students may enroll for up to nine units or three courses per quarter or semester, whichever is greater. Information is in *Personnel Policies for Staff Members* (section 51), available in department offices, at Shields Library, the Staff Development and Professional Services Office, and on the Internet. Petitions are also available on the Internet.

Motor Vehicle Parking Permit and Bicycle Licensing Fees

Parking permit information and rates are available on the TAPS website at http://taps.ucdavis.edu or call (530) 752-8277.

A California State bicycle license fee is required for all bicycles on campus (initial license, \$10.00; renewals, \$5.00). For more information, call (530) 752-2453 or visit the website above.

Costs for a Year at UC Davis

Cost of living expenses are adjusted annually and fees are subject to change without notice. For the most recent Student Expense Budget figures, please refer to the Financial Aid Office's website for undergraduate or graduate and professional students at http://financialaid.ucdavis.edu.

International Student Expenses

International students are responsible for all of their expenses while studying at UC Davis. The expenses include Nonresident Supplemental Tuition, Tuition, room and board and a modest amount for personal expenses. For the 2009-2010 academic year, costs for undergraduate students were \$49,097. Because the exact cost for tuition and fees is not determined until just before the beginning of the academic year, this amount is likely to increase without advance notice. For the latest costs, see http://financialaid.ucdavis.edu/undergraduate/cost/UGBudgets.html.

During the admission process, most international undergraduate students are required to complete the "Confidential Financial Statement" form certifying that funds are available for twelve months support. It is very important that students have adequate, reliable and continuing financial support for the whole time they are here. After students arrive in the United States, it is extremely difficult to obtain additional funding. The university does not offer grants or financial aid to international undergraduate students.

All students need to be aware that there are numerous initial expenses during the first few months, including tuition and fees, an initial down payment for housing, food and personal expenses. We suggest that you have a minimum of \$10,500 available for immediate expenses. Careful budgeting is essential for international students.

FEE REFUNDS

Cancellation, Withdrawal and Fee Refunds

To cancel your registration before the first day of instruction or to withdraw from the university on or after the first day of instruction, you must complete a Cancellation/Withdrawal Form and return the form to the Office of the University Registrar. If you do not submit a Cancellation/Withdrawal Form, you will be liable for fees according to university policy (below). No exceptions will be made to this policy.

For students who pay fees and then cancel or withdraw with official approval before the end of any quarter, fees may be refunded according to the Schedule of Refunds, on page 48.

Student Fees

As a result of Regental, legislative, gubernatorial, and/or campus actions, these fees may change without notice. For up-to-date fee information, see http://budget.ucdavis.edu/studentfees/. Programs and courses may have fees that are not listed here, check with your advisor.

	Underg	Undergraduate	Graduate	luate	Law ² (Semester)	Medicine	Management ³	Veterinary Medicine ⁴ (Semester)	Master of Public Health ⁵	Master of Preventive Veterinary Medicine ⁵	Betty Irene Moore School of Nursing ⁶	Capital Area North Doctorate in Educational Leadership	Health Informatics
	Resident	Nonresident	Resident	Nonresident	J.D.	M.D.	M.B.A.	D.V.M	M.P.H.	M.P.V.M.	M.S.	Ed.D.	M.S.
Student Services Fee ⁸	\$324.00	\$324.00	\$324.00	\$324.00	\$486.00	\$324.00	\$324.00	\$486.00	\$324.00	\$324.00	\$324.00	\$324.00	\$324.00
Tuition ⁸	\$3,740.00	\$3,740.00	\$3,740.00	\$3,740.00	\$5,610.00	\$3,740.00	\$3,740.00	\$5,610.00	\$3,740.00	\$3,740.00	\$3,740.00	\$3,740.00	\$3,740.00
ASUCD Fee	\$35.00	\$35.00											
GSA Fee			\$12.00	\$12.00			\$12.00		\$12.00	\$12.00	\$12.00	\$12.00	\$12.00
LSA Fee					\$30.00								
Memorial Union Fee	\$28.50	\$28.50	\$28.50	\$28.50	\$42.75	\$28.50	\$28.50	\$42.75	\$28.50	\$28.50	\$28.50	\$28.50	\$28.50
Facilities and Campus Enhancements Fee	\$134.83	\$134.83	\$134.83	\$134.83		\$134.83	\$134.83	\$202.25	\$134.83	\$134.83	\$134.83	\$134.83	\$134.83
Legal Education Enhancement and Access Program Fee					\$192.41								
Campus Expansion Initiative	\$179.88	\$179.88	\$63.64	\$63.64	\$91.01	\$63.64	\$63.64	\$95.46	\$63.64	\$63.64	\$63.64	\$63.64	\$63.64
Student Services Maintenance	\$111.61	\$111.61											
Fee and Student Activities & Services Initiative Fee													
Student Facilities Safety Fee	\$22.00	\$22.00	\$22.00	\$22.00	\$33.00	\$22.00	\$22.00	\$33.00	\$22.00	\$22.00	\$22.00	\$22.00	\$22.00
Student Health Services Fee	\$44.00	\$44.00	\$44.00	\$44.00	\$66.00	\$44.00	\$44.00	\$66.00	\$44.00	\$44.00	\$44.00	\$44.00	\$44.00
Unitrans	\$6.00	\$6.00											
Health Insurance ⁷	\$460.00	\$460.00	\$760.00	\$760.00	\$1,140.00	\$630.00	\$760.00	\$1,140.00	\$760.00	\$760.00	\$760.00	\$760.00	\$760.00
Professional Degree Supple-					1	0 0 1	00000	00000	00000	00 710 14	0000	00 7 00 1 0	0000
mental lutton					\$15,609.00	\$4,659.00	\$7,392.00	\$7,608.00	\$2,270.00	\$1,914.00	\$1,910.00	\$1,334.00	\$2,000.00
Course Motorials and Sorriose						\$01.0¢							
Course materials and services Fee 1						\$125.00		\$1,262.00					
Total Full-Time Student Fees, CA Resident	\$5,085.82		\$5,128.97		\$23,300.17	\$9,831.97	\$12,520.97	\$16,545.46	\$7,398.97	\$7,042.97	\$7,038.97	\$6,462.97	\$7,128.97
Nonresident Tuition ⁸		\$7,626.00		\$5,034.00	\$6,123.00	\$4,082.00	\$4,082.00	\$6,123.00	\$4,082.00	\$4,082.00	\$4,082.00	\$4,082.00	\$4,082.00
Total Full-Time Student Fees, Nonresident		\$12,711.82		\$10,162.97	\$27,369.17	\$13,913.97	\$16,602.97	\$22,668.46	11,632.97	\$11,276.97	\$11,120.97	\$10,544.97	\$11,210.97
Total Part-Time Student, CA Resident	\$3,215.82		\$3,258.97										
Total Part-Time Student, Nonresident		\$7,028.82		\$5,775.97									

The Law School operates on the semester system. Nonresident Law students pay a Professional Degree Supplemental Tuition (formerly Professional School Fee) of \$13,555.00 per semester. 1 A course materials and services fee may apply to some undergraduate and graduate courses; see http://budget.ucdavis.edu/studentfees/documents/special/course-materials-fees.pdf.

3 Students enrolled in the Graduate School of Management Working Professionals Program pay a flat rate per unit in lieu of the fees above. More information is available at http://www.gsm.ucdavis.edu/. 4 School of Veterinary Medicine fees reflect the change from quarters to semesters phased in beginning with students entering in 2011-12. 4th year students also attend summer quarter and

5 Nonresident Master of Public Health students pay a Professional Degree Supplemental Tuition (formerly Professional School Fee) of \$2,422.00 per quarter and nonresident Master of Preventative Veterinary Medicine students pay a Professional Degree Supplemental Tuition of \$2,066.00 per quarter.

- Professional School Fee for Betty Irene Moore School of Nursing only applies to Master's Degree students in the Nursing Science and Health-Care Leadership Program.

7 Undergraduate and Graduate students are automatically in the Student Health Insurance Plan (SHIP) unless they are able to prove comparable coverage under another insurance plan. More information is available at http://healthcenterucdavis.edu/insurance/.

8 Systemwide tuition and fees for 2012-13 had not yet been determined as of publication deadline. Figures presented reflect approved 2011-12 levels. Final approved 2012-13 tuition and fee levels may differ from the amounts presented.

The effective date for determining a refund of fees is the date you file a completed Cancellation/Withdrawal Form with the Office of the University Registrar and it is presumed that no university services will be provided to you after that date. The percentage of fees that may be refunded is determined by the number of calendar days (not school days) elapsed, beginning with the first day of instruction.

If you enrolled in classes, you will be dropped from all of your courses automatically when the Cancellation/ Withdrawal Form is processed. If you enrolled but have not paid fees in full by the tenth day of instruction, you will be administratively withdrawn and fees for the first 10 days of instruction will be charged to your account.

New Undergraduate Students

The nonrefundable \$100 deposit paid when you accepted admission and returned your Statement of Intent to Register (SIR) is withheld from the registration fee and the Schedule of Refunds is applied to the balance of fees assessed.

Therefore, on or before the first day of instruction, registration fees paid are refunded in full minus \$100. After the first day of instruction, the nonrefundable \$100 deposit is withheld from the registration fee and the Schedule of Refunds is applied to the balance of fees assessed.

All Continuing Students, Readmitted Students and New Graduate Students

On or before the first day of instruction, registration fees are refunded in full minus a \$10 service charge for cancellation/withdrawal. After the first day of instruction, the Schedule of Refunds is applied to the total registration fees and tuition. The Schedule of Refunds does not apply to other fees assessed; e.g. Bookstore, Student Health.

Planned Educational Leave Program (PELP)

The Schedule of Refunds also applies to students who participate in the Planned Educational Leave Program (PELP). Thus, for a full refund of registration fees paid, you must file a completed approved PELP Form with the Office of the University Registrar before or on the first day of instruction; see Leave of Absence: Planned Educational Leave Program (PELP), on page 86 in the Academic Information chapter.

Schedule of Refunds

The Schedule of Refunds applies to all continuing and readmitted students and new students who do not receive federal financial aid.*

The Schedule of Refunds refers to calendar days beginning with the first day of instruction. The number of days elapsed is determined from the date the completed Cancellation/Withdrawal Form or PELP Form is returned to the Office of the University Registrar. Percentages listed (days 1-35) should be applied respectively to University Registration Fee, Tuition and Nonresident Supplemental Tuition.

Elapsed Calendar Days	Percentage of Fees Refunded
0-1	100% less \$10.00
2–7 days	90%
8–18 days	50%
19-35 days	25%
36 days and over	0%

*New students who receive federal financial aid and withdraw during their first academic term may be refunded fees according to a Modified Fee Refund Schedule, available at the Financial Aid Office.

Student Health Insurance Plan (UCSHIP) Coverage and Refund of UCSHIP Fees

The University of California requires that all students have health insurance. To help students meet this requirement, UC Davis automatically enrolls all registered students in the UC system-wide Student Health Insurance Plan (UCSHIP). Fees for UCSHIP coverage are automatically charged to the student's account each term along with registration fees.

- For students who want to be enrolled in UCSHIP, enrollment is automatic-no action is required.
- Students with comparable insurance, who do not want to be enrolled in UCSHIP, must submit a UCSHIP waiver application at http://shcs.ucdavis.edu/insurance by the published deadline; see the Academic Calendar, on page 1. If a waiver is approved, UCSHIP enrollment will be waived through the end of the academic year. An approved waiver is effective for the duration of the current academic year only. Waiver applications must be filed each academic year.

On campus medical and mental health care is available to all students at SHCS, even if UCSHIP is waived.

More waiver information or information regarding benefits, eligibility, deadlines, or insurance coverage if your registration status changes, can be found at http://shcs.ucdavis.edu/insurance or by visiting the SHCS Insurance Services office at the Student Health & Wellness Center.

FINANCIAL AID

Financial Aid Office 1100 Dutton Hall (530) 752-2390 (530) 754-6073 (Hearing Impaired) http://financialaid.ucdavis.edu

The Financial Aid Office provides financial assistance in the form of grants, scholarships, loans, and Work-Study employment. To apply, undergraduates and graduate students are required to file the Free Application for Federal Student Aid (FAFSA), available at http://www.fafsa.ed.gov.

The priority-filing period is January 1 to March 2 each year; however, students are encouraged to apply even if the deadline has passed. Although state and university funding may be depleted, Federal Pell Grants and Direct Loans are available throughout the year for eligible applicants.

UC Education Finance Policy for Undergraduates

UC Davis uses the University of California Education Finance Policy to determine financial aid awards for undergraduates. The policy looks at four factors to choose the type and amount of aid for each student:

- 1. Cost of attendance
- **2.** Expected Family Contribution (EFC) as assigned by the federal processor based on the FAFSA
- 3. Federal and state grant eligibility based on the FAFSA
- **4.** Undergraduate Self-Help and Loan Contribution, which is the amount that undergraduates are expected to contribute toward their cost of education at UC Davis

The Financial Aid Office can assist students with dependents or child care costs that exceed the standard student budgets.

Undergraduates with outstanding academic records are encouraged to apply for scholarships. For information about scholarship application process, see Undergraduate Scholarships and Awards, on page 51.

Graduate Student Funding

Graduate students and students in the professional schools at UC Davis (Medicine, Law, Veterinary Medicine and the School of Management) apply for financial aid by completing the Free Application for Federal Student Aid (FAFSA). Financial need is based on the information provided on the FAFSA and the student is sent a Student Aid Report (SAR) with the Student Contribution (SC) assigned by the federal processor. The SC is subtracted from the UC Davis Student Expense Budget (for the student's graduate program) to determine need-based eligibility. Graduate scholarships, fellowships and teaching and research assistantships are administered through the Office of Graduate Studies.

Satisfactory Academic Progress

Federal regulations require that undergraduate and graduate student financial aid recipients meet the published Standards for Satisfactory Academic Progress for Financial Aid concerning units and maximum quarters of attendance allowed to obtain a degree. A copy of these standards is available at http://financialaid.ucdavis.edu/undergraduate/students/SAP.html. Review the policy in detail and discuss it with your academic adviser.

For more information, contact the Financial Aid Office. Regulations and deadlines are subject to change.

Types of Financial Aid

Grants

A grant is an award that does not have to be repaid as long as the student remains eligible. Whenever criteria and funding levels permit, a student's financial aid award includes grants.

Federal Pell Grants. All undergraduate financial aid applicants are required to apply for a Federal Pell Grant each year by filing the FAFSA. Recipients must be enrolled at full time to receive the full amount of awarded Pell Grant and must maintain good academic standing and make satisfactory academic progress. Eligibil-

ity is determined by the federal government according to a formula developed by the Department of Education and approved annually by Congress. The UC Davis electronic notice (MyAwards) informs the student of the Pell Grant award amount.

Cal Grants. All undergraduate financial aid applicants who are California residents are encouraged to apply for a Cal Grant by submitting the FAFSA and a GPA Verification form before March 2. Cal Grants are awarded by the California Student Aid Commission (CSAC) and may be renewed each year for four years. For more information, see http://www.csac.ca.gov.

- **Cal Grant A Awards** are based on financial need and academic achievement and can be extended for one year for students entering a teaching credential program. Cal Grant A pays partial registration fees.
- **Cal Grant B Awards** are based on financial need and are for undergraduate students primarily from low-income backgrounds. Recipients are required to complete at least 12 units each quarter. Cal Grant B pays a quarterly stipend for living expenses for first-year students and a portion of the registration fees plus a quarterly stipend for living expenses for students in their second through fourth years.

Cal Grant A and B recipients who plan to enroll in a Teaching Credential Program (TCP) may be eligible to renew their Cal Grant award for an additional year. The additional year of payment is provided to students who are seeking an initial teaching credential and cannot be used for other graduate level courses of study.

University Grants (UC Grant). The university determines grant eligibility for undergraduates by subtracting a student and parent contribution, any federal or state resources the student receives, and a standard work and loan contribution from the cost of attendance. Any remaining eligibility would be funded with UC Grant. UC Grant funding for graduate students is awarded by the Office of Graduate Studies. Students in the professional schools and the School of Education are awarded grant by their academic departments.

Bureau of Indian Affairs (BIA) Grants are awarded to students who are at least one-fourth American Indian, Eskimo or Aleut as recognized by a tribal group served by the Bureau of Indian Affairs and who show financial need. Applicants must submit a Free Application for Federal Student Aid (FAFSA) and provide supporting documents. Students are advised to write to the agency that administers their tribal affairs to request a BIA Higher Education Assistance application. The BIA Financial Aid officer on campus can help complete the application. The amount of BIA grant depends on need and availability of funds at each BIA agency.

Loans

Financial Aid almost always includes a long-term loan. Awards are dependent on funding available. Some loan fund sources do not receive allocations each year. Repayment of these loans (with the exception of Federal Direct PLUS loans) begins after graduation or withdrawal from school. Students are encouraged to work as much as possible (while remaining full-time students) and to develop modest personal budgets to keep final loan indebtedness within a manageable range.

Health Profession Student Loans (HPSL) are awarded to students in the School of Veterinary Medicine who demonstrate financial need. Parental income information is required for HPSL applicants regardless of age and dependency status.

- \$2,500 plus fees maximum
- 5% interest
- Repayment begins twelve months after receipt of the degree or withdrawal

Federal Direct Subsidized and Unsubsidized William D. Ford Student Loans (Direct Loans) are available through the Financial Aid Office. Subsidized loans are based on financial need and interest accrued while the student is in school is paid by the federal government. Unsubsidized loans are available to students regardless of income and assets, and there is no interest subsidy.

- Undergraduates may borrow up to annual maximums of \$3,500 subsidized plus \$2,000 unsubsidized = \$3,500 for freshmen, \$4,500 subsidized plus \$2,000 unsubsidized = \$6,500 for sophomore, and \$5,500 subsidized plus \$2,000 unsubsidized = \$7,500 for juniors and seniors, up to a maximum aggregate indebtedness of \$23,000 for subsidized loan and \$31,000 in combined subsidized and unsubsidized loan
- Independent undergraduates may borrow unsubsidized Direct Loans up to annual maximums of \$9,500 for freshmen, \$10,500 sophomores, and \$12,500 for juniors and seniors, up to a maximum aggregate amount of \$57,500, of which \$23,000 can consist of subsidized loans
- Graduate and professional students may borrow subsidized Direct Loans up to an annual maximum of \$8,500. Health professions students may borrow higher amounts dependent on the length of their academic year
- Graduate and professional students may borrow unsubsidized Direct Loans up to an annual maximum of \$12,000
- For the most current interest rates on Direct Loans, see https://www.myedaccount.com/
- A 1.5% loan fee is charged on all Direct Loans. The fee is deducted proportionately from each disbursement
- For Direct Loans, repayment begins six months after graduation or withdrawal from school

Federal Direct Parent Loans for Students (Direct PLUS) are government-insured loans that are made to parents of dependent students.

- Parents may borrow Direct PLUS up to the cost of education minus other financial aid received during the years the dependent student is an undergraduate
- There is no interest subsidy for this loan
- A 4% loan fee is charged and deducted proportionately from each disbursement
- Repayment begins within 60 days after loan disbursement

Direct Grad Plus Loans. The Grad Plus Loan is provided by the William D. Ford Direct Loan Program. (Students in Teaching Credential programs are not eligible for Graduate Plus loans.)

- For the most current interest rates on Direct Loans, see https://www.myedaccount.com/
- Credit checks are required to be eligible for the Grad Plus. Students who do not meet the credit requirements for a Grad Plus may still obtain the loan with an endorser who does meet the credit requirements

- A 2.5% origination fee is deducted from the loan amount
- Repayment period begins 60 days after loan disbursement.

Federal Perkins Loans are for U.S. citizens or permanent U.S. residents. Loans may be limited to a percentage of student's need because of demand and limited funds. This is a subsidized loan, which means the federal government pays the interest on the loan while the student is enrolled in school. Repayment starts nine months after graduation or withdrawal from school and may be extended over 10 years. Additional deferments are possible for temporary total disability or volunteer service in a private, non-profit organization, VISTA or the Peace Corps. Some teachers of students from low-income families and full-time teachers of handicapped children may also qualify for partial loan cancellation.

Annual Federal Perkins Loan Limits

- \$4,000 for undergraduate students
- \$6,000 for graduate/professional students

Aggregate (Maximum) Loan Limits

- \$8,000 for a student who has not completed the first two years of undergraduate work and for programs that are less than two years in length
- \$20,000 for a student who has successfully completed two years of a program of education leading to a bachelor's degree but who has not completed degree work
- \$40,000 for a graduate/professional student (includes loans borrowed at the undergraduate level)

Emergency, Short-Term and Assistant Loans meet temporary or emergency financial needs of currently enrolled students. Please visit the financial aid website for requirements, instructions and the online application. Loan funds are provided by UC Davis alumni, ASUCD, the Cal Aggie Foundation, the Regents of the University of California and private donors.

- Emergency Loans. \$500 maximum. The maximum repayment period is 30 days
- Short-Term Loans. \$501 or higher; Assistant Loans: graduate students who are in the teaching assistant, research assistant, readership, associate-instructor or postgraduate researcher classifications can apply for a maximum of one month's salary. The maximum repayment period is six months or the end of the academic year, whichever occurs first
- Assistant Loans. graduate students who are in the teaching
 assistant, research assistant, readership, associate-instructor or
 postgraduate researcher classifications can apply for a maximum
 of one month's salary. The maximum repayment period is six
 months or the end of the academic year, whichever occurs first.

For applications and more information about applying, see http://financialaid.ucdavis.edu.

Federal Work-Study

Student Employment Services 1100 Dutton Hall (530) 752-0520; sec@ucdavis.edu; http://jobs.ucdavis.edu

Undergraduate Work-Study

The Federal Work-Study program allows students to earn part of their financial aid through part-time employment. To participate, students must file a Free Application for Federal Student Aid (FAFSA) and receive Work-Study as a part of their financial aid package. Work-Study awards offer both money for education and work experience. Work-Study recipients should obtain a Work-

Study job or ask to defer the Work-Study before December 1 or the award will be canceled. The Student Employment Center coordinates the Federal Work-Study program for undergraduates at UC Davis.

Community Service. A wide variety of community service jobs are available for students who apply for Work-Study funding. These jobs provide educational and rewarding work experience and help students connect with the community at large. Students applying for community service jobs also receive priority consideration for Work-Study funding.

Work-Study for Graduate Students

Work-Study funds for graduate students are allocated directly to the chairpersons of the graduate programs. Graduate students seeking Work-Study funding should contact their respective departments for further information. Students must file a FAFSA and have financial need to be considered for Work-Study funding.

Undergraduate Scholarships and Awards

Undergraduate & Prestigious Scholarships Office: 1100 Dutton Hall (530) 752-2804; scholarships@ucdavis.edu; http://scholarships.ucdavis.edu/scholarships/

Mailing address: Undergraduate & Prestigious Scholarships Office University of California One Shields Avenue Davis, CA 95616-8696

UC Davis recognizes outstanding students with scholarships awarded on the basis of academic excellence and exceptional promise. The Scholarship Office administers approximately 220 different undergraduate scholarships. Many more scholarships are handled through outside agencies.

Committees made up of faculty and staff determine scholarship eligibility. In addition to academic records (a minimum grade point average of 3.250 is required), selection may be based on letters of recommendation, test scores and a personal essay in which your university goals and objectives are stated. Some awards are limited to students in specific majors or colleges, residents of certain geographical areas, students of a particular class standing, or students with demonstrated financial need. Most scholarships are not renewable and you must reapply each year for scholarship aid.

Students applying to the university are considered for scholarships using the same forms completed for admission purposes. The undergraduate scholarship application for continuing students becomes available online in October and is due in early January. See the Scholarship Office website for instructions and the application. Scholarship recipients will be notified beginning in April and continue through late summer.

Regents Scholarships, among the highest honors that undergraduates at the university can receive, are granted to exceptionally promising freshmen or juniors enrolling in the fall quarter. Awards may be honorary (honorarium) or may be accompanied by a stippend (for students demonstrating financial need), which generally

covers the difference between family resources and yearly educational costs. These scholarships are renewable as long as students maintain a 3.250 cumulative grade point average.

- Dollar amounts vary, but students with demonstrated need may receive a stipend to cover up to the cost of attendance for California residents
- 2-year and 4-year renewable scholarships

Prestigious Scholarships and Fellowships are highly competitive, merit-based awards open to all UC Davis students. These awards have an extensive application process, and our office is available to assist you. Please visit the Undergraduate or Graduate Prestigious Scholarships & Fellowships section of our website for more details.

Special Prizes at UC Davis recognize outstanding performance, achievement and promise in special programs or majors. The most prestigious prize is the University Medal, presented to the most outstanding graduating senior.

- Plaques or certificates and cash awards
- College and school medals to outstanding graduates

Alumni Scholarships provided by the Alumni Association in cooperation with the university, are based primarily upon leadership and scholastic achievement. Your financial need and extracurricular activities may also be considered. For more information, see http://alumni.ucdavis.edu/s/787/ index.aspx?sid=787&gid=1&pgid=322.

- \$1,000 minimum
- New undergraduates only
- · Selection by local alumni association chapters

Military Scholarships are awarded to outstanding high school seniors without regard to financial need, as well as to UC Davis students who have demonstrated exceptional leadership and scholastic achievement during their freshman and/or sophomore years. Eligible high school seniors apply for the full 4-year scholarship and must file applications by November. UC Davis scholarship students participate in the Military Science (ROTC) Program. Information and applications are available from the Department of Military Science in 125 Hickey Gymnasium (530) 752-5211.

- Full fees, books and supplies
- \$1,000 per year for miscellaneous expenses
- 1-, 2-, 3- or 4-year scholarships

Other Scholarships are made possible by individual donors, private corporations and various agencies. Many organizations and groups conduct their own scholarship programs. In most cases, you apply directly to these sponsoring groups. Information on available outside scholarships and scholarship search services are available at http://financialaid.ucdavis.edu/scholarships/Outside.html.

 Graduate students are also eligible for various scholarships and fellowships; see Fellowships, Assistantships and Loans, on page 113.



STUDENT LIFE

STUDENT LIFE

As a UC Davis student, you are part of a diverse student community that fosters academic and career exploration as well as personal growth. The campus offers assistance with the practicalities of student life such as finding housing, staying healthy and affording a university education. Faculty members, staff and peer advisers are here to support your academic goals by helping you master concepts, study effectively, manage time and apply classroom material to careers. Whatever your academic and career aspirations, you'll find opportunities to enrich your student experience through internships, research, community service, student clubs and study abroad. UC Davis students also enjoy myriad recreational choices, from impromptu Frisbee games on the Quad to intercollegiate athletics, craft classes, backpacking trips and more.

LIVING AT DAVIS

On-Campus Housing

Residence Halls

Student Housing Office (530) 752-2033; studenthousing@ucdavis.edu

Living on campus adds a measure of convenience to your life and helps familiarize you with the campus. Some 4,500 undergraduate students live on campus each year, including about 90 percent of freshman students. In each of the residence hall complexes, students and staff help create and maintain an environment conducive to personal growth and educational achievement.

Rooms are furnished with a bed and mattress, desk and chair, bookcase, chest of drawers, study lamp and wastebasket for each resident.

Cost is based on room occupancy (single, double or triple) and meal plan choice. Rates are available online at http://housing.ucdavis.edu/fees. Each year's rates are subject to approval by the UC Regents, typically in May, become available after approval, and are effective for the following academic year.

All new freshmen whose Statements of Intent to Register (SIR) are received on time are guaranteed residence hall housing as long as they complete all of the instructions that accompany their contracts and submit the online application and reservation fee by the due date. Freshmen housing contract offers will be available online as soon as students submit their SIR. Transfer students that have submitted their SIR will be offered a housing contract in the residence halls and student housing apartment spaces. Transfer students under 24 years-old may live in the residence halls or student housing apartment spaces. Transfer students 24 years-old and older will be offered a student housing apartment space through Student Housing, or one of the many apartment complexes in Davis. Students that do not wish to live in Student Housing will be given information about apartment complexes in the city of Davis that have available space for transfer students. Student Housing information is included with your admissions packet. If you have a special need, such as a medical condition, disability, dietary requirement, or circumstance that requires special accommodation, or consideration, please send a detailed letter of explanation to Student Housing, 160 Student Housing, One Shields Avenue, University of California, Davis, CA 95616-8712, once you have submitted your housing contract.

Student Housing

Orchard Park/Solano Park Apartments (530) 752-2033

Orchard Park and Solano Park Apartments offer 476 university-operated, unfurnished, on-campus apartments located in serene park surroundings for UC Davis students with children.

- Orchard Park; two-bedroom unfurnished apartments
- Solano Park; one-and two-bedroom unfurnished apartments

Rates are available online at http://housing.ucdavis.edu/fees. Each year's rates are subject to approval by the UC Regents, typically in May, become available after approval, and are effective on August 1.

While our first priority is to house students with children, Student Housing supports the University's commitment to provide oncampus housing to graduate students. Our waiting list is prioritized as follows: students with children; married or domestic partnership students, graduate students; undergraduate students. Vacancies in Orchard Park/Solano Park Apartments are filled from a waiting list based on the date the application is received. For a fall assignment, you should apply at least six to nine months in advance. For an assignment during the remainder of the year, the waiting period is usually shorter. You may submit an application before you are admitted to the university. If a member of your family has a physical disability that requires special housing accommodation, please attach a detailed letter of explanation to your application.

Russell Park

(530) 753-7322

Privately owned and managed on-campus living accommodations are available for student families. Russell Park features one-, two-and three-bedroom unfurnished units.

Graduate Student Apartment Housing

The Atriums (530) 753-7322

The Atriums offers on-campus living accommodations for single graduate students. The *privately owned and managed* apartments feature studio and two-bedroom unfurnished units.

Off-Campus Housing

The majority of UC Davis students live off campus. The City of Davis has ample apartments for rent, from one-person studio apartments to five- or six-person suites. Townhouses, duplexes and houses throughout the city are also available for student rental. ASUCD maintains a list of available community housing.

TRANSPORTATION AND PARKING

Transportation and Parking Services (TAPS) Located on North Dairy Road Office hours: M-F, 7:30 a.m.-4 p.m. (PST) Enforcement hours: 7 a.m.-10 p.m. (PST) (530) 752-8277; http://taps.ucdavis.edu Motorist Assistance Program: (530) 752-8277 Bicycle Program: (530) 752-BIKE (2453)

The central campus is closed to motorized vehicles. Walking and bicycling are the most common ways to traverse the campus.

Bicycles. All bicycles ridden or parked on campus must have a current California state bicycle license. You may buy a license or renewal tag at TAPS. Bicycle traffic and parking regulations are

strictly enforced. Bikes may be parked only in designated parking areas and may only be secured to bike racks. The Bicycle Program rents bicycle lockers on a quarterly or annual basis for storage of bicycles only. The ASUCD Bike Barn, at the Silo, offers repairs and rentals, and sells used bikes, bicycle parts and accessories. Students can also check out tools to do their own repairs or maintenance at the ASUCD Bike Garage in the North Entry Parking Structure.

Parking. If you park a vehicle (including a motorcycle or moped) on campus, you must display a valid UC Davis parking permit or pay for time at a meter. Parking is permitted in marked spaces only, with permits displayed so all information is visible through the front window. You may purchase a daily visitor permit at permit dispensers in any visitor parking lot or at TAPS. Visitor permits are valid in visitor lots and in "C" areas. After 5 p.m., they are also honored in "A" permit areas and at meters. All other lots require long-term permits, which may be purchased at TAPS.

Motorist Assistance Services. TAPS provides complimentary oncampus motorist assistance services including vehicle lock-outs, battery jumps, gasoline retrieval and tire inflation services.

Ridesharing. UC Davis encourages ridesharing. Registered carpools and vanpools receive reduced parking rates and preferential parking. For information on transportation alternatives, public transit, or commuter match assistance, call (530) 752-MILE (6453).

Shuttles. The UC Davis/UC Davis Medical Center Shuttle provides hourly service Monday through Friday between the UC Davis campus and the medical center in Sacramento. The shuttle is available to all members of the UC Davis community. You may purchase shuttle passes at Parking Services or the Cashier's Office. Departmental business passes are available at Parking Services.

The Intracampus Bus provides transportation between the UC Davis campus and the UC Berkeley campus for university employees, registered students and other university affiliates. Call Fleet Services at (530) 752-8287 for schedule information and reservations.

Buses

Unitrans 5 South Hall (530) 752-BUSS; http://www.unitrans.com

Unitrans, operated entirely by undergraduate students, provides year round public transit service on 15 lines on the UC Davis campus and the City of Davis. Unlimited access is provided to undergraduate students with a valid UC Davis registration card; others may ride by paying the single-ride cash fare or by purchasing discounted multi-ride passes from TAPS or at the Unitrans business office. Full service is provided each UC Davis school day (Monday-Friday; 7:00 a.m.-7:30 p.m. (PST)) and at nights (Monday-Thursday; 7:30 p.m.-11:30 p.m. (PST)) during the regular school year. Reduced schedule service operates during the summer, finals week, and all academic break periods. Unitrans operates the J, O, P, Q and W lines on Saturdays, Sundays, and designated holidays. Schedules are available at the MU Campus Information Center, bus terminals, Davis City Hall, the Unitrans office and at http://www.unitrans.com.

STUDENT EMPLOYMENT

Many employment opportunities are available at UC Davis and with private employers. Full-time or part-time students, students on PELP and students with a letter of acceptance for the following quarter who have not yet registered are eligible. With a part-time job students are able to borrow less and still meet their Self-Help Contributions. Most students work 10-12 hours a week while attending school, many in jobs on campus. There are also a wide variety of community service jobs, which can be both educational and personally rewarding.

To research available jobs, please see http://iccweb.ucdavis.edu/students/jobsandcareers.htm.

CHILD CARE AND WORKLIFE

Heitman Staff Learning Center (530) 754-8791; http://www.hr.ucdavis.edu/worklife-wellness

WorkLife is the principal resource on campus for referrals, outreach, education and programming that enable students, faculty and staff to meet commitments and pursue interests both in and outside of the university. Services address child care, elder care, breastfeeding support, health and wellness, and workplace flexibility. The unit serves as the university's liaison with the on-campus child development centers and City of Davis Child Care Services.

On-Campus Child Care Programs and Resources

- Hutchison Child Development Center (530) 752-3455; hutchison@brighthorizons.com; rhttp://www.hr.ucdavis.edu/worklife-wellness/Life/childcare/ hutchison-child-development-center
- LaRue Park Child Development Center (530) 753-8716; laruecdc@ucdavis.edu; http://www.davischildcare.org/
 Russell Park Child Development Center (530) 753-2487; russellcdc@ucdavis.edu; http://www.davischildcare.org/
 Privately owned and operated with university oversight, serving infants through preschoolers.
- Early Childhood Lab School at The Center for Child and Family Studies (530) 752-2888; http://ccfs.ucdavis.edu/EarlyChildhoodLaboratory.html

 A teaching and research laboratory for the Department of Human and Community Development, offers part-time programs for infants through preschoolers. Children are selected from a waiting list according to criteria designed to meet aca-

demic goals.

- The UC Davis Breastfeeding Support Program (530) 754-8791; http://www.hr.ucdavis.edu/worklife-wellness/Life/breastfeeding-support-program-1
 Provides lactation sites with electric breast pumps, registration and orientation sessions, private consultation, and sales of supplies for mothers who wish to continue breastfeeding their infants after returning to school or work.
- The Student Employment Center (530) 752-0520; http://financialaid.ucdavis.edu/jobs/jobs Posts listings for parents seeking license-exempt providers.

Community Child Care Programs

City of Davis Child Care Services 600 A Street Davis, CA 95616 (530) 757-5695; http://www.city.davis.ca.us/cs/childcare/

City of Davis Child Care Services maintains information on licensed family child care homes, day care centers, nursery schools, playgroups, support groups and other family-related services for all of Yolo County. Additional services include parenting workshops and handouts; a bi-monthly newsletter; a parenting resource library; and a book, video and toy lending library. The program provides referrals to licensed family child care homes and administers the UC Davis Child Care Subsidy Program and the Child Care Grant, both of which can help low-income families pay for child care. Applications for subsidies are available at the grant office in 600 A Street.

HEALTH AND COUNSELING SERVICES

Student Health and Counseling Services (SHCS)

UC Davis Student Health & Wellness Center (530) 752-2300 219 North Hall (530) 752-0871 http://shcs.ucdavis.edu/

Student Health and Counseling Services (SHCS) provides both medical and mental health care for registered students. Services are conveniently located on campus. Medical care and Insurance Services are located at the UC Davis Student Health & Wellness Center. Counseling and Psychological Services (CAPS) are located in North Hall. SHCS supports students' academic goals by providing highly accessible wellness, counseling, illness and injury care at affordable rates. Services are available to all registered students regardless of insurance coverage. Student fees subsidize SHCS services so students pay small fees for most medical services, with most advice and mental health counseling services at no charge.

Advice Nurse and Medical Urgent Care (530) 752-2349. Services are available for acute medical illness and injury care. Appointments are not required for Urgent Care, but students are encouraged to call the Advice Nurse before coming in. Patients are seen according to severity and urgency. In addition, our Advice Nurse service is free for all UC Davis students to discuss health concerns and the need for medical care. Some issues may be resolved through self-care or over the counter treatment.

Primary Care Clinics & Specialty Clinics (530) 752-2349.

Medical professionals are available by appointment five days a week for primary care treatment and referrals. Appointments can be made to fit around class and work schedules. To ensure continuity of care, students are assigned a primary care provider and are asked to schedule with this provider when requesting an appointment. For convenience, appointments may be scheduled on the same day that a student calls. Appointments can be scheduled for routine primary care, nutrition and fitness, men's/women's health and physical exams, allergy care, sports medicine, travel immunizations and other services. Physician specialists are available upon referral from a primary care provider. Services include acupuncture, dermatology, endocrinology, internal medicine, neurology, orthopedics, physical medicine & rehabilitation, podiatry, and psychiatry.

Other SHCS Services at the Student Health and Wellness Center include Laboratory, X-ray, Pharmacy, over the counter products, Physical Therapy, Massage Therapy, Alcohol and Drug Abuse prevention and intervention education and Dietitian services.

Health Insurance Requirement. The University of California requires that all students have health insurance. To help you meet this requirement, UC Davis automatically enrolls all registered students in the UC system-wide Student Health Insurance Plan (UCSHIP). Fees for UCSHIP coverage are charged to your student account each term along with your registration fees.

- If you want to be enrolled in UCSHIP, you are automatically enrolled—no action is required.
- If you have comparable insurance and do not want to be enrolled in UCSHIP, you must apply for a UCSHIP waiver by the published deadlines. If your waiver is approved, your UCSHIP enrollment will be waived through the end of the academic year. On campus medical and mental health care is available to all students at SHCS, even if you waive UCSHIP.

More waiver information or information regarding benefits, eligibility, deadlines, or insurance coverage if your registration status changes can be found at http://shcs.ucdavis.edu/insurance by visiting the SHCS Insurance Services office at the Student Health & Wellness Center.

Counseling and Psychological Services (CAPS)

A Department of Student Health and Counseling Services 219 North Hall

(530) 752-0871; http://shcs.ucdavis.edu/services

Counseling and Psychological Services (CAPS) offers confidential psychological and psychiatric services to all registered students experiencing problems or concerns that affect their academic progress and sense of well-being. Staff members provide short-term individual counseling and group counseling for academic, personal and interpersonal concerns. Students often seek counseling to examine issues such as relationships, family problems, stress, cultural differences, assertiveness, self-esteem, intimacy, depression and anxiety. Additionally, staff can assist with educational concerns such as coping with university life, academic performance, test anxiety and reentry adjustment. Services for relationship issues are also offered to students and their partners. Psychiatry services are available to students by referral. Staff can provide assistance with off-campus referrals.

Confidentiality is strictly maintained in accordance with state laws and ethical standards. To use CAPS' services, students should contact the receptionist for information about making an appointment. If immediate assistance is needed, walk-in (urgent care) services are available Monday-Friday from 8:00 a.m.–4:30 p.m. (PST); except Wednesday when CAPS opens at 9 a.m. (PST). After hours phone consultation is also available by calling the CAPS main number and following the instructions. In addition, peer counseling services are also available Monday-Friday from 8:00 a.m.–5:00 p.m. (PST) through The House.

Students, faculty or staff who are concerned about a student or desire consultation or assistance in making a referral are encouraged to contact CAPS. Parents who are concerned about their UC Davis student's emotional reactions or behavior can also call CAPS to discuss their concerns.

The House

Temporary Building 16 (two-story house by Student Housing) (530) 752-2790; http://shcs.ucdavis.edu/thehouse

The House is a professionally supervised peer counseling program of Counseling and Psychological Services (CAPS), a department of Student Health and Counseling Services. Students receive confidential support, information and referrals regarding personal or social problems. Well-trained student volunteers assist fellow students through individual peer counseling and a wide variety of workshops held in an informal setting. Stress reduction and wellness resources include a meditation room, a video and listening room with relaxation and educational compact discs and an automatic massage chair. No appointment is necessary and services are offered on a drop-in or telephone basis Monday-Friday from 8:00 a.m.–5:00 p.m. (PST) during fall, winter and spring quarters. The House is closed during the summer quarter.

Volunteers for peer counselor positions at the House are selected during winter quarter. Students are trained in basic counseling skills and can receive units for training. Transcript notation is also available for quarters working as a peer counselor volunteer.

Health Education and Promotion

A Department of Student Health and Counseling Services

UC Davis Student Health and Wellness Center (530) 752-9652; http://shcs.ucdavis.edu/hep

Health Education and Promotion (HEP) helps students enhance their wellness to meet academic goals through student-centered health education services and the creation of health-promoting campus and community environments. HEP service areas include nutrition, physical activity, sexual health, contraception, alcohol, tobacco, other drug risk reduction, wellness, sleep, and stress management.

Anonymous HIV Counseling and Antibody Testing Program.

HEP offers anonymous HIV counseling and antibody testing to registered UC Davis students. Free, oral, rapid testing is available weekly during the academic year; for more information, see http://shcs.ucdavis.edu/services/hiv-testing.html.

Sexual health services include the "Love Lab" mobile cart offering safer sex supplies and educational information at no charge to students. More sexual health resources can be found at http://shcs.ucdavis.edu/hep/sh/index.html.

Alcohol, Tobacco and Other Drug (ATOD) Risk Reduction provides educational programs and implements environmental management strategies. This group also provides trainings on safe party management. For more information on safer partying, see http://safeparty.ucdavis.edu.

UC Davis Farmers Market (530) 752-9652. HEP co-sponsors a campus farmers market at the Silo courtyard during Fall and Spring quarters. Fresh fruits, vegetables, nuts, and flowers are available.

Wellness Portal. The online portal assists students, staff and faculty in locating resources related to the various aspects of wellness. This "one stop shop" for wellness includes campus resources, as well those in the City of Davis and the larger Web community; see http://mywellness.ucdavis.edu.

Outreach Presentations (530) 752-9652. Peer Health Educators and professional staff are available to facilitate small and large

group presentations and workshops for residence halls, fraternities, sororities and other student organizations. For a complete list of programs offered or to schedule a program, see http://shcs.ucdavis.edu/hep/presentations.html.

Student Positions. HEP offers paid and volunteer opportunities for students. The positions provide an excellent opportunity to develop skills in: conducting group presentations, changing health-related policies and influencing media. Transcript notation and/or academic credit are available. All positions require a three quarter commitment. See our website beginning winter quarter regarding student opportunities at http://shcs.ucdavis.edu/hep/student-positions.html.

EXTRACURRICULAR ACTIVITIES

By participating in extracurricular activities at UC Davis, you can benefit from numerous opportunities for educational, personal, cultural and social enrichment. In general, registered and enrolled UC Davis students may participate in extracurricular activities sponsored by the campus. Some activities have additional eligibility criteria, so you are encouraged to inquire about the particular requirements of the groups and programs that interest you.

CAMPUS RECREATION AND UNIONS

The Department of Campus Recreation

The Activities and Recreation Center (ARC) 232 ARC, One Shields Ave, Davis CA 95616 (530) 752-1730; http://campusrecreation.ucdavis.edu

Memorial Union Auxiliary Services 457 Memorial Union, One Shields Ave, Davis CA 95616 (530) 752-2524; http://campusrecreation.ucdavis.edu

The UC Davis Department of Campus Recreation and Unions manages the following programs and facilities, which serve the campus by creating opportunities to build community, cultivating friendships and enhancing learning.

These programs complement the academic mission of the university and enhance the quality of life for the campus.

The following facilities are managed through the Department of Campus Recreation and Unions:

- Activities and Recreation Center (ARC)
- Craft Center
- Equestrian Center
- Freeborn Hall
- · Hickey Pool
- Memorial Union
- Outdoor Adventures Center
- Pavilion
- Putah Creek Lodge
- Recreation Fields
- Recreation Pool
- Recreation Pool Lodge
- UCDHS Student Fitness Center

The following programs are offered through the Department of Campus Recreation and Unions:

Campus Recreation Memberships, Informal Recreation and Fitness & Wellness Programs

Activities and Recreation Center (ARC) (530) 752-1730

The ARC, the region's premier full-service fitness facility, offers a variety of features, such as four indoor basketball courts (convertible to volleyball and badminton), eight four-wall courts, a multiuse activity center (MAC), an indoor track, large fitness/weight areas, and an indoor climbing wall. In addition, the complex includes group exercise, dance and martial arts studios, a student lounge with computer terminals and wireless access points, a large ballroom, a small conferencing center, a full-service Starbucks, and a Pro Shop. Currently enrolled UC Davis students may use the ARC at no additional cost. Programming within the ARC—including group exercise, dance classes, martial arts classes, personal training, rock climbing, and intramural sports—may require an additional fee. UC Davis faculty, staff, alumni, and retirees may enjoy the ARC by purchasing an affordable membership. For more information on the ARC, see http://campusrecreation.ucdavis.edu.

Cal Aggie Marching Band

Activities and Recreation Center (ARC) (530) 752-6469

The California Aggie Marching Band is a student-run volunteer organization dedicated to providing support for UC Davis and is committed to student development and camaraderie through excellence in musical entertainment and the embodiment of Aggie Pride. Known by many as the "Band Uh!," the band celebrates campus traditions and entertains participants and spectators at athletic, campus and community events.

Aquatics

Recreation Pool

Corner of La Rue Road and Hutchison Drive (530) 752-1730

Located near the ARC, the Recreation Pool's distinctive shape allows for a wide variety of water activities. The pool includes lap lanes, diving boards, an island, a large grass area for sunbathing and a shallow wading pool. Picnic tables and a barbecue are also available on a first-come, first-served basis. The Rec Pool offers aqua aerobics classes and swim lessons for all ages. The pool opens for the season in mid-April and closes in mid-October.

Hickey Pool

Hickey Gymnasium Building courtyard; central campus (530) 752-1730

Hickey Pool is a seven-lane, 33 and 1/3 yard pool with a moveable bulkhead previously used as the competitive pool on campus, housing six intercollegiate athletic teams, physical education classes, intramural sports, sport clubs, and University Extension classes. The heated Hickey Pool is available to students and ARC members for lap swimming hours during the year.

Craft Center

South Silo (530) 752-1475/1730

The Craft Center is an ideal place to channel your creative energy, offering more than 90 affordable and fun classes each quarter. The center's 10 well-equipped studios are available for informal use on

a daily or quarterly basis. Workshops and classes are offered each quarter in woodworking, weaving, jewelry making, art and graphics, computer imaging, ceramics, photography, silk-screen printing, welding, leather working, stained glass and other crafts.

Equestrian Programs

Garrod Drive; southwest of Veterinary Medical Teaching Hospital (530) 752-2372

The 25-acre Equestrian Center is open year round, offering horse riding instruction in both English and Western riding. Group lessons are available for beginning through advanced levels, along with training in horse care and stable management. The Equestrian Center sponsors clinics, horse shows, and special events. The center is also home to the UC Davis Equestrian Club.

Intramural Sports and Sport Clubs

Activities and Recreation Center (ARC) (530) 752-1730

Campus Recreation and Unions' Competitive Sports program provides UC Davis students, faculty and staff the opportunity to participate in a variety of competitive and recreational sports on campus.

The Intramural Sports program offers numerous sports leagues, tournaments, and events throughout the year, including soccer, badminton, softball, flag football, ultimate, and volleyball. The Sport Club program promotes student participation in a wide variety of athletic activities, provides opportunity for student competition at various levels of play, and fosters the development of student leadership. Sport clubs are comprised of students, faculty and staff of the university.

Memorial Union (MU)

MU Information Center (530) 752-2222

The MU Complex is a central gathering place for all UC Davis Students. It houses a variety of student services and activities, including the ASUCD student government offices, Coffee House, CoHo To Go, Aggie Student Store, Corral, Campus Copies, Classical Notes, STA Travel, U.S. Post Office, UC Davis Store, UC Davis Aggie Reuse Store, Campus Ticket Office, MUII meeting/conference facilities and AggieCard Office.

Griffin Lounge serves as a comfortable space for studying and getting together with friends. The Art Lounge, on the second floor, provides a comfortable and relaxed space that is popular for studying and enjoying student art.

Freeborn Hall, a 1,300-seat assembly hall adjacent to the MU complex, hosts concerts, performing arts events, dances, banquets, lectures and conferences.

MU Games Area

Games Area; located below the UC Davis Bookstore (530) 752-2580 (530) 752-1730; http://gamesarea.ucdavis.edu

The Games Area features bowling lanes, billiards, video arcade, GameFlyTM video game rental kiosk, lounge space and storage lockers. Bowling leagues, classes, clinics and tournaments are offered for all ages from beginning through advanced skill levels. The facility is fully accessible to those with disabilities.

Outdoor Adventures

The Barn; corner of California and Hutchison (530) 752-1995

Outdoor Adventures will help you develop your outdoor skills and plan your outdoor excursion. You can rent professional quality equipment and arrange custom-designed trips. An up-to-date library contains topographic maps, trail guides and other materials. Outdoor Adventures offers classes, excursions and clinics for backpacking, rock-climbing, whitewater rafting, sea kayaking, mountaineering, cross-country skiing and more. Outdoor Adventurers also offers health care training classes in wilderness first aid, EMT, CPR, AED and swift water rescue.

CENTER FOR STUDENT INVOLVEMENT (CSI)

4th floor, Memorial Union (530) 752-2027; http://csi.ucdavis.edu

Studies show that college students who are involved in campus life through activities and organizations feel more connected to campus, are more satisfied with their college experience and are more likely to graduate than non-involved students. The Center for Student Involvement (CSI) provides students with opportunities for campus involvement, leadership development, learning, exploration, community service, cross-cultural competence and collaboration by supporting a wide variety of student organizations and campus programs.

Student Organizations

More than 500 student organizations are registered and supported at UC Davis through the Center for Student Involvement. They consist of cultural, political, religious, service, ethnic, academic, professional, international, social, recreational, performing arts, fraternity/sorority and advocacy groups that provide students and the entire campus with important educational experiences. More information about each registered student organization and how to start a club is available at http://csi.ucdavis.edu.

The Buzz

(530) 752-2027; http://thebuzz.ucdavis.edu

The campus kicks off the school year on the first Friday of Fall Quarter with The Buzz, a festival filling the entire Quad. Part of Fall Welcome week, The Buzz welcomes new and returning students to campus with a night of live entertainment, games, prizes, free food and campus resources.

Activities Fair

(530) 752-2027; http://campusunions.ucdavis.edu

The Activities Fair, held every October, is an ideal opportunity to learn how to get involved, meet new people and try new activities. During the event, 200 student organizations and campus programs provide information and recruit new members.

UC DAVIS STORES

(530) 752-6848; http://bookstore.ucdavis.edu/

The UC Davis Stores are full-service stores owned and operated by the university. They provide goods and services for the campus community to support the university's academic mission, as well as UC Davis-branded apparel, general merchandise and gifts.

SILO UNION

The Silo Union houses food services, meeting/conference facilities, lounges and the campus pub. Students will enjoy favorite programs like Trivia Night. Silo food services include both quick, popular and familiar fast food, such as Taco Bell, Carl's Jr. and Pizza Hut, as well as a large selection of fresh and healthy prepared items, Starbucks Coffee and a custom sandwich line. Located in the South Silo are the ASUCD Experimental College, Craft Center, Graduate Student Association, and the Silo Bookstore serving the School of Law.

THE UC DAVIS ACTIVITIES AND RECREATION CENTER (ARC)

(530) 752-1730; http://campusrecreation.ucdavis.edu

The Activities and Recreation Center (ARC) hosts many recreational activities for the UC Davis community. The building itself has four indoor basketball courts (convertible to volleyball and badminton), eight four-wall courts, a multi-use activity center (MAC), an indoor track, large fitness/weight areas and an indoor climbing wall. In addition, the complex includes group exercise, dance and martial arts studios, student lounges with computer terminals and wireless access points, a large ballroom, a small conferencing center, a full-service Starbucks, and a Pro Shop. The building is separated into three distinct areas: the controlled area, the conference and event area and The Pavilion. All fitness related activities comprise the controlled area that is open to all students with a valid UC Davis identification card. Faculty, staff, alumni, retirees and others may purchase membership to the ARC for an annual or monthly fee. The conference area is accessible through the main entrance to ARC or through a smaller corridor on the Northeast side of the building that leads into the conferencing

The UC Davis Pavilion, formerly Recreation Hall, hosts athletic competitions, concerts, trade shows, conferences and miscellaneous spectator events each year. The Pavilion houses approximately 149,000 square feet of space and encompasses the home court of the UC Davis Aggies volleyball team, gymnastics team, and men's and women's basketball teams. The Pavilion hours and access vary depending upon the event being hosted. More information regarding the ARC can be found at the ARC website, calling the number listed or by stopping by the ARC member services desk located in the lobby area.

UC DAVIS INTRAMURAL SPORTS AND SPORT CLUBS

(530) 752-1730; http://campusrecreation.ucdavis.edu

The UC Davis Intramural Sports and Sport Clubs programs offer many different competitive sports activities ranging from the traditional team sports like football, basketball and soccer to individual or dual sports such as racquetball, table tennis and golf. Additionally, we offer some non-traditional activities like inner tube water polo, floor hockey and dodgeball. All UC Davis students are eligible to participate in intramural activities. Our Sport Clubs program offers many opportunities for intercollegiate. Each club is formed, developed, directed and controlled by its members within University guidelines. Stop by the office or see our website for a complete list of clubs.

INTERCOLLEGIATE ATHLETICS

264 Hickey Gymnasium (530) 752-1111

The Intercollegiate Athletics (ICA) program is an integral part of the total educational process and a vital part of the human development of young men and women.

Intercollegiate athletics attempts to strengthen the integration of its objectives with the academic and developmental objectives of the university while maintaining a program of academic and athletic excellence; where students are supported in their efforts to reach the highest level of performance by providing them with adequate to outstanding facilities, quality coaching, appropriate support of health and wellness needs, and competitive opportunities with students from similar institutions.

Currently, the program consists of varsity teams in 14 women's and 9 men's sports. UC Davis is an active member of Division I. A majority of the varsity sports compete in the Big West Conference. Approximately 600 students compete on varsity teams each year.

ARTS

Whether you want to participate, be entertained or be inspired, an abundance of musical, theater, art, design and dance offerings take place on campus all year long.

Robert and Margrit Mondavi Center for the Performing Arts | UC Davis

Mondavi Center Administration Building (530) 754-5000; http://www.mondaviarts.org

The Mondavi Center is the premier performance venue in Northern California and the regional destination for the best in classical music, dance, distinguished speakers, jazz, theater, and world music. UC Davis students receive 50% off every event ticket, while UC Davis Staff and Faculty enjoy 10% off their ticket purchases. Tickets are available through the Mondavi Center Ticket Office at (530) 754-2787 or at http://www.mondaviarts.org.

Music

Department of Music (530) 752-5537; http://music.ucdavis.edu

The Department of Music sponsors the UC Davis Symphony Orchestra, the University Chorus, Early Music Ensemble, Concert Band and Wind Ensemble, Jazz Band, several world music ensembles, and chamber music groups. Music majors and other interested students can receive credit for participating in these groups, which perform at concerts and recitals open to the university community. The department sponsors artists-in-residence who give

Dramatic Art and Dance

Department of Theatre and Dance Wright Hall; http://theatredance.ucdavis.edu

The Department of Theatre and Dance has one of the finest theatre facilities in California, with an unusually good stock of scenery, props, costumes, and state-of-the-art lighting and sound equip-

concerts, recitals and lectures. Free noon concerts featuring indi-

and music students—are a favorite weekly event during the school

vidual performers and ensembles—both professional musicians

year. The Empyrean Ensemble is in residence on campus. The Department of Music sponsors nearly 100 public concerts each

ment. Facilities are complemented by an excellent faculty, the Granada-Artist-in-Residence program (which brings a major director, choreographer or playwright to the department twice a year), graduate students working on working on an Interdisciplinary M.F.A. degree in acting, choreography, design, devising and directing, and undergraduate students; and Ph.D. degree in Research as Practice, as well as Performance Studies. Students can audition for Department shows, or create work that is presented through our Institute for exploration in Theatre, Dance and Performance.

Each year's schedule includes the mostly undergraduate Edge Festival and UC Davis Film Festival, opportunities to work with professional directors and choreographers in main stage productions; as well as work through the Institute. These productions take place on our proscenium (Main Stage, Lab A), thrust (Wyatt), black box (Arena), and performance studio (University Club) stages as well as in the Mondavi theatre's Vanderhoef Studio and Jackson Hall. These productions are part of the academic program of the department and serve an important purpose in the study of theatre and dance. Participation is open to all students.

Art Galleries

Memorial Union Art Gallery

Second floor of the MU (530) 752-2885

The Memorial Union Art Gallery features a changing series of contemporary and historical art exhibits throughout the academic year. Works by professional artists as well as students are on display for periods of approximately six weeks. The gallery sponsors print sales, special programs and lectures, and offers internships for those interested in career work in an art gallery or museum.

UC Davis Design Museum

124 Cruess Hall (530) 752-6150; http://designmuseum.ucdavis.edu

The UC Davis Design Museum and Collection enhances and supports the teaching and research activities of the Department of Design, exploring how design shapes, improves and makes economically viable the objects, technology and environments we use, inhabit and experience every day. The museum exhibits national and international design-related materials including architecture, fashion, textiles, graphics, new media, product, furniture and lighting, and serves as a laboratory for experimental exhibition design and interpretation.

Richard L. Nelson Gallery

Nelson Hall (530) 752-8500

The Richard L. Nelson Gallery, named in honor of the first chair of the Department of Art, organizes quarterly changing exhibitions of contemporary and occasionally historical works of art. The gallery's program complements the teaching program of the Department of Art and brings art to the university community and the Northern California area at large. The Nelson has a permanent collection of 5,000 objects with an emphasis on postwar contemporary art.

Fine Arts Collection

Art Building, adjacent to the Nelson Gallery (530) 752-8500 The Fine Arts Collection, representing various historical periods and cultures, is the UC Davis campus' major collection of art.

Basement Gallery

Art Building basement

The Basement Gallery is a student-directed gallery that exhibits the artwork of advanced UC Davis art majors. The Basement Gallery is a vital alternative space for seeing important new work and for experiencing interesting and innovative art shows. There are approximately three shows per quarter. For more information, see http://ucdbasementgallery.com/information/.

C.N. Gorman Museum

1316 Hart Hall (530) 752-6567; http://gormanmuseum.ucdavis.edu Monday-Friday, 12-5 p.m.; Sun: 2-5 p.m. (PST), closed holidays and holiday weekends.

The C.N. Gorman Museum is committed to exhibiting contemporary artworks by leading Native American and Indigenous artists. Established in 1973, the museum is named after Carl Nelson Gorman, a Navajo artist, World War II code talker and one of the founders of the Department of Native American Studies.

STUDENT GOVERNMENT

Associated Students (ASUCD)

Student Government Administrative Office 348 Memorial Union (530) 752-3632

ASUCD Student Services Office 347 Memorial Union (530) 752-1990; http://asucd.ucdavis.edu

The Associated Students of the University of California, Davis (ASUCD), authorized by the regents and the chancellor, represents all undergraduate students and is responsible for over \$11 million used to enhance the student experience. Graduate and law students also have access to all ASUCD commercial activities. Funds allocated to ASUCD provide activities and services that make life as a student a little easier, less expensive or just more fun.

ASUCD operates more than 40 activities, including the Unitrans bus system, The *California Aggie* newspaper, the Bike Barn repair services, travel service, free legal advice for undergraduate students, Campus Copies, Classical Notes, Project Compost, Cal Aggie Camp, U.S. Post Office and the Coffee House, among others.

The ASUCD-sponsored Experimental College offers a variety of nontraditional classes each quarter for students interested in diversifying their educational experience. Radio KDVS stereo 90.3 FM, the student-run campus radio station, broadcasts at 5,000 watts. Other ASUCD activities include Entertainment Council and the Whole Earth Festival.

Picnic Day, a UC Davis tradition since 1909, is the largest studentrun event in the nation. This annual spring open house features more than 100 exhibits and cultural displays, including a parade, a fashion show, sports, sheep dog trials, dachshund races, food, music and dancing.

You can find information about ASUCD programs at their website http://asucd.ucdavis.edu, in the Student Directory, which combines details about ASUCD services and organizations with the ASUCD student telephone directory or by visiting the ASUCD Student Services Office in the Memorial Union.

Allocated funds are budgeted through the ASUCD Senate. Based on a modified federal form of government, the senate consists of 12 elected senate members and the ASUCD president and vice president. The senate is the policy-making body for ASUCD and supervises all aspects of the association. The ASUCD president is the chief administrative officer and is assisted by the vice presi-

dent. ASUCD is the liaison for the undergraduate student body and represents the students with other universities, the UC Office of the President and the regents.

The ASUCD Senate is the policy making body of the student government and are responsible for allocating funds through their annual budget hearings. The Senate consists of 12 members who serve year-long terms with elections held during the fall and winter quarters.

Seven commissions and one committee advise the senate and assist the governing board with its decisions by researching legislation and making recommendations. Commission chairs are exofficio members of the senate. Each commission also involves itself with various projects that relate to its specific area.

- Academic Affairs advocates students' rights in the area of academics, including dealing with the Academic Senate and with issues such as grading policies, tenure and teacher evaluations. Academic Affairs also sponsors the popular "Last Lecture Series."
- Business and Finance makes recommendations to the Senate on all financial matters and conducts audits on ASUCD commercial units
- Environmental Policy and Planning addresses all issues and concerns that pertain directly to the environment.
- Ethnic and Cultural Affairs makes recommendations on policies and programs concerning UC Davis' ethnic community, acts as a liaison between on-campus and off-campus bodies affecting ethnic students and their quality of life at the university.
- External Affairs deals with off-campus concerns including the regents, UC Office of the President, and the Davis City Council.
- Internal Affairs recommends policies to improve ASUCD operations and the quality of nonacademic student life on campus.
- The Gender and Sexuality Committee actively promotes awareness of gender and sexuality issues, and prevention of sexual assault through outreach efforts and education programs.
- The Elections Committee ensures the fair administration of ASUCD online elections. The committee coordinates candidate and ballot measure forums and provides unbiased election information.

The ASUCD President is the chief administrative officer and is assisted by the Vice President. ASUCD is the liaison for the undergraduate student body and represents the students with other universities, the community, the UC Office of the President and the regents.

The judicial branch consists of the ASUCD Student Court. The nine member court the responsibility to carry out all rules designated to it in the ASUCD Constitution and its bylaws. ASUCD Court Members serve "life" terms, lasting four years or their entire academic career at UC Davis.

UC Davis Administrative Advisory Committees

Office of the Chancellor; http://chancellor.ucdavis.edu/aac/

The Office of the Chancellor encourages students to participate in issues affecting the campus community by applying for membership on an administrative advisory committee. Each committee focuses on a specific area, such as athletics, childcare, disability issues, Regents' scholarships or student services and fees. The committees respond to requests for advice, identify needs or con-

cerns within the charge of the committee and recommend action to the campus administration.

Applications are accepted each winter for service on committees the next academic year. Undergraduate students should contact ASUCD Student Advocacy. Graduate students should contact the Graduate Student Association.

Graduate Student Association (GSA)

Graduate Student Association (GSA) Room 253, South Silo (530) 752-6108; Fax (530) 752-5158; gsa@ucdavis.edu; http://gsa.ucdavis.edu

The Graduate Student Association (GSA) is the officially recognized student government for UC Davis graduate students. GSA provides a forum for addressing the concerns of graduate students and promotes communication with campus administrators. GSA also serves as an advocate at all levels of the university on behalf of graduate students. Funded by graduate student fees, GSA provides services to all academic graduate students and to professional students in the Graduate School of Management. Services include new student orientation, legal service, travel awards, announcements and assorted social events. Other professional students are eligible to join GSA by paying a fee.

GSA General Assembly representatives are usually designated by other students in their department or graduate group but can be selected through other processes determined by their department or graduate group. General Assembly meetings are held once a month and are open to all graduate and professional students. Each year the General Assembly elects the members of the Executive Council, who serve in a variety of positions to carry out the policies and functions of the organization.

Student Organizations

Greek Life

(530) 752-4606; http://greeklife.ucdavis.edu/

Affiliation with fraternities and sororities provides a connection to campus through friendships, a support group for academic and personal growth, leadership opportunities and involvement in campus activities and traditions.

The Student Recruitment and Retention Center

16 South Hall

(530) 754-6836; http://thecenter.ucdavis.edu

The Student Recruitment and Retention Center stands for educational equity. The center is a student-run student-initiated center serving historically underrepresented students. Programs include Southeast Asians Furthering Education (SAFE); (BRIDGE) Pilipino Outreach and Retention Program; Natives Empowered Through Unity & Education (NE' UE); African Diaspora Cultivating Education (ACE); Yik'al Kuyum—The Chicano/a and Latino/a Holistic Student Support Program; and Graduate Academic Achievement and Advocacy Program (GAAAP). The SRRC family is a group of diverse students who come to serve their communities, but also dedicate themselves to journeying together toward collective holistic empowerment. Some of the ways that we do this are: peer mentoring, study support, leadership retreats, K-20 enrichment, and available funding opportunities. Join our staff or volunteer and receive internship units or transcript notation

Cal Aggie Student Alumni Association (SAA)

Walter A. Buehler Alumni and Visitors Center (530) 752-0286; http://www.alumni.ucdavis.edu

Student Alumni Association (SAA) follows the mission of "advancing student-alumni relations" by building community between past and present Aggies, providing student leadership opportunities, upholding Aggie traditions and offering benefits and services. Programs include Aggie Diner, Take an Aggie to Lunch, Take an Aggie to Work, Evening with an Aggie, Aggie Welcome events, Pajamarino and community service opportunities. You may join SAA at any time during the academic year. For more information about joining SAA, see http://saaform.ucdavis.edu/.



ACADEMIC ADVISING AND STUDENT SERVICES

ACADEMIC ADVISING

UC Davis offers many different types of academic advising to help you get the most from your education. College advisers can assist you in meeting degree requirements and taking maximum advantage of the resources available at the university. A conference at least once a quarter with your faculty or staff adviser is especially desirable during your first year and during your final quarters preceding graduation. A meeting with a faculty or staff adviser is required each year for engineering students.

COLLEGE ADVISING

College of Agricultural and Environmental Sciences

Office of the Dean 150 Mrak Hall

(530) 752-0108; http://www.caes.ucdavis.edu

In the dean's office you will find:

- Staff advisers who can help with university and college rules, regulations and policies and procedures that affect students
- Academic advising; in-depth advice regarding probation/dismissal status, admission to the college, readmission, second baccalaureate options, and limited status enrollment requirements
- · Advice and action on petitions
- Other services including college English requirement check, release of holds on registration packets and final evaluation for graduation

Associate Dean of Undergraduate Academic Programs

Diane Ullman, Associate Dean 150 Mrak Hall (530) 752-0108

The college has an associate dean of undergraduate academic programs and advising staff who welcome the opportunity to become acquainted and to talk with individual students. They can also help you with academic problems if you are placed on probation or subject to dismissal.

Faculty Advisers/Staff Advisers. You will be assigned a faculty adviser to help you plan a program that corresponds to your individual educational interests. The master advisers coordinate advising within a major. Staff advisers in the department can advise you on courses, specific requirements of majors and career opportunities. You are strongly urged to consult with your faculty adviser or staff adviser each quarter before selecting your courses.

As educational objectives evolve, you may, in consultation with the master adviser for your major, choose a new faculty adviser whose area of expertise corresponds more directly to your specific objectives.

Undeclared/Exploratory Program (non-degree program)

150 Mrak Hall (530) 752-0610

Are you unsure what major you really want to pursue? If so, you may want to register in the Undeclared/Exploratory Program. With the help of staff in the dean's office and the major advisers, you can explore specialized options, develop your decision-making abilities and select the major best suited to your needs. For registration purposes, indicate "Undeclared/Exploratory" on your

admissions materials. You must declare a major before you complete 90 units; see Declaration of Major, on page 74, in the Academic Information chapter.

College of Biological Sciences

Dean's Office 202 Life Sciences (530) 752-0410; http://biosci.ucdavis.edu/

The Associate Dean and staff in the Dean's office offer complete academic advising services for students working on a major administered by the College of Biological Sciences. We advise on college and university requirements, policies, and procedures, including PELP, withdrawal, readmission, change of major or college, multiple majors and late actions. We evaluate transfer work, discuss petitions for variance and provide degree checks for graduation purposes.

The office is also responsible for the academic progress of all students majoring in the college. If you have any problems (personal, medical, financial) that are affecting your academic performance, or if you are on academic probation, we invite you to make an appointment to see one of the college advisers in the Dean's office.

Advising for the Major. Students who declare or intend to declare majors in Biochemistry and Molecular Biology; Cell Biology; Evolution, Ecology and Biodiversity; Exercise Biology; Genetics; Microbiology; Neurobiology, Physiology, and Behavior; or Plant Biology should contact the specific department office for academic advising services, where both faculty and staff advisers are available.

Students who declare or intend to declare a major in Biological Sciences or students who are in the Undeclared-Life Sciences program should consult with the Biological Sciences major adviser in the Dean's office for program planning and major requirements.

Peer Advisers. Peer advisers are available in each department office. Biological Sciences houses its peer advisers in the Dean's Office.

College of Engineering

Undergraduate Advising Office 1050 Kemper Hall (530) 752-1979; http://engineering.ucdavis.edu Facebook: UC Davis College of Engineering

Information and assistance on academic, career and personal matters is available in the Undergraduate Advising Office, either through direct assistance from one of the staff advisers or through referral to other offices on campus. The Undergraduate Advising Office handles student petitions, transfer evaluation, articulation of transfer coursework, degree certifications, and advises students who are not in good academic standing.

Advising. Before registering for courses your first quarter, consult with your departmental staff adviser, whose name and office hours you can obtain at the department office. The departmental staff adviser is aware of the requirements for your major and will assist you with planning your program.

Mandatory Advising. The College has implemented a mandatory advising system that is enforced through SISWeb. You are required to meet with your adviser once a year, during a specific quarter, which is determined by the first letter of your last name (A-G = Fall; H-N = Winter; O-Z = Spring). Students are notified of the hold by checking SISWeb at the time of registration. If you fail to clear your hold during your specified period, you may be unable

to make changes to your current registration and to register for future quarters. If you meet with your adviser during this quarter and have your hold released, there should be no difficulties with subsequent registration. For more information on mandatory advising, talk to your major adviser or call the Undergraduate Advising office at (530) 752-1979.

Students seeking information about graduate school preparation or undergraduate research opportunities in engineering can participate in the Gearing up for Grad School (Winter Quarter) seminar series offered by the College of Engineering. Additional advising about graduate school preparation and undergraduate research opportunities is available from faculty or staff advisers in the program you are interested in from the Undergraduate Advising Office in 1050 Kemper Hall (530) 752-1979 or through the Pre-Graduate School advising unit of the Student Academic Success Center; see http://advisingservices.ucdavis.edu/advising/grad/.

Peer Advisers. A well-developed peer advising system complements faculty and staff advising. Peer advisers are available in 1050 Kemper Hall. They are also available during designated hours in the residence halls. To speak with a peer adviser, call the Undergraduate Advising Office at (530) 752-0553.

College of Letters and Science

Undergraduate Education and Advising Office 200 Social Sciences and Humanities Building (530) 752-0392; http://www.ls.ucdavis.edu/Students

The deans and staff in the Undergraduate Education and Advising Office can help you with issues relating to your academic goals and experiences. You can consult the Advising Office on matters such as program planning, selection of a major, exceptions to regulations and academic enrichment opportunities. To find answers to your questions and other useful information, including contact information and how to arrange to meet with an adviser, see http://www.ls.ucdavis.edu/Students.

The Undergraduate Education and Advising Office also provides a number of additional services:

- Determines how your transfer credits from other institutions apply towards completion of university, campus, and college requirements for the bachelor's degree. Applicability of transfer credit toward the major is determined by your major faculty adviser
- Performs degree checks to identify remaining university, campus, and college requirements, and certifies graduation
- Acts on petitions requiring the dean's approval
- Reviews the records of students who are subject to disqualification and determines whether such students may continue at UC Davis

Advisers. All new students who have selected a major will be assigned an adviser within that major department. New students should contact their department or program office during the first quarter of residence on the UC Davis campus to meet with their adviser. If your adviser is not available when you need assistance, or if you wish to consult an adviser in a major program other than the one represented by your assigned adviser, contact the department or program office for help.

New students are encouraged to see their faculty adviser at least once every quarter during their first year on campus to discuss their educational goals, course program and progress. Continuing students who have completed three quarters in residence in the college should consult with an adviser at certain important checkpoint stages in their academic careers. You are urged, however, to maintain regular contact with an adviser in your major to avoid program errors that may delay graduation. Seniors should maintain close contact with their advisers to ensure that they are meeting the major requirements.

Academic Options Program. Students who have not yet selected a major are automatically placed in the L&S Academic Options Program which provides academic advising to lower division students. Residence Hall Advising Team sites are located in on-campus residence hall areas. Each site is staffed by a team of L&S Peer Advisers who will be available to Academic Options Program students living in that residence hall complex. Through individual advising, group sessions, and programs, this team will work with you over the next several quarters. They will help you with your academic planning, ensuring progress toward your educational goals and satisfaction of degree requirements. They also can assist you in exploring your options before you select your major.

L&S Academic Options Program students not living in a university residence hall complex will receive academic advising from the L&S Undergraduate Education and Advising Office. Advisers there also are available to provide academic assistance to all students in the College of Letters and Science.

Advising Checkpoints. At a minimum, you should consult with your faculty adviser at two, possibly three, critical stages in your academic career:

- Before you complete 90 units of degree credit, including transfer work, you must develop in consultation with your faculty adviser, a proposal for a quarter-by-quarter program of courses showing how you will meet your educational goals and graduation requirements. You must also have declared a major by this time. Filing this plan with your adviser does not preclude subsequent modifications of the plan or a change of major.
- When you complete 135 units of degree credit, including transfer work, you may request a Degree Check from the Letters and Science Advising Office and should consult your faculty adviser concerning course selection and satisfaction of requirements in the major.
- Before you complete 195 units of degree credit, including transfer work, you must develop in consultation with your faculty adviser, a firm study plan in the form of a quarter-by-quarter program that will satisfy all remaining degree requirements as expeditiously as possible. This plan will be filed with your adviser. If the plan indicates that you will have to register beyond the 225-unit limit in order to meet degree requirements, you must contact the Undergraduate Education and Advising Office immediately. Exceptions to the 225-unit limit are granted by the dean only rarely. Typically, approval is granted only to allow completion of minimum degree requirements.

If you have not met with your faculty adviser before these established checkpoints, a hold may be placed on your registration as a reminder.

Peer Advisers. Student-to-student advising is an important part of the university advising services. The College of Letters and Science deans' office peer advisers are available in the Undergraduate Education and Advising office, in 200 Social Sciences and Humanities Building, and on a weekly basis in the campus residence halls to talk with students about their academic concerns.

ACADEMIC ADVISING SERVICES

Academic Peer Advising (530) 752-1736, places Peer Advisors in over 70 departments and Dean's offices to help students find the answers to their questions about major requirements, courses and university regulations. The Academic Peer Advisor complements faculty advising by providing a student perspective. The Academic Peer Advising program is managed by the Academic & First-Year Transition Services office in Student Housing, and the peer advisors are trained by the major departments to provide information and assistance about graduate schools, career opportunities and college requirements.

Student Academic Success Center

South Hall

1st floor, South Hall (530) 752-3000; http://advisingservices.ucdavis.edu

Educational Opportunity Program (EOP) (530) 752-9711, offers an array of services to help students adapt both academically and socially to the University setting and successfully achieve their educational goals. EOP provides a caring and supportive environment for students to meet with peer and staff advisers and network with other students. Services include:

- · Orientation and welcome activities
- · Academic assistance
- Personal and social support
- Workshops
- Support network for former foster youth
- · Tutoring and supplemental instruction
- · Connection with campus resources and programs

Students interested in learning more about EOP may inquire at <code>eop@ucdavis.edu</code> or see <code>http://eop.ucdavis.edu</code>. The office is located in 106 South Hall; visitors are always welcome and no appointment is necessary.

The EOP Guardian Scholars Program (GSP) provides academic and personal support to former foster youth. The program offers services to help students transition to the University and increase their potential to succeed. The staff adviser serves as the liaison between students and various campus units, providing assistance with academic planning, financial aid, housing and other campus resources. The Guardian Scholars office is located in 102 South Hall.

Mentorships for Undergraduate Research in Agriculture, Letters and Science (MURALS) is a pre-graduate opportunity program designed to enrich the research experience of students who are "situational disadvantaged" in their access to graduate school. The mission of MURALS is to encourage students to further their education beyond the baccalaureate degree. By working with a faculty mentor, students not only have an opportunity to participate in academic research, but their experience may give them an incentive to pursue graduate work leading to a master's or doctoral degree. Students must be a junior or senior with a GPA of 3.000 and 90 units and meet additional eligibility requirements. For more information, please see the MURALS website at http://murals.ucdavis.edu.

Transfer Reentry Veterans Center (TRV) in 1210 Dutton Hall, *transferstudents@ucdavis.edu*, helps students who have transferred from other institutions of higher education and/or students who

have returned to the university after several years of life and work experience. The center coordinates transfer student matters among existing student services units to aid in an easy and smooth transfer to the university. It also sponsors special receptions and workshops for new transfers as well as monthly workshops called Transfer Tuesdays. Feel free to drop-in to talk with a transfer student Peer Advisor or call to make an appointment.

Veterans Affairs (530) 752-2020, assists veterans, dependents and reservists with certifying course attendance to the Department of Veterans Affairs, coordinating a tutorial assistance program, providing advice and support, and helping with Tuition waivers, work study and financial aid concerns. To initiate a benefit claim, write or drop by with your letter of admission.

Student Regent (530) 752-9204, The UC Davis Student Regent campus Coordinator assists students with the application process for this prestigious appointment. The Student Regent is a position on the Board of UC Regents, which governs the University and is responsible for the financial management of the University, its investments, and its property holdings. The Regents preside over the appointment of the President of the University, the ten campus Chancellors, and the Officers of The Regents, among others. The selected candidate is appointed to serve a two-year term; in the first year, s/he will serve as "Student Regent-designate" and will participate in all Board and committee meetings, but without voting privileges. In the second year, s/he will serve as Student Regent and will participate as a full voting member of the Board. To apply you must be an undergraduate, graduate, or professional student at one of the University's ten campuses and be in good academic standing. The Student Regent will be reimbursed for expenses incurred for attendance at Board and committee meetings, and all mandatory University fees and tuition will be waived during the student's two-year term.

Health Sciences Advising (530) 752-4475, offers individualized advice and information to students interested in admission to health profession schools (medical, dental, vet med, etc.) including prerequisite course planning, exam preparation, evaluation of competitiveness and assistance with all aspects of the application process such as writing the personal statement, getting good letters of recommendation, selecting schools/programs and strategies for becoming the most competitive applicant possible. In addition, Health Sciences Advising offers small group advising and informative workshops, and hosts visits from admissions officers from various health professions schools.

Pre-Graduate School Advising (530) 752-3000, assists students with the application process for Masters, Ph.D. or teaching credential programs. Staff members meet with students to discuss strategies on how to become a competitive applicant including GPA, test preparation, writing the statement of purpose, and obtaining strong letters of recommendation. Graduate School Information Day is held on campus each October to give students an opportunity to speak with representatives from Universities across the country in preparation for entrance to graduate school.

Pre-Law/MBA Advising (530) 752-4475, offers help with preparation and program planning for students interested in the legal profession or business fields. The staff and law student advisors also work with students on strategies on how to be a competitive applicant, test preparation, writing the personal statement and business essays, obtaining letters of recommendation and selecting schools. In addition to providing the annual Law School Information Day each fall where students have an opportunity to speak with law

school admissions representatives from over sixty law schools around the United States, the service also conducts several useful information programs each quarter.

Student Disability Center

54 Cowell Building (530) 752-3184 (530) 752-6833 (TTY); http://sdc.ucdavis.edu

The Student Disability Center provides services to students with disabilities in accordance with Section 504 of the Rehabilitation Act, the Americans with Disabilities Act and state law. The SDC assists students with disabilities in identifying accommodations that will ensure they have equal access to educational opportunities at UC Davis. SDC staff also provide information to faculty and staff about working with students with disabilities.

Student Housing

160 Student Housing (530) 752-1736; http://housing.ucdavis.edu

The First-Year Experience Program (530) 752-4546, is one component of the Student Housing Academic & First-Year Transition Services office, which includes the new student Orientation program and the academic year First-Year Experience Peer Advising program. All first-year and transfer students living in Student Housing and second year students have access to an extensive network of academic support services referred to as the "Residence Hall Advising Team," a partnership between Student Housing, the four Colleges and the Student Academic Success Center. Included are residential Academic Advising Centers, which offer drop-in peer advising provided by peer advisers from the four Colleges and the FYE Program. The peer advisers are able to assist with registration procedures, course selection, choosing a major or other general advising questions. The peer advisers can either answer your questions or put you in contact with others who can. Peer tutors from the SASC provide drop-in tutoring services during the evenings in the Academic Advising Centers for new students enrolling in common first-year courses such as Math, Chemistry, Writing and Statistics. Upper-division students should visit their major department adviser or College Dean's office for academic advising and support services.

New Student Orientation (530) 752-4443,

orientation@ucdavis.edu, http://orientation.ucdavis.edu, assists new students and their families with the transition to UC Davis. Orientation includes assistance with academic advising, course registration, information for campus resources and social integration. The staff will introduce you to the campus environment, procedures and opportunities, and offers programs relevant to your changing needs. Your contribution to orientation programs, through ideas and assistance, is always welcome.

STUDENT CONDUCT AND GRIEVANCES

Student Judicial Affairs 3200 Dutton Hall (530) 752-1128; http://sja.ucdavis.edu

Student Judicial Affairs (SJA) is charged with administering the student discipline system. SJA supports campus standards by resolving alleged violations of university policies or campus regulations. SJA also provides information about campus grievance processes and addresses student complaints involving prohibited discrimination or harassment (based on sex, race, religion, disability, etc.), arbitrary treatment, or unfair policies or practices. The office can help with conflict resolution and provide interpretations of university policies and regulations.

Misconduct and Discipline

Students enrolling or seeking enrollment in the university have an obligation to act honestly, ethically and responsibly consistent with the university's function as an educational institution. As members of our academic community and of society at large, students have both rights and responsibilities and are expected to comply with the general law, University policies and campus regulations. Rules concerning student conduct, student organizations, use of university facilities and related matters are set forth in both university policies and campus regulations; they apply to on-campus and University-related conduct or activities, and also to certain off-campus behavior.

Standards for student conduct are included in the *UC Davis Code of Academic Conduct*, the *Student Organization Sourcebook*, the Guide to Residence Hall Life and the *University of California Policies Applying to Campus Activities, Organizations and Students*. The operation of the campus student disciplinary system is outlined in the publication, the *Administration of Student Discipline*. These policies and regulations are available on the Internet. For assistance, contact SJA.

Misconduct for which students are subject to discipline includes, but is not limited to, plagiarism, cheating, or other dishonest or unfair academic misconduct; furnishing false information to the university; sexual assault, relationship violence, or other physical assault; threats of violence or conduct that threatens health and safety; misuse of university property or resources, including electronic communications; possession of weapons; harassment, including stalking and sexual harassment; forgery; theft; vandalism; possession, use, distribution or sale of drugs or alcohol that is illegal or against University policy; hazing; obstruction or disruption of university activities or functions; and alteration or misuse of university documents, records, keys or identification.

Disciplinary sanctions that may be imposed range from censure to dismissal from the university and may include restitution, exclusion from activities or areas of campus, and/or assigned community service. Suspected violations of campus or university standards by individual students should be reported to the Office of Student Judicial Affairs. Suspected misconduct by registered student organizations should be reported to Student Housing, Office of Student Development at (530) 752-1736.

If complaints cannot be resolved informally by agreement between Student Judicial Affairs, the accused student and the reporting party, the case may be referred to a hearing before a panel of students and faculty or staff, or a hearing officer. The president of the university, through the chancellor, has ultimate authority for the administration of student discipline.

Student Responsibilities

Students are responsible for complying with the announcements and regulations printed in this catalog, in the *Registration Guide*, and with all policies, rules and regulations of the university and this campus. Students will not be able to register or receive transcripts of record or diplomas until they have met all university obligations.

Discrimination/Harassment

If students believe that they have been discriminated against or harassed, they may contact Student Judicial Affairs at (530) 752-1128 or the Title IX and Americans with Disabilities Act Compliance Coordinator, (530) 752-9466, for information and assistance. It is important to seek assistance as soon as possible, as time limits

may apply to some grievance processes. Advice is also available from the Sexual Harassment Information Line at (530) 752-2255 and the campus Sexual Harassment Officer at (530) 752-9255. Graduate students may contact Graduate Studies at (530) 752-0650 and/or the Graduate Student Association at (530) 752-6108.

RESOLVING ACADEMIC PROBLEMS

Grade Changes

Grades may not be changed once they have been submitted to the Office of the University Registrar unless (1) a clerical error has been made (e.g., homework score was added incorrectly) or (2) a procedural error has affected the student's grade (e.g., misapplication of grading procedures.). Students who believe they received an incorrect grade due to a clerical or procedural error should ask their instructor to file a grade change form with the Office of the University Registrar. If the instructor does not agree, the student should discuss the matter with the chair of the department. If at that point the matter is still unresolved, the student may request a change of grade by filing a grade change petition with the Office of the University Registrar. Requests must be made by the end of the following quarter.

The Academic Senate Committee on Grade Changes reviews requests for grade changes and, like the instructor, has no authority to reevaluate student work but can change the grade if it finds a documented clerical or procedural error. In the case of a challenged grade, the student will be expected to bear the burden of proving that a clerical or procedural error occurred and caused the incorrect grade to be assigned. If the alleged procedural error involves arbitrary treatment or prohibited discrimination, the Committee may inform the student of his/her right to file a complaint under campus grievance procedures (see nondiscrimination policy). For more information, students may contact the Office of Student Judicial Affairs (530) 752-1128.

See the *UC Davis Registration Guide* at http://registrar.ucdavis.edu for further details. See guidelines for the Committee on Grade Changes at http://academicsenate.edu/GCC. Questions regarding this process should be directed to the Deputy to the Committee on Grade Changes at Grade Changes at GradeChanges@ucdavis.edu.

Other Academic Problems

If you need a requirement waived or any other type of variance, contact your faculty adviser or the appropriate dean's office for information on your college's procedures. If you cannot get satisfaction through normal channels, contact the ASUCD Student Advocacy Grievance Center or the Committee on Student-Faculty Relationships; see ASUCD Student Advocacy Grievance Center, below.

ASUCD Student Advocacy Grievance Center

349 Memorial Union (530) 754-4131/6101/3339

The ASUCD Student Advocacy Grievance Center advocates students' academic and nonacademic concerns to the faculty and administration. Grievance counselors assist students one-on-one, directing them to appropriate channels through which to state their academic grievances (e.g., student-faculty relations, sexual harassment, grade change problems, pre-judicial treatment in the classroom and problems with academic procedure and policy) and nonacademic grievances (e.g., campus facilities, campus safety,

ASUCD and any other nonacademic concerns). All information discussed between counselors and students is completely confidential. Students can get counseling, referrals and support to aid in the resolution of these matters.

STUDENT ACADEMIC SUCCESS CENTER

Academic Resources

2205 Dutton Hall (530) 752-2013

At the Student Academic Success Center, you can receive help with general study skills, math and science concepts, writing essays and term papers, reading efficiency, English as a second language, time-management and test-taking skills and test anxiety reduction.

Learning specialists can help you individually, in small groups, or you may participate in workshops covering specific areas of study. Undergraduate tutors offer group tutoring on a pre-arranged and drop-in basis.

Educational Opportunity Program (EOP) Services

EOP Building (530) 752-9711

Educational Opportunity Program (EOP) (530) 752-9711, offers an array of services to help students adapt both academically and socially to the University setting and successfully achieve their educational goals. EOP provides a caring and supportive environment for students to meet with peer and staff advisers and network with other students. Services include:

- · Orientation and welcome activities
- Academic assistance
- · Personal and social support
- Workshops
- Support network for former foster youth
- Connection with campus resources and programs
- Supplemental instruction in math and science

The Student Academic Success Center (SASC) offers pre- and coclasses in mathematics and physics for EOP students. Pre-classes help prepare students for the regular university class they usually take the following quarter. Co-classes provide supplementary instruction for students enrolled in the regular class. The SASC offers pre-classes for Mathematics 16A, 21A and Physics 9A. The SASC also offers co-classes for the Mathematics 16 and 21 series and the Physics 9 series. All pre-classes carry three workload units and co-classes carry one workload unit. These units count toward minimum progress and financial aid eligibility, but do not count toward graduation.

Guardian Scholars Program (GSP)

EOP Building (530) 752-1211

The mission of the Guardian Scholars Program (GSP) is to empower foster youth at UC Davis to reach their potential by providing a community network that supports their academic progress and personal growth. The GSP is a one-stop center where students can get help from professionals who understand the challenges of former foster youth and where students can meet other students who have a similar background. In addition to the ser-

vices available through EOP, Guardian Scholars offers one-on-one mentoring with faculty and staff and a network of off-campus resources specifically intended for former foster youth.

Mentorships for Undergraduate Research in Agriculture, Letters and Science (MURALS)

EOP Building (530) 752-9931

Mentorships for Undergraduate Research in Agriculture, Letters and Science (MURALS) is designed to enrich the research experience of students situationally disadvantaged in their access to graduate school. The program aims to encourage students to further their education beyond the baccalaureate. By working with a faculty mentor, students not only have an opportunity to participate in academic research, but their experience may give them an incentive to pursue graduate work leading to a master's or doctoral degree. Students must be a junior or senior with a GPA of 3.000 and 90 units and meet additional eligibility requirements.

For more information, please see the MURALS website at http://murals.ucdavis.edu.

Transfer Reentry Veterans (TRV) Center

1210 Dutton Hall (530) 752-2200 Transfer Reentry

If you transferred to UC Davis, are a reentry student, the TRV Center is here to serve you. Reentry refers to undergraduate students who are 25 or older, graduate students who are 30 or older, married students or student parents.

If you or your parents(s) served in the U.S. military and you are unsure of what benefits you may be eligible for, the TRV Center can help.

TRV Center services include: drop-in academic peer advising, Osher Reentry Scholarship program, access to the TRV Resource Network, Veteran educational benefit certifications and fee waivers, resources for commuting students, computer access, study space and networking with the community of TRV students through events and activities.

Pre-Graduate/Pre-Professional Services

South Hall, 1st Floor (530) 752-4475

Pre-Professional/Pre-Graduate School Advising offers individualized advice and information to students interested in admission to professional and graduate schools (medical, dental, vet med, law, Masters and Ph.D. programs, etc.) including prerequisite course planning, exam preparation, evaluation of competitiveness and assistance with all aspects of the application process such as writing the personal statement, getting good letters of recommendation, selecting schools/programs and strategies for becoming the most competitive applicant possible. In addition, the program offers small group advising and informative workshops, and hosts visits from admissions officers from various professional schools.

Graduate School Information Day is held on campus each October to give students an opportunity to speak with representatives from Universities across the country in preparation for entrance to graduate school. Similarly, Law School Information Day is held each

fall where students have an opportunity to speak with law school admissions representatives from law schools around the United States.

Special Transitional Enrichment Program (STEP)

2205 Dutton Hall (530) 752-2013

Freshman EOP students are invited to participate in the Special Transitional Enrichment Program (STEP). The program begins in summer and continues through the first two academic years, offering preparatory course work, developing academic skills and providing advising. It helps students adjust academically and socially to the campus by strengthening their learning skills and study habits, and by providing an extensive orientation to campus life.

INTERNSHIPS AND CAREER SERVICES

Internship Programs

The Internship and Career Center 2nd and 3rd Floors, South Hall (530) 752-2855; http://icc.ucdavis.edu

You can take advantage of one of the hundreds of organized internships through the Internship and Career Center or initiate your own.

An internship may be full time or part time, credit or non-credit, voluntary or involving a stipend, depending on your needs and interests and the availability of openings. Internship experiences must emphasize learning rather than routine activities, must include field supervision by a qualified professional and, where appropriate, the faculty member responsible for giving credit. Academic credit is awarded only for experiences planned and approved in advance by the sponsoring faculty member.

The Internship and Career Center (ICC)

2nd and 3rd Floors, South Hall (530) 752-2855; http://icc.ucdavis.edu

If you are an undergraduate, graduate or alumnus, ICC can help you identify your abilities and interests and relate them to jobs; gain access to practical experience to increase your competitiveness in the job market; and find out how and where to look for the jobs you want. ICC staff present workshops and seminars each quarter on finding an internship, beginning a job search, developing a resume and preparing for an interview. Webshops on these topics are also available at the ICC website.

The ICC Career Library (2nd floor, South Hall) contains materials that can help you learn how your major field of study can be translated into job opportunities and data concerning types of employment graduates have obtained. Useful to job-seekers-and available free of charge in print and at the ICC website is ICC's Career Resource Manual, which provides guidelines for preparing a resume, tips on being interviewed and information on employment in government, business and education.

The ICC coordinates Aggie Job Link, an online compilation of internship opportunities, part time student jobs and career vacancies that are augmented daily and accessible through the ICC website. ICC's Career Recruiting Programs, located on the 3rd floor South Hall, arranges employment interviews and schedules oncampus recruiting by employers.

Graduate Student and Postdoctoral Career Services

The Internship and Career Center 2nd floor, South Hall (530) 752-7841

Students enrolled in the teaching credential program or pursuing a master's or doctoral degree in order to teach should visit the Graduate Student and Postdoctoral Career Services offices in South Hall

Services include teaching job vacancy listings, information on establishing placement files (professional dossiers) through Interfolio, and special workshops on writing teaching resumes, curriculum vitae and preparing for interviews. Individual advising is available by appointment.

Advisers maintain contact with school district personnel and provide resources to students and graduates on career opportunities. The office sponsors the Graduate Career Options Program for advanced degree candidates originally planning a teaching career and now considering other career options, and hosts the Pathways Symposium, a day-long career services event for graduate students and postdoctoral scholars.

Community Service Resource Center

The Internship and Career Center 2nd floor, South Hall (530) 752-3813

If you are interested in providing community service please visit the UC Davis Community Service Resource Center coordinated through the ICC. Public service work can be a rewarding and satisfying experience that may also improve your qualifications for the job market. Community service may or may not be compensated through wages, academic credit or transcript notation and can vary from a one-day activity to a long-term commitment. The Community Service Resource Center is a referral program for students who want to perform community service and a resource for agencies and campus units with service opportunities. The office has a database and directories with information about non-profit agencies in California, community service opportunities throughout the world and employment in the non-profit or public sectors after graduation.

ACADEMIC RESOURCES

Education Abroad Center

207 Third Street, Suite 120 (530) 297-4633; Fax (530) 297-4695 http://eac.ucdavis.edu

The opportunity to study abroad is one of the richest educational experiences a student can have. When students return from study abroad in places like Italy or Hong Kong, they describe their time abroad as an experience that changed their lives. Students study abroad to see the world, to study their academic interests in a global context, to learn a language, to prepare for a job in the global economy and to add distinction to an application for graduate or professional school.

The Education Abroad Center (EAC) can help students decide which program is best for them, whether to study abroad for a summer, quarter, semester or a full year and when to go abroad (freshman through senior years). The EAC Coordinators also participate in freshman seminars, offer financial aid workshops and can advise on programs that have internship opportunities. The

EAC also administers the Global and International Studies (GIS) minor, which is sponsored by the Humanities Program in the College of Letters and Science.

The EAC is home to the University of California Education Abroad Program (EAP), to UC Davis Quarter Abroad and to UC Davis Summer Abroad. The EAC also provides advising for students interested in non-UC "independent" programs and administers the Non-UC Study Abroad (NUCSA) leave program. Finally, the EAC advises and provides student services for international EAP Reciprocal Exchange students

First-Year Seminar Program

1350 Surge III (530) 752-6050; http://cetl.ucdavis.edu/first-year-seminars/students/

The UC Davis First-Year Seminar Program gives first-year students the opportunity to study with faculty members in small groups, meeting in settings more informal than the ordinary classroom. The seminars focus on a current intellectual interest of the faculty member. All seminars emphasize student participation, providing intense intellectual exchange among students and between student and teacher.

Mathematics and Science Teaching Program (MAST)

104 Everson Hall (530) 754-9621; mast@ucdavis.edu; http://mast.ucdavis.edu

The UC Davis Mathematics and Science Teaching Program (MAST) program helps students explore mathematics and science teaching careers while working on their math, science, or engineering degree. Part of the statewide University of California Science and Mathematics Initiative, MAST offers seminars on education, internships in K-12 classrooms, and academic advising to help students choose coursework compatible with multiple goals, including preparing for a teaching credential program.

Student Farm

(530) 752-7645; http://studentfarm.ucdavis.edu

The Student Farm offers students a wide range of educational and research opportunities in sustainable agriculture through numerous internship offerings, formal courses (e.g., in organic crop production, sustainable agriculture and environmental education) and research efforts. Opportunities include several staff-supervised hands-on projects such as organic vegetable production and marketing, on-farm composting, tractor operations and environmental education tours for school children. In addition, students may conduct field and greenhouse experiments in various aspects of sustainable agriculture or other individual projects. The Student Farm is a part of the Agricultural Sustainability Institute and is located on the west edge of the campus core, near the Rec Pool. The Student Farm is open to all students, regardless of major or background.

Undergraduate Research Center

Student Community Center, Room 2300 (530) 752-3390; http://undergraduateresearch.ucdavis.edu

The Undergraduate Research Center serves as the home to several campus programs and represents a campus-wide collaborative to encourage and facilitate faculty-sponsored undergraduate research, scholarship and creative activity opportunities for UC Davis undergraduates. These experiences serve as a vehicle to help

students understand what it means to attend a premier research university, enhance the quality of students' interactions with faculty, and learn first-hand that knowledge is not just learned, but discovered. Programs and services are available to all majors and all class levels and include advising, coaching and academic planning; referrals to sponsored research programs and faculty research projects; and educational programs, seminars and workshops related to the student researcher's professional development and training.

Washington, D.C. Program

230 South Hall (530) 752-6652; http://washingtonprogram.ucdavis.edu

The University of California hosts a system-wide academic and residential program for undergraduate students attending from each of the UC campuses. Housed within the UC Washington Center (UCDC), an 11-story, state of the art facility, convenient to public transportation, and located in downtown D.C., the programs provide undergraduates an opportunity to enrich their education while in residence for one quarter in the nation's capital. The program's principal activities include enrollment in credit-bearing courses, participation in academic internships, and opportunity to explore the many educational, cultural and historical activities in the Washington area.

UCDC is open to undergraduates from all majors who will have upper-division standing by the start of the quarter in which they plan to participate. A GPA of at least 3.000 is recommended for admission although not required. Applicants are also evaluated based on overall relevant experience, a written statement, and letters of recommendation.

The program offers both an 11 week academic year component, where students earn academic credit and continue to be registered as full-time UC Davis students during the quarter in which they participate; and a 10-week summer component with a credit or non-credit option. The academic component includes an internship that requires students to work three to four days per week as interns in Congress, federal agencies, interest groups, trade associations, research institutions, media corporations, museums, or in other organizations related to the interests and objectives of individual students; a research seminar that requires students to write a research paper in consultation with Washington Program faculty and graduate fellows; and an upper division seminar chosen from elective courses that vary each quarter but typically include international relations, history, political science, public policy and other social sciences; the arts and humanities; and science policy. In addition to regular instruction, seminars often include guest speakers, observations of congressional committees and federal agencies, and other relevant Washington experiences. Courses are taught by UCDC faculty appointed by the various UC campuses, or visiting faculty from the Washington area.

STUDENT RESOURCE AND INFORMATION CENTERS

Campus Violence Prevention Program

Police / TAPS Building 200 Dairy Road Bikeway (530) 752-3299

The goals of the UC Davis Campus Violence Prevention Program (CVPP) are to reduce the incidence of sexual assault, intimate partner violence, stalking and bias related incidents in the campus

community and at the UC Davis Medical Center by increasing the knowledge and awareness of students, staff and faculty about such offenses; to provide crisis intervention, advocacy, support, counseling and referrals to victims of such offenses, their families and friends; to service as a resource for information regarding sexual assault, intimate partner violence, stalking and bias related crime; and to collaborate with other campus units and community agencies to provide a safer campus community and a concerted integrated effort.

The Program's primary mission is to eliminate all forms of violence and in the interim, to ensure that comprehensive and appropriate support services are available for survivors. The Violence Prevention Program provides confidential and supportive responses to victims and offers one on one advocacy with initial medical evaluation, legal and police procedures, and academic and housing issues. Confidential crisis intervention, problem-solving and advocacy is also available to recent survivors and to those working to recover from past incidents, as well as short-term intervention and support being available for friends, family, housemates and co-workers. With the overall purpose of providing for a comprehensive model program of support, education, training and outreach.

Center for Leadership Learning

168 LaRue Road; program is housed in The College at LaRue residential community (530) 752-6908; http://cll.ucdavis.edu/

The Center for Leadership Learning (CLL) offers a variety of leadership programs for undergraduate students. Students may attend development sessions offered each quarter or may opt to earn a certificate of completion in any of the following programs: Student Leadership Development Series (SLDS), Student Professional Development Program (SPDP), Diversity Leadership Development Program (DLDP). Each program aims to develop and cultivate a new generation of leaders who are civically and socially engaged, who demonstrate effective cultural and interpersonal communication skills, and who are prepared to successfully contribute to their professional field of choice. By strengthening their leadership, professional, and diversity skills, students can increase their self-confidence, learn skills applicable to the world of work, and enhance their resumes.

Cross-Cultural Center

Steven Baissa, Director Student Community Center, First Floor (530) 752-4287; Fax (530) 752-5067; ccc@ucdavis.edu; http://ccc.ucdavis.edu

The mission of the Cross-Cultural Center (CCC) is to foster a multi-cultural community through education and advocacy regarding systematic group oppressions, ethnic and cultural diversity, and establishing an environment of cross-cultural learning and exchange for the entire campus. The CCC advocates for a campus environment free of racism, classism, sexism, heterosexism, ableism, body image oppression, religious/spiritual oppression and any other forms of oppression.

The CCC strives to build an inclusive and welcoming campus community through the annual Culture Days programs that raise awareness and celebrate our cultural diversity. Programs include Asian Pacific Culture Week, Black Family Week, La Raza Cultural Days and Native American Culture Days and Powwow. Everyone is invited to share in these programs featuring speakers, workshops, films, entertainment and family events.

The center features much more, as well. It is home to Danzantes del Alma, a popular student folklórico dance troupe that celebrates the culture and heritage of Mexico through performances on campus and throughout northern California. All students are invited to participate and no prior dance experience is required. Peer Education and Community Empowerment (PEACE), is a student-to-student train the trainer program dedicated to undoing racism, sexism, homophobia, and to promoting a welcoming, respectful, living and learning environment. The CCC also puts on Black Graduation, the Asian Pacific Islander Leadership Retreat, and has an affiliate program for registered campus student organizations.

Lesbian, Gay, Bisexual and Transgender Resource Center

Sheri Atkinson, Director Student Community Center, 397 Hutchison Drive (530) 752-2452; http://lgbtrc.ucdavis.edu

The LGBT Resource Center provides a comprehensive range of education, information and advocacy services and works to create and maintain an open, safe and inclusive environment for lesbian, gay, bisexual and transgender students, staff, faculty, their family and friends and the entire campus community. The LGBT Resource Center offers a library of over 1,500 books, most of which can be borrowed for two weeks for personal use. The Center can also serve as a meeting space for local organizations or support groups. Our focus is respect, pride and unity with regard to all individuals. The LGBT Resource Center is open Monday–Friday, 9 a.m.–5 p.m. (PST).

Services for International Students and Scholars (SISS)

Services for International Students and Scholars (530) 752-0864; siss@ucdavis.edu

Services for International Students and Scholars assists international students, faculty and researchers in gaining and maintaining an appropriate immigration status while at UC Davis. SISS provides orientation and other information and assistance as part of its mission to build a campus community that is fully inclusive of international students and scholars.

All new and transfer international students must attend a special orientation program held just before each quarter begins. The orientation helps new students with immigration regulations and finding campus services and community resources, and is a vital addition to campus and departmental orientation programs. Orientation for new J-1 international scholars is held every two weeks. Students and scholars should report to SISS as soon as possible after arriving in Davis.

Estimated Costs for 2012-2013

International students are responsible for all of their expenses while studying at UC Davis. The expenses include Nonresident Supplemental Tuition, Tuition, room and board and a modest amount for personal expenses. For the 2012-2013 calendar year (12 months), we estimate the cost will be \$52,000 for undergraduates, and \$52,500 for graduate students. Because the exact cost for tuition and fees is not determined until just before the beginning of the academic year, these are only preliminary figures. This minimum allowance may be increased without advance notice.

Women's Resources and Research Center (WRRC)

North Hall, First Floor (530) 752-3372; http://wrrc.ucdavis.edu

The Women's Resources and Research Center (WRRC) educates the campus community about women's issues and concerns. We promote an understanding of the role and impact of gender in our lives and in our society, help women of diverse backgrounds achieve their intellectual, professional, and personal goals, and advocate for women's full inclusion, equality and advancement. The WRRC serves the needs of students, staff and faculty.

The WRRC's caring, knowledgeable staff answers questions, locates resources and helps you with a wide range of personal, academic or work-related concerns. The WRRC offers events, skill-building workshops and classes; a library focused on women and gender; advising, mentoring, advocacy and referral by WRRC staff; and informal, comfortable spaces to meet, study and socialize. Student internships and volunteer opportunities are available at the WRRC



ACADEMIC INFORMATION

REGISTERING AT UC DAVIS

Registration

Office of the University Registrar 12 Mrak Hall (530) 752-3639; http://registrar.ucdavis.edu

Registration is the way you become a student at the university. To be a continuing UC Davis student, you must register each quarter. Registration includes enrolling in classes, the financial obligation to pay tuition, fees and all other charges on your student account, filing your current address with the Office of the University Registrar, and completing and filing any forms pertaining to your registration status.

If you are a new or reentering student you must also:

- Have a student ID card produced; see the AggieCard website at http://registrar.ucdavis.edu/html/photoid.html for information on how to upload your photo and obtain your AggieCard.
- Submit a Statement of Legal Residence; see Residence for Tuition Information, on page 572.
- The California Health and Safety Code requires first time enrollees who are 18 years of age or younger to provide proof of immunization against the Hepatitis B virus prior to enrollment. For more information, see Student Health and Counseling Services at http://healthcenter.ucdavis.edu/newstudent/hep-b.html.

New graduate students who have been registered previously at UC Davis as undergraduates are considered to be new students.

Change of Name. Your legal name must be on file with the Office of the University Registrar. If your name has changed since the time of your application, please complete the Name Change Form and submit it with the legal documentation for verification to the Office of the University Registrar in 12 Mrak Hall.

Change of Address. Be sure to inform the Office of the University Registrar of any change of address. Failure to file your current addresses can result in a hold on your registration. You can update your address using SISWeb; see http://sisweb.ucdavis.edu.

Late Registration

Late registration privileges extend through the 10th day of instruction, but you are assessed a late fee to defray the extra clerical costs. Registration after the deadline is allowed only if action or inaction on the part of the university delays registration. A recommendation from an appropriate administrative unit is required and tuition and registration fees must be paid with cash, cashier's check, credit union check, university check or fee credit.

ENROLLING IN COURSES

SISWeb Registration. Students enroll in courses by using SISWeb; see http://sisweb.ucdavis.edu.

The *UC Davis Registration Guide*, available one week before the start of registration for the quarter, explains registration procedures, gives class meeting times and locations, and provides updated information on fees and registration. The *Registration Guide* is available online at http://registrar.ucdavis.edu.

The Class Search Tool and other registration information are available at http://registrar.ucdavis.edu.

Undergraduate Registration Priority. Access to registration is by priority groups. The groups are established according to student class level, as determined by the number of units completed. Undergraduate Class Level is determined as follows:

Freshman Level 0–44.99 units
Sophomore Level 45–89.99 units
Junior Level 90–134.99 units
Senior Level 135 units and above

You are officially registered in all courses listed on your individual study list. Once registered, you are financially liable for all tuition and fees associated with the term and responsible for completing each of the courses. View your study list (class schedule) using SISWeb.

Adding and Dropping Courses

You can adjust your schedule by adding or dropping courses until the deadlines published in the *Registration Guide*.

The last day to add courses is the 12th day of instruction. The last day to drop courses without dean's permission or fee is the 20th day of instruction, except for those courses designated by departments as 10-day-drop courses. You need to obtain the permission of your dean and pay the processing fee to drop a designated 10-day-drop course after the 10th day of instruction or to drop any other courses after the 20th day of instruction.

The quarterly *Registration Guide* lists the add and drop deadlines and explains how to use SISWeb to adjust your schedule and what add/drop procedures and fees apply after the published deadlines. The quarterly academic calendar also lists the course add and drop deadlines.

Late Drop

To drop a course after the deadline, but before the day of the scheduled final examination, you need approval of the dean of your college or school. Graduate students must have their adviser's approval in order to drop courses. A processing fee applies to late drops. Permission to drop courses after the deadline may be granted only in exceptional circumstances.

Late Add

To add a course after the deadline, but before the day of the scheduled final examination, you need approval of the department. A processing fee applies to late adds.

Retroactive Drop

Occasionally, in exceptional circumstances, students are allowed to drop a course after the course is completed. Reasons for seeking a retroactive drop are very specific: medical problems, severe emotional difficulties, or recent death or severe illness in the immediate family. Petitions are subject to approval by the Grade Change Committee of the Davis Division Academic Senate. Petitions are available from the Office of the University Registrar and should include a detailed account of the problem, appropriate documentation and an adequate explanation of why an *I* grade or late drop was not taken during the quarter in which the problem occurred. The instructor's signature is required on the petition. A processing fee is applicable on all retroactive drops.

Retroactive Add

In some rare circumstances, students are allowed to add a course after the course is completed. Petitions are subject to approval by the Grade Change Committee of the Davis Division Academic Senate.

Petitions for retroactive adds are available from the Office of the University Registrar. Each petition must include the reason for the student's failure to add the course during the quarter in which it was offered. The petition must be supported by the instructor's signed approval, together with a statement from the instructor indicating knowledge of the student's participation and performance during the presentation of the course in question and the instructor's understanding as to the reason for the student's failure to add the course before the end of the quarter. A course grade must be assigned by the instructor. A processing fee is applicable on all retroactive adds.

COURSE LOAD

Expected Progress. Undergraduate students are expected to graduate in 12 quarters (four years). To do so, students should plan to complete an average of 15 units per quarter (15 units per quarter for 12 quarters totals 180 units). Because occasions arise which prevent students from achieving expected progress towards the degree, the campus has established minimum progress requirements, to which students must adhere.

Minimum Progress Requirements. To meet minimum progress, a full-time regular undergraduate is required to maintain an average of at least 13 units passed over all quarters of enrollment. Minimum progress is calculated at the end of every Spring Quarter for the preceding three quarters (Fall, Winter, Spring) comprising the academic year. Undergraduate students falling below this requirement are not in good academic standing and may be disqualified from further enrollment at the University. Quarters for which a student was officially approved for part-time status are omitted from the minimum progress calculation. For more information, see Probation and Dismissal, on page 82.

Certification of Full-Time Status. Undergraduate students must carry a study load of at least 12 units (including workload units) each quarter in order to be certified as full-time students for insurance and financial aid purposes or to compete in intercollegiate athletics. Graduate students must carry a study load of at least 12 units each quarter in order to be certified as full-time students.

Course Load Limits in the College of Letters and Science.

Freshman students in their first year and transfer students in their first quarter of residence may not take more than 17 units each quarter. For all other Letters and Science students, the study list may not exceed 21 units each quarter. These unit limitations include non-credit remedial courses and repeated courses, but not make-up work to remove incomplete grades.

Course Loads in the College of Engineering. Because of the large number of required units in engineering programs, many students must take more than 15 units per quarter and/or attend summer session to finish in four years.

Part-Time Student Status

If, for reasons of occupation, family responsibility, health or, graduating-senior status (one term only), you are unable to attend the university on a full-time basis, you may qualify for enrollment in part-time status. Undergraduate students must file for part-time status each quarter. Graduate students with approved part-time status will remain part-time until the student enrolls full-time. To be considered eligible, undergraduate students must be registered in 10 units (including workload units) or fewer by the tenth day of instruction that quarter and graduate students must be registered in 6 units or fewer by the tenth day of instruction. Minimum progress requirements are waived for part-time students. The Petition to Change Status is are available online at the Registrar's website or at the Office of the University Registrar. Part-time students have use of the same facilities and are eligible for the same services, including student health services, as full-time students.

THE MAJOR

You will find a complete list of the majors offered at UC Davis under Degrees Offered by UC Davis, on page 11.

Declaration of Major

College of Agricultural and Environmental Sciences. Students must declare a major by the time they have completed 90 units. Failure to declare a major at this point may result in a hold on further registration. In order to declare a major, you must meet with your faculty adviser and/or advising associate, fill out a Change of Major petition available at the Office of the University Registrar website or dean's office and file the petition with the dean's office. If you have completed 90 units, you must prepare a study plan with your adviser and/or advising associate at the same time. You are accepted into a major only after your major department and the dean's office have approved the Change of Major petition. With the approval of the College Executive Committee, additional requirements, such as completion of a particular set of required courses with a specified grade point average (usually well above a C average), may be introduced as conditions for acceptance into any major at any time.

College of Biological Sciences. Students must declare a major by the time they have completed 90 units. A hold will be placed on a your registration if you are still undeclared after completing 90 units. Students can obtain a Change of Major petition from the Dean's office website or the Office of the University Registrar website. They must meet with an academic adviser for the major, discuss a projected plan of studies, obtain the adviser's signature and return the signed petition to the Dean's Office. The minimum requirement for entry into a major is a C average in all courses used to satisfy major requirements. Students are accepted into the major when their adviser and the dean have approved the petition.

Students who fail to maintain a 2.000 GPA in courses required for their major over two consecutive quarters may be required to withdraw from the major.

College of Engineering. Students must declare a major when they apply to the College of Engineering. The ability to change majors is subject to meeting the requirements set forth by the faculty of the College of Engineering. Requirements for changing to a College of Engineering major can be found at http://engineering.ucdavis.edu/undergraduate/advising/answers.html#a1 or by contacting the Undergraduate Advising Office (530) 752-1979.

College of Letters and Science. Students must declare a major by the time they have completed 90 units. If you have not declared a major by this point, a hold may be placed on your registration. Such a hold would be removed only when your Change of Major petition is filed in the deans' office. Petitions can be obtained from department offices or the Office of the University Registrar's web-

site. As a part of the declaration procedure, you must, in consultation with a faculty adviser, prepare a projected plan of study. You are accepted into the major when your adviser and the dean have approved the petition.

To be accepted into a major, you must have a *C* average in all courses you have completed that are required for that major, as well as a *C* average in the upper division courses you have taken toward the major. With the approval of the College Executive Committee, additional requirements, such as completion of a particular set of required courses with a specified grade point average (usually well above a *C* average), may be introduced as conditions for acceptance into any major at any time.

If your performance is unsatisfactory after you have declared a major program, you may be required by the dean to withdraw from that major, upon written recommendation from the chair of the department or the curriculum committee that administers the major.

Change of Major Within a College

To change from one major to another within a college, you need the consent of the department or committee in charge of your proposed new major and the approval of the dean. Admission into a major program may be denied by the program or by the dean if your grade point average (GPA) in courses required for the selected major is less than 2.000.

Procedures for change of major within a college are the same as for declaration of major and the same conditions apply. If you wish to change to a major that has admission restrictions, you must comply with the special procedures and requirements for that major.

Except under unusual circumstances, no change of major will be permitted after you attain senior standing (135 units). Students wishing to petition for such an exception should consult in advance with the relevant dean's office regarding additional restrictions and requirements.

It is not possible to change or declare a major in the quarter in which you file to graduate.

College of Biological Sciences. Students who wish to change their major after completing 135 units should include a quarter-by-quarter graduation plan with the change of major petition. Changes of major will not be permitted by the Dean after the beginning of the quarter of the student's graduation.

College of Engineering. The above provisions may not apply to students in the College of Engineering, whose freedom to change majors is limited. Requirements for changing to a College of Engineering major can be found at http://engineering.ucdavis.edu/undergraduate/advising/answers.html#a1 or by contacting the Undergraduate Advising Office (530) 752-1979.

Change of Major Accompanied by Change of College

A change petition, available at dean's offices, the Office of the University Registrar, and online at the Office of the University Registrar's website, must be endorsed by a faculty adviser of the new major you are selecting and signed by a faculty adviser of the major you are leaving and the dean of the college from which you wish to transfer. In addition, admission to the new college will require that dean's approval. To obtain that approval, you must be in good academic standing (qualitatively and quantitatively; see

the Probation and Dismissal, on page 82), meet all minimum GPA criteria, including those for the major, and satisfy any other admission requirements established by the new college.

Except under unusual circumstances, no change of major will be permitted after you attain senior standing (135 units). Students wishing to petition for such an exception should consult in advance with the relevant dean's office regarding additional restrictions and requirements.

It is not possible to change or declare a major in the quarter in which you file to graduate.

College of Biological Sciences. Students who wish to change their major and college after completing 135 units should include a quarter-by-quarter graduation plan with the change of major petition. Changes of major will not be permitted by the Dean after the beginning of the quarter of the student's graduation.

College of Engineering. Requirements for changing to a College of Engineering major can be found at http://engineering.ucdavis.edu/undergraduate/advising/answers.html#a1 or by contacting the Undergraduate Advising Office (530) 752-1979.

Multiple Majors

College of Agricultural and Environmental Sciences. A student choosing to major in multiple majors must petition the departments/programs/divisions responsible for the major(s) and the dean of the college. The dean's approval of declaration for multiple majors is subject to the following:

- 1. Eighty percent of the upper division units offered in satisfaction of course and unit requirements of each major must be unique; that is, they may not be offered in satisfaction toward the upper division unit requirements of any of the other selected majors. Courses with substantial overlap in content will not count as part of the eighty percent. Departmental advisers may approve only one course for substitution when considering the eighty percent in upper division courses and units required for each major.
- When unit requirements of the majors included in a request differ, the major with the smaller number of upper division units required should be used to compute the minimal unit difference that must be met.
- **3.** A student in good academic standing and with a minimum of a *C* average in the upper division courses taken toward the major may elect to declare simultaneously more than one major within the college or a combination of majors offered by the college and other undergraduate colleges on campus.

College of Biological Sciences. Admission into multiple majors is subject to the approval of offices in charge of the majors involved and the Dean of the College. Departments, curriculum committees and other teaching units, singly or collectively, as well as faculty advisers have the right to disapprove a student's request for a multiple major.

Approval of a request to declare more than one major is subject to the following:

1. Eighty percent of the upper division units used to satisfy requirements in each major must be unique; that is, they may not be offered in satisfaction of requirements of any of the other majors involved.

- 2. If the major programs differ in the number of upper division units required, the major program requiring the smaller number of upper division units will be used to compute the minimum number of units that must be unique.
- 3. In determining that the eighty percent requirements have been satisfied, advisers and the Dean must count both specific courses and courses with substantial overlap of content as common to the majors involved.
- **4.** Students must complete all majors within the 225-unit limit.
- Students may only petition for a multiple major after completing two Depth Subject Matter courses in each major.

A student who completes all requirements for approved multiple majors in which one major normally leads to an B.A. degree and another normally leads to a B.S. degree, will receive a B.A.S. degree. A single degree is granted to students who graduate with multiple majors.

College of Engineering. Engineering has two established combined majors. In addition to the combined majors, students may choose to complete two engineering majors. Enrollment in an engineering major and a non-engineering major may be possible. Double-major students must satisfy the requirements for both majors. Degree requirements for such double majors ordinarily cannot be completed within four academic years. A change of major petition is required for all requests and appropriate approvals from all applicable departments and dean's offices are necessary.

The Department of Computer Science does not allow double majors of Computer Science and Engineering and Computer Engineering, or Computer Science and Engineering and Electrical Engineering, or Computer Science and Engineering and Computer Science.

Triple majors will not be approved.

If you want to double major in any over-subscribed engineering major, you will be subject to the additional restrictions for changing into those majors and must satisfy the requirements of both majors.

College of Letters and Science. Students choosing to major in multiple subjects must notify the dean's office of their decision by submitting for approval a petition endorsed by faculty advisers in the majors. The dean's approval of the declaration of more than one major is subject to the following conditions:

1. At least 80 percent of the upper division units used to satisfy course and unit requirements in each major selected must be unique and may not be counted toward the upper division unit requirements of any other major undertaken. Courses with substantial overlap in content will not count as part of the 80 percent.

If the major programs differ in the number of upper division units required, the major program requiring the smaller number of units will be used to compute the minimum number of units that must be unique.

- At the time of request, a substantial part of the preparatory subject matter and at least two upper division courses in each major must have been successfully completed.
- **3.** All degree requirements *must* be completed within the 225-unit limit.

Combination proposals that *cannot be approved* are two or more majors offered by the same discipline, *except* art history and art studio.

A student who completes all requirements for approved multiple majors in which one major normally leads to an A.B. degree and another normally leads to a B.S. degree, will receive a B.A.S. degree. A single degree is granted to students who graduate with multiple majors.

Cross-College Majors

College of Agricultural and Environmental Sciences. The College does encourage multiple majors between colleges whenever your academic interests and abilities indicate this to be the best route. After endorsement of the Change of Major petition by the appropriate faculty in the colleges involved, each dean may approve the petition if there are sufficient differences between the requirements for the major programs you wish to study. At least 80 percent of the upper division units used to satisfy course and unit requirements in each major selected must be unique and not duplicate those of the other major. In planning for multiple majors, you should determine the total requirements needed for each major as well as for graduation from each college involved.

All degree requirements must be completed within the 225-unit limit.

The same conditions apply for cross-college majors as for multiple majors.

College of Biological Sciences. The same conditions apply for cross-college multiple majors as for multiple majors within the college. In addition, approval of the deans of all involved colleges are required for cross-college multiple majors.

College of Engineering. Enrollment in a combination of an engineering major and a non-engineering major may be possible. A change of major petition is required for all requests and appropriate approvals from all applicable departments and dean's offices are necessary. Such double-major students must satisfy the requirements for both majors. Degree requirements for such double majors ordinarily cannot be completed within four academic years.

College of Letters and Science. The same conditions apply for cross-college majors as for multiple majors. Cross-college programs will not be approved if the majors involved are available within a single college as well.

Individual Major

Students with academic interests not covered by an established major have the opportunity to develop an individual major. Such a major requires the selection of interrelated courses totaling a minimum of 45 upper division units from two or more areas of study. If you choose this option you will work closely with faculty advisers to develop a coherent and rigorous academic program. This program is then submitted to a faculty committee for review and approval. Submit the proposed program to the committee prior to reaching 90 units, or by the fourth full week of the fifth quarter before graduation, whichever is earlier. If you wish to undertake an individual major, request the appropriate forms from your dean's office. Program requirements are outlined under Individual Major, on page 350. The College of Engineering does not offer an individual major. The College of Agricultural and Environmental Sciences has suspended this program.

THE MINOR

If you are interested in two or more areas of study, you should consider completing one or more minor programs. Minor program requirements are listed in the chapter of this catalog under the department that offers them. You will find a complete list of the minors offered at UC Davis under Minor Programs Offered by UC Davis, on page 13.

A minor consists of 18 to 24 units in upper division courses specified by the department or program offering the minor. Courses used to satisfy the requirements of a minor, including those completed elsewhere, must be approved by an adviser in the sponsoring department or program. For minors offered by the College of Agricultural and Environmental Sciences, at least half of these units and courses must be completed in residence on the UC Davis campus. You are also expected to complete all courses that are prerequisite to the upper division courses required for the minor. Minors offered by the College of Letters and Science do not require that a portion of the units be completed at UC Davis.

Students in the College of Biological Sciences may not complete a minor in the same field as the student's major. This includes any minor offered by the department or curriculum committee in charge of the student's major. All major and minor requirements must be completed within the 225 total unit limit.

With the exception of interdisciplinary minors approved by the College Executive Committee, students in the College of Letters and Science may not complete a minor offered by the department or program in charge of the student's major.

To request certification of a minor, you must have a grade point average of 2.000 in all courses required for the minor. At most, one course used in satisfaction of your major may be applied to your minor. If you elect more than one minor, the minors may not have any courses in common.

If you want to have completion of a minor certified on your transcript, you must obtain a minor petition from your dean's office and file it no later than the deadline for filing for graduation. You can elect only one minor in a subject area. Requirements for the minor must be met by the time of graduation.

College of Engineering. Students in Engineering who plan to complete a minor must file a minor petition, available on the College of Engineering website at http://engineering.ucdavis.edu/undergraduate/advising/answers.html#a14. The completed petition must be approved by the minor adviser and then turned into the Undergraduate Advising Office of the College of Engineering for certification at least one quarter prior to graduation. Not more than one course applied to the satisfaction of requirements in the major program shall be accepted in satisfaction of the requirements of the minor.

There are currently nine approved minor programs in the College of Engineering Information about these minors can be obtained by contacting the undergraduate adviser in the home department of each minor:

Department of Applied Science:

• Optical Science and Engineering (not accepting new students) Department of Biological and Agricultural Engineering:

- · Energy Efficiency
- Energy Science & Technology
- Energy Policy

Department of Biomedical Engineering:

• Biomedical

Department of Chemical Engineering & Materials Science:

· Materials Science

Department of Civil and Environmental Engineering:

- Construction Engineering and Management
- · Sustainability in the Built Environment

Department of Computer Science:

· Computational Biology

In addition, the Department of Computer Science offers a minor in Computer Science. For information, contact the Undergraduate Adviser in the Department of Computer Science (530) 752-7036.

School of Management. The minor offered by the Graduate School of Management requires that students apply and be admitted to the program prior to taking courses. There is a quarterly admission process. Students who are not admitted to the minor will not be allowed to take courses. Students who have not been admitted to the minor program and enroll in these courses will be dropped.

ACADEMIC CREDIT

Units of Credit

Academic work at the university is measured by "units of credit." In conjunction with the letter grade you receive from the course instructor, units of credit give a fairly accurate evaluation of the amount of time you have devoted to a given subject. Units of credit also make it possible to anticipate the amount of work involved in a particular course and enable you to transfer from one campus or university to another without undue difficulty. To convert quarter units to semester units, multiply by 0.66; from semester to quarter units, multiply by 1.5.

Units of credit are assigned to courses based on 1 unit of credit for three hours of work by the student per week. Usually this means one hour of lecture or discussion led by the instructor and two hours of outside preparation by the student. In laboratory courses, two or three hours of work in the laboratory are normally assigned 1 unit of credit.

In most courses at UC Davis, the standard procedure prevails, so that a 3-unit course meets for three hours a week, a 4-unit course for four hours and so on. Courses that are an exception to this pattern may require additional class time or give more demanding assignments. If you have questions about the number of units assigned to a course, you should check the expanded course descriptions (available at your college, department, or on the Internet) or ask the instructor what is required in terms of outside reading, term papers, problem sets or field trips. These are not always spelled out completely in the *General Catalog*. By knowing the amount of work that will be required, you can plan your course load more systematically and realistically.

Credit by Examination

Under certain prescribed conditions, currently registered students in good standing may receive course credit by taking an examination without formally enrolling in a course. You may obtain a petition and a copy of the prescribed conditions from the Office of the University Registrar. The petition is subject to the approval of the instructor giving the examination and the department involved.

The completed petition, accompanied with the processing fee, must be presented for final approval to the dean of your college or school, or if you are a graduate student, to the dean of Graduate Studies. The completed petition must be submitted to the Office of the University Registrar no later than the business day before the date of the scheduled examination; petitions that are submitted after this date will be denied. Students who are approved by the Office of the University Registrar to take credit by examination shall be issued a permit to take the examination, which the student will present to the instructor at the time of the examination.

The credit received for the examination may not duplicate any credit you have already earned toward your degree. You may not use credit by examination to repeat any course you have taken previously, regardless of the grade you received in that course. Credit earned by examination may not be applied towards satisfaction of the General Education requirement. The final examination results will be reported to the Office of the University Registrar, which will assign the appropriate grade and grade points to you. Since failure to pass the examination will be recorded as an *F*, you are encouraged to prepare fully for such an examination before attempting it. Optional *P/NP* or *S/U* grading is subject to approval by the appropriate dean.

You may also receive credit for learning in nonacademic settings through credit by examination.

To earn credit through the credit by examination process, the examination must be given by a UC Davis instructor and be for a course listed in the current *General Catalog*. Students are not eligible to take a credit by examination in a quarter in which they are not currently enrolled.

Concurrent Credit from Another Institution

A student may not obtain transfer credit for courses taken at a non-University of California campus in a term during which the student is registered as a full-time student at UC Davis. A variance can be obtained only by petitioning the dean of your college well in advance of the desired registration. When a variance is granted, units earned are counted toward minimum progress for the term in which the dual registration occurs. Summer Session courses are exempt from this regulation.

Students may gain credit for courses taken during the summer at other institutions, provided the courses parallel those given in the University of California. Assurance that such credit will be accepted, however, can be given only after the courses have been completed. You should arrange to have the transcripts of your Summer Session grades sent to Undergraduate Admissions for evaluation.

Intercampus Visitor Program

Qualified undergraduates may take advantage of educational opportunities on other University of California campuses as an Intercampus Visitor (ICV). This program enables students who

have completed at least one year in residence on their home campus and have maintained a grade point average of at least 2.000 to take courses not available on their home campus, to participate in special programs, or to study with distinguished faculty members on other campuses of the university. Students who meet the above requirements should complete an application available in the Office of the University Registrar.

Summer Sessions

1350 Surge III (530) 752-7622; http://summer-sessions.ucdavis.edu

Every summer, many students earn units, complete their undergraduate degrees, expand their knowledge, do research, take special study courses, meet prerequisites or take courses that are often over-enrolled during the academic year by participating in Summer Sessions at UC Davis.

Summer Sessions offers more than 700 lower and upper division course sections in a wide range of subject areas that provide full university credit transferable to most campuses. Since admission is open to virtually all adults, Summer Sessions traditionally attracts students from universities and colleges, high school graduates and many other qualified applicants. Admission to a summer session, however, does not guarantee or imply admission to the university's regular academic quarters.

Summer offerings include Special Programs that either occur offcampus or take place outside the normal six-week terms.

Summer Sessions dates are listed in the Academic Calendar, on page 1, at http://summer-sessions.ucdavis.edu and in the Registration Guide.

UC/CSU/Community College Cross Enrollment

If you are interested in taking a particular class at a nearby California State University or community college campus, you may now do so through the Intersegmental Cross Enrollment program. Enrollment is limited to one course per term and participating students need the approval of both the home and the host campus. Please note that the Los Rios Community College district is **not** participating in the program.

Senate Bill 361 requires that UC, CSU and the California Community Colleges permit students to enroll in one course per term at a campus of either of the other two systems on a space available basis at the discretion of the two campuses. This program aims to encourage community college students to enroll concurrently in courses offered at local universities, potentially increasing the number of community college transfers, including students from underrepresented groups.

Students must meet certain qualifications and be certified by their home campus as to eligibility, residence, fee, financial aid and health status. Generally, students will be allowed to add a class, if space is available, after the add/drop period on the host campus. To add a course, students must obtain the faculty member's approval and signature on a Cross-Enrollment form, available at their home campus Registrar's Office. The student takes the signed form to the Registrar's Office at the host campus for processing. If you are interested in participating, come to the Office of the University Registrar service counter in 12 Mrak Hall for more information.

Open Campus (Concurrent) Program

UC Davis Extension 1333 Research Park Drive (800) 752-0881 or (530) 757-8777 http://www.extension.ucdavis.edu/opencampus

Most of the classes taught at UC Davis are available to members of the public through the Open Campus (Concurrent) Program on a space available basis. The enrollment limitations, deadlines and fee schedule are provided in the Open Campus brochure-available online, by mail or from the UC Davis Extension office. Students previously registered at UC Davis who have not graduated may not enroll through Open Campus (Concurrent) until twelve months after withdrawing from UC Davis except with permission of the student's College Dean's Office. Upon admission or readmission to regular student status at UC Davis, the units and grade points earned when enrolled in Open Campus courses will count toward both the 180-unit undergraduate degree requirement and the UC GPA

UC Davis Extension

1333 Research Park Drive (800) 752-0881 or (530) 757-8777 http://www.extension.ucdavis.edu/

As the outreach arm of UC Davis, UC Davis Extension provides continuing education in numerous professional and academic fields. Details on Extension courses are available by visiting the Extension website, calling or coming to the Extension office. Students enrolled at UC Davis who wish to use UC Davis Extension courses, other than those offered through Open Campus (Concurrent), towards degree requirements must obtain written approval from the dean's office of their college before enrolling in the Extension courses. Upon approval students may apply a limited number of credits towards the undergraduate or graduate degree requirement.

EXAMINATIONS

Midterms

In undergraduate courses for which a midterm examination is required, each student has the right to take the midterm (or submit the take-home examination as opted by the instructor) during one of the regularly scheduled meetings of the class as published in the *Registration Guide*. The scheduling of a midterm examination at a time other than a regularly scheduled class meeting requires mutual written consent of the instructor and each student registered in the course. A student who does not consent in writing to the different time must be permitted to take the examination (or submit the take-home examination) at the officially scheduled time. A student who consents in writing to the change of examination time waives the right to take the midterm at the officially scheduled time.

Final Examinations

Scheduling. The *Registration Guide* lists the regulations and times that final examinations are to be held. Exams are set according to the day-and-start time of the classes offered during the quarter. This information is available so that you can avoid final examination conflicts. A student who has multiple exams on the same day may discuss the situation with the instructors of the courses. **Students are responsible for ensuring they do not have conflicting exams.** There is no regulation mandating a change.

Requirements. Except under certain specified circumstances, Academic Senate Regulations require that final examinations be given in all undergraduate courses. Final examinations may be given in graduate courses. Exceptions to the regulation would be independent study courses, courses that consist of laboratory work only and courses in which the examination has been waived by the Academic Senate Committee on Courses of Instruction.

At the instructor's option, the final examination in any course other than an on-line course may be wholly or in part of the takehome type. All examinations for on-line courses must be proctored to ensure that the person taking the examination is the student receiving credit. The writing time (in undergraduate courses) of a take-home and an in-class final examination together should not exceed three hours. In each course in which a final examination is required, the students have the right to take the final examination (and/or submit the take-home examination) at the time published in the *Registration Guide*.

An instructor may release each student's original examination, or a copy, at any time. Otherwise, the instructor will keep the exams, or copies thereof, until the end of the next quarter and students may pick up their exams during this period.

For on-line courses, the instructor of each on-line class will be provided the option to have the final in the last time slot on the last day of finals or at a time on dead day. Students shall be notified of the time and place of the final on or before the first day of instruction.

Changing a Final Examination Date. An in-class final examination may not be rescheduled for a date earlier than the first day of finals week. The due date for a take-home final examination may not be rescheduled for a date earlier than the first day of finals week. The scheduling of an examination at a time other than the specified time requires the written mutual consent of the instructor and each student involved in the change. Any student who does not consent in writing to a different time will be permitted to take an examination (or submit the instructor-opted take-home examination) at the officially scheduled time. A student who consents in writing to a change in the final examination time waives the right to take the examination as originally scheduled. Departures from the published examination schedule should be carried out so as not to disadvantage students who are unable to accept the changed schedule.

A student who is improperly denied the right to take a required final examination on the published date (or submit the take-home examination as opted by the instructor) may file a petition with the Executive Council of the Davis Division of the Academic Senate by the end of the next regular term for appropriate action.

Disabilities. Students with documented disabilities may be entitled to in-class accommodations. The student shall provide the instructor with a letter from the Student Disability Center (SDC) recommending those academic accommodations that the instructor is responsible for providing. Students must request accommodation as soon as possible, to allow the university reasonable time to evaluate the request and offer necessary adjustments. No accommodations shall alter the nature of the academic demands made of the student nor decrease the standards and types of academic performance, nor require facilities or personnel that cannot reasonably be provided. SDC coordinates with the Office of the University Registrar to reserve a classroom for examinations for

students with documented disabilities during finals week. The instructor should consult with the student and SDC on any questions or concerns.

Religious Observances. UC Davis seeks to accommodate any student who, in observance of a religious creed, encounters an unavoidable conflict with a test or examination schedule. The student is responsible for providing, in writing no later than the beginning of the quarter, notification of a potential conflict to the individual responsible for administering the examination and requesting accommodation. Instructors will consider such requests on a case-by-case basis and determine whether such conflicts can be resolved without imposing on the instructor or the other students in the class an undue hardship, which cannot be reasonably avoided. If so, the instructor will determine, in consultation with the student, a time during which the student can take the test or examination without incurring a penalty or violation to the student's religious creed.

GRADES

Every instructor is required to assign a grade for each student enrolled in a course. The following grades are used to report the quality of a student's work at UC Davis:

excellent
good
fair
barely passing
not passing (work so poor that it must be
repeated to receive recognition)
passed (grade <i>C</i> – or better)
not passed
satisfactory
unsatisfactory
incomplete (work is satisfactory but
incomplete for a good cause)
in progress

The grades A, B, C and D may be modified by a plus (+) or minus (_)

Grade Points

Grade points are assigned each letter grade as follows:

A + = 4.000	B-=2.700	D = 1.000
A = 4.000	C+ = 2.300	D– = 0.700
A– = 3.700	C = 2.000	F = 0.000
B+ = 3.300	C - = 1.700	P/NP = n/a
B = 3.000	D+ = 1.300	S/U = n/a

Grade Point Average (GPA)

The grade point average is computed on courses taken at the University of California. The value of grade points over units attempted determines your grade point average. The grade point balance represents the number of grade points above or below a *C* average. The grades *IP*, *P*, *S*, *NP* and *U* carry no grade points and are not included in grade point computations. Incomplete (*I*) grades are not included in the GPA at the end of the quarter, but are counted as *F* in determining if a bachelor's degree candidate has earned the minimum 2.000 GPA required for graduation.

A student at UC Davis is expected to maintain a *C* (2.000 GPA) or better in all work undertaken in the university. If you fall below a *C* average, you are considered "scholastically deficient;" see Probation and Dismissal, on page 82.

Passed/Not Passed (P/NP) Grading

Subject to regulation by the faculties of the colleges and schools, an undergraduate student in good standing may request to take specific courses on a Passed/Not Passed basis. Such requests must be submitted and confirmed before the 25th day of instruction.

The grade *P* is assigned for a grade of *C*– or better. Units thus earned are counted in satisfaction of degree requirements but are not counted in determining your grade point average.

The intent of this option is to encourage exploration in areas in which you have little or no previous experience by alleviating grading pressures. The maximum number of units graded *P* that will be accepted for degree credit is one third of the units completed in residence on the UC Davis campus. Consequently, at least two thirds of the units completed in residence at UC Davis and presented in satisfaction of degree requirements must be in courses taken for a letter grade.

In specific approved courses, instructors will assign only Passed or Not Passed grades. Such courses count toward the maximum number of units graded *P* allowable toward the degree. If you are planning to take courses on a *P/NP* basis, you should also familiarize yourself with the requirements of your particular school or college, which may have placed conditions or restrictions in addition to the university requirements. If you plan to attend graduate or professional school, you should consult with Pre-Graduate/Pre-Professional Advising Services regarding Passed/Not Passed grading.

If you elect the *P/NP* grading option for courses graded upon completion of a two- or three-quarter sequence (in-progress grading), a petition must be submitted before half of the time covered by the *IP* grading has elapsed. The *P/NP* grading will then be in effect for the entire course sequence.

If you receive a *D* or an *F* in a course, you may not repeat it using the *P/NP* option. If you receive an Incomplete in a course you took for a letter grade, you may not complete the course on a Passed/ Not Passed basis.

College of Agricultural and Environmental Sciences. The Passed/Not Passed option should be used only for elective courses, not for courses taken to fulfill major requirements. An *NP* grade in a course required by the major could prevent graduation. When in doubt, check with your faculty adviser before electing to take a course on a Passed/Not Passed grading basis.

College of Biological Sciences. All courses used to satisfy major requirements must be taken on a letter-graded basis, unless courses are only offered on a Passed/Not Passed basis. Courses taken before Fall 2006 on a Passed/Not Passed basis will be accepted in fulfillment of major requirements.

College of Engineering. Students in the College of Engineering may not take any course used to satisfy a degree requirement, or any course offered by the College of Engineering on a *P/NP* basis. College of Engineering students are unable to select the *P/NP* option in SISWeb. Engineering students wishing to take a nonengineering course that is not needed to satisfy a degree requirement can obtain a *P/NP* petition in the Undergraduate Advising Office in 1050 Kemper Hall.

College of Letters and Science. Students in the College of Letters and Science are subject to an additional limitation on the number of units that may be completed employing the Passed/Not Passed grading option; see Bachelor's Degree Requirements for the college in the Undergraduate Education chapter. Graduating seniors and other students planning to undertake graduate or professional studies, should consult an adviser before electing for Passed/Not Passed grading in courses required for the major program

Students enrolled in the College of Letters and Science are subject to an additional limitation on the number of units that may be completed employing the Passed/Not Passed grading option; see Bachelor's Degree Requirements for the college in the Undergraduate Education chapter. Graduating seniors and other students planning to undertake graduate or professional studies, should consult an adviser before electing for Passed/Not Passed grading in courses required for the major program.

Satisfactory/Unsatisfactory (S/U)

The grade of *S* is awarded to graduate students for work in graduate courses that otherwise would receive a grade of *B*– or better and for work in undergraduate courses that otherwise would receive a grade of *C*– or better.

Graduate students, under certain circumstances, may be assigned grades of *S* or *U*, but units earned in this way will not be counted in calculating the grade point average. Petitions to elect *S/U* grading are available from the Graduate Studies Office and must be signed by your graduate adviser. Graduate students may petition to take no more than one course per quarter on an *S/U* grading basis. A graduate course in which a *C*, *D* or *F* grade is received may not be repeated with the *S/U* option.

In specific approved courses, instructors will assign only Satisfactory or Unsatisfactory grades. Such courses count toward the maximum number of units graded *S* allowable toward the degree, as specified by each degree program.

In-Progress (IP) Grading

For a course extending over more than one quarter (designated "deferred grading only, pending completion of sequence" in course descriptions), evaluation of student performance is deferred until the end of the final quarter. Provisional grades of IP are assigned in the intervening quarters and are replaced with the final grade at the completion of the sequence. In order to gain credit toward graduation, a student must successfully complete the entire sequence. For electing *P/NP* grading for a course graded in-progress, see Passed/Not Passed (P/NP) Grading, on page 80.

Incomplete Grades

The grade of *I* may be assigned when a student's work is of passing quality and represents a significant portion of the requirements for a final grade, but is incomplete for a good cause as determined by the instructor; good cause may include current illness, serious personal problems, an accident, a recent death in the immediate family, a large and necessary increase in working hours or other situations of equal gravity.

In courses listed in the *General Catalog* as being letter graded, "passing quality" means "of *D*- quality or better." This standard holds in such courses whether or not the student has elected to take the course on a Passed/Not Passed or Satisfactory/Unsatisfac-

tory basis. For courses listed in the *General Catalog* as being graded on a Passed/Not Passed or Satisfactory/Unsatisfactory basis only, the completed work must be of a quality consistent with a grade of Pass or Satisfactory, respectively.

You may replace an *I* grade with a passing grade and receive unit credit (and grade points if the instructor assigns a letter grade) provided you satisfactorily complete the course work as specified by the instructor. In order to change your records, you must obtain a petition from the Office of the University Registrar and present it to your instructor for completion and mailing.

An *I* grade must be replaced with a letter grade (or *P* or *S* grade) before the end of the third succeeding quarter (excluding summer sessions) of the student's academic residence, or the grade will revert to an *F* (or *NP* or *U*). If a student's degree is conferred before the expiration of the time limit for an *I*-grade conversion, the graduated student shall have until the end of the third quarter succeeding the quarter in which the I grade was assigned to replace the *I* grade. If the grade is not replaced by then, the *I* grade will remain on the student's record.

You may not re-enroll for credit in a course for which an I grade has been assigned. An undergraduate student whose record shows more than 16 units of I grades will be subject to disqualification. A graduate student who accumulates more than eight units of I grades will be subject to probation.

Incomplete grades will not be included in your grade point average at the end of a quarter. However, at the time of graduation, any remaining I grades are included when your grade point average is computed in order to determine whether you have achieved the 2.000 average required for the bachelor's degree. An Incomplete grade, in these computations, has the same effect as a grade F, F or F0, depending on which option you have exercised. Therefore, it is recommended that students not delay the clearance of incomplete grades so as not to jeopardize graduation.

Retroactive Grade Changes

All grades except *I* and *IP* are final when filed by an instructor at the end of the quarter. No final grade except *I* may be revised by examination or the submission of additional work after the close of the quarter.

If a clerical or procedural error in the reporting of a grade by the instructor can be documented, you may request a change of grade with a petition available from department offices. The request must be made by the fifth week of the following quarter.

Grade changes for "clerical" errors (such as incorrect addition of points), upon documentation, are automatically granted. Requests to interchange *P*, *NP*, *S* or *U* grades with normal letter grades based upon student need (such as to allow graduation or to meet entrance requirements for professional school) do not involve clerical or procedural errors and are automatically denied. Thus, students should exercise the Passed/Not Passed or Satisfactory/ Unsatisfactory grading options with caution.

Students are reminded of their responsibility to be aware of the procedures and regulations contained in the *General Catalog* and the *Registration Guide*, to verify their class schedules, and to familiarize themselves with the expectations of their instructors. No changes, except completion of an *I* grade as noted above, can be made to the student's record once he or she has graduated.

Repeating Courses

Undergraduate students may only repeat courses in which they received a *D*, *F* or *NP*. Courses in which students received a grade of *D* or *F* may not be repeated on a *P/NP* grading basis. (Courses in which a grade of *NP* was received may be repeated on a *P/NP* grading basis.)

Degree credit for a repeated course will be given only once, but the grades assigned for both the first and second time a course is taken will appear on the student's transcript. In computing the GPA of undergraduates who have received a grade of D, F or NP, only the grade and corresponding grade points earned the second time a course is taken will be used, up to a maximum of 16 units for all repeated courses. After the 16-unit maximum is reached, the GPA shall be based on all grades assigned and total units attempted.

Repeating a course more than once requires approval by the appropriate college dean. Departments may restrict the repetition of a course if it is a prerequisite to a course the student has already completed with a grade of *C*– or better.

Graduate students, with the consent of the appropriate graduate adviser and the dean of Graduate Studies, may repeat any course in which they received a C, D, F or U, up to a maximum of 9 units for all courses repeated. Courses in which a grade of C, D or F has been earned may not be repeated on an S/U basis. Courses in which a grade of U as received may be repeated on an S/U basis.

Degree credit for a repeated course will be given only once, but the grades assigned for both the first and second time a course is taken will appear on the student's transcript. In computing the GPA of graduate students who have received a grade of C, D or F, only the most recently earned grade for each course and corresponding grade points will be used, up to a maximum of 9 units for all courses repeated. After the 9-unit maximum is reached, the GPA shall be based on all grades assigned and total units attempted.

Mid-Term Grade Standing

Students wishing to know their grade at the mid-quarter should ask the instructor. Those who have deficient grades (*D*, *F* or *NP*) are urged to confer with their advisers.

Final Grades

Grades are generally available about three weeks after a quarter has ended. You can check your grades through SISWeb; see http://sisweb.ucdavis.edu.

Transcripts

A record of each student's academic work at UC Davis is retained permanently by the Office of the University Registrar. Copies of your official transcript may be obtained from the Office of the University Registrar by submitting a transcript request form with the associated fee. Transcript requests should be made at least two weeks in advance of the time needed. For more information on how to request a transcript and transcript fees, see the Office of the University Registrar website at http://registrar.ucdavis.edu.

Transcripts of all work done through UC Davis Extension or concurrent enrollment must be requested directly from the UC Davis Extension Office, 1333 Research Park Drive, Davis, CA 95616. Transcripts of work completed at another campus of the university or at another institution must be requested directly from the campus or institution concerned.

PROBATION AND DISMISSAL

The following provisions apply to all undergraduates. Graduate and professional students with scholarship deficiencies are subject to action at the discretion of their respective deans.

Scholastic Deficiencies

A student will be placed on probation or subject to disqualification for failure to meet qualitative or quantitative standards of scholarship.

Qualitative Standards. The qualitative standards of scholarship require that a student maintain a *C* average (2.000) or better for all work undertaken in the university and for the work undertaken in any one quarter.

A student will be placed on **probation for qualitative reasons** if, at the end of any quarter, the student's grade point average (GPA) is:

- Less than 2.000, but not less than 1.500, for the quarter or
- Less than 2.000 for all courses taken within the University of California

A student will be **subject to disqualification for qualitative reasons** if, at the end of any quarter,

The student's grade point average is less than 1.500 for the quarter.

or

• The student's grade point average is less than 1.500 for all courses taken within the University of California,

or

• The student has attempted more than 16 units graded I (Incomplete),

or

• The student has spent two consecutive quarters on academic probation.

In the case of probation or subject to disqualification for qualitative reasons, the official transcript will state that the student is not in good academic standing. Once a student has met the qualitative standards of scholarship, or has satisfied all requirements for graduation, the notation will be removed from the transcript.

Quantitative Standards. The quantitative standards, referred to as minimum progress requirements, define scholarship in terms of the number of units that you must satisfactorily complete. It is expected that a student will earn the 180-unit minimum degree requirement within 12 quarters (four years). This means students are expected to complete, on average, 15 units per quarter.

Because occasions arise which prevent students from achieving expected progress towards the degree, the campus has established minimum progress requirements, to which students must adhere. To meet minimum progress, a full-time regular undergraduate is required to maintain an average of at least 13 units passed over all quarters of enrollment. Minimum progress is calculated at the end of every Spring Quarter for the preceding three quarters (Fall, Winter, Spring) comprising the academic year. Quarters during that period for which a student was officially approved for parttime status are omitted from the minimum progress calculation.

The following courses may be counted toward unit minimum progress:

- Required non-credit courses, e.g., Mathematics B, will be evaluated according to the "Carnegie unit" rule and counted as units passed, although these courses shall not be applied toward the satisfaction of baccalaureate degree requirements.
- Repeated courses passed to improve *D* or *F* grades up to a maximum of 16 units.
- Courses passed in Summer Sessions at UC Davis or at another accredited school and transferred to UC Davis will be counted as units passed (applied to the next full-time quarter of enrollment immediately following the summer session).
- Courses passed by examination in accordance with policies established by the Divisional Committee on Courses (applied to quarter in which exam is taken).
- Courses that are *IP* (in progress) will be counted as units passed.
- Courses graded *I* will be counted as units passed when replaced by a passing grade (applied to the quarter in which the *I* grade is received).

A student will be placed on **probation for quantitative reasons** if, at the end of any Spring Quarter, the minimum progress calculation for the preceding academic year shows that the student passed an average of less than 13 units but greater than or equal to 12 units per quarter.

A student will be subject to **disqualification for quantitative reasons** if, at the end of any Spring Quarter, the minimum progress calculation for the preceding academic year shows that the student passed an average of less than 12 units per quarter.

For every student who fails to meet minimum progress at the end of Spring Quarter, a "degree progress average" will be calculated at the close of the next full-time quarter of enrollment at UC Davis. The degree progress average is defined as the quotient of the number of units passed during all full-time quarters from the initial quarter of matriculation at UC Davis divided by the number of full-time quarters completed at UC Davis.

A student whose degree progress average is less than 13 units shall be "subject to disqualification for quantitative reasons." A student whose degree progress average is 13 or more units shall not be "subject to disqualification for quantitative reasons."

If a student fails to make minimum progress at the end of Spring Quarter, the degree progress average shall be calculated each subsequent full-time quarter of enrollment as long as the student is "subject to disqualification for quantitative reasons." A student who is "subject to disqualification for quantitative reasons" at the end of two consecutive full-time quarters of enrollment shall be disqualified from the university.

In the case of dismissal for quantitative reasons, the official transcript will state that the student is not in good academic standing.' Once a student has met the quantitative standards of scholarship, or has satisfied all requirements for graduation, the notation will be removed from the transcript.

Dismissal

Dismissal for either qualitative or quantitative reasons (defined above) is based on the decision of the dean of the college in which the student is enrolled. Such dismissal is from the University of California system and not simply the college or the UC Davis campus. Should a former UC Davis student later wish to be readmitted to the UC Davis campus, the authority to do so rests with the dean of the college from which the student was dismissed. If a student is dismissed from their college, they will automatically receive a full refund of registration fees paid for that term.

Students should go to the dean's office of their college if they need academic advising about probation and dismissal.

A student will be placed on probation or subject to disqualification for failure to meet qualitative or quantitative standards of scholarship.

HONORS AND PRIZES

Deans' Honors Lists

According to UC Davis campus regulations, the quarterly Dean's Honors List includes names of students who have completed, for a letter grade, a minimum of 12 units in a specific quarter with a grade point average equal to or higher than the minimum grade point average attained by the upper 16 percent of those registered in the same class level and college during that quarter. Honors lists will be posted quarterly on deans' office websites or made available by other means and a notation of these honors will be placed on each student's permanent record by the Office of the University Registrar.

Graduation Honors

Honors at graduation are awarded to students who have a grade point average in the top percent of their college as shown in the table below. The College of Letters and Science requires that additional criteria be met for high and highest honors; see the sections below for more information.

Total Quarter Units Completed at UC	Highest Honors	High Honors	Honors	Total
45-89	2%	next 2%	next 4%	8%
90-134	3%	next 3%	next 6%	12%
135±	4%	nevt 4%	nevt 8%	16%

Grade point averages from the winter quarter prior to graduation are used to determine the averages that will earn an honors designation. Following are the averages for winter quarter 2012. These averages will be used through winter quarter 2013.

Grade Point Average by College

Percent Determining Cut-Off Point	Agricultural & Environmental Sciences	Biological Sciences	Engineering	Letters and Sciences
2%	3.906	3.926	3.898	3.921
3%	3.877	3.891	3.878	3.885
4%	3.839	3.854	3.844	3.846
6%	3.766	3.815	3.808	3.780
8%	3.693	3.770	3.739	3.723
12%	3.599	3.681	3.637	3.614
16%	3.513	3.593	3.520	3.540

An honors notation is made on students' diplomas and on their permanent records in the Office of the University Registrar.

College of Letters and Science. Graduation with "honors" requires that a student meet the appropriate grade point requirement described in the above table for all UC courses completed. Students who meet the grade point requirement for graduation with honors, and who complete the Honors Program of the College of Letters and Science, may be recommended by their departments for graduation with high honors or highest honors on the basis of an evaluation of their academic achievements in the major and in the honors project in particular. Graduating students will not be awarded honors with the bachelor's degree if more than eight units of grade *I* (Incomplete) appear on their transcripts. The College Committee on Honors may consider exceptions to this condition. Petitions for this purpose should be submitted to the deans' office.

The Honors Program of the College of Letters and Science

The Honors Program in the College of Letters and Science permits students to pursue a program of study in their major at a level significantly beyond that defined by the normal curriculum. It represents an opportunity for the qualified student to experience aspects of the major that are representative of advanced study in the field. Successful completion of the College Honors Program is a necessary prerequisite to consideration for the awarding of high or highest honors at graduation.

Entrance into the honors program requires that a student have completed at least 135 units with a minimum grade point average of 3.500 in courses counted toward the major. Other prerequisites for entrance into the program are defined by the major. The program consists of a project whose specific nature is determined by consultation with the student's major adviser. It may involve completion of a research project, a scholarly paper, a senior thesis, or some comparable assignment depending on the major. The project will have a minimum duration of two quarters and will be noted on the student's record by a variable unit course number or special honors course designation. Successful completion of the honors program requires that a minimum of six units of credit be earned in course work for the project.

The Honors Program of the College of Engineering

An Honors Program is available to qualified students in the Chemical Engineering, Biochemical Engineering, and Materials Science and Engineering majors. The Honors Program is also available to the dual majors: Chemical Engineering/Materials Science and Electrical Engineering/Materials Science and Engineering, and Mechanical Engineering/Materials Science and Engineering. The Chemical Engineering and Materials Science Honors Program is a four-year program designed to challenge the most talented students in these majors. Students invited to participate will take a one-unit honors seminar in their Freshman year and will enroll in various one-unit honors courses. In the upper division, students will complete either an honors thesis or a project that might involve local industry (Chemical Engineering 194 HA, HB, HC). Students must maintain a grade point average of 3.500 to continue in the program. Successful completion of the Honors Program will be acknowledged on the student's transcript.

University Honors Program

http://honors.ucdavis.edu/

The University Honors Program (UHP) at UC Davis is designed to meet the needs of highly-motivated and academically-talented students. Through enriched educational opportunities, the UHP seeks to provide students with an undergraduate education that will engage them in active learning and nurture and promote critical thinking and oral and written expression.

Through dynamic interdisciplinary curriculum and innovative teaching, students work closely with distinguished faculty to create a vibrant community of scholars dedicated to pursuing academic excellence. The UHP offers students many of the benefits of a small college experience within the context of a major research university.

The program's multifaceted approach to learning provides students distinct pathways to becoming part of this prestigious honors program.

Davis Honors Challenge

(530) 752-2335; http://dhc.ucdavis.edu

A track within the University Honors Program (UHP), the Davis Honors Challenge (DHC) is a campuswide honors program for highly motivated students who are interested in enhancing their education through special courses, closer contact with faculty and dynamic interaction with academic peers.

DHC courses are limited in size so that participants receive substantial individual attention from faculty. In return, students are expected to participate actively in analyzing real world problems. Honors courses and small honors sections of regular courses also encourage individual student participation. Students satisfactorily completing the program will receive transcript notation for each academic year of participation.

First-year students participating in the DHC take one honors course, one orientation seminar and one DHC freshman seminar. Second-year students take one honors course, one problem oriented interdisciplinary seminar, and one DHC freshman seminar or honors contract. Third-year students are required to complete one honors contract and participate in a two-quarter sequence seminar. Fourth-year students participate in a year-long team project to identify real world problems, apply research, critical thinking, problem-solving and communication skills to develop viable solutions for their outside sponsor. Alternatively, they have the option of participating in an honors thesis project. Transfer students complete an acclimation seminar and two honors contracts during their first year in the program. They are also required to meet with an honors counselor to help determine their program pathway.

Other components of the DHC include an honors residential hall living learning community and various workshops and events. Each of these programs is designed to enhance students' college experience.

Entering first-year and transfer students who file a "Statement of Intent to Register" at UC Davis will be e-mailed detailed information about the DHC application process. Continuing students may obtain information and an application from the DHC Office after the start of spring quarter.

University Honors Challenge

(530) 752-3225; http://honors.ucdavis.edu

The University Honors Program (UHP) consists of two primary tracks available to the full spectrum of majors at UC Davis: the Davis Honors Challenge (DHC) and the Integrated Studies Honors Program (ISHP). Specific coursework in each of these tracks can be found in their respective catalog descriptions. The UHP can also include comprehensive four-year honors experiences in individual departments. Such current departmental offerings can be found at the UHP web site.

Integrated Studies Honors Program

(530) 752-9760; http://integratedstudies.ucdavis.edu

The Integrated Studies Honors Program (ISHP) is one track within the University Honors Program (UHP) and is a campuswide, invitational, first-year residential honors program, now in its fifth decade. Course offerings oriented toward independent research opportunities are also offered beyond the freshman year. During the freshman year, the Integrated Studies Honors Program offers specially designed, interdisciplinary honors courses that satisfy General Education requirements. Approximately 120 students live in an Academic Residential Community on campus and take two limited-enrollment honors courses (open only to Integrated Studies Honors Program students) and two seminars.

Holders of Regents Scholarships, the university's most prestigious scholarship awards, are guaranteed places in the Integrated Studies Honors Program. Other highly qualified students are also invited to participate and are selected to create a balanced community of students from all four undergraduate colleges.

Prizes and Awards

The University Medal is the highest campus honor awarded to a graduating senior in recognition of superior scholarship and achievement. A College or School Medal is also given to the outstanding graduating student in each of the colleges and professional schools.

Departmental citations, special awards and prizes are also awarded to students for superior achievement and scholarship.

College of Agricultural and Environmental Sciences. Each year, the outstanding graduating senior in the College is awarded a silver medal, known as the "Agricultural and Environmental Sciences Medal." Scholastic excellence (in a minimum of six quarters at UC Davis) is the primary basis for choosing the recipient. The Mary Regan Meyer Prize is awarded to an outstanding graduate who has demonstrated expertise and an interest in serving humanity. The Charles E. Hess Award is awarded to the graduate with the most noteworthy record of public/community service while at UC Davis. The Kinsella Memorial Prize, in honor of John E. Kinsella, is awarded annually to an outstanding individual who submits his or her Ph.D. dissertation during the spring, fall winter quarter or summer session immediately preceding the due date for nomination.

College of Biological Sciences. Each year the College Medal is awarded to one outstanding graduating senior. Academic excellence is the primary basis for selecting medal nominees. The Undergraduate Student of the Year is awarded to a graduating senior based on the criteria of academic excellence, research activ-

ity and involvement in service to the campus or community. For additional information regarding college awards, please contact the Dean's Office.

College of Engineering. Each year, outstanding senior students in engineering are selected by their grade point averages as nominees for the M.S. Ghausi Medal. Academic excellence is the primary basis for selecting the recipient of the award. The Zuhair Munir Award is given to the student who has submitted the year's best engineering doctoral dissertation. Established in 1999, the award honors former Dean of the College, Zuhair Munir, who led the UC Davis College of Engineering from 2000 to 2002 and acted as its Associate Dean for Graduate Studies for 20 years. More than 25 faculty, staff and friends of the College of Engineering contribute to this endowed fund.

College of Letters and Science. Graduating seniors with a distinguished academic record may be recommended by the faculty as nominees for the College's Herbert A. Young Medal. Each June, one medalist is selected from among the graduates of the current academic year. The Leon H. Mayhew Award is conferred upon the outstanding graduate majoring in the arts or humanities, preferably music, art, or literature. Academic excellence is the primary basis for selecting the recipients of these awards. The Lawrence J. Andrews prize is awarded to a student entering the senior year who not only has achieved academic excellence but who also has demonstrated interests outside of pure scholarship.

Chancellor's Award for Excellence in Undergraduate Research

This prestigious award recognizes a graduating senior who has distinguished him/herself through their excellence in undergraduate research. The winner, chosen for completing research or scholarship in any academic subject while at UC Davis, is announced and awarded a special plaque at commencement ceremonies in June. In conjunction with the Chancellor's Award, Professor Dean Simonton of UC Davis' Department of Psychology established an endowment for funding a cash prize for each year's student recipient. An award is also given each year to a faculty mentor for his/her outstanding contribution to undergraduate research. For more information, see http://undergraduateresearch.ucdavis.edu/awards.html.

Honorary Societies

Election to an honorary society is one of the most prestigious awards a student can receive. At UC Davis, the following honorary societies are represented:

- Alpha Kappa Delta (Sociology)
- Alpha Omega Alpha (Medicine)
- Alpha Zeta (College of Agricultural and Environmental Sciences)
- Gamma Sigma Delta (College of Agricultural and Environmental Sciences; College of Biological Sciences)
- Golden Key (All colleges and schools)
- The National Society of Collegiate Scholars (All colleges and schools)
- Omicron Delta Epsilon (Economics)
- Order of Omega (Fraternities-Sororities)
- Order of the Coif (Law)
- Phi Alpha Theta (History)
- Phi Beta Kappa (College of Letters and Science)

- Phi Kappa Phi (All colleges and schools)
- Phi Sigma (Biological Sciences)
- Phi Zeta (Veterinary Medicine)
- Pi Delta Phi (French)
- Pi Mu Epsilon (Mathematics)
- Pi Sigma Alpha (Political Science)
- Prytanean Honor Society (All colleges-undergraduate women only)
- Psi Chi (Psychology)
- Sigma Pi Sigma (Physics)
- Sigma Xi (All colleges and schools-research)
- Tau Beta Pi (Engineering)

LEAVING UC DAVIS

Graduation

Each candidate for an undergraduate degree must file an Application for Graduation with the Office of the University Registrar for the quarter in which the candidate plans to receive the degree; see http://registrar.ucdavis.edu/graduation. The dates for campus filing are published in the Academic Calendar, on page 1, and the quarterly Registration Guide.

Students in the College of Agricultural and Environmental Sciences must have their Major Certification form evaluated by the dean's office before their candidacy for a degree can be finalized; see Bachelor's Degree Requirements for the college in the Undergraduate Education chapter.

Students in the College of Engineering must register at the College of Engineering website (http://engineering.ucdavis.edu) in addition to filing with the Office of the University Registrar (http://registrar.ucdavis.edu). See the College of Engineering website or call the Undergraduate Advising Office at (530) 752-1979 for Engineering filing deadlines.

Graduating students who wish to participate in the Commencement Ceremony must register to do so with their college by the filing deadline for that term. For links to each college's registration website, see http://registrar.ucdavis.edu/graduation. Commencement Ceremonies are held twice a year, in the fall (December) and spring (June).

Please note that to graduate, a student *must* file an Application for Graduation with the Office of the University Registrar by the stated deadline. To participate in the Commencement Ceremony, a student *must* register with their college by the stated deadline. *These are separate actions*.

Leave of Absence: Planned Educational Leave Program (PELP)

The Planned Educational Leave Program allows any registered student-undergraduate or graduate-to temporarily suspend academic work at UC Davis. Undergraduates may take one such leave during their academic career at UC Davis and that leave is limited to one quarter in duration. For graduate students the maximum leave is up to one year. Undergraduates apply for PELP at the Office of the University Registrar. Graduate students apply through their departments and professional students apply through their Dean's office.

Applications for PELP may be filed as late as the tenth day of instruction during the quarter for which the student is requesting a leave. However, approved applications submitted after the first day of instruction will entitle you to only a partial retraction of fees assessed, which may provide a refund in accordance with the Schedule of Refunds. The Schedule of Refunds refers to calendar days beginning with the first day of instruction. The effective date for determining a refund of fees is the date the completed and approved PELP Form is returned to the Office of the University Registrar; see the Fees, Expenses and Financial Aid chapter.

An application fee is charged to your account when you enroll in the PELP program.

While students may receive academic credit at other institutions and transfer this credit to UC Davis (subject to rules concerning transfer credit), participants are reminded that the intent of the program is to "suspend academic work." Therefore, students are urged to carefully evaluate the desirability of taking academic work while away from the campus during PELP. Students enrolled in PELP are not eligible to enroll in Open Campus (Concurrent) courses at the UC Davis campus, or to otherwise earn academic credit at UC Davis during the PELP leave.

Readmission is guaranteed assuming you resume academic work by enrolling in courses, satisfying any holds that may have been placed on your registration and paying your registration fees by the established deadlines for the quarter specified for return on your approved PELP application. Students who do not return by the specified quarter will be automatically withdrawn from the university.

You will not be eligible to receive normal university services during the planned leave. Certain limited services, however, such as placement and student employment services, counseling, and faculty advising are available. Students on PELP may purchase a health care card from Student Health and Counseling Services and may retain library privileges by purchasing a library card. International students should consult Services for International Students and Scholars to find out how the PELP will affect their status. Grants and other financial aids will be discontinued for the period of the leave, but effort will be made, where legally possible, to allow you to renegotiate loan payment schedules and to ensure the availability of financial aid upon your return.

Withdrawal

To cancel your registration before the first day of instruction or to withdraw from the university on or after the first day of instruction, you must complete a Cancellation/Withdrawal Form and return the form to the Office of the University Registrar. If you do not submit a Cancellation/Withdrawal Form, you will be liable for fees according to he Schedule of Refunds; see the Fees, Expenses and Financial Aid chapter. The effective date for determining a refund of fees is the date the completed Cancellation/Withdrawal Form is filed with the Office of the University Registrar. No exceptions will be made to this policy. After filing your withdrawal form, you must complete an Exit Interview with Student Accounting; see the Student Accounting website

If you are receiving financial aid, you must report your change of status immediately, in person or by mail, to the Financial Aid Office. If you are receiving veterans benefits, you must also report your withdrawal to the Veterans Affairs Office.

College of Engineering. Engineering students planning to withdraw from the University are strongly advised to meet with an adviser in the Undergraduate Advising Office, in 1050 Kemper Hall or call (530) 752-1979, to discuss readmission requirements prior to withdrawing.

Retroactive Withdrawal. Petitions for retroactive withdrawals may be obtained from the Office of the University Registrar. Petitions are subject to approval by the Grade Change Committee of the Davis Division Academic Senate. Reasons for seeking such are medical problems, severe emotional difficulties, or death or severe illness in the immediate family. Petitions should include a detailed account of the problem, appropriate documentation and an adequate explanation of why withdrawal was not taken during the quarter in which the problem occurred.

RETURNING TO UC DAVIS; READMISSION

If you are a former UC Davis undergraduate student who wishes to resume undergraduate studies, you may reapply through the Readmission process. You are considered a former student if you have interrupted the completion of consecutive terms of enrollment on the UC Davis campus. For details regarding the Readmission process, see http://registrar.ucdavis.edu/html/readmin.html.

You may obtain the Readmission application from the Office of the University Registrar or download the application at http://registrar.ucdavis.edu/PDFFiles/D064ApplUndergradReadmission.pdf. The Readmission application must be completed and submitted to the Office of the University Registrar with the non-transferable, non-refundable application fee on or before the following deadlines:

- Fall. The last business day of July
- Winter. The last business day of October
- Spring. The last business day of January



UNDERGRADUATE EDUCATION

UNDERGRADUATE EDUCATION

5th Floor, Mrak Hall (530) 752-6068

UC Davis offers the Bachelor of Arts (A.B.) and Bachelor of Science (B.S.) degrees in over 100 major programs, as well as over 110 minors in a variety of disciplines.

Undergraduate education is governed by the Vice Provost—Undergraduate Education, and the Undergraduate Council, a standing committee of the Davis Division of the Academic Senate. The Vice Provost is also responsible for education-related programs including the Undergraduate Research Center, the Center for Leadership Learning, the Integrated Studies Honors Program, the Davis Honors Challenge, the Washington Center, Entry Level Writing, Summer Sessions, the Center for Excellence in Teaching and Learning, and the Women's Resources and Research Center Library.

Academic programs are offered by the four undergraduate colleges: the College of Agricultural and Environmental Sciences, the College of Biological Sciences, the College of Engineering, and the College of Letters and Science.

COLLEGE OF AGRICULTURAL AND ENVIRONMENTAL SCIENCES

Office of the Dean 150 Mrak Hall (530) 752-0108; http://www.caes.ucdavis.edu

Major programs in the College of Agricultural and Environmental Sciences highlight the multiple connections among agricultural sciences, environmental sciences and human sciences within the larger context of the quality of life in the global economy. The majors fall into three broad areas of study described below. The College of Agricultural and Environmental Sciences also offers two collegewide degree programs and two collegewide non-degree programs.

The Undergraduate Programs

Aaricultural Sciences

These majors prepare students in animal biology and the management of environmental resources as needed to develop sustainable animal production technologies. Also considered is the impact of production and management processes on animal health and welfare, human diet and health, and the natural environment.

The majors that focus on plant science provide a strong background in the context of agricultural and environmental systems and societal needs; ecological understanding of food and fiber production systems; biological and economic principles that underlie management decisions in agribusiness; and a basic background in all areas of plant biology, including plant development, plant protection, biotechnology and post-harvest physiology.

Majors:

- Agricultural and Environmental Education, B.S
- Animal Biology, B.S.
- Animal Science, B.S.
- Animal Science and Management, B.S.
- · Biotechnology, B.S.

- · Entomology, B.S.
- Plant Sciences, B.S.
- Sustainable Agriculture and Food Systems, B.S.
- Viticulture and Enology, B.S.

Minors:

- Agricultural Pest Management
- Applied Computing and Information Systems (Plant Sciences)
- Animal Biology (Animal Science)
- Animal Genetics (Animal Science)
- Apiculture Entomology (Entomology)
- Aquaculture (Animal Science)
- Avian Sciences
- Dairy/Livestock (Animal Science)
- Environmental Horticulture (Plant Sciences)
- Equine (Animal Science)
- · Forensic Entomology
- Fungal Biology and Ecology (Plant Pathology)
- Insect Biology (Entomology)
- Insect Ecology and Evolution (Entomology)
- Medical-Veterinary Entomology (Entomology)
- Nematology
- Precision Agriculture (Biological and Agricultural Engineering)

Environmental Sciences

These majors focus on the broad facets of the human and natural environments and their interactions. They draw on the social, physical and biological sciences as needed to prepare students for leadership and advanced studies in the areas of natural resource management, environmental quality and stewardship, community planning and design, and public policy decision making.

Majors:

- Agricultural and Environmental Education, B.S
- Atmospheric Science, B.S.
- Ecological Management and Restoration, B.S.
- Environmental Horticulture and Urban Forestry, B.S.
- Environmental Science and Management, B.S.
- Environmental Policy Analysis and Planning, B.S.
- Environmental Toxicology, B.S.
- · Hydrology, B.S.
- Landscape Architecture, B.S.
- Soil and Water Science, B.S.; see Environmental Science and Management
- Wildlife, Fish, and Conservation Biology, B.S.

Minors:

- Atmospheric Science (Land, Air, and Water Resources)
- Environmental Policy Analysis (Environmental Science and Policy)
- Environmental Toxicology
- Geographic Information Systems (Biological and Agricultural Engineering)
- Geographic Studies (Environmental Design)
- Hydrology (Land, Air, and Water Resources)
- Landscape Restoration (Plant Sciences)
- Soil Science (Land, Air, and Water Resources)
- Wildlife, Fish, and Conservation Biology

Human Sciences

These majors foster a deeper understanding of the multiple connections between scientific and cultural issues in the context of human health and the quality of life. Basic physical and biological science, social science, design, and economic principles are taught in this context, linking food and fiber production to consumption, emerging knowledge to societal applications and policy, and human development to active, informed citizenship. Emphasis is on linking resources for humans with humans as resources. Physiological, social and aesthetic dimensions of the human experience are explored.

Majors:

- Agricultural and Environmental Education, B.S
- Clinical Nutrition, B.S.
- Community and Regional Development, B.S.
- Fiber and Polymer Science, B.S.
- · Food Science, B.S.
- Human Development, B.S.
- Managerial Economics, B.S.
- Nutrition Science, B.S.
- Sustainable Agriculture and Food Systems, B.S.
- Textiles and Clothing, B.S.

Minors

- Aging and Adult Development (Human and Community Development)
- Community Development (Human and Community Development)
- Community Nutrition (Nutrition)
- Fiber and Polymer Science (Textiles and Clothing)
- Food Service Management (Nutrition)
- Human Development (Human and Community Development)
- Managerial Economics (Agricultural and Resource Economics)
- Nutrition and Food (Nutrition)
- Nutrition Science (Nutrition)
- · Textiles and Clothing

Collegewide Programs

The collegewide programs cut across all of the above areas, providing students in a variety of majors with a background in such areas as public policy, economic principles in a global context and the intersections among environmental, agricultural and socio-economic issues. Collegewide programs also include non-degree, lower division curricula aimed at providing students with a foundational knowledge base and the potential for developing individualized programs.

Majors:

- Individual Major, B.S. (suspended)
- International Agricultural Development, B.S.

Minors:

- Contemporary Leadership
- International Agricultural Development
- Science and Society

Non-degree programs:

- Undeclared/Exploratory
- · Science and Society

COLLEGE OF BIOLOGICAL SCIENCES

Dean's Office 202 Life Sciences (530) 752-0410; http://biosci.ucdavis.edu/

The College of Biological Sciences administers undergraduate programs in fundamental aspects of biology. The college is organized into five departments that represent major themes of modern biology: Evolution and Ecology; Microbiology; Molecular and Cellular Biology; Neurobiology, Physiology, and Behavior; and Plant Biology. The individual departments offer a total of eight specialized majors, each focusing on one of the core disciplines of biology. The Biological Sciences major, the Individual major, the Undeclared-Life Sciences program and the Bodega Marine Laboratory Spring Quarter Program are offered by the entire college.

The Undergraduate Programs

Biological Sciences

The Biological Sciences major is broad in concept, designed to span the numerous core disciplines of biology. The major covers most dimensions of the study of life, ranging from molecules and cells to populations of organisms. While emphasizing breadth, the Bachelor of Science degree also requires the student to select an area of emphasis that provides concentrated study in one facet of biology at the upper division level. Areas of emphasis are Evolution, Ecology and Biodiversity; Marine Biology; Microbiology; Molecular and Cellular Biology; Neurobiology, Physiology, and Behavior; and Plant Biology.

Major:

• Biological Sciences, A.B., B.S.

Minor:

· Biological Sciences

Evolution and Ecology

The major in Evolution, Ecology and Biodiversity offers the student a broad background in the theoretical and empirical basis of our understanding of the evolution and ecology of living organisms. The program of study begins with a core of introductory courses in mathematics, physical sciences and biology. These are followed by survey courses in evolution and ecology and more specialized courses that focus the student on particular disciplines or organisms, with an emphasis on problem-solving and critical thinking.

Major:

- Evolution, Ecology and Biodiversity, A.B., B.S. *Minor*:
- · Evolution, Ecology and Biodiversity

Microbiology

Microbiology deals with bacteria, yeasts and other fungi, algae, protozoa and viruses. These microorganisms are ubiquitous in nature and play a crucial role in areas such as agriculture, biotechnology, ecology, medicine and veterinary science. The field of microbiology contributes to areas of fundamental inquiry such as biochemistry, cell biology, evolution, genetics, molecular biology, pathogenesis and physiology.

Major:

Microbiology, A.B., B.S.

Molecular and Cellular Biology

The Department of Molecular and Cellular Biology offers three majors.

The Biochemistry and Molecular Biology major introduces students to the chemistry of living organisms and the experimental techniques that are used to probe the structures and functions of biologically important molecules. Students who enjoy both chemistry and biology and who are comfortable with quantitative approaches to problem-solving will find this major a rewarding field of study.

The Cell Biology major provides a comprehensive understanding of the cell, the basic structural and functional unit of all living organisms. The major emphasizes the principles that govern how biomolecules interact with one another to organize themselves into higher order structures that comprise cells and how cellular organization and function contribute to the development, maintenance and reproduction of adult organisms.

The Genetics major provides a broad background in the biological, mathematical and physical sciences basic to the study of heredity and evolution. The major provides a dual focus on the molecular mechanisms that regulate utilization of information encoded within the genome as well as the mechanisms and analysis of inheritance of genetic information. The major is sufficiently flexible to accommodate students interested in the subject either as a basic discipline in the biological sciences or in terms of its applied aspects in medicine, biotechnology and agriculture.

Majors:

- Biochemistry and Molecular Biology, B.S.
- · Cell Biology, B.S.
- · Genetics, B.S.

Neurobiology, Physiology, and Behavior

The Department of Neurobiology, Physiology, and Behavior offers two majors.

The major in Exercise Biology is an integrative program of study, encompassing the physiological, biomechanical and behavioral aspects of exercise and physical activity. The focus is on both the acute and adaptive effects of physical activity (and inactivity). Exercise biology deals with the mechanisms and consequences of activity from the molecular to the organismal (human ecological) level. We examine these mechanisms and consequences during growth, development, aging, disease and in altered environmental conditions. The exercise biology major encompasses the critical aspects of an integrative program in applied human biology.

The Neurobiology, Physiology, and Behavior major emphasizes the understanding of vital functions common to all animals. All animals perform certain basic functions-they grow, reproduce, move, respond to stimuli and maintain homeostasis. The physiological mechanisms upon which these functions depend are precisely regulated and highly integrated. Actions of the nervous and endocrine systems determine behavior and the interaction between organisms and their physical and social environments. Students in this major will study functional mechanisms; the control, regulation and integration of these mechanisms; and the behavior which relates to those mechanisms at the level of the cell, the organ system and the organism.

Majors:

- Exercise Biology, A.B., B.S.
- Neurobiology, Physiology, and Behavior, B.S.

Minore:

- · Exercise Biology
- · Human Physiology
- Neuroscience

Plant Biology

Plant Biology is the study of plants as organisms. It includes the newer disciplines of cellular and molecular plant biology and the traditional areas of botany, such as anatomy, morphology, systematics, physiology, mycology, phycology, ecology and evolution. The major provides breadth in diverse areas of plant biology and depth in one of several areas of specialization.

Major:

• Plant Biology, A.B., B.S.

Minor:

Plant Biology

Collegewide Programs

Quantitative Biology and Bioinformatics

The interdisciplinary minor in Quantitative Biology and Bioinformatics is an integrative program that introduces students to the quantitative and computational approaches that are redefining all disciplines in the biological sciences, from molecular and cell biology, through genetics and physiology, to ecology and evolutionary biology. The minor in Quantitative Biology and Bioinformatics is open to all undergraduates regardless of major and is sponsored by the College of Biological Sciences.

Minor:

• Quantitative Biology and Bioinformatics

Individual Major

Students whose academic interests are not met by any established major, or combinations of majors and minors may develop an Individual major. Students work in conjunction with the Committee on Undergraduate Petitions and a faculty member in the college.

Major:

• Individual Major, A.B., B.S.

Students who wish to explore the array of life science majors offered at UC Davis before declaring a major may be admitted to the college through the Undeclared—Life Sciences program. These students use the College of Biological Sciences Dean's Office for their advising center. Students in this program must declare a major before completing 90 units.

Bodega Marine Laboratory Program

http://bml.ucdavis.edu/

Spring Quarter Program

A full quarter of undergraduate course work in marine biology is available each spring quarter at the Bodega Marine Laboratory, located in Bodega Bay, California. Course offerings include lecture and laboratory instruction in the developmental biology and physiological adaptation of marine organisms, and population biology

and ecology; a weekly colloquium; and an intensive individual research experience under the direction of laboratory faculty (Biological Sciences courses 120, 120P, 122, 122P, 123; Neurobiology, Physiology, and Behavior 141, 141P). This is a 15 unit program and course offerings and instructors may vary from year to year. Applications are due January 31. For more course detail, see Bodega Marine Laboratory Program, on page 184 or http://bml.ucdavis.edu/.

Summer Special Session Courses

This integrated program offers students a multidisciplinary understanding of coastal ecosystems through intensive, hands on courses taught at Bodega Marine Laboratory. The program offers students three sequences of instruction with up to 10 units in each. Two sequences occur during the first Summer Session dates and one sequence in the second Summer Session dates. Applications are due April 15. For more course detail, see full description under appropriate academic department listing or http://bml.ucdavis.edu/.

The programs are residential with students housed on the laboratory grounds. Participants are assessed a room and board fee in addition to standard campus registration fees. Additional information is available directly from the Bodega Marine Laboratory at (707) 875-2002, P.O. Box 247, Bodega Bay, CA 94923.

COLLEGE OF ENGINEERING

Undergraduate Advising Office 1050 Kemper Hall

(530) 752-1979; http://engineering.ucdavis.edu Facebook: http://www.facebook.com/UCDEngineering

Engineering is the profession in which the physical and biological sciences are applied in a practical way for the benefit of society. As an engineering student, you will learn to observe and describe technological problems and to seek useful solutions to them. Your skills upon graduation will be useful to you not only as an engineer, but also as a professional in management, sales, operations, manufacturing and other fields.

Undergraduate Majors. Fifteen undergraduate majors, including two combined major programs are offered. Each of these is a four-year program leading to the degree of Bachelor of Science.

The following programs are accredited by the Engineering Accreditation Commission of ABET; http://www.abet.org:

- Aerospace Science and Engineering
- Biochemical Engineering
- Biological Systems Engineering
- Chemical Engineering
- Civil Engineering
- Computer Engineering
- Electrical Engineering
- Electronic Materials Engineering (currently not accepting new students)
- · Materials Science and Engineering
- · Mechanical Engineering
- Optical Science and Engineering (currently not accepting new students)

The Engineering Accreditation Commission and the Computing Accreditation Commission of ABET; http://www.abet.org; accredit the following program:

• Computer Science and Engineering

The following programs are not accredited by The Engineering Accreditation Commission of ABET; http://www.abet.org:

- Biomedical Engineering
- Chemical Engineering/Materials Science and Engineering
- Mechanical Engineering/Materials Science and Engineering **Minor Programs.** The College of Engineering currently offers eight minor programs:
- Biomedical; in the Department of Biomedical Engineering
- Construction Management and Engineering; in the Department of Civil and Environmental Engineering
- Energy Efficiency; in the Department of Biological and Agricultural Engineering
- Energy Science and Technology; in the Department of Biological and Agricultural Engineering
- Energy Policy; in the Department of Biological and Agricultural Engineering
- Materials Science; in the Department of Chemical Engineering and Materials Science
- Optical Science and Engineering in the Department of Applied Science) (currently not accepting new students)
- Sustainability in the Built Environment (in the Department of Civil and Environmental Engineering)

In addition, the Department of Computer Science offers a minor in Computer Science.

The Undergraduate Programs

Applied Science

The Department of Applied Science offers a major in Optical Science and Engineering.

The objective of the Optical Science and Engineering program is to provide a basic education in the fundamental principles of optics combined with key courses in physics, mathematics and the engineering applications of optics. There is a rapidly growing national demand for engineers educated in optical science and engineering. Much of the high-technology infrastructure is based upon optics and its applications, the most prominent being optical digital information transmission. In addition, engineers trained in optical science and engineering are in strong demand in health care and life science, optical sensing for environmental and weather applications, energy-use reduction, commercial camera and space-program optical applications, and national defense applications.

Major.

 Optical Science and Engineering, B.S. (currently not accepting new students)

Minor:

• Optical Science (currently not accepting new students)

Biological and Agricultural Engineering

Biological Systems Engineering majors learn to combine the science and art of engineering with the science of biology to design systems that influence, control, or use biological materials and organisms for improving the quality of life. Specific objectives include designing systems to process biological materials into consumer products; designing machines to interact with biological systems in disciplines ranging from agriculture to medicine; managing, recycling and using wastes; developing systems to protect and preserve our natural resources and environment; developing

and improving processing systems for food; designing equipment and systems that improve nutrition and diets; and minimizing waste discharge to the environment.

Major:

• Biological Systems Engineering, B.S. *Minors*:

- Energy Science and Technology
- Energy Policy
- Energy Efficiency

Biomedical Engineering

The Department of Biomedical Engineering advances fundamental medical concepts; creates knowledge from the molecular to the organ systems levels; and develops innovative biologics, materials, processes, implants, devices and informatics approaches. These approaches are applied to the prevention, diagnosis and treatment of disease. The objective is to prepare students for employment in companies that manufacture medical assist devices, human tissue products and therapeutics. The program also prepares students to enter a graduate program in biomedical engineering or pursue professional degrees in medicine and related health fields.

Major:

• Biomedical Engineering, B.S.

Minor:

Biomedical Engineering

Chemical Engineering and Materials Science

The Department of Chemical Engineering and Materials Science offers five majors, including two combined majors.

Chemical Engineering majors learn to apply chemical and engineering principles to create useful products ranging from antibiotics to zirconium, from petroleum to plutonium, from agricultural chemicals to plastics. Specific objectives include the design of industrial processes as diverse as integrated circuit materials production, integrated waste management and petroleum refining.

Biochemical Engineering majors combine chemical engineering studies with studies in the life sciences and bioprocess engineering. Bioprocess engineering is the application of engineering principles to develop, optimize and commercialize manufacturing processes. Specific objectives include pharmaceuticals production, environmental repair, industrial chemical production and food production.

Materials Science and Engineering majors learn to understand the relationships among microscopic structure, properties and behavior of materials in order to produce new and improved materials with capabilities far superior to common metals, alloys and ceramics. Specific objectives include the development of materials for high-speed transportation systems, surgical and dental implants, new generations of power plants and solid-state electronic devices in computer and optical communications technology.

Majors:

- Biochemical Engineering, B.S.
- · Chemical Engineering, B.S.
- Chemical Engineering/Materials Science and Engineering, B.S.
- Materials Science and Engineering, B.S.

• Electronic Materials Engineering B.S. (currently not accepting new students)

Minor:

Materials Science

Civil and Environmental Engineering

Civil Engineering majors learn to apply the principles of the physical and biological sciences and engineering to plan and design systems to improve the quality of life. Specific objectives include providing potable water and freedom from disease-carrying wastes; protecting the natural environment; mitigating the effects of earthquakes and other natural disasters; designing land-, water- and air-transportation systems; and building roads and structures.

Major:

• Civil Engineering, B.S.

Minors:

- Construction Engineering and Management
- Sustainability in the Built Environment

Computer Science and Engineering

The field of computer science and engineering encompasses the organization, design, analysis, theory, programming and application of digital computers and computing systems. The curriculum develops versatile engineers with backgrounds spanning a broad computer/software spectrum. The Computer Science and Engineering major provides a solid background in mathematics, physics, chemistry and electronic circuits and systems—all supporting the computer hardware and software courses that form the focus of the curriculum. A key theme is the hardware/software interaction in computer system design; this theme is reflected in the balance between hardware and software course requirements and in the orientation of the courses themselves.

Major:

- Computer Science and Engineering, B.S.
- Computational Biology

Electrical and Computer Engineering

Electrical Engineering majors learn to apply the principles of the physical sciences and engineering to the design, analysis, development, production and evaluation of electronic systems. Specific objectives include the provision of systems for communications, control, signal processing, integrated circuit fabrication, optoelectronics, consumer electronics and digital systems.

Computer Engineering majors study the design, development, analysis, organization, theory, programming and application of digital computers. Specific objectives include developing the student's ability to design both software and hardware. In comparison to the Computer Science and Engineering major, the Computer Engineering major provides greater emphasis on hardware in the key hardware/software interaction in computer system design.

Majors

- · Computer Engineering, B.S.
- Electrical Engineering, B.S.

Mechanical and Aerospace Science Engineering

Aerospace Science and Engineering majors learn to apply the principles of the physical sciences and engineering to vehicles whose motion is determined by aerodynamic forces. Specific objectives include the design, development and manufacture of aircraft and other transportation systems integrating the disciplines associated with aerodynamics, propulsion, structures and guidance/control.

Mechanical Engineering majors learn to apply physical and mechanical principles to the design and manufacture of machines and products, energy conversion systems and equipment for guidance and control. Specific objectives include the provision of products and processes for intelligent manufacturing systems, biomechanical and sports equipment, power generation systems, propulsion for transportation, integration of vehicles and automated highways, and applications of computer and automation technologies.

Majors:

- Aerospace Science and Engineering, B.S.
- Mechanical Engineering, B.S.
- Mechanical Engineering/Materials Science and Engineering, B.S.

COLLEGE OF LETTERS AND SCIENCE

Office of Undergraduate Education and Advising Room 200, Social Sciences and Humanities Building (530) 752-0392; http://www.ls.ucdavis.edu

Major programs in the College of Letters and Science provide students systematic exposure to the key principles, methods, findings and representations of a selected area of study. In pursuing a major, students gain intellectual depth and competency in that subject matter, explore important linkages with collateral fields of inquiry and are encouraged to engage in independent study.

The academic programs offered through the college are grouped in three divisions: Humanities, Arts and Cultural Studies; Mathematical and Physical Sciences; and Social Sciences. One collegewide degree program, the individual major, also is available.

The Undergraduate Programs

Division of Humanities, Arts and Cultural Studies

These majors focus centrally on the artifacts, expressions and concerns of humankind in various cultures and times. They provide students the opportunity to explore the creation, performance and analysis of works of art, the language and customs of non-English speaking societies, the theory and criticism of literature, and the peoples and cultures of this nation and its hemisphere. Students interested in studying these types of issues may select from more than 25 different majors.

Majors:

- African American and African Studies, A.B.
- · American Studies, A.B.
- · Art History, A.B.
- Art Studio, A.B.
- Asian American Studies, A.B.
- Chicana/Chicano Studies, A.B.
- · Chinese, A.B.
- Classical Civilization, A.B.
- Comparative Literature, A.B.

- Design, A.B.
- Dramatic Art, A.B.
- · English, A.B.
- Film Studies, A.B.
- French, A.B.
- German, A.B.
- Italian, A.B.
- Japanese, A.B.
- Medieval and Early Modern Studies, A.B.
- Music, A.B.
- Native American Studies, A.B.
- Religious Studies, A.B.
- Russian, A.B.
- Spanish, A.B.
- Technocultural Studies, A.B.
- · Women's Studies, A.B.

Minors:

- African American and African Studies
- American Studies
- Art History
- Art Studio
- Asian American Studies
- Chicana/Chicano Studies
- Chinese
- Classical Civilization
- Comparative Literature
- Dramatic Art
- English
- Film Studies
- French
- German
- · Global and International Studies
- Greek
- Human Rights
- Italian
- Japanese
- Latin
- Luso-Brazilian Studies
- Medieval and Early Modern Studies
- Music
- Native American Studies
- Professional Writing
- · Religious Studies
- Russian
- Sexuality Studies
- Social and Ethnic Relations
- Spanish
- Women's Studies

Division of Mathematical and Physical Sciences

These majors focus primarily on the description and interpretation of the structure, processes and events of the physical universe. They provide students the opportunity to explore in depth the structure, properties and reactions of substances; fundamental mathematical techniques and models and their application to the interpretation and explanation of phenomena; studies of matter and energy and their interconversions; the nature and development of computer languages; and earth and environmental processes. Students interested in studying these types of subjects may select from twelve different majors. The division strongly encourages undergraduates to enroll in undergraduate research projects with one-on-one instruction by faculty scholar/researchers.

Majors:

- Applied Mathematics, B.S.
- Applied Physics, B.S.
- Chemical Physics, B.S.
- Chemistry, A.B., B.S.
- Computer Science, B.S.
- · Geology, A.B., B.S.
- Mathematical and Scientific Computation, B.S.
- Mathematics, A.B., B.S.
- Natural Sciences, B.S.
- Pharmaceutical Chemistry, B.S.
- Physics, A.B., B.S.
- Statistics, A.B., B.S.

Minors:

- Chemistry
- Computer Science
- Environmental Geology
- Geology
- · Geophysics
- Mathematics
- Oceanography
- Physics
- Statistics

Division of Social Sciences

These majors focus largely on issues and problems that characterize social, cultural, political and economic life across human societies. They provide students the opportunity to explore the relationships between people and the groups and organizations of which they are a part, the antecedents of individual behavior, the development of political and economic systems, the social forces that have shaped the contemporary world and the foundations of language, thought, knowledge and perception. Students interested in studying these types of issues may select from 15 dozen different majors.

Majors:

- Anthropology, A.B., B.S.
- Communication, A.B.
- East Asian Studies, A.B.
- · Economics, A.B.
- History, A.B.
- International Relations, A.B.
- Linguistics, A.B.
- Middle East/South Asia Studies, A.B.
- Philosophy, A.B.
- Political Science, A.B.
- Political Science–Public Service, A.B.
- Psychology, A.B., B.S.
- Science and Technology Studies, A.B.

- · Sociology, A.B.
- Sociology–Organizational Studies, A.B.

Minors:

- Anthropology
- Communication
- · East Asian Studies
- Economics
- History
- · History and Philosophy of Science
- · Jewish Studies
- Latin American and Hemispheric Studies
- Linguistics
- Linguistics for Language Teachers
- Middle East/South Asia Studies
- · Philosophy
- Political Science
- · Psychology
- Sociology
- War-Peace Studies

Collegewide Program

Students whose academic interests cannot be satisfactorily met through the completion of an established major have the opportunity to develop an individual major. Individual majors may reflect the most recent trends in scholarship and research and are typically interdisciplinary in nature. The major proposal is developed in close and active consultation with two faculty advisers from the academic disciplines most closely related to the subject matter of the individual major. Careful faculty guidance and review assure that individual majors are comparable in academic rigor and intellectual coherence to those regularly available through the departments and programs of the college.

Major:

Individual Major, A.B., B.S.

BACHELOR'S DEGREE REQUIREMENTS

You must satisfy four groups of requirements before you can become eligible for candidacy for the bachelor's degree; see Bachelor's Degree Requirements, below. The four groups are:

- University requirements, which apply to all colleges;
- General Education requirement, which applies to all colleges;
- · College requirements; and
- · Major requirements.

Every student is responsible for seeing that all of their degree requirements are fulfilled.

Detailed information on university requirements, the General Education requirement and college requirements can be found in this chapter.

UNIVERSITY REQUIREMENTS

All students must fulfill the following University of California requirements.

Entry Level Writing Requirement

The university requires every undergraduate student to demonstrate college-level proficiency in English composition. Satisfaction of the Entry Level Writing Requirement is a prerequisite to all other undergraduate courses in English.

The requirement, as determined by Undergraduate Admissions, may be met in one of the following ways:

- By earning a score of 680 or higher on the Writing section of the new SAT Reasoning Examination, or on the old SAT-II Writing Test.
- By earning a score of 3, 4 or 5 on either College Board Advanced Placement Examination in English.
- By earning a score of 30 or higher on the Combined English/ Writing section of the ACT Assessment.
- By earning a score of 5 or above on the International Baccalaureate's Higher Level English A Examination.
- By earning a score of 6 or above on the International Baccalaureate's Standard Level English A Examination.
- By entering the university with credentials showing the completion of an acceptable 3 semester-unit or 4 quarter-unit collegelevel course in English composition with a grade of C or higher.
- By writing a passing essay on the Analytical Writing Placement Examination. This examination may be taken only once prior to enrollment. It is offered in the spring at local sites throughout California; a student admitted for fall quarter who has not already satisfied the Entry Level Writing Requirement must take this examination. Out-of-state students or any California freshmen admitted after mid-April will take another form of the Ana-

lytical Writing Placement Examination, which will be offered on the UC Davis campus at the beginning of each quarter. For the time and location, consult the *Registration Guide*, published before the beginning of each quarter.

If you have not satisfied the requirement in one of the ways described above, *you must enroll in Workload 57 during your first quarter of residence at the university, or as soon thereafter as space is available in the course.* Workload 57, offered by Sacramento City College on the UC Davis campus, counts as 4.5 units on your study list and toward minimum progress but carries no units toward graduation. To satisfy the requirement, students must earn a course grade of *C* or higher. Students who receive a grade lower than *C* must repeat Workload 57. If the requirement has not been satisfied by the end of your third quarter, and you were not required to take courses for non-native speakers of English in the Linguistics program, you may be disenrolled from the University.

Students whose native or school language is not English, and some students whose schooling combines work in the United States and in another country, must demonstrate proficiency in English. The level of proficiency must meet the standards of both the Linguistics and the Entry Level Writing programs. The results of the Analytical Writing Placement Examination administered at the beginning of each quarter determine whether a student has met the Entry Level Writing Requirement or must take specific course work in the Linguistics program. Students held for Linguistics course work have three quarters to meet the Entry Level Writing Requirement plus the number of quarters required in Linguistics.

American History and Institutions

The American History and Institutions requirement ensures that every graduating student will have at least a minimum knowledge of the background of this country's development and an understanding of the political, economic and social interrelationships of its way of life.

Bachelor's Degree Requirements

University Requirements

All students must fulfill the following University of California requirements:

Entry Level Writing Requirement

American History and Institutions Requirement

Unit Requirement

Residence Requirement

Scholarship Requirement

General Education Requirement

All students must fulfill the campus General Education Requirement; see General Education Requirement, on page 97.

College Requirements

College of Agricultural and Environmental Sciences

Unit Residence Scholarship English Composition

College of Biological Sciences

Unit
Scholarship
English Composition
Foreign Language (only A.B. &
B.A.S. degrees)
Breadth (only A.B. & B.A.S.
degrees)

College of Engineering

Unit
Residence
Scholarship
English Composition
Design
Engineering General Education
Current Catalog Curriculum

College of Letters and Science

Unit
Residence
Scholarship
English Composition
Area (Breadth)
Foreign Language (A.B. &
B.A.S. degrees)

Major Requirements

Course requirements for each major are listed in the Programs and Courses section of this catalog.

You may meet this requirement in any of these ways:

- Complete one high school unit in American history, or 1/2 high school unit in American history and 1/2 high school unit in civics or American government, with a grade of *C* or better in each course
- Complete any one of the following courses:
- African American and African Studies 10, 100, 120, 121
- Asian American Studies 1, 2
- Economics 111A, 111B
- History 17A, 17B, 17C, 72A, 72B, 170A, 170B, 170C, 171A, 171B, 174A, 174B, 174C, 175A, 175B, 175C, 176A, 176B, 177A, 177B, 179, 180A, 180B, 183A, 183B (upper division courses may be taken only with the consent of the instructor)
- Native American Studies 1, 10, 55, 116, 130A, 130B, 130C
 Political Science 1, 5, 100, 101, 102, 103, 104, 105, 106, 108, 109, 113, 130, 131, 160, 163

Students electing to complete one of the above courses in order to meet this requirement are subject to the rules for prerequisites and majors

- Present evidence that the requirement has been accepted as satisfied at another campus of the university
- Present evidence that the requirement has been satisfied through courses in the area of American History and Institutions at another collegiate institution whose credits are acceptable for transfer to UC Davis
- Successful completion of the Advanced Placement (AP) Examination in American History or American Government and Politics with a score of 3 or higher
- Successful completion of the International Baccalaureate (IB)
 Examination in History of the Americas Higher Level (HL) with a score of 5, 6, or 7
- Successful completion of the SAT Subject Examination in U.S. History with a score of 550 or higher

International students, regardless of the type of visa they hold, must meet the university's American History and Institutions requirement for graduation.

Unit Requirements

A minimum of 180 quarter units is required for graduation. These must be distributed according to the minimum requirements set forth by the faculty of your college.

A maximum of 12 units of Internship Courses (92, 192, or a combination) may be counted toward the 180-unit bachelor's degree requirement.

The acceptability of transfer courses for unit credit is determined by Undergraduate Admissions. The acceptability of such courses toward specific requirements is determined by the individual college or school.

Students should refer to the Advanced Placement Examination chart and their transcripts to eliminate the possibility of duplication of credit.

Residence Requirements

The minimum residence requirement for a bachelor's degree at the University of California is one academic year (three quarters). Thirty-five of the final 45 quarter units completed by each candi-

date must be earned while in residence on the UC Davis campus. Each summer session in which a student completes a course of at least 2 quarter units may be counted as half a quarter's residence. Not more than 18 of these 35 quarter units may be completed in summer session courses at UC Davis.

Regularly approved courses (laboratory, field, or other individual work) done outside of a regular session but under the direction of a department of instruction may be accepted upon the recommendation of the department in partial fulfillment of the residence requirement for the bachelor's degree. Registration is with the consent of the instructor only.

UC Davis Extension courses are not accepted as part of the university residence requirement.

There are additional residence requirements for students enrolled in the Colleges of Letters and Science and Engineering. If you are planning to study abroad during your senior year, you should consult your college dean's office.

With the approval of the dean of a student's college or school, a candidate for the bachelor's degree who was in active service in the armed forces of the United States in the year preceding the awarding of the degree may be recommended for the degree after only one quarter of university residence in which the candidate completes at least 16 units or passes a comprehensive examination in the major or field of concentration.

Scholarship Requirement

To receive a bachelor's degree, you must obtain twice as many grade points as units (a 2.000 GPA) for all courses you have attempted in the university. An exception to this rule is made for those students undertaking certain honors courses. For specific college requirements consult the college sections following.

GENERAL EDUCATION REQUIREMENT

The General Education (GE) requirement promotes the intellectual growth of all undergraduates by ensuring that they acquire a breadth of knowledge that will enlarge their perspectives beyond the focus of a major and serve them well as participants in a knowledge-based society. It seeks to stimulate continued intellectual growth by providing students with knowledge not only of the content but also of the methodologies of different academic disciplines. It involves students in the learning process by its expectation of considerable writing and class participation. It encourages students to consider the relationships between disciplines.

New General Education (GE) Requirement; Fall 2011 and On

The following section pertains to students who matriculated to UC Davis for the first time in Fall 2011 or later. Students who matriculated prior to Fall 2011 should refer to the Former General Education (GE) Requirement; Pre-Fall 2011, on page 99.

The GE requirement has two components, **Topical Breadth** and **Core Literacies**, and is defined in terms of units, not courses.

Topical Breadth Component 52 units

A GE course in topical breadth addresses broad subject areas that are important to the student's general knowledge. The units of most undergraduate courses at UC Davis are assigned to one of the three Topical Breadth Areas.

Note: In the case of a course that has been certified in more than one Topical Breadth Area, a student may count the units of the course in only one of the areas in which it has been certified.

The literacies are crucial both for success in one's profession and also for a thoughtful engaged citizenship in the community, nation and world.

Note: In the case of a course that has been certified in more than one Core Literacy Area, a student may count the units of the course in only one of the core literacy areas in which it has been certified. Additionally, GE credit for a core literacy course a student completes before it was an approved GE literacy course is subject to the college dean's office approval.

1. Literacy with Words and Images at least 20 unit

The objective of this core literacy is to help students communicate their ideas effectively in written, oral and visual forms. The requirement also seeks to enhance students' critical judgment of oral, written, and visual messages created by others.

Note: A student must have completed the Entry Level Writing Requirement (formerly known as the Subject A requirement) before receiving General Education credit for coursework satisfying requirements a, b, and Writing Experience coursework satisfying requirement c, below.

- **a. English Composition** 8 units (as described by College of A&ES, College of L&S, College of Biological Sciences, or College of Engineering)
- **b. Writing Experience** coursework in the student's major or in other departments at least 6 units

Courses in writing experience provide students instruction on how to communicate ideas in the subject matter of the course. The opportunity to improve writing after having received careful commentary is crucial to this requirement.

c. Oral Skills coursework or additional writing experience coursework at least 3 units

Courses in oral literacy involve effective communication of ideas through oral presentation and build on and strengthen the critical thinking skills exercised through writing. As an alternative to developing oral communication skills, the student may take additional coursework certified as writing experience (see requirement b, above).

d. Visual Literacy coursework at least 3 units

Courses in visual literacy provide students with the analytical skills they need to understand how still and moving images, art and architecture, illustrations accompanying written text, graphs and charts, and other visual embodiments of ideas inform and persuade people. Coursework may stress the skills needed to communicate through visual means as well as the analytical skills needed to be a thoughtful consumer of visual messages.

2. Civic and Cultural Literacy. at least 9 units

The objective of this core literacy is to prepare students for thoughtful, active participation in civic society. Students will learn to think analytically about American institutions and social relations, understand the diversity of American cultures, and see the relationships between national and local cultures and the world.

a. American Cultures, Governance, and

Courses in American Cultures, Governance, and History provide students with an understanding and appreciation of the social and cultural diversity of the United States and of the relationships between these diverse cultures and larger patterns of national history and institutions.

b. World Cultures at least 3 units

Courses in World Cultures provide students with a global perspective in a world where communication technologies, economic relationships, and the flow of people across national borders increasingly challenge national identities and create transnational cultures. Students can satisfy this requirement through coursework or through certified study abroad.

3. Quantitative Literacy..... at least 3 units

The objective of this core literacy is to provide students with an understanding of quantitative reasoning and skills for evaluating claims and knowledge generated through quantitative methods.

4. Scientific Literacy at least 3 units

The objective of this core literacy is to provide students with an understanding of the fundamental ways scientists approach problems and generate new knowledge, and an understanding of how scientific findings relate to other disciplines and to public policy.

Additional Conditions

Meeting Total Units Requirement. With the exception of units used to satisfy the English Composition element, units approved for a Core Literacy will be accepted toward satisfaction of the appropriate Topical Breadth component. Course units that satisfy requirements in the candidate's major or majors may also be counted toward satisfaction of General Education requirements.

Grading. Students may take courses P/NP to fulfill their General Education requirements, up to the limits set by college and campus regulations.

Advanced Placement and International Baccalaureate. Students may not present Advanced Placement or International Baccalaureate credit in satisfaction of GE requirements, except insofar as it may be applied to the English Composition component of the Literacy with Words and Images requirement.

Transfer Students who have successfully completed the Intersegmental General Education Transfer Curriculum (IGETC) lower division course work are exempt from all General Education requirements that may be met with lower-division courses. Transfer students who have not completed the IGETC, and who are not entitled to graduate under the provisions of a *General Catalog* issued prior to Fall 2011 as permitted by the applicable college policy on degree requirement changes, are required to satisfy all General Education components under the revised requirement but may offer previously completed coursework toward their satisfaction

Approved Revised General Education Courses

See New General Education Courses; Fall 2011 and On, on page 538, for a list of the courses that provide General Education credit. Please note that you cannot claim GE credit for a course you completed before it was an approved GE course.

Former General Education (GE) Requirement; Pre-Fall 2011

The following section pertains to students who matriculated to UC Davis prior to Fall 2011. Students who matriculated for the first time in Fall 2011 or later should refer to the New General Education (GE) Requirement; Fall 2011 and On, on page 97.

The GE requirement has three components: Topical Breadth, Social-Cultural Diversity and Writing Experience.

Topical Breadth Component 6 courses

Topical breadth courses are grouped into three broad subject areas of knowledge:

- Arts and Humanities. Courses in this area provide students with knowledge of significant intellectual traditions, cultural achievements and historical processes.
- 2. Science and Engineering. Courses in this area provide students with knowledge of major scientific ideas and applications. They seek to communicate the scope, power, limitations and appeal of science.
- **3. Social Sciences.** Courses in this area provide students with knowledge of the individual, social, political and economic activities of people.

To fulfill the topical breadth component of the General Education requirement you must successfully complete three approved courses in each of the two subject areas of topical breadth other than the one that includes your major. To identify the area of topical breadth to which your major belongs, see Topical Breadth Assigned Subject Areas for Majors and Minors; Pre-Fall 2011, on page 569. Each academic major has been assigned to one of the

three subject areas of GE topical breadth. If you have any questions concerning the subject area to which your major is assigned, consult your college dean's office.

A course approved in more than one topical breadth subject area may only be offered in satisfaction of only one of those subject areas.

- **Double majors** will satisfy the topical breadth subject areas to which they are assigned. You will still be responsible for completing any topical breadth subject area in which you do not have a major. If, for example, two majors are assigned to the same subject area, you will need to complete the topical breadth component in each of the other two other subject areas. If, on the other hand, you complete two majors that have been assigned to two different areas of topical breadth then you will be responsible for completing the topical breadth component in only the remaining subject area.
- **Individual majors** are assigned to an area of topical breadth at the time they are approved by your college.
- Each minor has also been assigned to one of the three subject areas of topical breadth. A minor assigned to a subject area other than the area of your major will satisfy the GE course requirement for topical breadth in that subject area.
- Courses in your major may count toward the topical breadth component when those courses are also assigned to subject areas other than the area of your major.

Social-Cultural Diversity 1 course

Courses in social-cultural diversity teach students the significance of the many patterned differences that characterize human populations-particularly differences of gender, race, ethnicity, sexuality, religion or social class.

To fulfill the social-cultural diversity component of the GE requirement, you must successfully complete one course from the approved list; see Former General Education Courses; Pre-Fall 2011, on page 560.

Writing Experience3 courses

Courses in writing experience improve student writing through instruction and practice. Writing assignments are designed to encourage students to think critically and communicate effectively. Courses require one extended writing assignment (five pages or more) or multiple short assignments. Writing is evaluated not only for content, but also for organization, style, use of language, and logical coherence.

To fulfill the writing experience component of the GE requirement, you must successfully complete three courses from the approved list at the back of this catalog.

Note: You must satisfy the university Entry Level Writing Requirement (formerly Subject A) before you take any writing experience course for GE credit. If you take an approved writing experience course, but have not yet satisfied the Entry Level Writing Requirement, you will not receive GE writing experience credit for that course.

Additional Conditions

Letter Grading. All courses taken to fulfill the GE requirement must be taken for a letter grade. No GE credit will be awarded for a course that you take on a Passed/Not Passed basis.

College and University Composition Requirements. The following GE courses may not be used to satisfy university or college requirements in composition and GE writing experience simultaneously:

- Communication 1
- Comparative Literature 1, 2, 3, 4
- English 3
- Evolution and Ecology 12
- Native American Studies 5
- University Writing Program 1, 18, 19, 101, 102 series, and 104 series

Courses Approved for Multiple GE Components. Courses approved for more than one component of the GE requirement (topical breadth, writing experience and social-cultural diversity) will be accepted toward satisfaction of all components for which the course has been approved.

College of Engineering. Students seeking a degree in a College of Engineering major must complete 24 units of general education coursework (33 units are required for Computer Science and Engineering majors) and two upper division courses from the campus approved list of approved courses in Arts and Humanities or Social Science. The list of approved courses appears at the back of this catalog.

Transfer Student Exemption for IGETC, TCC and UC Reciprocity. You are exempt from the UC Davis GE requirement if you come from a California community college and are certified as having successfully completed the "Intersegmental General Education Transfer Curriculum" (IGETC) or "Transfer Core Curriculum" (TCC), or if you come from another UC campus and are certified as having successfully completed the lower division breadth or General Education requirements of that UC campus (UC reciprocity).

If you are in the College of Engineering and have satisfied IGETC or TCC, you are still required to complete two upper-division General Education courses at UC Davis to satisfy College of Engineering requirements.

If you are a Transfer student who has not completed TCC or IGETC prior to attending UC Davis, transfer work comparable to approved UC Davis GE courses may be used to satisfy the GE requirement, as determined by the college dean's office.

Approved Former General Education Courses

See Former General Education Courses; Pre-Fall 2011, on page 560, for a list of the courses that provide General Education credit. Please note that you cannot claim GE credit for a course you completed before it was an approved GE course.

General Education Theme Options

The following section pertains to students who matriculated to UC Davis prior to Fall 2011.

General Education theme options are sets of GE courses sharing a common intellectual theme. Faculty from the College of Agricultural and Environmental Sciences has worked collaboratively to develop sets of complementary courses in several areas of interest. These GE theme options are not a separate element of the GE requirement, but a way of selecting your GE courses so that you may benefit from a coherent focus of study while completing the GE requirement.

Completion of a theme satisfies the GE requirement for students with majors assigned to the GE topical breadth area of Arts and Humanities. Students with majors assigned to the topical breadth area of either Science and Engineering or Social Science will need to complete additional GE courses in Arts and Humanities to satisfy the campus GE requirement.

Beginning a theme option does not prevent you from later choosing to take other approved GE courses to fulfill the GE requirement. If you choose to mix courses from a theme option and the broader GE course lists, you will need to make sure that the combination of courses you select will complete the campus GE requirement.

COLLEGE REQUIREMENTS FOR THE BACHELOR'S DEGREE

College of Agricultural and Environmental Sciences

Unit Requirements

Of the required 180 units counted toward a degree, 54 units must be upper division work.

Unit Credit Limitations

In addition, the following unit limitations apply to all majors:

- Not more than 6 units can be Physical Education 1 and 6
- Not more than 20 units can be courses numbered 90X, 92, 97T, 97TC, 99, 190C, 190X, 192, 197T, 197TC, or 199
- Not more than 12 units can be courses numbered 92 and/or 192 (credit will not be given for 192s or 199s taken before the completion of 84 units)
- Not more than 5 units per quarter of Special Study courses (99, 194H, 199)
- Not more than 9 units of professional courses (numbers 300–499) may be used toward the 54 upper division units

Limitation on Credit for Units Graded P. The Academic Senate limits the total number of courses graded *P*, including units earned in courses graded "P/NP only," to one third of the units completed on the UC Davis campus. The *P/NP* option is to be used only for elective courses and should not be used for major requirements.

Credit for Open Campus (Concurrent) Courses. Students may apply credit for courses taken in the Open Campus (Concurrent) Program through UC Davis Extension towards the 180-unit undergraduate degree requirement. The grade points earned when enrolled in Open Campus courses will count toward the calculation of a student's UC GPA upon his/her admission or readmission to regular student status at UC Davis. Students registered at UC Davis may not enroll in Open Campus courses.

Credit for UC Davis Extension Courses. Registered UC Davis students who plan to use academic credit earned in a UC Davis Extension cour se other than Open Campus (Concurrent) towards their UC Davis degree must obtain prior written approval from their College before registering in the UC Davis Extension. Upon approval students may apply a limited number of credits towards the 180-unit undergraduate degree requirements. Courses completed in UC Davis Extension will not count toward the calculation of a student's UC GPA.

Registration Beyond the 225-Unit Limit. Students may not exceed 225 units; registration for enrollment when the limit has been reached may only be approved by the Dean. A petition to complete excess units may be picked up in the Dean's office or in your major department.

Residence Requirement

Thirty-five of the final 45 quarter units completed by each candidate must be earned while in residence on the UC Davis campus.

Scholarship Requirement

Students in the College are required to attain a minimum grade point average of 2.000 for all courses specified as depth subject matter in their major. Options, specializations and emphases may be included. Consult your master adviser. Only grades earned in courses taken at UC Davis are included in the grade point calculation. Each candidate must complete a program of study either as prescribed in (a) a major approved by the Undergraduate Majors and Courses Standing committee and printed in this catalog, or (b) an individual major approved by the Individual Major Standing

English Composition Requirement

Once the Entry-Level Writing requirement has been satisfied, you may begin taking courses to meet the College's English composition requirement.

The English Composition requirement may be met in one of three

- 1. Either two courses emphasizing written expression or one course emphasizing written expression and one course emphasizing oral expression, with a grade of C- (or P) or better. The following UC Davis courses satisfy this requirement:
 - (a) one course must be selected from English 3, University Writing Program 1, 18, 19, 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 102H, 102J, 102K, 102L, 104A, 104B, 104C, 104D, 104E, 104F, 104I or Nematology 150 (courses with primary emphasis in writing skills);
 - (b) one course selected from the courses not selected above, or from Communication 1, Comparative Literature 1, 2, 3, 4, or Native American Studies 5 (courses emphasizing either writing or speaking skills);
- 2. Advanced Placement English score of 4 or 5 PLUS any course listed in 1(a) or 1(b) above EXCEPT University Writing Program 1 or English 3

OR

3. By passing the English Composition Examination administered by the College of Letters and Science upon completion of 70 units of degree credit (the examination does not yield credit).

English Composition Examination. The no-fee, no-unit examination is typically offered on a Saturday in October, January and April; for specific dates see the Registration Guide or see http:// writing.ucdavis.edu/compexam/.

If students choose to take this challenge exam, they are strongly advised to do so in their junior year. Register for the English Composition Examination at http://writing.ucddavis.edu/compexam/ from the Monday before the exam date until Friday at noon or until no spaces remain. The AWPE/Upper-Division Composition Examination form, available at the UC Davis Bookstore, is required. It is

recommended that students with disabilities contact the Student Disability Center at (530) 752-3184 and the University Writing Program at (530) 752-0450 at least two weeks prior to the exam date to arrange accommodations. No examinations are given during the summer.

General Education

You should consult your Dean's Office or department adviser in advance to determine exactly how your General Education courses will apply toward your major.

You can choose one of four General Education theme options to help plan your GE courses. The themes, Global Population and Environmental Issues; Biodiversity and Cultural Diversity; Food and Fiber; and Changing Agriculture are described in more detail in General Education Theme Options, on page 570.

Study Plan Approval

A Study Plan provides for attainment of specific long-term goals and should allow for the acquisition of prerequisite knowledge for courses to be taken in subsequent quarters; the fulfillment of College and major requirements; a proper balance between the demands of the courses and your ability to master the subject matter; and meeting the minimum progress requirements; see Course Load, on page 74.

In conjunction with a faculty adviser and/or staff adviser, you must plan and prepare a program that specifies your goals and shows how the graduation requirements will be met. It is a regulation that a written "study plan" be filed with your faculty adviser or staff adviser by the end of the second quarter of the junior year (having completed not more than 120 units either in residence and/or by transfer).

You may be denied registration for future quarters if you do not comply with this regulation. However, filing this study plan does not preclude a change of major or program modifications.

Major Degree Certification

A Major Certification is completed during the quarter you plan to graduate. At that time, you and your faculty adviser and/or staff adviser check to see that all major requirements have been completed. The Dean's Office completes the degree certification by verifying that all college and university requirements have been satisfied.

Degree Requirement Changes

On occasion, the faculty make changes in the requirements that students must satisfy to obtain the baccalaureate degree. So that you will not be penalized by changes that may work to your disadvantage and so that you will benefit by changes that assist you in completing your degree requirements, it is college policy that you may choose to fulfill the university, college and major requirements in effect at the time you were registered at UC Davis. If you have transferred to UC Davis from a community college, state college, or another university, you may follow the requirements as stated in any UC Davis General Catalog in effect either during the three years immediately preceding your transfer to UC Davis or at the time you first registered at that institution, whichever is most recent. Once you have chosen the year of the General Catalog under which you wish to be governed, you must satisfy all of the university, college and major requirements specified in that catalog.

College of Biological Sciences

All students in the College of Biological Sciences must satisfy the following college requirements in addition to satisfying the University Requirements, on page 96 and General Education Requirement, on page 97.

Unit Requirements

Total Units. Complete no less than 180 units allowing for the unit credit limitations listed below. No student may exceed 225 units in their academic career without approval of the Dean. Units earned in Advanced Placement and International Baccalaureate exams are not counted toward this 225-unit limit. Upon reaching 200 units, a student must submit a quarter-by-quarter graduation plan to the Dean's Office or a hold will be placed on his/her registration.

Upper Division Units. Complete 64 upper division units.

Unit Credit Limitations

 Passed/Not Passed Units. All courses used to satisfy major requirements must be taken on a letter-graded basis, unless courses are only offered on a Passed/Not Passed basis.

The Academic Senate limits the total number of courses graded P, including units earned in courses graded "P/NP only," to one third of the units completed on the UC Davis campus.

- Physical Education. Maximum of 6 units of Physical Education 1, 6 and similar physical activity courses including transfer work.
- **Transfer work.** Maximum of 105 units of credit earned at two-year institutions (community college).
- **Graduate Courses**. Courses numbered 200-299 may not be applied toward the 64-unit upper division requirement.
- **Professional and teaching courses.** Maximum of 9 units in courses numbered 300-399 and 400-499. These units may not be applied toward the 64-unit upper division requirement.
- **Upper division standing.** Must complete 84 units before enrolling in 192, 194H and 199 to receive degree and upper division credit.
- **Special Study.** Not more than 5 units per quarter of Special Study courses (99, 194H, 199).
- Nonstandard Courses. Maximum of 20 units of nonstandard courses including transfer work.*

Nonstandard courses are defined here as tutoring, internship, research, research conference, honors research and similar course activities. Some examples of these courses are, but are not limited to, courses numbered 90C, 92, 92C, 97T, 97TC, 99, 189, 190C, 191, 192, 192C, 193, 194H, 197T, 197TC, 199, etc. Courses numbered 98 or 198 are not included in this 20-unit limitation

There are additional unit credit limitations on tutoring and internship units.

- **Tutoring.** Maximum of 3 tutoring units including but not limited to 97T, 197T, 97TC and 197TC.
- **Internship.** A maximum of 6 internship units including but not limited to 92, 192, 92C, 192C.

*Specific exceptions to these limits may be granted by the Committee on Undergraduate Petitions based on the uniqueness of the experiences and their concordance with the petitioner's educational objectives.

Credit for Open Campus (Concurrent) Courses. Students may apply credit for courses taken in the Open Campus (Concurrent) Program through UC Davis Extension towards the 180-unit undergraduate degree requirement. The grade points earned when enrolled in Open Campus courses will count toward the calculation of a student's UC GPA upon his/her admission or readmission to regular student status at UC Davis. However, the units earned do not satisfy the university residence requirement. Students registered at UC Davis may not enroll in Open Campus courses.

Residence Requirement

Meet university residence requirement. No additional college residence requirements.

Scholarship Requirement

Students must attain at least a 2.000 GPA for all courses required in their major. Students must also attain a 2.000 GPA in all Depth Subject Matter courses required in their major. Students who fail to maintain a 2.000 GPA in courses required for their major over two consecutive quarters may be required to withdraw from the major.

- **Repeating Courses.** Students may once repeat courses in which they received a grade of *D*+ or less. To repeat a course more than once, students must petition the Dean for approval prior to enrolling in the course.
- Passed/Not Passed Grading Option. All courses used to satisfy
 major requirements must be taken on a letter-graded basis,
 unless courses are only offered on a Passed/Not Passed basis.

English Composition Requirement

The English Composition requirement may be satisfied in one of two ways:

1. Completing 8 units, to include 4 upper division units, in English composition courses with at least a *C-* or Passed grade from the following list: Comparative Literature 1, 2, 3, 4, English 3, Native American Studies 5, University Writing Program 1, 18, 19, 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 102H, 102I, 102J, 102K, 102L, 104A, 104B, 104C, 104D, 104E, 104F, 104I.

OR

2. Passing the English Composition Examination, administered by the Entry Level Writing program, upon completion of 70 units of degree credit. This examination does not yield credit. Students interested in entering the health science field should check with the Health Sciences Advising Office or the Dean's Office before choosing this option.

English Composition Examination. The no-fee, no-unit examination is typically offered on a Saturday in October, January, and April; for specific dates see the *Registration Guide* or see http://writing.ucdavis.edu/compexam/.

If students choose to take this challenge exam, they are strongly advised to do so in their junior year. Register for the English Composition Examination at http://writing.ucdavis.edu/compexam/ from the Monday before the exam date until Friday at noon or until no spaces remain. The AWPE/Upper-Division Composition Examination form, available at the UC Davis Bookstore, is required. It is recommended that students with disabilities contact the Student Disability Center (530) 752-3184 and the University Writing Pro-

gram (530) 752-6283 at least two weeks prior to the exam date to arrange accommodations. No examinations are given during the summer.

Additional Bachelor of Arts Requirements

Bachelor of Arts degrees are available in Biological Sciences; Evolution, Ecology and Biodiversity; Exercise Biology; Microbiology; and Plant Biology. These degrees offer students an opportunity to broaden their education while pursuing a rigorous life science

Candidates for the Bachelor of Arts degrees must complete two additional requirements.

- 1. Foreign Language. The requirement can be met in one of three ways:
- Complete with passing grades 15 quarter units of college level course work, or the equivalent thereof, in a single language.
- · Attain a minimal score prescribed by the Committee on Undergraduate Curriculum and Educational Policy, in the College Entrance Examination Board Achievement Test in Foreign Language, which may be taken at any time during the student's high school career, or any other achievement test approved by the Committee on Undergraduate Curriculum and Educational Policy.
- Placement beyond the 15-unit level on a placement/proficiency examination offered by one of the foreign language departments of the University.
- **2. Breadth Requirements.** Complete one of the following options:
- At least three upper division courses in a single program in the humanities or social sciences, which are not offered in satisfaction of major, college English composition or General Education requirements. Each course must be at least three units and may not include internship, research, tutoring, other non-standard courses or directed group study courses.
- At least three lower or upper division courses in the fine arts, which are not offered in satisfaction of major, college English composition or General Education requirements. Each course must be at least three units and may not include internship, research, tutoring, other non-standard courses or directed group study courses.
- A certified minor or an additional major in the humanities, social sciences, or fine arts from any UC Davis college or program. Minors and all majors must be completed before accumulating 225 total units.

Declaration of Major/Undeclared-Life Sciences

Students must declare a major by 90 units. A hold will be placed on a student's registration if he/she is still undeclared after completing 90 units.

All changes of major and college must be completed before the beginning of the student's quarter of graduation.

Students with Biological Sciences majors and students who are Undeclared—Life Sciences use the College of Biological Sciences Dean's Office for advising on their program. All other students who are enrolled in a major administered by the College of Biological Sciences should see the master or staff adviser in the department office that houses their major, as listed in the catalog. All students, regardless of their college affiliation, working on a major administered by the College of Biological Sciences should obtain university, general education, college and other non-major academic advising from the College of Biological Sciences Dean's Office.

Degree Check

Students are encouraged to meet with their academic adviser at least once a year to ensure timely graduation. Students are required to consult an academic adviser at two points in their academic careers:

- Before accumulating 90 units.
- · Before accumulating 135 units.
- In addition, if you are taking courses which, if passed, will cause your unit total to exceed 200 units and you intend to register for the next quarter, you must file a plan with your adviser that leads to graduation within 225 units. If the plan anticipates registering after you have accumulated 225 units, the plan must be submitted to the Dean for approval.

If you do not meet any of these advising requirements, a hold may be placed on your registration.

Degree Requirement Changes or Catalog Rights

On occasion, the faculty makes changes in the requirements that students must satisfy to obtain the baccalaureate degree. So that you will not be penalized by changes that may work to your disadvantage and so that you will benefit by changes that assist you in completing your degree requirements, it is college policy that you may choose to fulfill the university and college requirements (see General Education Requirement, on page 97 for an exception) as stated in any UC Davis General Catalog in effect at the time you were registered at UC Davis. If you have transferred to UC Davis from a community college, state college, or another university, you may follow the requirements as stated in any UC Davis General Catalog in effect either during the three years immediately preceding your transfer to UC Davis or at the time you first registered at that institution, whichever is most recent. Once you have chosen the year of the General Catalog under which you wish to be governed, you must satisfy all of the university and college requirements specified in that catalog.

With respect to the completion of your major requirements, most of the majors in the College of Biological Sciences require completion of the major degree requirements in effect at the time you officially declared your major. However, because departments differ in how they handle these matters, check with the department or major program office if you have any questions about which requirements apply to you.

College of Engineering

Prerequisite Requirements

Engineering is a discipline that requires mastery of prerequisite coursework prior to moving forward in the curriculum. Students should plan to repeat any engineering requirement in which a grade of *C*- or better is not earned. Students are encouraged to carefully adhere to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

Current Curriculum Requirement

Because Engineering is a rapidly developing profession, the things an engineer needs to know change on an almost daily basis. To respond to this, the faculty make changes to the curriculum on a regular basis. In order to ensure that students graduate with the most current engineering knowledge, College of Engineering students must complete the degree requirements in effect in the academic year of graduation or in the immediately preceding academic year. Students in the class of 2014 will need to complete the degree requirements for the 2012-2013 or 2013-2014 academic year. The College of Engineering *Bulletin* is published every year with current degree requirements. The *Bulletin* is available at http://engineering.ucdavis.edu/pages/current_students/advising/index.html.

When degree requirements change, a transition plan is developed to ensure that students who are getting regular advising and following recommended course sequences will be able to graduate within four years. Contact your departmental adviser or the Undergraduate Advising Office for more specific information or questions. The list of advisers can be found a http://engineering.ucdavis.edu/undergraduate/advising/index.html.

Unit Requirements

Each candidate for the degree of Bachelor of Science in Engineering must satisfactorily complete an approved curriculum in engineering. No unit of coursework you complete may be used to satisfy two different degree requirements, except under the following conditions:

- College of Engineering students may use course units to satisfy both Revised General Education requirements and course requirements for their major.
- In cases where the catalog specifically states that course units may be used to satisfy two different degree requirements.

Detailed requirements for the approved curricula are given in the Programs and Courses chapter of this catalog; to see the courses required in your major, consult this section. The minimum number of required units varies with the curriculum, from 180 to 198. You are responsible for planning your program and satisfactorily completing all degree requirements.

You may, for good cause, request a modification of particular degree requirements by submitting a student petition. These petitions, which are available from your departmental adviser or in the Undergraduate Advising Office, can be a valuable aid in resolving individual program conflicts or other special problems. Such petitions are subject to approval by the Undergraduate Educational Policy Committee, composed of one faculty representative from each department and non voting staff advisers and student repre-

sentatives. The Associate Dean for Undergraduate Studies serves as ex-officio member of this committee. A negative decision by the committee may be appealed to the College Executive Committee.

Transfer students. To be eligible for transfer into the College of Engineering you must have at least ninety transferable quarter units (sixty semester units) from another institution. To be a competitive applicant, you must have a minimum overall GPA of 3.100.

Highest priority for transfer admission is given to California community college transfer applicants who have completed two transferable English composition courses and all of the required lower division engineering coursework offered at the community college they attended.

We give lower priority for admission to community college applicants who are missing one or two of the required lower division courses. Community college applicants will be denied admission if they are missing three or more of the required lower-division courses.

Priority is next given to junior-level transfers from other UC campuses and other four-year institutions in and out of state. These students must also have completed all of the required lower-division coursework.

Successful applicants are admitted to a specific major. You may be limited in your ability to change majors within the college after you are admitted.

Transfer students. To be eligible for transfer into the College of Engineering you must have at least ninety transferable quarter units (sixty semester units) from another institution. To be a competitive applicant, you must have a minimum overall GPA of 3.100.

Highest priority for transfer admission is given to California community college transfer applicants who have completed two transferable English composition courses and all of the required lower division engineering coursework offered at the community college they attended.

We give lower priority for admission to community college applicants who are missing one or two of the required lower division courses. Community college applicants will be denied admission if they are missing three or more of the required lower-division courses.

Priority is next given to junior-level transfers from other UC campuses and other four-year institutions in and out of state. These students must also have completed all of the required lower-division coursework.

Successful applicants are admitted to a specific major. You may be limited in your ability to change majors within the college after you are admitted.

Transfer advising and information. For more specific advice on lower-division requirements for community college students, meet with the transfer counselor at your institution or see the Assist website at http://www.assist.org. Transfer credit agreements are available on the College of Engineering website at http://engineering.ucdavis.edu/undergraduate/transfers/agreements.html. You may also contact the College of Engineering Undergraduate Advising Office (530) 752-1979.

California Community college students should consider a Transfer Admission Guarantee (TAG), which is a formal written agreement specifying the courses you need to complete and the grade point average you need to earn to be admitted. A signed agreement guarantees that you will be admitted to UC Davis in the major you want and for the term you have chosen-provided that you complete the agreement and apply for admission during the open filing period. If you would like more information on the TAG program, see your community college counselor or see http:// engineering.ucdavis.edu/undergraduate/transfers/tag.html.

We also participate in the Transfer Opportunity Program, which encourages community college students to transfer to UC Davis and provides them with services to ease the transition. You can use the Transfer Opportunity Program to get information about admission and transfer requirements, academic programs, financial aid, housing, tutoring, campus life and other services.

Upon admission, transfer students are classified as having upper division status, but are obligated to complete all lower division course requirements for the major before your lower division requirements are considered complete. You may, however, start your upper division coursework while completing your lower division requirements provided you meet all prerequisites for the upper division courses.

Credit for Open Campus (Concurrent) Courses. Students may apply a maximum of 16 units of credit for courses taken in the Open Campus (Concurrent) Program through UC Davis Extension towards the 180-unit undergraduate degree requirement. The grade points earned when enrolled in Open Campus courses will count toward the calculation of a student's UC GPA upon his/her admission or readmission to regular student status at UC Davis. Students registered at UC Davis may not enroll in Open Campus courses. Open Campus is not available to students that have been enrolled at UC Davis within the last 12 months and have not graduated, unless an exception letter is provided to Extension by the Associate Dean for Undergraduate Studies of the College of Engineering.

Residence Requirement

Meet university residence requirement. No additional college residence requirements.

Scholarship Requirement

In addition to meeting the university scholarship requirement, you are required to maintain a 2.000 grade point average for all course work within Engineering.

English Composition Requirement; Upper Division

The ability to write well and communicate effectively is cited as one of the most desirable traits sought by prospective engineering employers. Because engineers must be able to explain complex ideas, it is critical that students pay close attention to the development of writing and communication skills. All students admitted to the University must complete the Entry Level Writing Requirement (see page 96) before credit for any composition course or general education writing experience course will be granted.

Once the Entry Level Writing Requirement has been satisfied, there are two distinct composition requirements for engineering students:

• Lower-division composition. Can be satisfied by completion of an Advanced Placement English exam with a score of 4 or 5;

International Baccalaureate credit for English 3; or completion of one of the following courses with a grade of C- or better: University Writing Program 1, English 3, Comparative Literature 1-4. or Native American Studies 5.

• **Upper division composition.** Requirements vary by major. Please see your departmental adviser to determine the coursework that has been approved for your major.

Please note that when coursework is used to satisfy either of the composition requirements, a grade of *C*- or better must be earned.

Engineering Design Requirement

Engineering design is the process of devising a system, component, or process to meet certain needs. Design involves a decisionmaking process (often iterative), in which the basic sciences, mathematics and engineering sciences are applied to convert resources optimally to meet a stated objective. Among the fundamental elements of the design process are the establishment of objectives and criteria, synthesis, analysis, construction, testing and evaluation. You must take an appropriate amount of design course work through a combination of required and restricted elective courses. Specific comments about design are included in individual curricula descriptions. You should also review the design content of your individual program with your adviser in the course of completing the upper division advising worksheet.

Electives

In general, there are three kinds of elective courses in the engineering curricula; General Education, Technical and Unrestricted.

General Education Electives. Because, as an engineer, you will be a significant participant in the human setting, you will need to have a breadth of education that will allow you to deal with contemporary social issues and to understand the impact of engineering solutions in the global and societal context. To these ends, you must complete you must complete the UC Davis General Education requirement details; see page 97.

Since all engineering programs are in the Science and Engineering GE topical breadth area, you will fulfill the campus GE requirements by taking courses in the Arts and Humanities and Social Sciences areas.

In satisfying the GE requirement note that (a) you must take GE courses for a letter grade, and (b) you must satisfy the Entry-Level Writing requirement before you can receive writing experience credit for any course.

In consultation with your academic adviser, you should attempt to design a coherent approach to contemporary issues by using your GE elective.

Unrestricted electives. If your curriculum allows for unrestricted electives, you may count any course for which university credit is allowed as an unrestricted elective in the engineering curricula.

Degree Check

Use a Degree Requirement Check sheet for your major to monitor your progress toward completing degree requirements. These check sheets are available in the Undergraduate Advising Office in 1050 Kemper Hall and from your major adviser. The University holds students responsible for knowing and completing all degree requirements. Degree checks are performed as a courtesy to help students make accurate progress toward fulfilling all major, college, and university requirements. Students should request a preliminary degree check three quarters prior to graduation and a

follow-up degree check prior to the beginning of a student's final quarter. Requests can be submitted to the Undergraduate Advising Office in 1050 Kemper Hall.

College of Letters and Science

Unit Requirements

A minimum of 180 units is required for the bachelor's degree. Of these units, 64 must be earned in upper division courses.

Registration Beyond the 225-unit Limit. You are expected to fulfill all degree requirements within the 180- to 225-unit range. Once 225 units have been completed (excluding units awarded for College Board Advanced Placement Examinations or International Baccalaureate Examinations), you may register only with the permission of the dean. Such permission is rarely granted and then typically only to allow completion of *minimum* degree requirements. You will be expected to adhere to a program of courses agreed upon and to meet other conditions that may have been set. Approval must be obtained before you will be permitted to register for courses for the quarter following completion of 225 or more units

If you are in good standing, you will be able to complete 12 quarters or the equivalent (e.g., four years) of college work even if you have earned more than 225 units before you finish your fourth year. You must petition for continuation, however, and file the quarter-by-quarter course program you have planned.

Unit Credit Limitations

For certain courses, limits have been established on the number of units that can be counted towards the 180-unit minimum required for the degree. To avoid discovering just before graduation that you are short units, keep track of the number of units you have taken in each of the following categories.

Limitation on Credit for Graduate and Professional Courses.

Undergraduates may enroll in graduate and professional courses in the 200, 300, and 400 series subject to the restrictions described in Academic Information, on page 72, in this catalog. Graduate and professional courses that have been completed will be listed on the student's transcript in the usual manner. However, the units earned may be counted toward degree requirements only under the conditions listed below.

Within the limitations A, B and C given below, undergraduate students in the College may count an unlimited number of units in graduate 200 series courses and up to a combined total of 9 units in 300 and 400 series professional courses toward degree requirements. These units, however, are not counted as upper division units unless this is granted by petition to the dean.

- **A.** The recommendations of the instructor in the course and the department chairperson—in addition to approval from the dean—must be obtained by petition in order to receive credit toward the degree for the following kinds of courses:
- All graduate courses 200–298, whether offered by a department or program outside of or within the College of Letters and Science
- All professional courses 300–398 for teachers offered outside of the College of Letters and Science
- All postgraduate professional courses 400–498 offered outside of the College of Letters and Science

- All variable unit courses 300–398 and 400–498 offered within the College of Letters and Science
- **B.** The minimum eligibility conditions for an undergraduate student in the College to petition for degree credit for a 200, 300, or 400 series course are a UC grade point average of 3.300 and completion of 18 upper division units basic to the subject matter of the course. These eligibility conditions may be waived, however, upon the recommendation of the course instructor and concurrence of the department chairperson if the student's preparation warrants exception.
- C.Undergraduates in the College cannot receive degree credit for special study courses 299, 399, or 499.

Limitation on Credit for Units Graded P. Excluding courses that are graded on a Passed/Not Passed (P/NP) basis only, the number of units graded P that may be accepted towards a degree in the College of Letters and Science is limited to not more than one fourth of the units completed in residence on the UC Davis campus.

The Academic Senate limits the total number of courses graded *P*, including units earned in courses graded "P/NP only," to one third of the units completed on the UC Davis campus. This limitation applies to all UC Davis undergraduates, including Letters and Science students.

Limitation on Credit for UC Davis Extension Courses.

- A.UC Davis Extension courses with a designator of "X". Students may apply credit earned through lower division and upper division UC Davis Extension "X" courses towards the 180-unit requirement only with written approval from the dean prior to registration. The degree credit allowed by the dean for such courses is usually less than the unit value listed in the course description. Additional limitations on UC Davis Extension "X" courses include: a maximum of 9 units may be offered for elective credit only and may not be applied toward fulfillment of the Area, Foreign Language, Upper Division, or Residence requirements of the College.
- **B.** UC Davis Extension courses with a designator of "XD." Students may apply credit earned through lower division and upper division UC Davis Extension "XD" courses towards the 180-unit requirement. Additionally, credit from such courses may be applied toward fulfillment of all university, campus, college and major unit and subject matter requirements—including the Area, Foreign Language, Upper Division and Residence requirements of the College—in the same manner that the corresponding regular UC Davis course is so accepted.
- C.UC Davis Extension courses with a designator of "XDC" (Open Campus (Concurrent) Program). Subject to the following conditions, students may apply credit earned through lower division and upper division UC Davis Extension Open Campus (Concurrent) courses-i.e., those bearing the "XDC" designator-towards university unit and subject requirements, and, effective Fall 2003, the calculation of the student's UC GPA, upon admission or readmission to regular student status at UC Davis.
- Students on leave of absence and regular status students when matriculated, or regular status students for a period of one calendar year following the last term of regular enrollment at UC Davis, may not enroll in Open Campus (Concurrent) courses. Exceptions to this policy for undergraduate students may be made only under extraordinary circumstances by petition with prior approval by the dean and the Dean of UC Davis Extension.

- Concurrent ("XDC") courses do not count toward satisfaction of the University residence requirement or the residence requirements of the campus or the college.
- Concurrent ("XDC") courses may constitute at most half of the units offered in satisfaction of the upper division requirements of the major.
- In the event that the faculty of the college imposes further restrictions on the number of units of UC Davis Extension Open Campus (Concurrent) course work that may be applied to undergraduate degree programs, the allowable number of units of course work will be determined chronologically, starting with the course completed first. Grade point credit for such courses will be determined in the same manner.

Other Unit Credit Limitations. The following are additional courses that have limits on the number of units that can be counted toward your degree.

- Internship courses (numbers 92, 192): 12 units maximum including internship units taken at other institutions; see Nonstandard courses
- Music 130, 131, 140, 141, 142, 143, 144, 145, 146, 147, 154 (combined): 19 units maximum
- Nonstandard courses (92, 97T, 97TC, 99, 192, 194H, 197T, 197TC, 199 and similar courses): 30 units maximum or onesixth of the units taken at UC Davis, whichever is the smaller; note the separate unit limits on internship, special study and tutoring courses; and major limitations
- Physical Education 1 and 6 (combined): 6 units maximum
- Special Study courses (99, 194H, 199): 5 units maximum in any one quarter; see Nonstandard courses
- Tutoring courses (97T, 97TC, 197T, 197TC): 10 units maximum; see Nonstandard courses, above

Residence Requirement

While registered in the College of Letters and Science, a minimum of 27 upper division units, including 18 upper division units in the major, must be completed on the UC Davis campus; work completed while registered in the UC Education Abroad Program or the UC Davis Extension Open Campus Program does not satisfy campus or College Residence requirements.

Scholarship Requirement

The minimum grade point average to satisfy the scholarship requirement is 2.000 for all courses counted toward the major and for all upper division courses used to satisfy major requirements. Only grades earned in courses taken at UC Davis will be included in the grade point computations. To obtain these minimum averages in the major, you may repeat courses that are graded D or F. If you have to repeat a course more than once, you need the dean's prior approval.

English Composition Requirement

The English Composition requirement can be met in one of two

1. By passing the English Composition Examination upon completion of 70 units of degree credit (the examination does not yield credit);

OR

- **2.** By completing with a grade of *C* (or *P*) or better
 - a. One course from English 3, Comparative Literature 1, 2, 3, 4, Native American Studies 5, or University Writing Program 1,

and

b. One course from University Writing Program 101, 102 series, or 104 series, which must be taken after 84 units have been completed.

Transfer Courses in English Composition. Transfer courses considered by the Dean to be equivalent or comparable to English 3, Comparative Literature 1, 2, 3, 4, Native American Studies 5, or University Writing Program 1, 18, 19, 101, or 104 series, will be accepted toward satisfaction of the English Composition requirement. Note that University Writing Program 101 and 104 series courses or the equivalent must be taken after you have completed 84 units of transferable degree credit.

If your transfer work does not include an acceptable English composition course taken after you had completed or accumulated 84 units, you may fulfill the requirement by examination (see below) or take one course from University Writing Program 101, 102 series, or 104 series at UC Davis.

English Composition Examination. The no-fee examination is typically offered on a Saturday morning in October, January and April. No examinations are given during the summer.

For specific examination dates, instructions, and to sign up to take an examination, see the University Writing Program-Upper Division Composition Exam Information webpage at http:// writing.ucdavis.edu/programs-and-services/upper-division-compositionexam-information/upper-division-composition-exam-information. It is recommended that students with disabilities contact the Student Disability Center at (530) 752-3184 and the Entry Level Writing Program Office (530) 752-0450 at least two weeks prior to the exam date to arrange accommodations.

Area (Breadth) Requirement

The College Breadth Requirement promotes the intellectual growth of students by asking them to acquire a broader background of knowledge than is provided by the usual major. The Breadth requirement also guides students in exploring the interdependence of knowledge.

A.B. Degree. Satisfaction of the campus General Education requirement:

With the exception of the "Literacy with Words and Images: College English Composition requirement" portion of the campus General Education requirement, courses used to satisfy the English Composition and Foreign Language requirements may not be counted toward the Area requirement.

The Letters and Science faculty believes that the completion of a certified minor is often the best way for a student to obtain structure and coherence in pursuit of intellectual breadth.

B.S. Degree. A total of 90 units in natural sciences/ mathematics; and satisfaction of the General Education requirement.

Courses numbered 92, 97T, 97TC, 98, 192, 197T, 197TC, 198 and from 200 through 499 cannot be counted toward satisfaction of the natural sciences/mathematics Area requirement. A maximum of 10 units in special study courses (99, 194H, 199) may be counted toward that portion of the Area requirement. With the

exception of the "Literacy with Words and Images: College English Composition requirement" portion of the campus General Education requirement, courses used to satisfy the English Composition and Foreign Language requirements may not be counted toward the Area requirement. Subject to the restrictions just listed, courses acceptable for fulfilling the 90-unit natural sciences/mathematics Area requirement are:

Natural Sciences and Mathematics

- Anatomy, Physiology and Cell Biology 100
- Anthropology 1, 5, 15, 151, 152, 153, 154A, 154BN, 156A, 156B, 157, 158
- Astronomy
- Avian Sciences 13
- Biological Sciences
- Cell Biology and Human Anatomy 101, 101L
- Chemistry
- Engineering 6, 10, 35, 102
- Engineering: Biomedical 126
- Engineering: Computer Science 10, 30, 40, 50, 60, 120, 122A, 122B, 140A, 140B, 142, 150, 152A, 152B, 153, 154A, 154B, 158, 160, 163, 165A, 165B, 170, 175, 177, 178
- Engineering: Electrical and Computer 70, 170, 173A
- Entomology 10, 100, 153
- Environmental and Resource Sciences 30, 131
- Environmental Science and Policy 30, 100, 121
- Environmental Toxicology 101
- · Evolution and Ecology
- Exercise Biology 101, 103, 106, 106L, 110, 111, 112, 113, 115, 116, 117, 126
- Fiber and Polymer Science 110
- Food Science and Technology 100A, 100B, 101A, 101B
- Geology
- Integrated Studies 8A
- Mathematics
- · Microbiology
- Molecular and Cellular Biology
- · Neurobiology, Physiology, and Behavior
- Nutrition 10, 111AV, 111B
- Pathology, Microbiology, and Immunology 126
- Physical Education 133, 135
- Physics
- · Plant Biology
- Psychology 41, 100, 101, 103A, 103B, 104, 113, 121, 122, 123, 124, 126, 127, 129, 130, 131, 135, 146, 180B
- Statistics
- Wildlife, Fish, and Conservation Biology 10

Foreign Language Requirement; A.B. and B.A.S. Degrees

The College of Letters and Science encourages its students to acquire functional proficiency in at least one language other than English before graduating. Generally speaking, the language programs at UC Davis promote proficiency in each of the "four skills": listening, speaking, reading, and writing. Language learning is a key component of a liberal education. It enables students to communicate effectively in an increasingly internationalized world, enhances their ability to understand ways of thinking different from their own, gives them direct access to cultural production from another time and place, awakens in them an awareness of the conditioned nature of their assumptions about the world, and trains them to cope more effectively with intellectual and practical

problems they may face in their future careers. At a minimum, the College requires A.B. candidates to complete three sequenced quarters (15 units) of courses in one foreign language or its equivalent. B.S. candidates, only as required in the major program.

The Foreign Language requirement may be satisfied in any language offered at UC Davis (including ancient languages), or for which transfer credit is allowed from another academic institution (including American Sign Language).

You may also satisfy this requirement by examination in a language not offered on the UC Davis campus. In this case, the Dean's Office will refer you to the appropriate campus unit which will assist you in making arrangements to take an examination on another University of California campus, with a faculty member who teaches the language in question.

Satisfaction of the Requirement. If you plan to apply for a study abroad program with a language prerequisite, you should plan on completing the Foreign Language requirement by the end of your second or third year, depending on the program. The requirement may also be completed through course work in certain study abroad programs that do not have a language prerequisite. The Foreign Language requirement may be satisfied by examination or completion of language courses as follows:

1. Foreign Language Placement Test. This test does not yield unit credit—it only determines whether the Foreign Language requirement has been met, or at which point in the language sequence you should enroll. Students must follow the language program's placement policy if they decide to study the language at UC Davis.

You may validate your knowledge of a language acquired by any means before matriculating at UC Davis by taking this test (or another form of evaluation, if available in the relevant language department). A test may not be taken, however, in a language for which you have already received degree credit. If you are a transfer student, consult your Graduation Requirement Degree Check, which is issued by the Dean's Office within a quarter after first enrollment at UC Davis. If you want to continue to study the language at UC Davis, you must consult the relevant language coordinator.

- 2. College Board Subject Test. Earning a qualifying score of at least 550 on a College Board Foreign Language Subject Test satisfies the requirement. This test may be taken at any time during your high school career. Once your score is on file at Undergraduate Admissions, notify the Letters and Science Dean's Office so that satisfaction of the College requirement can be noted on your record.
- **3. College Board Advanced Placement Examination.** A score of 5, 4, or 3 on any foreign language College Board Advanced Placement Examination, with the exception of Latin, taken in high school will satisfy the Foreign Language requirement.
- **4. International Baccalaureate Higher Level Examination.** A score of 7, 6, or 5 on the French A1, A2 or B Examination, the Italian A1 Examination, the Latin A1 Examination, or the Spanish A1 Examination taken in high school will satisfy the Foreign Language requirement.
- **5. Intersegmental General Education Transfer Curriculum** (**IGETC**). IGETC is a series of courses prospective transfer students attending California community colleges may complete to satisfy the lower division breadth/general education requirements at the University of California. Students may satisfy the

Foreign Language requirement by attaining certification of IGETC completion.

6. Course Completion in College; or the equivalent. A.B. and B.A.S. degrees—equivalent of 15-unit level of proficiency in one language at UC Davis (e.g., Spanish 3 or Japanese 3). B.S degree—none, but as is required in the major program.

If you have successfully completed the second or third year of a language in the tenth or higher grade in high school you may receive unit credit for course 1 of that language when taken at UC Davis, but the grading mode will be P/NP only. Although a Passed or Not Passed grade will be charged to your P/NP option, no petition is required; see Passed/Not Passed (P/NP) Grading in the Academic Information chapter.

7. Proficiency Examination. If you have not completed the required level language course, but assume you have attained equivalent knowledge, you may satisfy the language requirement by passing a proficiency examination. For more information, consult the appropriate foreign language department.

Major Degree Certification

Requirements for major programs are described in the Undergraduate Courses chapter of this catalog. These requirements are fulfilled by completing a major program offered by a teaching department or program committee in the College of Letters and Science (see the list of majors) or an individual major program approved by the College's Committee on Individual Majors.

No more than six units in internship courses (numbered 92, 192, or similar internship courses) may be accepted in satisfaction of the requirements of major programs. Courses numbered 97T, 97TC, 197T and 197TC do not satisfy unit or course requirements in the major.

Degree Check

Before the beginning of your senior year, take some time to consider your goals and to plan the academic program for your final year as an undergraduate. To plan properly and to ensure that you get the most out of your remaining education and complete all

graduation requirements as well, you should know what requirements remain unsatisfied. To help you in these efforts, the Undergraduate Education and Advising Office provides on its website informational materials and instructions on how to evaluate your progress on college and university requirements; see http:// www.ls.ucdavis.edu/students. Many departments provide similar information regarding your major requirements.

Once you have completed 135 units of degree credit, you should contact your departmental adviser for a check of your major requirements. At approximately this point, you also should request an official degree check summarizing your progress in fulfilling college and university requirements from the Undergraduate Education and Advising Office; see http://www.ls.ucdavis.edu/ students for additional information.

Degree Requirement Changes

On occasion, the faculty makes changes in the requirements that students must satisfy to obtain the baccalaureate degree. So that you will not be penalized by changes that may work to your disadvantage and so that you will benefit by changes that assist you in completing your degree requirements, it is College policy that, unless otherwise specified by the Davis Division of the Academic Senate, you may choose to fulfill the university and College requirements as stated in any UC Davis General Catalog in effect at any time you were registered as a full-time student at a postsecondary institution of higher education; e.g., community college, college or university.

Once you have chosen the year of the General Catalog under which you wish to be governed, you must satisfy all of the university and college requirements specified in that catalog. With respect to the completion of your major requirements, most of the majors in the College of Letters and Science require completion of the major degree requirements in effect at the time you officially declared your major. However, because departments differ in how they handle these matters, check with the department or major program office if you have any questions about which requirements apply to you.



GRADUATE STUDIES

GRADUATE STUDIES

250 Mrak Hall (530) 752-0650; http://gradstudies.ucdavis.edu

UC Davis offers advanced degrees in over 90 graduate programs. A student's graduate study is guided by either departments or graduate groups. Graduate groups are composed of individual faculty members from multiple departments with similar academic interests. The group structure, used extensively at UC Davis, permits faculty to be affiliated with graduate programs in more than one discipline and offers students an interdisciplinary graduate experience that crosses the administrative boundaries of the various departments, colleges, schools, and sometimes campuses. In keeping with UC Davis' progressive spirit, the group structure also allows for evolution of established degree programs and facilitates the development of new ones. More than half of the graduate programs at UC Davis are organized as graduate groups. You will find a complete list of graduate degrees under Degrees Offered by UC Davis, on page 11.

Graduate study is governed by the Graduate Council, a standing committee of the Davis Division of the Academic Senate and by the dean of Graduate Studies. A universitywide Coordinating Committee on Graduate Affairs determines general policies and establishes common procedures.

PREPARING FOR AN ADVANCED DEGREE

Admission to a graduate program at the University of California requires a bachelor's degree that is comparable in quality to a degree from the University of California both in distribution of academic subject matter and in scholarly achievement.

The primary requirement for admission to any program is evidence of intellectual achievement and promise. Your application will be evaluated first on the basis of your transcript to assure that your qualifications meet minimum standards as set by the university and UC Davis Graduate Council. Generally, you must have a minimum B average in undergraduate course work from an institution of acceptable standing to be considered for admission. UC Davis also requires a Statement of Purpose and a Personal History Statement from each applicant. International applicants must demonstrate the ability to understand and use English by submitting TOEFL or IELTS scores. Graduate programs frequently require submission of additional materials such as Graduate Record Examination (GRE) scores, letters of recommendation, and portfolios or examples of written work to assist in selecting from among many highly qualified applicants. Admission to graduate study is limited by the number of spaces available in major programs. Not all eligible applicants can be admitted.

UC Davis is committed to maintaining excellence, preserving fairness and promoting diversity in its student population. In addition to an applicant's past scholastic achievement, admissions criteria include an applicant's potential for service in the field, keeping in mind the needs of our society and of underrepresented and disadvantaged communities. Evaluation criteria also attempt to take into account any prior disadvantages applicants have overcome that may bear on future achievements and services.

APPLYING FOR ADMISSION

To apply for admission, please go online to http://gradstudies.ucdavis.edu.

Each program to which you apply must receive a complete application, including the application fee of \$80 (U.S.) or \$100 (international).

To apply for fellowship, please go online to http://gradstudies.ucdavis.edu.

For application deadlines, please go to the Office of Graduate Studies website at http://gradstudies.ucdavis.edu/prospective/ admissiondeadlines.cfm. It is also recommended that you check the website of the program to which you are applying for their application deadlines. No applications are accepted after the published program-specific deadline.

About Admissions

Applications are accepted for fall quarter only. You may apply for admission to graduate study at http://gradstudies.ucdavis.edu. Transcripts of all your undergraduate and previous graduate study. along with other supporting documents (if required), must be sent via mail to your graduate major program office.

You should begin the application process as early as possible in the academic year since many programs have early deadlines. In addition, your chances for appointment as a teaching assistant or graduate student researcher, or of receiving financial support, are enhanced by applying early. The application deadlines are available on the Internet as noted above, unless otherwise indicated by the program, or until your proposed graduate program is full, whichever occurs first.

The Graduate Admissions Advisory Committee for the program will submit its recommendation and evaluation to the Office of Graduate Studies; final admission decisions rest with the dean of Graduate Studies. This approval procedure applies to all applicants, including those seeking a transfer to UC Davis from another UC campus.

Applications for the degrees of Juris Doctor, Doctor of Medicine, Doctor of Veterinary Medicine, Master of Business Administration, Master of Professional Accountancy, and Master of Preventive Veterinary Medicine must be filed directly with the appropriate professional school.

Readmission

For deadline to file applications for readmission to graduate status with the Office of Graduate Studies, please go to the Graduate Studies website at http://gradstudies.ucdavis.edu/prospective/ admissiondeadlines.cfm.

If you were formerly registered at UC Davis as a graduate student and wish to return to pursue the same degree objective in the same major, you must apply for readmission and pay the readmission application fee of \$70. The readmission application must be filed with the Office of Graduate Studies by May 31 (or earlier if the program specifies an earlier date). Readmission to quarters other than fall is granted on an exception basis by special petition to the Associate Dean for Graduate Students. If you are seeking to return to a new degree program and/or new major, you must apply for admission along with other new applicants. Apply at http://gradstudies.ucdavis.edu. Transcripts of all work undertaken since you were last registered in graduate status at UC Davis must

be presented with the application. There is no assurance of reentry, as applicants for readmission will be considered in competition with other applicants for the program.

International Students

http://intlstudents.ucdavis.edu

Assessment of a foreign degree is based on the characteristics of the national system of education, the type of institution attended and the level of study completed.

If you are an international student with credentials from universities outside the U.S., you should begin the application process as early as one year in advance. Official copies or certified copies of all transcripts in English and in the original language are required before your application can be processed. Do not attempt to convert your grade point average or ranking to a U.S. equivalent. The Office of Graduate Studies will determine your eligibility using U.S. guidelines for credential evaluation. Completed online applications from international students along with the nonrefundable \$100 application fee must be received by the program to which you are applying by May 31, unless your proposed program has an earlier deadline.

International students must apply at http://gradstudies.ucdavis.edu.

English Requirement. Applicants whose native language, or language of prior instruction, is not English must take the TOEFL or IELTS. The minimum score required for admission to graduate study at UC Davis is 550 for the paper test and a score of 80 based on the reading, listening, speaking and writing categories on the Internet-based test for TOEFL, or at least 7 on a 9-point scale for IELTS. TOEFL scores are valid for two years only. Some programs require higher scores; for more information, see http://gradstudies.ucdavis.edu/programs. There is no conditional admission. TOFEL scores must be reported electronically by ETS. The score report is required before application processing begins. You may send a photocopy of your paper report; however, official scores are required before registration if you are admitted.

TOEFL Scores. The Test of English as a Foreign Language (TOEFL) is given by Educational Testing Service (ETS), TOEFL Services, PO Box 6151, Princeton NJ 08541-6151,

(609) 771-7100. Request information from *toefl@ets.org* or see http://www.ets.org/toefl.

IELTS Scores. The Academic Modules of the International English Language Testing System (IELTS) are designed by the University of Cambridge Local Examinations Syndicate and administered by the British Council worldwide. You are responsible for providing us with an official Test Report Form (TRF) of your IELTS. Remember to order the TRF when you register to take the test. To register for the IELTS, see the IELTS website at http://www.ielts.org or contact the IELTS Subject Officer, University of Cambridge, Local Examinations Syndicate, 1 Hills Road, Cambridge, CB1 2EU, United Kingdom.

Visas. If you need a certificate of eligibility for a student visa issued by UC Davis, you will be required to complete a certification of finances form showing the availability of sufficient funding for your graduate program. For complete details, see Services for International Students and Scholars (SISS), on page 71, in the Academic Advising chapter.

PROGRAM OF STUDY

New students are assigned an adviser within the appropriate department or graduate group who assists them in planning a program of study. The program will depend to some degree on the student's undergraduate training and may include undergraduate courses to remove deficiencies. Each student must satisfy the degree requirements as stated by the program and found at http://gradstudies.ucdavis.edu/programs.

Additional requirements for study may be established by the department or group and approved by the Graduate Council. These requirements often include a core of required courses, but considerable flexibility is permitted to suit individual needs. Undergraduates at UC Davis who plan to pursue graduate study should consult with their major adviser early in their senior year to guarantee adequate preparation.

A graduate degree is awarded to recognize a student's command of a wide range of knowledge in an academic field. It is not awarded merely for fulfillment of technical requirements, such as residence or the completion of specific courses.

Graduate Student Deadlines*									
	Fall 2012	Winter 2013	Spring 2013	Summer 2013	Fall 2013	Winter 2014	Spring 2014	Summer 2014	Fall 2014
Deadline for students who expect to complete work for master's degrees to file applications for candidacy with master's degrees to file applications for candidacy with the dean of Graduate Studies	Aug 6	Oct 22	Feb 1	May 17	Aug 5	Oct 25	Jan 31	May 16	Aug 4
Deadline for candidates for master's degrees to file thesis with the dean of Graduate Studies	Nov 30	Mar 8	May 31	Aug 30	Dec 2	Mar 7	May 30	Aug 29	Dec 5
Deadline for candidates for master's degrees to take comprehensive examination	Dec 14	Mar 22	Jun 13	Sep 13	Dec 13	Mar 22	Jun 12	Sep 12	Dec 19
Deadline for students who expect to complete work for the degrees of Doctor of Philosophy and Doctor of Engineering to file applications for candidacy with the dean of Graduate Studies	Aug 6	Oct 22	Feb 1	May 17	Aug 5	Oct 25	Jan 31	May 16	Aug 4
Deadline for candidates for the degrees of Doctor of Philosophy, Doctor of Education, and Doctor of Engineering to file dissertation with the dean of Graduate Studies	Nov 30	Mar 8	May 31	Aug 30	Dec 2	Mar 7	May 30	Aug 29	Dec 5
* Deadlines are subject to change without notice.									

Master's Degree

Students working toward a master's degree must be registered for at least three full-time quarters. Two regular six-week Summer Sessions may count as the equivalent of one quarter. Usually, all work for the master's degree is done in residence on the UC Davis campus—with the consent of the graduate adviser and the Associate Dean for Graduate Students; however, some work taken elsewhere may be credited toward your degree. The limit for such transfer credit is 6 units from another institution, or 12 concurrent units (Open Campus enrollment), or up to one half of the unit requirement if the courses were taken at another UC campus-providing the units were not used to satisfy requirements for another degree.

A master's degree may be awarded upon completion of one of two basic plans in which either a thesis or a comprehensive examination is required.

Doctoral Degree

The Doctor of Philosophy degree, as granted at the University of California, means that the recipient possesses knowledge of a broad field of learning and has given evidence of distinguished attainment in that field; it is a warrant of critical ability and powers of imagination and synthesis. It means, too, that the candidate has presented a dissertation containing an original contribution to the knowledge in the chosen field of study.

Students working toward a doctorate must be registered for a minimum of six full-time quarters. Experience indicates that it takes considerably longer than this to complete a degree program. Two consecutive regular Summer Sessions may count as the equivalent of one regular quarter.

There is no university unit requirement for the doctoral degree. However, individual programs have course requirements that must be completed before admission to the Qualifying Examination.

The Qualifying Examination is administered by a committee appointed by the dean of Graduate Studies. The examination is intended to demonstrate critical thinking ability, powers of imagination and synthesis and broad knowledge of the field of study. Upon recommendation of the Qualifying Examination Committee, and with the approval of the Graduate Council, the examination may be repeated one time.

After successful completion of the Qualifying Examination, the student must file for Advancement to Candidacy for the degree. At this time, a committee is appointed to direct the research problem and guide in the preparation of the dissertation.

Graduate students in certain doctoral programs may participate in a Designated Emphasis, a specialization that might include a new method of inquiry or an important field of application that is related to two or more existing doctoral programs. The Designated Emphasis is awarded in conjunction with the doctoral degree and is signified by a transcript designation; for example, "Ph.D. in History with a Designated Emphasis in Critical Theory." Programs approved as Designated Emphases include African American and African Studies, Biology of Vector-borne Diseases, Biophotonics, Biotechnology, Classics and Classical Receptions, Critical Theory; Feminist Theory and Research; International and Community Nutrition; Native American Studies; Organism-Environment Interaction; Reproductive Biology; Second Language Acquisition; Stem and Progenitor Cells; Studies in Performance and Practice; Translational Research; and Writing, Rhetoric, and Composition Stud-

INTERCAMPUS EXCHANGE PROGRAM

A graduate student registered on any campus of the university may become an intercampus exchange student with the approval of the graduate adviser, the chairperson of the department or group on the host campus and the dean of Graduate Studies on both the home and the host campuses.

An intercampus exchange student has library, health service and other student privileges on the host campus, but is considered a graduate student in residence on the home campus. The grades obtained in courses on the host campus are transferred to the home campus and entered on the student's official graduate tran-

Application forms may be obtained from the Office of Graduate Studies website (http://gradstudies.ucdavis.edu) and must be submitted five weeks before the beginning of the quarter in which you wish to participate in the program. Petitions received after the first day of the quarter will not be processed.

FELLOWSHIPS, ASSISTANTSHIPS AND LOANS

http://gradstudies.ucdavis.edu/ssupport

Financial support for graduate study at UC Davis is available in several forms: teaching and research assistantships, financial aid and fellowships/scholarships. For more information, see http:// gradstudies.ucdavis.edu/ssupport.

Financial aid is awarded on the basis of demonstrated financial need and is administered by the Financial Aid Office. Federal financial aid includes student loans, grants and work-study funding. You may apply for financial aid before you have been admitted. To be considered for financial aid, or for any awards based on financial need, you must file a "Free Application for Federal Student Aid" (FAFSA), at http://www.fafsa.ed.gov no later than March 2, prior to the fall quarter enrollment. This form, submitted directly to the Federal Student Aid Program Office, Iowa City, IA, is used to determine financial need only. Contact the Graduate Financial Aid Office for information regarding loans, grants and work-study at http://financialaid.ucdavis.edu/graduate.

Graduate fellowships are awarded primarily on the basis of scholarly accomplishment and promise of outstanding academic and professional achievement. Fellowship awards can include a stipend, fees and/or Nonresident Supplemental Tuition. Considered in evaluations are the Graduate Record Examination (GRE) scores, undergraduate and graduate grade point averages, academic transcripts, statement of purpose, letters of recommendation and other documentation such as publications or awards. The minimum cumulative undergraduate or graduate grade point average required for a stipend, Nonresident Supplemental Tuition fellowships or in-state fee award is 3.000 (A=4.000). U.S. citizens and permanent residents are eligible for Nonresident Supplemental Tuition fellowships for their first three quarters at UC Davis only. New international students may be awarded Nonresident Supplemental Tuition fellowships, in addition to some stipend fellowships, in their first three quarters.

To apply for fellowship, go online to http://gradstudies.ucdavis.edu.

For fellowship application deadlines, please go to the Office of Graduate Studies website at http://gradstudies.ucdavis.edu/prospective/admissiondeadlines.cfm. It is also recommended that you check the website of the program to which you are applying for their fellowship application deadline.

GRADUATE ACADEMIC CERTIFICATE PROGRAM

A Graduate Academic Certificate (GAC) program is a structured sequence of courses and requirements that focus on a specialty or area of expertise not offered by a regular graduate degree program. GACs are administered by a UC Davis instructional unit (professional school, department, graduate group or a designated emphasis program) and are an additional sequence of training and expertise for graduate students enrolled in a degree program.

GACs consist of a minimum of 12 units of graduate level instruction and are recognized by transcript notation and an official certificate issued by UC Davis with the gold seal of the University of California. GAC programs include Air Quality and Health, Conservation Management, Development Practice, and Second Language Acquisition. For more information, see http://gradstudies.ucdavis.edu/programs/GACs.html.

GRADUATE CERTIFICATE PROGRAM FOR ENGINEERS

For engineers who already have a degree, the College of Engineering offers Graduate Certificate Programs in various fields of Engineering. The certificate programs consist of course work in selected engineering subjects and require fewer units than the degree programs. The purpose of the Graduate Certificate Program is to provide practicing engineers with an opportunity to develop additional expertise in specific areas and to explore new fields of technical interest.

General requirements for the programs are:

- 15 or 16 units of specified graduate course work, or a combination of specified graduate and undergraduate course work.
- Admission to Graduate Studies.

Further information on the Graduate Certificate Programs may be found within the graduate programs of the College of Engineering; see http://engineering.ucdavis.edu/graduate.

SEMINAR ON COLLEGE TEACHING

Center for Excellence in Teaching and Learning 1310 Surge III (530) 752-6050; http://cetl.ucdavis.edu/egw/sct/

The Seminar on College Teaching introduces graduate students to the principles and methods of designing and delivering college-level instruction. The seminar deals with a broad range of skills and issues involved in helping college students learn, including classroom presentations, planning discussions, facilitating active learning, evaluating student learning and employing effective class management strategies.

Participants meet for weekly two-hour sessions. Participants select and complete several assignments, such as developing a syllabus, preparing a lesson plan, investigating an ethical issue related to teaching, creating a teaching blog, or writing a teaching philosophy statement. Readings from various sources complete the seminar experience.

Participants who attend every session and fulfill the required brief assignments in a satisfactory manner receive a certificate of completion that is appropriate to note in a curriculum vitae.



SCHOOL OF EDUCATION

SCHOOL OF EDUCATION

School of Education School of Education Building (530) 752-0757; http://education.ucdavis.edu

The School of Education offers a wide range of academic and professional development programs that prepare teacher and administrative leaders for the world of public education (P-16), as well as researchers and university faculty. Hallmarks of our work include research that is integrated with practice and policy; deep, sustained engagement with schools and communities; and authentic, collaborative partnerships with those who share our goals.

Through our Ph.D., Ed.D. and M.A. programs, we prepare students to take leadership roles in strengthening schools, community colleges and universities, advancing research and scholarship, and improving education policy and practice. In our credential program (Teaching Credential/M.A.), we prepare students to become teacher leaders and educational advocates for all children.

PROGRAMS OF STUDY

The Minor in Education is considered a foundation for undergraduates who wish to obtain a teaching credential; enter any education-related field such as speech therapy, school counseling, occupational learning, or social work; obtain a master's degree in education or a related field; pursue a doctoral degree in education; or develop a better understanding of issues confronting education today. Education Minor coursework focuses on social foundations of education, psychology of learning, schools as institutions, challenges of educational assessment, and educating diverse populations in a wide variety of disciplines and contexts. As part of the Education Minor, students also complete an internship in a local K-12 school or other learning context.

Undergraduates who are interested in exploring teaching mathematics or science in public schools should contact the MAST Program (http://mast.ucdavis.edu) at their first opportunity. The MAST Program offers seminars that give participants experience in elementary, middle school, and high school classrooms. MAST advisers can help students combine the prerequisites for a credential program with General Education requirements. The Natural Sciences major is sound preparation for teaching the science disciplines offered in middle and high schools. A major in Mathematics will provide the broad understanding needed to teach in public schools.

The Master of Arts in Education provides a course of study for examining research and theory about learners, teachers, schools, and related social institutions. The program prepares professionals to conduct research about the education of children, youth, and adults in a multicultural society. Graduates may assume leadership positions in school districts, state education agencies, and private organizations concerned with instructional research, policy and practice.

The M.A. Program in Education offers (1) a general track that serves a broad range of student research interests and career plans, (2) a Practicing Teachers track that offers research training and experience focused on classroom-based inquiry and instructional

intervention, and (3) an M.A./Credential track that integrates the M.A. with the Teaching Credential and focuses particularly on classroom-based research.

Students in the M.A. General and M.A. for Practicing Teachers programs are offered three areas of emphasis: Instructional Studies, Psychological Studies, and Socio-cultural Studies.

The Integrated Teaching Credential with Master's Degree Program offers an opportunity for qualified students to complete the requirements for both a Masters of Arts in Education degree and a Multiple Subject OR Single Subject Credential in English, mathematics, science, social science or agriculture in a 15-month, five-quarter program. The BCLAD (bi-lingual) authorization is available to credential candidates in both the elementary and secondary programs.

The Credential Program prepares students for the teaching profession by immersing them in the total environment of a public school classroom while enrolled in required coursework. The coursework incorporates a theoretical-practical approach to the teaching-learning process, encouraging close interactions among teacher candidates and teacher education faculty. Students complete requirements for the M.A. degree during two part-time quarters following the credential year. This coursework introduces the integration of research into teaching practice, making teachers more informed and pro-active practitioners.

The Capital Area North Doctorate in Educational Leadership (CANDEL) is a collaborative program of UC Davis and Sonoma State University. The program, leading to a Doctor of Education (Ed.D.) degree, is intended primarily for working professionals in P-12 or Community College related leadership positions and may be completed within three years. Graduates of this program will be prepared to lead in educational environments that promote learning, equity and achievement for all students. Armed with both real-world, problem-based learning, and scholarship skills, program graduates will be uniquely ready to manage the complexities of educational organizations, effect school change processes and shape the educational policies that bear on the practice of education in the public setting.

The Ph.D. in Education is a multidisciplinary program offered by the Graduate Group in Education, with faculty drawn from education, mathematics, science, social science and humanities units throughout the UC Davis campus. The program provides a challenging course of study for examining research and theory about learners, teachers, schools and related social institutions. Through coursework, apprenticeships and mentoring, Ph.D. students are prepared to conduct research and teach about the education of children, youth and adults in a multicultural and multilingual society. Graduates of the program have assumed faculty positions in universities, as well as other leadership positions in universities, school districts, state education agencies and in private organizations that support teaching and learning in schools and communities. The program offers five areas of emphasis: Language, Literacy and Culture; Learning and Mind Sciences; Mathematics Education; Science/Agricultural Education; and School Organization and Educational Policy.

PREPARING FOR THE STUDY OF **EDUCATION**

Teaching Credential/M.A. Degree Program

Academic preparation for the Teaching Credential Program includes a completed bachelor's degree and a GPA of at least 3.000. For the Multiple Subject credential, many undergraduate majors are appropriate preparation for the program. For Single Subject credential candidates, we recommend an undergraduate major in the intended area of secondary teaching. Use undergraduate internship opportunities to gain classroom experience in the grade levels at which you wish to teach. In addition to these general requirements, learn about current state and UC Davis credential prerequisites at the School of Education website or call our Student Services Office.

- Classroom experience in the appropriate grade levels
- U.S. Constitution course
- Specific preparatory coursework; see adviser for details
- California Basic Educational Skills Test (CBEST)
- For the elementary credential program, the California Subject Examination for Teachers (CSET)
- For secondary credential programs, approved subject matter coursework or the California Subject Examination for Teachers (CSET) for the appropriate subject

Applicants are encouraged to have program prerequisites and testing requirements completed prior to submitting an application. Credential requirements are revised by the State of California. To obtain the most current information, students considering a career in teaching are encouraged to consult with the School of Education advisers throughout their undergraduate career.

M.A. in Education Degree Programs. Applicants to the General Track M.A. and M.A. for Practicing Teachers must have completed an undergraduate degree with a major in a field that supports their intended area of emphasis. A minimum undergraduate GPA of 3.000 is necessary for graduate admission at the University of California, Davis. Please consult with advisers in the School of Education regarding additional testing or supplemental information that may be required for application to a specific program.

Ed.D. Degree (CANDEL). Applicants to the CANDEL program must meet general admission requirements for graduate study at the University of California. Requirements include a bachelor's and master's degree (or equivalent) from an accredited institution, and a GPA of at least 3.000. In addition, applicants will have demonstrated prior experience in administrative or leadership roles in an educational institution or related areas.

Ph.D. Degree. Applicants to the Ph.D. program in Education must have a bachelor's degree, and normally will have completed a master's degree (or equivalent) in a field that supports their intended area of emphasis. A minimum GPA of 3.000 in previous undergraduate coursework is required for graduate admission at the University of California, Davis. Applicants must demonstrate a high potential for scholarly achievement and research. Individuals possessing graduate degrees in fields other than education are encouraged to apply. Experience in teaching, research, or related areas of education are desirable.

APPLYING FOR ADMISSION

School of Education graduate and teaching credential students are admitted for fall term ONLY. Online applications will be available through the Office of Graduate Studies website at http://gradstudies.ucdavis.edu/.

Application deadlines and requirements vary by program. Please consult with a School of Education adviser regarding your program interests. Applicants with underrepresented and nontraditional backgrounds are encouraged to apply.

Minor in Education

No Application Deadline. The Education Minor is open to students in all majors.

For more information, see our website at http:// education.ucdavis.edu or contact the School of Education Student Services Office at (530) 752-0757 or eduadvising@ucdavis.edu.

Steps in declaring a minor in education:

- · Consult with the education undergraduate adviser in our Student Services Office
- Declare minor by completing a "Declaration of Minor" form available from the Dean's Office in the college of your major

Teaching Credential/M.A. Degree Program

Application Deadline. Please see the School of Education website for Program application information and deadlines at http:// education.ucdavis.edu.

For more information or instructions please see our website or contact the School of Education Student Services Office at (530) 752-0757 or eduadvising@ucdavis.edu.

Steps in the Admissions Process:

- Complete Office of Graduate Studies online application
- Submit nonrefundable application fee payable to UC Regents
- Submit two (2) official transcripts for all college and university work completed
- Submit to the School of Education any supporting documentation: verification of classroom field experience, copies of test scores, etc.

Applicants will be:

- · Screened and scheduled for an admissions interview
- · Evaluated and reviewed by an admissions committee
- · Recommended to Office of Graduate Studies for admission or
- · Notified of admission or non-admission by the Office of Graduate Studies

M.A. Degree

Master of Arts in Education General Track and Master of Arts in Education for Practicing Teachers

Application Deadline. Please see the School of Education website for Program application information and deadlines at http://education.ucdavis.edu.

For more information or instructions please see our website or contact the School of Education Student Services Office at (530) 752-0752 or eduadvising@ucdavis.edu.

Steps in the Application Process:

- Complete Office of Graduate Studies online application, which includes three (3) uploaded letters of recommendation
- Submit nonrefundable application fee payable to UC Regents
- Submit official transcripts for all college and university work completed
- Submit to UC Davis your official scores (taken within the last 5 years) for the Graduate Record Exam (GRE) General Test

Capital Area North Doctorate in Educational Leadership (CANDEL)

Application Deadline. Please see the School of Education website at http://education.ucdavis.edu.

For more information, see the program website at http://education.ucdavis.edu/programs/candel.html or contact the School of Education at (530) 754-6664 or eduadvising@ucdavis.edu.

Steps in the application process:

- Complete the online application for the Capital Area North Doctorate in Educational Leadership
- Submit application fee (nonrefundable) made payable to UC Regents

- Submit two (2) official transcripts in sealed envelopes as received from the registrar(s) of each college or university attended
- Submit official score(s) for the Graduate Record Examination (GRE) General Test or the Miller Analogies Test (MAT)
- Submit three (3) letters of recommendation written by three employers, professors, or others in a position to assess the applicant's potential for graduate work (must be uploaded online)
- Include a statement of support from employer; a separate document from the applicant's current employer verifying a commitment to provide periodic leave for intensive program activities

Finalists will be interviewed by the CANDEL Admissions Committee.

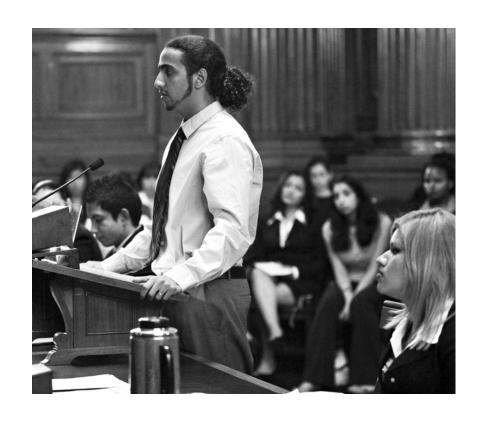
Ph.D. Degree

Application Deadline. Please see the School of Education website at http://education.ucdavis.edu.

For more information or an application package, see the program website at http://education.ucdavis.edu/programs/PhDoverview.html or contact the School of Education Student Services Office at (530) 752-0757 or phdeduadvising@ucdavis.edu.

Steps in the application process:

- Complete online UC Davis Office of Graduate Studies application
- Submit nonrefundable application fee payable to UC Regents
- Official score(s) for the Graduate Record Examination (GRE) General Test
- Three (3) letters of recommendation
- One (1) official transcript from all institutions attended
- Writing sample (typically a seminar paper, thesis, or published article)



SCHOOL OF LAW

SCHOOL OF LAW

School of Law, Admission Office (530) 752-6477; admissions@law.ucdavis.edu, http://www.law.ucdavis.edu

The University of California Davis School of Law offers a three-year professional curriculum leading to the degree of Juris Doctor. Within a uniquely supportive atmosphere, law students are provided a comprehensive modern law school curriculum taught by a nationally and internationally distinguished faculty. The School offers a full range of traditional law courses, opportunities for practical experience through clinical programs and for in-depth study of an area of law in an individualized program of classroom work, research, writing, or experience in the community. It further provides professional skills training in interviewing and counseling, negotiation and dispute resolution and trial practice. The School seeks to promote critical evaluation of law and legal institutions in a broad perspective, integrating non-legal disciplines with professional legal education.

UC Davis Law School is fully accredited by the American Bar Association, is a member of the Association of American Law Schools and has a chapter of the Order of the Coif.

PREPARING FOR THE STUDY OF LAW

No specific college major is required for admission to the School of Law and there is no prescribed pre-legal program. Your college record and Law School Admission Test (LSAT) score must, of course, demonstrate that you are highly qualified for the study of law.

As a pre-law student, you should plan a course of study that will give you a broad cultural background and include intensive work for a substantial period of time in a selected field of study. Pre-law students should develop the ability to think critically. They should gain an understanding of people and institutions and know how to gather and weigh facts, to solve problems and think creatively. They should be able to read rapidly with comprehension and express themselves clearly, completely and concisely, both orally and in writing.

You can get help with program planning from the Pre-Law Advising Office in 160 South Silo (530) 752-4475.

For additional information, see the Official Guide to ABA-Approved Law Schools, a publication of the Law School Admission Council and the American Bar Association. This book includes information on the law and lawyers, pre-law preparation, applying to law school and the study of law, together with individualized information on all ABA approved law schools. It can be found at college and major bookstores or ordered at http://www.LSAC.org.

APPLYING FOR ADMISSION

Deadline for filing electronic applications for admission to the School of Law:

February 1

1. Request the law school catalog to learn more about the School and the admission process. The electronic application can be accessed at the School's website, http://www.law.ucdavis.edu or at the Law School Admission Council (LSAC) website at http://www.LSAC.org. Complete instructions about the admission process, including answers to frequently asked questions, can be found in the Prospective Student section of the Law School website.

The last date for filing completed electronic applications, together with all supporting documents, including Law School Admission Test (LSAT) scores, Credential Assembly Service (CAS) reports and letters of recommendation, is *February 1* of the year in which admission is sought. Early filing of all application materials is strongly recommended.

2. You must take the Law School Admission Test and register with the Credential Assembly Service so that the score will be reported to the school. You are urged to take the test as early as possible and no later than December preceding the year in which admission is sought; the February test date is too late for Fall admission.

Testing centers are located in all parts of the United States and in many foreign countries. Tests are given four times a year: February, June, September/October and December.

To obtain information about the test, specific test dates and the location of testing centers, you can contact the Law School Admission Council (LSAC) at <code>lsacinfo@lsac.org</code>. Both the CAS and LSAT registration process are electronic. See the LSAC website to find information about the test, test dates, test centers and to familiarize yourself with the online services.

- **3.** Register with the Credential Assembly Service (CAS) no later than December 1 at the LSAC website. Arrange to have a transcript from each college or university you have attended sent directly to LSAC. Complete instructions for the online services are available at the LSAC website.
- 4. Submit an official transcript of college work completed during the first semester or quarter of your senior year directly to the School of Law as soon as it is available. Failure to do so may delay consideration of your application materials. Successful applicants must submit directly to the School of Law a final transcript showing the award of a bachelor's degree.

5. Provide two letters of recommendation from objective and responsible persons to whom you are well known. At least one of these letters should come from a faculty member under whom you studied while in college. UC Davis Law School requires all applicants to submit recommendations to the LSAC Letter of Recommendation Service (LOR) for inclusion with your CAS report. Your application cannot be considered until two letters have been received.

Your application will be reviewed by the School of Law Admissions Committee, which seeks students of demonstrated academic ability, as evidenced by a variety of factors including information provided in the required two-four page personal statement and letters of recommendation, in combination with the LSAT score and the undergraduate grade point average (GPA). The committee seeks students of diverse backgrounds and considers economic factors, obstacles overcome, advanced degrees or other advanced studies, significant work experience and extracurricular and community activities during and after the college years. An applicant's growth, maturity and commitment to the study of law are also major considerations. Students are admitted only on a full-time basis and only in August.

6. When accepted by the School of Law, you are simultaneously admitted to Graduate Studies on the UC Davis campus of the university for the program leading to the degree of Juris Doctor. If you intend to pursue studies leading to other graduate degrees, or wish to become a candidate for a Combined Degree Program, you must make separate application to Graduate Studies or the Graduate School of Management before commencing such studies.

Admission to Advanced Standing

If you have completed at least one year of full-time law course work in another American Bar Association (ABA) approved law school, you may be considered for admission to advanced standing with credit for not more than one year of such work. The application filing period is June 1-30. No application for advanced standing will be considered until the Office of Admissions has received transcripts for all prior law school work.

Application procedures for advanced standing are the same as described above with the addition of (1) a letter of good standing including class rank from the dean of any law school previously attended; (2) at least one letter of recommendation from a law professor; (3) transcripts of all law school work; (4) LSAT score provided as part of an updated CAS report from LSAC; and (5) an official transcript from the school where you earned your undergraduate degree, stating the date the degree was conferred. The deadline for transfer applications is June 30 of the year for which transfer is sought. Committee decisions on advanced standing are normally made in July or early August of the year in which admission is sought.

Students who have been disqualified at another law school will not be admitted to UC Davis Law School.

Recruitment of Underrepresented Groups

The students and faculty of the School of Law recognize the great need for lawyers from under-represented groups. The School, therefore, actively solicits applications from those groups that

reflect the many diverse populations of California but, traditionally, have been underrepresented in the law school population.

The School of Law, in cooperation with the Association of American Law Schools (AALS) and the Council on Legal Education Opportunity (CLEO), participates in programs designed to increase the number of law students from underrepresented groups. CLEO applications may be obtained by writing to Council on Legal Education Opportunity, 740 15th Street, N.W., 9th floor, Washington, D.C. 20005, (202) 828-6100 or toll free (866) 886-4343; http://www.cleoscholars.com.

PROGRAM OF STUDY

The professional curriculum requires six semesters for completion and extends over a period of three years. It is for full-time students only; no part-time or evening program is offered. New students are admitted only at the beginning of the fall semester.

After satisfactorily completing the professional curriculum of 88 semester units and the required period of resident study, you will receive the degree of Juris Doctor (J.D.). Students who fail to attain satisfactory grades may be required to withdraw from the School at the end of any academic year.

The first year's work is prescribed and provides the essential foundation for subsequent legal study. Satisfactory completion of the first-year courses is, in all cases, prerequisite to second- and thirdvear courses. The work of the second and third years is elective. The courses of the professional curriculum are listed in the Undergraduate Courses chapter.

Combined Degree Programs

Individual students may find a combined degree involving law and another discipline such as economics, business, sociology, or science advantageous. To support this kind of study, the School, in conjunction with other schools and university departments, has established Combined Degree Programs. Under these programs, a student may work toward a J.D. degree and a master's degree in another discipline at the same time. Students working toward a combined degree are required to spend their first year at the law school.

Normally, a Combined Degree Program will take at least four years. You will usually be able to earn up to 10 semester-hours of law school credit for work in the related discipline and normally can complete the combined degrees in less time than it would take to earn the two degrees separately. The first year of the Combined Degree Program must be taken entirely in the School of Law. During the remaining years, course work may be divided between the law school and the related discipline. You must satisfy the admission requirements for both programs and file applications with both units.

Students have pursued degree programs in combination with UC Davis departments for the M.A. degree in economics, philosophy, computer science and sociology, and with the School of Management for the M.B.A. degree. The law school will attempt to work out an additional program if you are interested in other disciplines. You may enroll in the Combined Degree Program any time before the beginning of your third year in law school. If you are interested in pursuing a Combined Degree Program, and have made a separate application to another school or department, you should notify the School of Law if that application is accepted.

The LL.M. Program

(530) 757-8569; Fax (530) 757-8596; lawinfo@ucde.ucdavis.edu http://www.law.ucdavis.edu/international/

The Law School LL.M. (Master of Laws) program integrates American and foreign law students at all levels of study. For foreign law graduates, the program provides an opportunity to gain a basic knowledge of the United States legal system. United States law school graduates and selected foreign LL.M. candidates may also seek admission on a thesis rather than a course basis. Other opportunities available to all graduate law students include developing special expertise in a particular area and doing special projects and original research under the direction of a faculty member.

Each LL.M. candidate must successfully complete a minimum of 20 semester units of work, usually 10 units each semester. Foreign LL.M. students must enroll in the 1-unit course *Introduction to Legal Research* and the 2-unit course *Introduction to the Law of the United States*. They earn the remainder of their required course credit in regular elective J.D. courses. Each foreign student must also complete an intellectually rigorous legal research and writing project, constituting at least 2 units of credit.

All LL.M. candidates begin their year of study with a complete orientation in the academic and social life of the law school, the UC Davis campus and the city of Davis. LL.M. students are encouraged to enroll in the School of Law's Orientation in U.S.A. Law Program, given in the month before the LL.M. Program begins.

SCHOOL OF LAW ACADEMIC CALENDAR 2012-2013

The School of Law operates on a semester system rather than the quarter system used on the remainder of the UC Davis campus.

	Fall 2012	Spring 2013
Introduction Week	Monday– Friday,	
	Aug 13–17	
Law School instruction begins	Monday,	Monday,
	Aug 20	Jan 21
Labor Day holiday	Monday,	
	Sep 3	
Veteran's Day holiday	Monday,	
ent 1 1 1.1	Nov 12	
Thanksgiving holiday	Thursday-	
	Friday, Nov 22–23	
Mantin Lathan Vince In halidan	NOV 22-23	Mandan
Martin Luther King, Jr. holiday		Monday, Jan 21
Presidents' Day holiday		Monday,
residents Day nonday		Feb 18
Spring recess		Monday-
Spring recess		Friday,
		Mar 18–22
Law School instruction ends	Friday,	Friday,
	Nov 30	Apr 26
Reading period	Saturday-	Saturday-
01	Tuesday,	Tuesday,
	Dec 1-4	Apr 27-30
Law School examination period	Wednesday-	Wednesday-
	Thursday,	Thursday,
	Dec 5-20	May 1–16
Law School Commencement		Friday,
		May 17
Wednesday, January 23 & Thursday, February 21	are treated as a Monda	y for class sched-
ule purposes.		

http://www.law.ucdavis.edu/current/registrar/academic-calendar-12-13.html



GRADUATE SCHOOL OF MANAGEMENT

GRADUATE SCHOOL OF MANAGEMENT

Graduate School of Management Gallagher Hall (530) 752-7658; http://gsm.ucdavis.edu

The Graduate School of Management offers a full-time, two-year program leading to the Master of Business Administration degree. The program provides both entry-level and mid-career students with an understanding of management approaches to problem solving and an awareness of the environment within which public and private management decisions are made. Successful completion requires not only a sophisticated understanding of a variety of functional skills in finance, marketing, production, program evaluation and accounting, but also an understanding of computers, information systems and the application of scientific methods to the identification and solution of management problems.

Preparing for the Study of Management

A bachelor's degree and a strong interest in professional management are prerequisites for admission to the Graduate School of Management. The school seeks students from diverse professional and academic backgrounds and does not limit its consideration to applicants from any particular category of majors. Entry-level and mid-career applicants are considered and women and minorities are encouraged to apply.

Although the program has no specific subject prerequisites, it is strongly recommended that students complete the following course work before enrolling:

Accounting—an introductory course in financial accounting
Economics—an introductory course in microeconomics
Mathematics—an introductory course in calculus
Statistics—a course in elementary statistics

APPLYING FOR ADMISSION

Application Deadlines are in November, January, March and May, each year. For the most current information, see http://gsm.ucdavis.edu.

Admission is for the fall quarter only. Application materials can be obtained in the following ways:

- Apply on-line at our website at http://gsm.ucdavis.edu
- Print the application materials at http://gsm.ucdavis.edu
 or contact the Graduate School of Management at
 admissions@gsm.ucdavis.edu
- Call (530) 752-7658

Complete and return your application, with all supporting documents, by the deadlines given above. The application fee is \$125.00.

In addition to your application, you need to submit:

- Transcripts from all colleges or universities previously attended
- Graduate Management Admission Test (GMAT) or Graduate Record Exam (GRE) taken within the last five years of the admission date. For further information and registration forms, contact Graduate Management Admission Council at http:// mba.com or Educational Testing Service at http://ets.org/gre

- Two letters of recommendation
- · Four essays on specific topics
- Interviews are by invitation only

For more information, call (530) 752-7658, or contact admissions@gsm.ucdavis.edu.

International Students

International applicants for whom English is a second language must take either Test of English as a Foreign Language (TOEFL) or IELTS within the last two years. For more information, contact TOEFL, Educational Testing Service at http://toefl.org or IELTS Int'l at http://toefl.org or IELTS Int'l at http://tielts.org.

International students must show proof of financial support for two academic years including fees and living expenses.

Criteria for Admission

Admission to the UC Davis MBA Program is highly selective. The aim of the Admissions Committee is to select those applicants whose academic background, intellectual capability, work experience, demonstrated leadership and communication skills meet the challenging demands of the MBA program and a managerial career. Consideration of an applicant's undergraduate performance includes a review of trends in scholastic performance and areas of academic strength as well as an assessment of overall grade point averages. Admissions standards and grading policies of the schools attended are also considered. Verbal, quantitative and analytical scores on the GMAT are used to evaluate general aptitude for management study. Background and maturity as indicated by employment history, service and activity records, recommendations and the applicant's essays are factors in the committee's evaluation. Professional management experience is not required for admission but is favorably considered.

PROGRAM OF STUDY

The hallmark of the two-year UC Davis MBA program is its flexibility. Students are required to take nine core courses, 27 units, and 45 units of elective coursework for the 72 units required for the degree. The required core curriculum is designed to provide you a foundation in the functional areas of business-accounting, economics, finance, marketing, organizational behavior, statistics, and strategy. These management disciplines are examined through the use of case studies, lectures and the analysis of a few select companies on which to base illustrations and spark discussions. As early as the first year of study, students are able to integrate elective courses into their personal curriculum.

Elective courses at the Graduate School of Management place an emphasis on real-world application of management principles through the use of executive guest speakers who present "live" case study analyses and actual "client" businesses for student projects. Many courses require team projects and emphasize managing by innovation and entrepreneurialism. These team projects develop your independent research abilities and hone your presentation skills.

Most students choose functional concentrations such as:

- · Business Analytics and Technologies
- Entrepreneurship
- Finance/Accounting
- General Management

- Marketing
- · Organizational Behavior
- Strategy
- · Technology Management

MBA Programs in Sacramento and Bay Area

In addition to the full-time program, the Graduate School of Management offers two part-time MBA programs in Sacramento and in the Bay Area. Students enrolled in the MBA Program pay a flat rate per unit.

Fees are available at http://gsm.ucdavis.edu.

Application Deadlines are in December, February, April and May, each year. For the most current information, see http:// gsm.ucdavis.edu.

If you would like more information about this program, please contact the Graduate School of Management Admissions at (530) 752-7658 or see http://gsm.ucdavis.edu.

Master of Professional Accountancy (MPAc)

The Master of Professional Accountancy (MPAc) degree is a fulltime, one-year program designed to prepare students for a career in the accounting field, and to fulfill the requirements for those seeking to take the Uniform Certified Public Accountant Exam as administered by the State of California. The MPAc degree provides students with the skills to be experts in risk assessment, systems analysis, taxation, and corporate governance, and to act as overseers of public trust.

Graduates will gain a breadth of communication, business, and accounting skills that will meet the demands of sought-after organizational leadership roles.

Preparing for the Master of Professional Accountancy

An undergraduate degree in accounting is not a prerequisite for the MPAc program, however in order to prepare for the rigorous curriculum at the graduate level, students are required to complete the following three courses:

Introduction to Financial Accounting. Basic concepts of accounting; interpreting and using financial statements; understanding accounting principles

Introduction to Managerial Accounting. Product costing: using accounting information for decision making; planning and performance evaluation

Business Law. General principles of business law in the areas of contracts, business organization, real property, uniform commercial code, sales, commercial paper, employment relations, and creditor-debtor against a background of the history and functioning of our present legal system

Students are expected to complete prerequisites before beginning the MPAc program; any deficiencies must be completed prior to enrollment. Transfer credits from other institutions cannot be substituted for the MPAc curriculum, although such classes can be used to fulfill the aforementioned prerequisites.

The MPAc program welcomes applicants from all undergraduate disciplines and backgrounds. Women and minorities are encouraged to apply.

Applying For Admission

Application deadlines are in December, February, March and June, each year. For current information, see http://gsm.ucdavis.edu/ master-professional-accountancy.

To obtain application materials or apply online, see http://gsm.ucdavis.edu/mpac-admissions.

Applications must be submitted with supporting documents by the round deadlines in order to receive priority consideration. The application fee is \$125.

Supporting documents include:

- · Transcripts from all colleges or universities attended
- Scores from either the Graduate Management Admission Test (GMAT) or the Graduate Record Examination (GRE) taken within the last five years
- · Two letters of recommendation
- International students who have not earned an undergraduate degree in an English-speaking institution must take the Test of English as a Foreign Language (TOEFL), the Pearson Test of English (PTE), or the International English Language Testing System (IELTS) exam. For more information, see http://toefl.org, http://pearsonpte.com, or http://ielts.org
- International students must demonstrate proof of financial support for one academic year, including fees and living expenses.

Interviews are by invitation only.

Admission Criteria

The goal of the Admissions Committee is to select those applicants whose academic background, intellectual capability, communication skills, and professional promise meet the demands of the MPAc program.

Consideration of an applicant's undergraduate performance includes a review of trends in scholastic performance and areas of strength as well as an assessment of overall grade point averages. Admissions standards and grading policies of the schools attended are also considered. Verbal, quantitative and analytical scores on the GMAT or GRE are used to evaluate general aptitude for the MPAc course of study. Recommendations and the applicant's essays are factors in the committee's evaluation.

Program of Study

The MPAc program is "lock-step" meaning there are no electives and students complete courses as a unified cohort. The curriculum, which begins in the fall quarter and finishes the following spring quarter, is designed to establish a foundation in financial reporting and analysis, financial management, taxation and tax analysis, auditing and attestation, professional communication, managerial controls, and accounting ethics.

Students must pass a capstone examination which is taken after advancing to candidacy and at the end of coursework at the culmination of spring quarter to receive the degree.

For more information, call the Graduate School of Management at (530) 752-7658, or see http://gsm.ucdavis.edu/ master-professional-accountancy.



SCHOOL OF MEDICINE

SCHOOL OF MEDICINE

School of Medicine http://www.ucdmc.ucdavis.edu/medschool/

The Doctor of Medicine degree requires the satisfactory completion of a four-year course of study composed of 15 consecutive quarters. Course work is conducted on the Sacramento campus, at the UC Davis Medical Center and in nearby affiliated hospitals.

PREPARING FOR THE STUDY OF MEDICINE

When you apply to the School of Medicine, you must submit the results from the Medical College Admission Test (MCAT), so it is recommended that you take the MCAT by the spring before application. Information can be obtained at your undergraduate institution or directly from MCAT Program, Box 4056, Iowa City, IA 52243 (319) 337-1357. To be acceptable for the fall entering class, the MCAT must be taken no later than the previous fall. No scores older than three years from June of the year you apply will be accepted. Applicants must also meet the following academic requirements.

Applicants must also meet the following academic requirements:

- A. Completed at least three years of study in an accredited college or university in the United States. A minimum of 90 semester hours or 135 quarter units of college-level work is required. Courses in highly specialized fields are acceptable only at the discretion of the medical school.
- **B.** Completed satisfactorily before matriculation each of the following courses:

	Quarter Units	Semester Units
• English, 1 year or its equivalent	12	6
• Biological science, 1½ years* including laboratory, or its equivalent	15	11
General chemistry, 1 year including lab- oratory, or its equivalent	12	8
• Organic chemistry, 1 year or its equiva- lent. If two or more undergraduate organic chemistry courses are offered, it is recommended that you elect the	12	8
more rigorous optionPhysics, 1 year including laboratory or its equivalent	12	8
• Mathematics, College level math, including statistics. Note: AP credit does not satisfy math requirement	6	4

- * Upper Division Science Requirements for Admission. One semester or two quarters of upper division biology. This can be satisfied by courses in Biochemistry, Molecular Biology, Cell Biology or Genetics. Admission to medical school requires that the applicant will have an understanding of fundamental concepts of biomedical science. Although a biochemistry course is not absolutely required for admission, it is strongly recommended.
- C.Demonstrate the potential to perform academically at least as well as the average of the current first year class. This reflects the School of Medicine's generally higher standards and our emphasis on potential as judged from the application as a whole, including but not limited to MCAT and GPA scores.

For additional information, contact the School of Medicine Admissions Office at (916) 734-4800.

APPLYING FOR ADMISSION

Deadline for filing applications for admission to the School of Medicine:

October 1

The School of Medicine participates in the centralized American Medical College Application Service (AMCAS). For information on admission to medical school, see the Association of American Medical Colleges (AAMC) at http://www.tomorrowsdoctors.org. You need to submit only one application and one set of official transcripts to AMCAS, regardless of the number of member schools to which you are applying. This includes transcripts where community college courses were taken during high school and the summer term(s) before or while attending a four-year college.

Submit the completed application and other required credentials directly to AMCAS for verification, reproduction and immediate distribution to the medical schools you have indicated.

After your AMCAS application has been received by the School of Medicine, the Admissions Office will notify you and may request a secondary application and letters of recommendation along with a nonrefundable application fee of \$80. The instructions on how to make the fee payment and where to submit the letters of recommendation are included with the request to submit the secondary application. Recommendations can be in the form of a report by a premedical advisory committee at the college or university where you are enrolled or letters from at least two faculty members who are familiar enough with you and your abilities to make a meaningful evaluation. We recommend that one letter be from a science instructor and the other from a non-science instructor-three to six letters of recommendation suggested.

Applications are accepted by AMCAS between *June 1* and *October 1*. We strongly recommend that you make an early request for application materials from AMCAS and see that the necessary supporting items reach the Committee as soon as possible after the School of Medicine requests them. The Committee reviews only complete application files and schedules interviews for highly qualified applicants throughout the application period and beyond.

A personal interview is required before a place in the first-year class can be offered. However, because of the large number of applicants, it is not possible to interview each one and for this reason interviews are held only at the invitation of the Admissions Committee. Interviews take place at the medical school in order to provide you with first-hand knowledge of programs and facilities and give you the opportunity to meet some of the students.

As decisions are made, letters of acceptance are sent; this can be as early as mid-October and as late as June of the following year.

Applicant Selection. The class entering in the fall will be limited to 105 students selected on the basis of academic achievement, academic promise and personal characteristics. The Admissions Committee uses these criteria to determine if a candidate will be able to complete satisfactorily the requirements of the medical curriculum and become excellent medical practitioners. Factors taken into consideration include scholastic records, Medical College Admission Test performance and reports of teachers, advisers and interviewers with regard to intellectual capacity, motivation, emotional stability and personal dedication.

The majority of openings in the entering class will be awarded to students who are California residents. However, the School of Medicine participates in the program of the Western Interstate

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Commission for Higher Education (WICHE) and residents of participating states will be considered as residents for purposes of admission. For more information, write the WICHE, 3035 Center Green Drive, Suite 200, Boulder, CO 80301-2204.

The School of Medicine selects students for admission with a view to meeting the needs of society, of the medical profession and of the School. Because we live in a pluralistic society, and the educational experience is enhanced by the interaction of students from various backgrounds, the School desires diversity in its student body. This is reflected in the School's commitment to expand opportunities in medical education for individuals from groups underserved in medicine as the result of socioeconomic disadvantage and to increase the number of physicians practicing in underserved areas. Therefore, the Admissions Committee, composed of individuals from a variety of backgrounds and representative of a broad spectrum of medical sciences, evaluates applicants in terms of all relevant factors. These include academic credentials, with due regard to how they may have been affected by disadvantages experienced by the applicant, such personal traits as character and motivation, experience in the health sciences and/or the community, career objectives, and the ability of the individual to make a positive contribution to society, the profession and the School.

Transfer with Advanced Standing

We do not accept transfer students.

PROGRAM OF STUDY

Doctor of Medicine. The curriculum for the M.D. degree is normally a four-year program that provides comprehensive training for the practice of medicine and provides a blend of basic sciences training and clinical experience. The emphasis during the first two years is on the basic-science foundations of medicine. Medical students are introduced to patient care during their very first quarter of study, reflecting the school's commitment to the training of highly skilled clinicians. Several volunteer clinics, largely staffed by UC Davis medical students, provide an ideal setting for handson clinical experience.

Combined Degree Program. In addition to the Doctor of Medicine degree, the School of Medicine at UC Davis offers a variety of dual-degree programs through coordination with other graduate groups and divisions. These advanced degrees can couple the M.D. degree with the M.P.H., Ph.D. and M.B.A. that train physicians to meet, respond to and solve the broad diversity of problems and dilemmas facing current and future health care. A new five-year program for students interested in telecommunications-enhanced rural medicine is available. We also have three Underserved Communities Leadership Pathways in rural, valley, and urban. For more information, visit their website at see http://www.ucdmc.ucdavis.edu/mdprogram/rural_prime/ & http://www.ucdmc.ucdavis.edu/mdprogram/syprime/index.html.

Meeting this challenge requires those capable of advancing our biological sciences knowledge base and others who can recognize and solve the ethical, political and humanitarian issues that confront the broad delivery of health care to all. Hence, the field for the Ph.D. in the joint degree program at UC Davis can be any graduate program offered on the UC Davis campus, extending beyond the traditional biological sciences boundaries, and strongly encouraging candidates to seek degrees in social sciences and humanities. All requirements for both degrees are met in a course of study that usually lasts seven years. To be admitted, and be concurrently enrolled in both degree programs, students must apply for separate admission to both the M.D. and Ph.D. programs and obtain permission of the School of Medicine M.D./Ph.D. Advisory Committee. Funding for two competitive fellowships is awarded annually to students enrolled in the M.D./Ph.D. program.

Advisory Committee. Inquiries about admission to graduate education should be directed to the Dean of Graduate Studies, University of California, One Shields Avenue, Davis, CA 95616. For more information concerning the combined-degree programs, contact Joanna Garcia, Office of Admissions, School of Medicine, University of California, 4610 X Street, Sacramento, CA 95817.

Family Nurse Practitioner/Physician Assistant Program. The Family Nurse Practitioner/Physician Assistant (FNP/PA) credential program educates health care professionals to act as members of a health care team and improves the availability of culturally relevant primary health care in underserved populations throughout central and northern California. Enrollment in these courses is limited to students who are enrolled in the FNP/PA program; see Medicine, School of, Department of Family and Community Medicine

Master of Public Health (MPH) Degree. The Department of Public Health Sciences (PHS) offers the MPH degree. The MPH degree is accredited by the Council on Education for Public Health. Students apply for admission through the Office of Graduate Studies. The MPH program is designed for people interested in disease prevention and community health. The program includes instruction in epidemiology, biostatistics, environmental and occupational health, health services and administration, and social and behavioral science, and prepares students for an expanding range of professional opportunities and roles in public health and medicine. The MPH program runs on the main campus quarter system. The majority of courses are taught on the Davis campus. For more information, see http://mph.ucdavis.edu/.

ACADEMIC CALENDAR

The School of Medicine operates on a different schedule from the rest of the UC Davis campus. The program is a continuous four-year academic experience. The first year curriculum commences in mid-summer and extends through mid-spring of the following year. There is a six week break between the first and second year for electives, research, and remediation. The second year curriculum begins in early summer and extends through mid-spring of the following year. This is followed by a six-week academic period for preparation for USMLE Step 1. The third year clinical clerkships start in the spring and extend for 48 weeks. The fourth year curriculum begins immediately thereafter and extends through spring of the following year, with graduation in May.



BETTY IRENE MOORE SCHOOL OF NURSING

BETTY IRENE MOORE SCHOOL OF NURSING AT UC DAVIS

Education Building, Sacramento campus UC Davis Health System (916) 734-2145; http://nursing.ucdavis.edu

The Betty Irene Moore School of Nursing at UC Davis advances health and ignites leadership through innovative education, transformative research and bold system change.

The school cultivates academic excellence through immersive, interprofessional and interdisciplinary education and research in partnerships with the communities it serves. Faculty, staff and students discover and disseminate knowledge to advance health, improve quality of care and shape policy.

The school was launched through a \$100 million commitment from the Gordon and Betty Moore Foundation, the nation's largest grant for nursing education. The Betty Irene Moore School of Nursing cultivates academic excellence and addresses urgent societal needs through:

- Leadership development—build capacity for advocacy and action at all levels
- Interprofessional/interdisciplinary education—health professionals learn multiple perspectives to work and communicate as teams
- Transformative research—apply the science of nursing to improve health and reshape health systems with emphasis on aging, rural health and diverse communities
- Cultural inclusiveness—teach culturally-appropriate approaches to care and involve communities to design and conduct relevant research
- Innovative technology—use technology to create an engaged and interactive approach to nursing education, research and practice

The school welcomed its first classes for the Master of Science and the Doctor of Philosophy degree programs in fall 2010 through the Nursing Science and Health-Care Leadership Graduate Degree Program.

Graduates of the Nursing Science and Health-Care Leadership Graduate Degree Program are prepared for academic and leadership positions. Graduates exercise leadership through scientific thinking, responsibility, initiative, cultural inclusiveness, knowledge of organizations and system change, teamwork, and a commitment to healthy communities.

The Betty Irene Moore School of Nursing is part of the UC Davis Health System, an integrated, academic health system encompassing UC Davis School of Medicine, the 645-bed-acute-care hospital and clinical services of UC Davis Medical Center and the 800-member physician group known as the UC Davis Medical Group. For more information, see http://nursing.ucdavis.edu.

PROGRAMS OF STUDY

Nursing Science and Health-Care Leadership

The UC Davis Nursing Science and Health-Care Leadership Graduate Degree Program prepares nurse leaders, researchers and faculty in a unique interdisciplinary and interprofessional environment. The graduate group is composed of faculty from across campus with expertise in nursing, medicine, health informatics, nutrition, biostatistics, public health and other fields. Research and education at the Betty Irene Moore School of Nursing emphasize healthy systems and healthy people. Healthy Systems—improving health-care systems and designing policies to be effective, efficient and responsive. Research in healthy systems includes health policy, organizational change, informatics, implementation science and leadership. Healthy People—promoting health for individuals, families and populations in partnership with communities, with an emphasis on aging, rural and diverse populations. Research for healthy people includes community health, public health, epidemiology, gerontology, rural health and health disparities.

Master of Science

Master's degree students are those with experience or interest in transforming health care through nursing education and research. They want to focus on important societal health issues through the work of advancing health and improving the systems that provide health services.

Graduates of the Nursing Science and Health-Care Leadership Graduate Degree Program are prepared for academic and leadership positions. Graduates exercise leadership through scientific thinking, responsibility, initiative, cultural inclusiveness, knowledge of organizations and system change, teamwork, and a commitment to healthy communities.

The master's degree program is a full-time, professional degree program that prepares graduates for health-care leadership roles in a variety of organizations and as nurse faculty at the community college-level.

Some examples include:

- Leaders of health organizations and agencies-such as community clinics, trade associations, advocacy groups-improving quality of care and work environments, and advancing outcomes and health-care effectiveness and efficiency
- Community college and other prelicensure nursing facultyteaching the next generation of nurses
- Legislative and governmental agency staff and leadership developing, influencing and implementing policy to improve access and outcomes (not limited to health agencies but other organizations that provide public infrastructure such as transportation, planning or parks and recreation)
- Careers across the health-care sector, such as insurance, pharmaceutical, hospital, home health, aging support services, adoption services, chronic illness support services and medical equipment industries fostering the integration of excellence in clinical care, management, policy, education and research

Doctor of Philosophy

Students with experience and/or interest in leading the transformation of health care through nursing education and research are sought for the Nursing Science and Health-Care Leadership Doctor of Philosophy program. Ideal students want to focus on important societal health issues through the work of advancing health and improving the systems that provide health services.

Graduates of the Betty Irene Moore School of Nursing are prime candidates for formal leadership positions. Graduates exercise leadership through scientific approaches, vision, initiative, cultural inclusiveness, teamwork, and a commitment to assuring health care is highly effective, compassionate and accessible.

The full-time, academic doctoral program prepares graduates as leaders in health care, health policy and education/research at the university level to:

- · Conduct transformative research
- · Educate health professionals and researchers
- Effect system change
- · Influence and implement policy
- Advance health from multiple settings

PREPARING FOR THE STUDY OF NURSING

The Nursing Science and Health-Care Leadership Graduate Degree Program is ideal for students who:

- See problems in health care and think of solutions
- Want to improve health systems and advance health
- Find value in diversity of thought, belief, language and culture

APPLYING FOR ADMISSION

Betty Irene Moore School of Nursing students are admitted for **fall term only**. Online applications are available through the Office of Graduate Studies website at http://gradstudies.ucdavis.edu.

Application deadlines and requirements vary by program and year. For more information, please see the School of Nursing website at http://nursing.ucdavis.edu or contact the School of Nursing at (916) 734-2145.

MASTER OF SCIENCE

Admission Requirements

- Current registered nurse (R.N.) licensure
- A bachelor's degree in nursing or a related field
- A minimum undergraduate G.P.A. of 3.000
- A statement of purpose and personal-history statement, including research interests and future goals
- Three (3) letters of recommendation
- G.R.E. is not required

Degree Program Requirements

- Full-time enrollment (12 units per quarter) is required.
- Required courses for the master's degree program include a combination of core courses and electives. Six graduate-level core courses-Health Status and Care Systems, Implementation Science, Leadership in Health Care, Quantitative Skills for Change, Community Connections and an Informatics course-and the Master's Degree Seminar are required courses for the master's-degree program
- Students work with their advisers to select electives appropriate to their areas of interest
- A master's thesis is required
- Master's-degree students are expected to complete the program in five quarters. A sixth quarter option is available if needed

DOCTOR OF PHILOSOPHY

Admission Requirements

- A minimum undergraduate G.P.A. of 3.000
- Three (3) letters of recommendation
- A statement of purpose and personal-history statement, including research interests and future goals
- The application process may require an interview
- G.R.E. is not required

Degree Program Requirements

Required courses for the doctoral program include a combination of core courses and electives. Students work with their advisers to select electives appropriate to their areas of interest.

- Full-time enrollment (12 units per quarter) is required
- Required courses for the doctoral-degree program include five graduate-level core courses-Health Status and Care Systems, Implementation Science, Leadership in Health Care, Research Design in Nursing and Health Care and an Informatics courseand the Doctoral Seminar. A series of courses in research methods is also required
- Doctoral students are required to pass an oral qualifying examination. The intent of the oral qualifying examination is to determine whether the student is adequately prepared and sufficiently intellectually independent to conduct doctoral-level research. The exam may include both an oral component as well as the student's proposal for the dissertation research
- A doctoral dissertation is required. Students will enroll in dissertation units as full-time students after the qualifying exam until
 the dissertation is complete
- Ph.D. students are expected to complete the program in four years

ACADEMIC CALENDAR

The School of Nursing operates on the traditional UC Davis campus quarter system. Core nursing courses are offered in fall, winter and spring quarters only.



SCHOOL OF VETERINARY MEDICINE

SCHOOL OF VETERINARY MEDICINE

School of Veterinary Medicine Office of the Dean Surge IV (530) 752-1383; http://vetmed.ucdavis.edu

The mission of the School of Veterinary Medicine is to provide the best possible health care for animals through teaching, research and public service. Students are offered a rigorous four-year program of study that prepares them for diverse career opportunities in veterinary medicine.



PROGRAMS AND COURSES

UNDERGRADUATE COURSES

Lower Division Courses

These courses, numbered 1-99, are open to all students for lower division credit, but are designed primarily for freshmen and soph-

Upper Division Courses

These courses, numbered 100-199, are open to all students who have met the necessary prerequisites as indicated in the General Catalog course description. Preparation should generally include completion of one lower division course in the given subject or completion of two years of college work.

VARIABLE-UNIT COURSES

Subject to approval by the department chair, an instructor may arrange to give a special study course (numbers 90X, 92, 97T, 97TC, 98, 99, 190X, 192, 194H, 197T, 197TC, 198, 199) to interested students. These courses may be offered any fall, winter, or spring quarter as determined by the department.

- 90X/190X (Seminar) are seminar courses for in-depth examination of a special topic within the subject area.
- 92/192 (Internship) courses enable individual students to obtain practical experience to complement their educational goals or to explore potential career interests and opportunities. Students must have completed 84 units before enrolling in course 192.
- 97T/197T (Tutoring) and 97TC/197TC (Tutoring in the Community) are courses for students who want to tutor in a subject in which they are proficient—generally in their major field while enrolled as an undergraduate.
- 98/198 (Directed Group Study) courses are set up on a onetime basis for a group of students in a subject for which no regular courses have been established.
- 99 (Special Study for Undergraduates) is a course arranged for an individual student who shares, with an instructor, an academic interest that cannot be accommodated within the formal course structure.
- 194H (Special Study for Honors Students) courses are for individual students with honor status, as determined by the department offering the course and who have completed 84 units.
- 199 (Special Study for Advanced Undergraduates) courses are the upper division counterparts of course 99 and involve supervised independent study and research requiring adequate background in the subject proposed for study as well as prior completion of 84 units.

Credit in courses 99, 194H and 199 is limited to a total of 5 units per term.

Autotutorial Courses are courses in which students instruct themselves at their own pace. These courses can be identified by the letters AT at the end of their course numbers, e.g., 13AT, 141AT.

Virtual Courses are courses in which instruction is delivered on the Internet. These courses can be identified by the letter V at the end of their course numbers, e.g., 10V, 162V.

Research Conference Courses are courses in which advanced undergraduate students may participate in critical discussions of staff research activities. These one-unit courses are numbered 190C and are graded on a Passed/Not Passed basis.

GRADUATE COURSES

Courses numbered 200-299 are open to graduate students and to undergraduates who have completed 18 units of upper division work basic to the subject matter of the course. However, admission is subject to the approval of the instructor in charge of the course. Grading in 290C courses and most variable-unit 299 or 299D courses is Satisfactory/Unsatisfactory. Check the course description for grading information.

PROFESSIONAL COURSES FOR TEACHERS AND NURSE PRACTITIONERS

Courses numbered 300-399 are teacher-training courses in the School of Education and in other departments and are especially intended for teachers or prospective teachers. Courses designed to provide instruction to teaching assistants are included. Courses for certification of family nurse practitioners and physician assistants are also included. These courses are open only to students enrolled in those programs.

OTHER PROFESSIONAL COURSES

Courses numbered 400–499 are professional training courses. Graduate students should consult their faculty adviser or contact the Graduate Studies Office before registering in 400 series courses to determine if graduate credit may be awarded for the course in question.

PREREQUISITES

Prerequisites for courses should be noted carefully; the responsibility for meeting these requirements rests on the student. If you can demonstrate that your preparation is equivalent to that specified by the prerequisites, the instructor may waive these requirements for you. However, the prerequisite that requires that you complete 84 units before registering in the course may not be waived. The instructor in charge of a course may request that the Registrar drop from the course any student who has enrolled without completing the published prerequisites if, in the judgment of the instructor, failure to have completed that work seriously reduces the probability that the student will successfully complete the course. An instructor who intends to exclude a student for this reason must notify the student before taking action.

COURSE DESCRIPTIONS

Below is a sample of how a course is listed in this catalog.

190. Proseminar in Nutrition (1)

Seminar—1 hour. Prerequisite: senior standing; course 111. Discussion of human nutrition problems. Each term will involve a different emphasis among experimental, clinical, and dietetic problems of community, national and international scope. May be repeated twice for credit with consent of instructor.—I, II, III. (I, II, III.) Zidenberg-Cherr

Top line is course number; title; units.

Paragraph following is course instructional format; prerequisite; course description; grading, if other than letter grading; quarter offered 2012–13; quarter offered 2013–14 (in parentheses); instructor (if specified).

Quarters offered is the quarter in which a course is intended to be given is shown as follows:

- I. Fall Quarter (September to December) or Fall Semester (August to December), School of Law
- II. Winter Quarter (January to March) or Spring Semester (January to May), School of Law
- III. Spring Quarter (April to June)
- IV. Summer Quarter (July to September)

The quarter a course is offered is subject to change. For more information, consult the department.

Alternate Year Designation

Some course descriptions will include the phrase "Offered in alternate years." If the course will be offered in the 2012–13 academic year, the quarter designation immediately follows the description. If the course will be offered in the 2013–14 academic year, the quarter designation is inside parentheses.

Multi-Quarter Courses

A series of course numbers followed by two or three letters (for example, Physics 110A-110B-110C) is continued through three successive quarters, ordinarily from September to June. The first quarter course listed this way is a prerequisite to the second and the second is prerequisite to the third. On the other hand, where A and B portions of a course are listed separately (for example, Economics 160A and 160B), the A course is not a prerequisite to B, unless it is specifically mentioned in the list of prerequisites.

Expanded Course Descriptions

Because of space limitations, you may find that the descriptions in the *General Catalog* do not include all the information you would like about a course. The faculty has responded to this need by writing the "Expanded Course Descriptions," giving more detailed explanations about each course offering. These descriptions are available each quarter to assist students in selecting their courses. They contain such information as texts used, preparation required of students, basis for grading, course format, special assignments (papers, field trips, etc.) and a topical outline of the material to be covered.

Copies of the "Expanded Course Descriptions" are available for on-campus use at the College dean's offices, advisers' offices, advising centers, and departmental offices.

The course offerings and instructors listed in this catalog are subject to change without notice. For the most current offerings and instructors, refer to the *General Catalog Supplement* at http://registrar.ucdavis.edu/UCDWebCatalog.

African American and African Studies

(College of Letters and Science) Halifu Osumare, Ph.D., Director

Program Office. 2201 Hart Hall (530) 752-1548; http://aas.ucdavis.edu

Committee in Charge

Christine Acham, Ph.D. (African American and African Studies) Wale Adebanwi, Ph.D.

(African American and African Studies) Moradewun Adejunmobi, Ph.D.

(African American and African Studies) Milmon Harrison, Ph.D.

(African American and African Studies) Bruce Haynes, Ph.D. (Sociology) Amina Mama, Ph.D. (Women & Gender Studies) Bettina Ng'weno, Ph.D.

(African American and African Studies) Halifu Osumare, Ph.D.

(African American and African Studies) Patricia A. Turner, Ph.D.

(African American and African Studies)

Faculty

Christine Acham, Ph.D., Associate Professor Wale Adebanwi, Ph.D., Assistant Professor Moradewun Adejunmobi, Ph.D., Professor Milmon F. Harrison, Ph.D., Associate Professor Bettina Ng'weno, Ph.D., Associate Professor Halifu Osumare, Ph.D., Associate Professor Patricia A. Turner, Ph.D., Professor

Emeriti Faculty

John Stewart, Ph.D., Professor Emeritus

Affiliated Faculty

Laila Kiburi, Ph.D., Lecturer Elizabeth Mukiibi, Ph.D., Lecturer Andrea Smith-Moore, Ph.D. Lecturer

The Major Program

African American and African Studies is a field of study in the humanities, arts, and social sciences that provides students with a multi-disciplinary learning experience. In addition to courses offered within African American and African Studies, students have the option of taking selected courses in other programs and departments that complement courses offered within African American and African Studies. Majors and minors are also encouraged to take advantage of internship opportunities when they are made available.

The Program. The purpose of this program is to give students a sense of the individual characteristics and common concerns of Black communities in Africa, the United States, and in the wider Diaspora. The African American emphasis includes courses on history, culture, and the impact of developments in politics and the economy on the social organization of Black people in the United States. The African Diaspora emphasis enables students to study the way Black communities outside Africa and the United States have dealt with questions of race and ethnicity. It also considers how they have defined their identity in the political arena as well as by using religion, theater and dance, literature and film. The African emphasis allows students to focus on Africa's recent history, social issues, and contempo-

Career Alternatives. Students completing the African American and African Studies major are well prepared for graduate study in psychology, education, sociology, human development, history, etc. Majors in African American and African Studies can also pursue professional training in fields such as pharmacy, medicine, or law. Graduates with this major have also pursued employment opportunities in the federal and state government, in international development agencies, in human service units, in

county social service programs, and counseling services. African American and African Studies is also an appropriate background for work in community organizations like the Urban League, NAACP, Urban Affairs, and the Office of Economic Opportunity, and for teaching at all levels.

A.B. Major Requirements:

The major program must be developed in consultation with the African American and African Studies Staff Adviser, and approved by the program's Faculty Adviser.

Preparatory Subject Matter.....28 One course from African American and One course from Anthropology 2; Economics 1A, 1B; Geography 2; Sociology 1; Political Science 1, 2; Psychology 1..... One course from Chicana/o Studies 10; Native American Studies 1, 10; American Studies 10; Asian American Studies 1, 2 Two courses from History 15, 17A, Four units from African American and African

Art 41A, 41B, Music 28, 105, 106...... 4 Depth Subject Matter36

Studies 16, 51, 54, 154, 155A, Dramatic

One course from African American and African Studies 150A, 150B, 151, 152, 155A, 156, 157, 160, 170, 171, 175A, 175B, 181, 185..... One course from African American and African Studies 111, 123, 130, 133, 141, 145A, 156, 162, 163, 165, 172... A coordinated program of upper division courses, selected and approved in consultation with the major adviser and chosen to reflect the student's major emphasis

Possible areas of emphasis include the following: Creative arts in the black community worldwide, social and political trends in the global black community, African American society and culture, Africa, African Diasporas. These areas of emphasis are offered as guidelines for students in the major. They are not the only areas of emphasis that students may choose for the major.

Related Upper Division Courses

The following courses are offered by faculty members in other disciplines and focus on African American studies, African diaspora studies, or African

American Studies 156; Anthropology 104N, 139AN, 140A, 140B; Art History 150; Community and Regional Development 151, 151L, 152, 153, 172; Comparative Literature 154, 165; English 167, 178, 179, 181A, 181B; History 102 (O), 115A, 115B, 115C, 115D, 116, 177A, 177B, 178A, 178B; Political Science 134, 149, 176; Sociology 128, 129, 130, 134, 137, 143A, 145A, 145B, 130; Dramatic Art 155A; Women's Studies 160, 178C, 180, 182

Total Units for the Major64 Major Adviser. Contact Program office.

Minor Program Requirements: UNITS

African American and African Studies ... 24

Select one course from African American and African Studies 10, 12, 15, 17, or 80 4 Select any five upper division courses offered in African American and African Studies, but not including African American and African

Note: Although a course may be listed more than once, such a course may satisfy only one require-

American History and Institutions. This University requirement can be satisfied by completion of African American Studies 10, 100; see also under University Requirements, on page 96.

Courses in African American and African Studies (AAS)

Lower Division Courses

10. African-American Culture and Society

Lecture - 3 hours; discussion - 1 hour. Critical examination of the historical, political, social, and economic factors that have affected the development and status of African-American people in contemporary society. GE credit: Div | ACGH, DD, SS, WÉ. – I. (I.) Acham, Harrison

12. Introduction to African Studies (4)

Lecture/discussion-4 hours. Introduction to African Studies which will focus on the various disciplinary perspectives through which African society and culture are generally studied. A survey of methods, resources and conceptual tools for the study of Africa. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.—II. (II.) Adebanwi, Adejunmobi

15. Introduction to African American **Humanities (4)**

Lecture - 3 hours; discussion - 1 hour. Introduction to the humanist tradition developed by writers, philosophers, and artists of African descent in the West. Attention also given to African sources, as well as European, Caribbean, Latin-American, and North American variations on this tradition. Class size limited to 165 students. GE credit: Wrt | ACGH, AH, DD.-II. (II.) Harrison, Osumare

16. Verbal and Performance Arts in Africa

Lecture/discussion-4 hours. African verbal arts; oral texts from different African cultures. Types of critical response to oral texts, role of oral artists, context and esthetics of oral performance in Africa. GE credit: ArtHum, Div, Wrt | AH, VL, WC.-II. (II.) Adejunmobi

17. Women in African Societies (4)

Lecture/discussion-4 hours. Gender relations in traditional and contemporary African society. Involvement of African women in politics, religion, the economy, the arts. African responses to feminist theory. Images of women in African literature. GE credit: SocSci, Div, Wrt | SS, WC, WE.-I. (I.) Ade-

18. Introduction to Caribbean Studies (4)

Lecture - 3 hours; discussion - 1 hour. Introduction to the contemporary culture, peoples, politics, and societies of the Caribbean. Topics include movements of people, goods and ideas across the Atlantic world and creative productions within the Caribbean. GE credit: AH or SS, WC.-I. (I.) Ng'weno

50. Black Popular Culture (4)

Lecture—3 hours; discussion—1 hour. Survey of the African American images in popular culture (film, television, comedy, sports and music). GE credit: AH or SS, WC.—III. (III.) Acham

51. History of Afro American Dance (4)

Lecture-4 hours. Evolution of African-American dance, tracing its history and development from West and Central Africa to the United States. Investigates the social and cultural relevance of African American dance and its artistic merits through contributions from its choreographers and performers. GE credit: AH, DD, VL.—III. (III.) Osumare

52. African Traditional Religion (4)

Lecture - 2 hours; discussion - 2 hours. Introduction to traditional religions of the sub-Saharan African peoples: emphasis on myths, rituals and symbols in West, East, Central and South African indigenous religions. Examines themes: sacred kingship, divination system, women, prophecy, conversion and adaptation to Islam and Christianity. GE credit: ArtHum, Div, Wrt | AH, WC.-II. (II.)

80. Introduction to Black Politics (4)

Lecture - 4 hours. Introduction to the analysis of Afro-American politics, using conceptual frameworks from political science and other social sciences. GE credit: SocSci, Div, Wrt.-III. (III.) Harrison

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

100. Survey of Ethnicity in the U.S. (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: upper division standing or consent of instructor. Limited enrollment. Sociological and historical analysis of the experience, culture, and relations of and between groups considered racial and/or ethnic minorities in the United States. GE credit: ACGH, AH, DD.-II. (II.) Harrison, Osumare

101. Introduction to Research in the Afro-American Community (4)

Lecture - 4 hours. Prerequisite: course 10 or consent of instructor. Introductory survey of Afro-American Studies methods and techniques; problems and methodology in Afro-American Studies. — III. (III.) Harrison

107A. African Descent Communities and Culture in the Caribbean and Latin America

Lecture/discussion-4 hours. Prerequisite: uppe division standing. Origin and development of African descent communities and cultures in the Caribbean, and Latin America. The similarities and differences among African descent communities and cultures in terms of religious practices, music, and national identity. GE credit: ArtHum, Div, Wrt | WC.-I. (I.) Ng'weno

107B. African Descent Communities and Culture in North America (4)

Lecture - 2 hours; discussion - 1 hour; term paper. Prerequisite: upper division standing. Origin and development of African descent communities and culture in the U.S.A., Canada, and Mexico from the African slave trade to contemporary urban society. Offered in alternate years. GE credit: ArtHum, Div, Wrt. — (I.)

107C. African Descent Communities and Culture in Europe and Asia (4)

Lecture/discussion-4 hours. Prerequisite: upper division standing. The study of the origin and development of African Descent communities and cultures in Europe and Asia. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH or SS, WC.-II. (II.) Ng'weno

110. West African Social Organization (4)

Lecture—4 hours. Ecology, population, social and political organization, and culture of West Africa in the precolonial, colonial, and post-colonial periods. GE credit: SocSci, Div | SS, WC.-I. (I.) Adebanwi, Adejunmobi

111. Cultural Politics in Contemporary Africa (4)

Lecture/discussion-4 hours. Prerequisite: upper division standing or course 12. Themes and style of new cultural forms in Africa as displayed in art, music, film and writing, especially in regard to blending of indigenous and foreign influences. Social and political forces shaping contemporary cultural expression. Offered in alternate years. GE credit: Div, Wrt | AH or SS, WC. - (II.) Adebanwi, Adejunmobi

123. Black Female Experience in Contemporary Society (4)

Lecture-4 hours. Prerequisite: upper division standing or consent of instructor. Black female social, intellectual, and psychological development. Black women's contributions in history, literature, and social science; life experiences of Black women and

philosophical underpinnings of the feminist movement. Offered in alternate years. GE credit: ArtHum, Div | ACGH, DD, SS. - III. (III.) Acham

130. Education in the African-American Community (4)

Lecture - 2 hours; discussion - 1 hour; fieldwork - 3 hours. Prerequisite: course 10 or course 100, completion of the subject A requirement. Examination of the history of the education of African Americans in the United States. Examination and critique of contemporary theories concerning the schooling of African Americans. Offered irregularly. (Former course 140.) GE credit: DD, SS.—I. (I.) Turner

133. The Black Family in America (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: upper division standing or consent of instructor. Analysis of social science research to examine relationship between black (African-descent) family structures, patterns of functioning, and political economic, and social conditions in the U.S. Offered in alternate years. GE credit: SocSci, Div | ACGH, DD, SS.-III, IV. (III, IV.) Harrison

141. Psychology of the African American Experience (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: course 10 or consent of instructor. Introduction to the psychological issues faced by African Americans. Analysis of issues from European/Western and Afrocentric frame of reference. Emphasis on Optimal Theory, a psychological theory based on an Afrocentric world view.—III. (III.) Haggins

145A. Black Social and Political Thought (4)

Lecture-4 hours. Prerequisite: course 10 or 80, or consent of instructor. Exploration and analysis of Black social and political thought in the Americas. Offered in alternate years. GE credit: SocSci, Div | SS. - (III.) Harrison, Osumare

145B. Black Intellectuals (4)

Lecture - 4 hours. Prerequisite: course 10, 80, 145A, or consent of instructor. Exposition and critical analysis of selected theoretical writings of Black intellectuals, and especially political and social thinkers, in the Americas. Offered in alternate years. GE credit: SocSci, Div | DD, SS, WE. - (III.) Harrison, Ng'weno, Osumare

150A. Afro-American Visual Arts Tradition: A Historical and Cultural Study (4)

Lecture-4 hours. Prerequisite: upper division standing. Afro-American visual arts tradition, folk and formal, in historical and cultural context, from 1600 through Reconstruction. GE credit: ArtHum, Div.-I.

150B. Afro-American Visual Arts Tradition: A Historical and Cultural Study (4)

Lecture - 4 hours. Prerequisite: upper division standing. Afro-American visual arts tradition, folk and formal, in historical and cultural context, from Reconstruction to the present. GE credit: ArtHum, Div. - II. (II.)

151. Afro-American Vernacular Music and Verbal Arts (4)

Lecture-2 hours; discussion-2 hours. Socio-political dimensions of Afro-American musical forms like spiritual, work song, minstrelsy blues, rhythm and blues, jazz, gospel, soul and contemporary pop, and related verbal arts like preaching, toasting, rap ping.-III. (III.) Turner

152. Major Voices in Black World Literature

Lecture - 2 hours; discussion - 1 hour; term paper. Prerequisite: upper division standing, completion of course 10, or course 12, or course 18. Recurrence of cultural tropes in the works of major black world authors and formation of an African-oriented canon. Principal activities include critical reading and discovery of literature as a cultural resource. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, DD, WC, WE.—(II.) Adejunmobi

153. African Literature (4)

Lecture - 3 hours; term paper. Prerequisite: completion of Entry Level Writing Requirement (ELWR). Colonial and post-colonial sub-Saharan African literature and the African oral traditions from which it emerged. Genres and themes of African literature from the nineteenth century to the present. Offered in alternate years. (Same course as Comparative Literature 154.) GE credit: ArtHum, Div, Wrt | AH, WC, WE. - III. (III.) Adejunmobi

155A. African-American Dance and Culture in the United States, Brazil and the Caribbean (4)

Lecture/discussion—4 hours. A comparative study of the African American dance forms in the U.S.A. Brazil, Haiti, Cuba, Jamaica, Barbados, and Trinidad. Examination of ritual, folk, and popular dance forms and the socio/historical factors that have influenced these forms. (Same course as Dramatic Art 155A.)—II. (II.) Osumare

156. Language and Identity in Africa and the African Diaspora (4)

Lecture/discussion-4 hours. Prerequisite: upper division standing or course 12. Relationship between language and identity in literature from Africa and the African Diaspora. Use of pidgins, Creoles, translation from African languages and impact of language policies. Offered irregularly. GE credit: Div | AH, DD, WC.-III. (III.) Adejunmobi

157. Literature and Society in South Africa (4)

Lecture/discussion-4 hours. Prerequisite: upper division standing. Political and social developments in 20th-century South Africa as illustrated by a range of South African writing. Response of different writers to race relations, impact of government policy on types and context of writing. Offered in alternate years. GE credit: Div, Wrt | AH, WC, WE.—(II.) Adejunmobi

160. African-American Folklore (4)

Lecture-2 hours; discussion-1 hour; fieldwork-3 hours. Prerequisite: course 10. Theory and history of African American folklore and folklife, including music, material culture, oral narrative, proverbs, and humor. African and Caribbean cultural influences on New World folk genres will be probed. GE credit: ArtHum, Div. - III. (III.) Turner

162. Islam in Africa and the Americas (4)

Lecture/discussion-4 hours. Prerequisite: Religious Studies 60 or course 12 or course 110. Comparative and historical survey of Islam in the regional and cultural settings of Sub-Saharan Africa and the Americas. Offered irregularly. GE credit: ArtHum, Dlv, Wrt | AH, WC, WE.—III. (III.)

163. African Religions in the Americas (4)

Lecture - 2 hours; discussion - 2 hours. Prerequisite: course 10: course 15 or consent of instructor. Comparative study of African religious heritage in the Americas: Jamaica, Trinidad, Cuba, U.S.A., Haiti, and Brazil. Emphasis on the origins and development of Candomble, Santeria, Shango, Vodun, and Rastafarianism in the New World. (Former course 153.) GE credit: ArtHum, Div, Wrt | AH, WC, WE. - III. (III.)

165. Afro-Christianity and the Black Church

Lecture — 3 hours; discussion — 1 hour. Prerequisite: upper division standing; course 10, 15 or consent of instructor. Examination of the historical role of Christian belief and practice as well as the institution of the Black Church in the experience of African Americans, from slavery to the present. Offered in alternate years. GE credit-SocSci, Div | ACGH, DD, SS. — (II.) Harrison

168. Black Documentary: History and Practice (4)

Lecture—3 hours; laboratory—5 hours. Prerequisite: Film Studies 1, course 170; course 50 recommended; consent of instructor. Study of Black documentary history and understanding of the use of the documentary form for political purposes. A discussion of documentary theory. Each student, singly or in a team, will create and carefully edit a documentary project. GE credit: ArtHum, Div | AH, DD, VL, WC.—IV. (IV.) Acham

169. History of African-American Television

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 50 recommended. History of the representation of African Americans in television; how the representations reflect social and political forces in American society. Role of African Americans in actively shaping their representation. GE credit: ArtHum, Div | AH, DD, VL, WE.-II. Acham

170. African-American Film and Video (4)

Lecture — 3 hours; film viewing — 3 hours. Prerequisite: Film Studies 1, course 50 recommended. Comparative approach in the study of fictional film and video dealing with the African American experience drawing on film and cultural studies to examine and discuss selected works. GE credit: ArtHum, Div, Wrt | AH, DD, VL, WE.-II. (II.) Acham

171. Black African and Black European Film and Video (4)

Lecture/discussion—3 hours; film viewing—3 hours; term paper. Prerequisite: one of course 15, 50, or English 160 or 162, or consent of instructor. Comparative approach in the study of dramatic films and videos that treat black life in África and Europe. Critical attention will focus on the imaginative construction of ethnicity, race, nationality, gender, and sexuality in each particular work. Offered in alternate years. GE credit: ArtHum, Dlv | AH, VL, WC.-(II.)

172. Diaspora and New Black Identities (4)

Lecture/discussion—3 hours; term paper. Critical analysis about what it means to be Black/African American in the United States today. Topics include old and new diasporas, immigration, national origin, language, religion, class, education, politics, identity and cultural heritage. GE credit: Div, Wrt | ACGH, DD, SS, WE.-II. (II.) Ng'weno

175A. Black Documentary: History and Theory (4)

Lecture—3 hours; film viewing—3 hours. Prerequisite: Film Studies 1, course 170; course 50 recommended. Black documentary history and documentary theory. Use of black documentary for political purposes. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, DD, VL, WE.—(III.) Acham

175B. Black Documentary Practicum (4)

Lecture — 2 hours; laboratory — 6 hours. Prerequisite: course 175A and consent of instructor. Creation of documentary projects, with students working in production crews. Offered in alternate years. GE credit: AH, DD.-II, III. Acham

176. The Politics of Resources (4)

Lecture/discussion-4 hours. Prerequisite: course 12 or 110. Limited enrollment. Examination of the ways in which the processes of the extraction, purification and use of natural resources and the complex regimes of valuation and commodification they (re)produce lead to cooperation and conflict in contemporary Africa and beyond. GE credit: SS, WC. - III. (III.) Adebanwi

177. Politics of Life in Africa (4)

Lecture/discussion-4 hours. Existing (in)capacities in the structures of state and society in Africa for people to live well. Topics include institutions and practices that define state and civil society encounters in Africa; democracy, ethnicity, economic crisis, religion, citizenship, etc. Offered in alternate years. GE credit: AH or SS, WC.—(II.) Adebanwi

180. Race and Ethnicity in Latin America (4)

Lecture/discussion-4 hours. The social and political effects of racial and ethnic categorization in Latin America, including issues of economic production, citizenship, national belonging, and access to resources. Emphasis is on peoples of African, Indigenous, and Asian descent. GE credit: ArtHum or Soc-Sci, Div | SS, WC, WE.-II. (II.) Ng'weno

181. Hip Hop in Urban America (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: upper division standing or consent of the instructor. Must have Junior or Senior level standing. History, aesthetics, urban context, and economics of hip-hop in the US, and its globalization. Hip-hop's four artistic elements-rap, deejaying, breakdance, and aerosol art-allow the examination of issues of race, ethnicity, and gender in youth culture and American society. GE credit: AH, DD, VL.-III. (III.) Osumare

185. Topics in African-American Film (4)

Lecture - 3 hours; film viewing - 3 hours. Prerequisite: course 170; course 50 recommended. Intensive study of special topics in African American film. May be repeated one time for credit. GE credit: ArtHum, Div, Wrt | AH, DD, VL, WE.—II. (II.) Acham

190. Topics in African and African-Diaspora Studies (4)

Lecture/discussion-3 hours; term paper. Prerequisite: upper division standing in African American and African Studies or consent of instructor. Intensive treatment of a special topic or problem in African or African Diaspora Studies. May be repeated one time for credit when topic differs. - III. (III.)

192. Internship in African-American and African Studies (1-8)

Internship - 3-24 hours. Prerequisite: upper division standing, completion of 12 units of upper division study in African American and African Studies courses and consent of instructor. Enrollment limited to African American and African Studies majors and minors. Supervised internship in community, government, or private institutions, in all subject areas offered by the African American and African Studies Program. May be repeated for credit for a total of 12 units. (P/NP grading only.)

197T. Tutoring in Afro-American Studies (1-5)

Tutoring — 1-5 hours. Prerequisite: consent of major committee; upper division standing with major in Afro-American Studies. Leading of small voluntary discussion groups affiliated with one of the department's regular courses. May be repeated for credit for a total of six units. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

201. Critical Foundations in African American Studies (4)

Seminar—3 hours. Prerequisite: graduate standing. Introduction to history of African American Studies. Topics include: research agendas, policy implications, debates, crises, and institutional frameworks. Offered in alternate years. — (I.) Harrison, Osumare

202. Critical Foundations in African Studies (4)

Seminar - 3 hours; term paper. Prerequisite: graduate standing. Introduces students to the history and current organization of African Studies as area of intellectual investigation. Offers students an opportunity to review research agenda and policy implications, debates, crises, and institutional frameworks surrounding the production of knowledge about Africa. Offered in alternate years.—III. Adejunmobi

203. Critical Foundations in African Diaspora Studies (4)

 $\begin{array}{l} {\sf Seminar-3\ hours;\ term\ paper.\ Integrative\ conceptual\ framework\ includes\ History,\ Geography,\ Politi-} \end{array}$ cal Economy, Culture, Aesthetics as tools to investigate the African Diaspora. Students engage African Diaspora theories within their research projects understanding issues developing from the movement of Africans to the rest of the world. — III. (II.) Ng'weno, Osumare

204. Methodologies in African American and African Studies (4)

Seminar - 3 hours; term paper. The relationship between theory and methodology, with emphasis on identifying relevant methodological approaches and constructing theoretically informed research projects for studying the experience of people of African descent whether on the African continent or in the rest of the world.—I. Harrison, Ngweno

298A. Directed Group Study in African American and African Diaspora Studies

Prerequisite: graduate standing. May be repeated for credit up to three times. (S/U grading only.)

298B. Directed Group Study in African Studies (1-5)

May be repeated for credit up to three times. (S/U grading only.)

299. Directed Group Study in African Studies (1-12)

(S/U grading only.)

Agricultural and **Environmental** Chemistry (A Graduate Group)

Susan E. Ebeler, Ph.D., Chairperson of the Group Group Office. 4117 Meyer Hall (530) 752-1415; http://agchem.ucdavis.edu/

Faculty

Douglas O. Adams, Ph.D., Associate Professor (Viticulture and Enology)

Cort Anastasio, Ph.D., Professor (Land, Air and Water Resources)

Charles Bamforth, Ph.D., Professor (Food Science and Technology) Anheuser-Busch Endowed Professor

Deborah Bennett, Ph.D., Assistant Adjunct Professor (Public Health Sciences, School of Medicine)

Linda F. Bisson, Ph.D., Professor (Viticulture and Enology) Roger B. Boulton, Ph.D., Professor

(Viticulture and Enology)

William H. Casey, Ph.D., Professor (Chemistry)

Victor P. Claassen, Ph.D., Assistant Researcher (Land, Air and Water Resources)

Andrew J. Clifford, Ph.D., Professor (Nutrition) Anthony Cornel, Ph.D., Lecturer (Entomology) Carroll E. Cross, M.D., Professor (Internal Medicine)

Randy Dahlgren, Ph.D., Professor (Land, Air and Water Resources) Academic Senate Distinguished Teaching Award

Susan E. Ebeler, Ph.D., Professor (Viticulture and Enology)

lan C. Faloona, Ph.D., Assistant Professor (Land, Air and Water Resources)

Oliver Fiehn, Ph.D., Associate Professor (Molecular and Cell Biology)

Edwin N. Frankel, Ph.D., Adjunct Professor (Food Science and Technology)

Annaliese K. Franz, Ph.D., Assistant Professor (Chemistry)

Nilesh W. Gaikwad, Ph.D., Assistant Professor (Nutrition)

J. Bruce German, Ph.D., Professor (Food Science and Technology)

Peter G. Green, Ph.D., Lecturer (Civil and Environmental Engineering)

Bruce D. Hammock, Ph.D., Professor (Entomology) Academic Senate Distinguished Teaching Award

Matt Hengel, Ph.D., Assistant Adjunct Professor (Environmental Toxicology)

Peter Hernes, Ph.D., Assistant Professor (Land Air Water Resources)

Hildegarde Heymann, Ph.D., Professor (Viticulture and Enology)

Dirk M. Holstege, Ph.D., Assistant Adjunct Professor (Environmental Toxicology)
William R. Horwath, Ph.D., Professor

(Land, Air and Water Resources)

Krassimira R. Hristova, Ph.D., Research Professor (Land, Air and Water Resources) You-Lo Hsieh, Ph.D., Professor (Textiles and Clothing) Norman Y. Kado, Ph.D., Associate Adjunct Professor (Environmental Toxicology) Peter B. Kelly, Ph.D., Professor (Chemistry) Annie J. King, Ph.D., Professor (Animal Science) Michael J. Kleeman, Ph.D., Associate Professor (Civil and Environmental Engineering) John Knezovich, Ph.D., Adjunct Professor (Environmental Toxicology) Walter S. Leal, Ph.D., Professor (Entomology)
Carlito B. Lebrilla, Ph.D., Professor (Chemistry) Carlio B. Leoning, Fri.D., Professor Fumio Matsumura, Ph.D., Professor (Environmental Toxicology) Michael J. McCarthy, Ph.D., Professor (Food Science and Technology) Alyson E. Mitchell, Ph.D., Associate Professor (Food Science and Technology) Frank M. Mitloehner, Ph.D., Associate Professor (Animal Science) Krishnan P. Nambiar, Associate Professor (Chemistry) Distinguished Graduate Mentoring

Alexandra Navrotsky, Ph.D., Interdis Professor (Chemical Engineering and Material Science) John Newman, Ph.D., Adjunct Professor (Nutrition) Sharman O'Neill, Ph.D., Professor (Plant Biology) Sanjai J. Parikh, Ph.D., Assistant Professor (Land, Air and Water Resources) James R. Sanborn, Ph.D., Researcher (Entomology/Pesticide Regulation) Neil E. Schore, Ph.D., Professor (Chemistry)

Kate Scow, Ph.D., Professor (Land, Air and Water Resources) James N. Seiber, Ph.D., Professor (Food Science and Technology) Takayuki Shibamoto, Ph.D., Professor (Environmental Toxicology)
Charles F. Shoemaker, Ph.D., Professor (Food Science and Technology)

Gary M. Smith, Ph.D., Professor (Food Science and Technology) Randal J. Southard, Ph.D., Professor (Land, Air and Water Resources)

Gang Sun, Ph.D., Professor (Textiles and Clothing)

Swee Teh, Ph.D., Associate Researcher (Anatomy/Physiology/Cell Biology: VM) Ronald S. Tjeerdema, Ph.D., Professor (Environmental Toxicology)

Dean J. Tantillo, Ph.D., Assistant Professor (Chemistry) Academic Senate Distinguished Teaching Award

Jean VanderGheynst, Ph.D., Associate Professor (Biological and Agricultural Engineering) Andrew L. Waterhouse, Ph.D., Professor (Viticulture and Enology)

Matthew J. Wood, Ph.D., Assistant Professor (Environmental Toxicology)
Thomas M. Young, Ph.D., Professor

(Civil and Environmental Engineering) Qi Zhang, Ph.D., Assistant Professor (Environmental Toxicology)

Emeriti Faculty

Donald G. Crosby, Ph.D., Professor Emeritus (Environmental Toxicology) David S. Reid, Ph.D., Professor Emeritus (Food Science and Technology) John R. Whitaker, Ph.D., Professor Emeritus (Food Science and Technology) Robert J. Zasoski, Ph.D., Professor Emeritus (Land, Air and Water Resources)

Affiliated Faculty

Lowell L. Ashbaugh, Ph.D., Associate Researcher (Crocker Nuclear Lab) Diane M. Barrett, Ph.D., Specialist (Food Science and Technology) Thomas Harter, Ph.D., Specialist in Cooperative Extension (Land, Air and Water Resources)
Warren H. White, Ph.D., Researcher (Crocker Nuclear Lab)

Graduate Study. The Graduate Group in Agricultural and Environmental Chemistry offers programs of study and research leading to the M.S. and Ph.D. degrees. Study relates to the chemical and biochemical aspects of foods, wine, fibers/polymers, pesticides, and environmental pollution. Detailed information regarding graduate study may be obtained at http://agchem.ucdavis.edu/.

Graduate Advisers. D.O. Adams (Viticulture and Enology), Y.-L. Hsieh (Textiles and Clothing), A.E. Mitchell (Food Science and Technology), T. Shibamoto Matt Hengel (Environmental Toxicology), Sanjai Parikh (Land, Air and Water Resources), T. Young (Civil and Environmental Engineering)

Courses in Agricultural and **Environmental Chemistry (AGC)** Graduate Courses

290. Seminar (1)

Seminar - 1 hour. Selected topics in agricultural and environmental chemistry, presented by students. (S/U grading only.)—I, II, III. (I, II, III.)

298. Group Study (1-5)

Prerequisite: consent of instructor. The chemistry and biochemistry of foods, nutritional chemicals, pesticides, and other special topics as they apply to agricultural and environmental chemistry.

299. Research (1-12)

Arrangements should be made well in advance with a faculty member of the Group in Agricultural and Environmental Chemistry. (S/U grading only.)

Agricultural Computing and **Information Systems**

See Applied Computing and Information Systems, on page 162.

Agricultural and **Environmental** Education

(College of Agricultural and Environmental Sciences and School of Education)

The Major Program

The major serves those interested in teaching agricultural and environmental sciences in schools or in non-formal settings such as nature preserves, environmental camps, or other venues. This major prepares graduates to direct programs in the agricultural and environmental sciences as well as provides them with a skill set necessary to work within social science careers related to these fields. This program of study meets state and federal requirements for entry into teacher preparation in agriculture and science, as well as requirements in Career Technical Education (CTE).

The Program

The program is designed to provide students with a broad background in various agricultural and environmental science disciplines, e.g., animal science, environmental science, plant and soil science, agricultural engineering, business management, agro ecology, and horticulture. The program also focuses on the social sciences related to human resource development. The program provides students with practical experiences through fieldwork, school, and non-formal learning sites placements, or placement in sites related to a student's focus of study. Through this major students will have the opportunity to

explore and then incorporate agricultural and environmental issues into educational and development

Career Alternatives

The need for scientists, technicians and educators to assist in domestic and international agricultural and environmental programs has created a continuing demand for qualified instructors and supervisory personal. This major also provides general preparation which is appropriate for work in banking, sales and service, rural recreation and related agricultural and environmental sectors. Students interested in obtaining breadth in both agricultural and environmental sciences will appreciate the scope and flexibility the

B.S. Major Requirements (AEE):

b.5. Major Requirements (AEE):	
	Units
Government/U.S. Constitution	4
History 17A or Political Science 14	
Preparatory Subject Matter	50
A minimum of eight (8) units is required in each of Animal Science, Agricultural Business and Enomics, Applied Biological Systems Technology Environmental Horticulture, Environmental Scienand Natural Resources; and Plant and Soil Science	co- /, nce
Animal Science 1, 2, 21, 41	
Science/Math Preparatory42	2-44
Biological Sciences 2A & 2B	
Depth Subject Matter	21
Agricultural Education 100	

Focused Depth Subject Matter 16

The specialized focus will consist of a minimum of 16 units in one of the six areas listed below.

Agricultural Business and Economics. Agricultural and Resource Economics 100A, 100B, 120, 130, 135, 138, 140, 150, 175,

Animal Science. Select upper division units from any Animal Genetics, Animal Science, Avian Sciences course or Animal Biology 102; Food Science and Technology 109; Nature and Culture 140; Neurobiology, Physiology, and Behavior 101, 121; Nutrition 115, 122, 123

Applied Biological Systems Technology Applied Biological Systems Technology 121, 142, 161, 165, 175, 180, 182 Environmental Horticulture. Environmental Horticulture 102, 105, 120, 129, 125, 133, 160; Nature and Culture 120, Plant Sciences 150

Environmental Science and Natural Resources. Environmental and Resource Sciences 121, 131; Environmental Science and Policy 100, 101, 110, 116, 123, 151, 161, 170, EVE 101, 115, 134; Plant Sciences 101, 105, 110A; Wildlife, Fish and Conservation Biology 110, 111, 120,

Plant and Soil Science. Plant Biology 102, 105, 116, 117, 160, 172, 176; Plant Sciences 150; Soil Science 100, 102, 118; Viticulture and Enology 101A, 101C

Restricted Electives...... 16

At least four additional upper division courses (minimum 16 units; duplicate from Depth specialization courses not counted) selected with approval of an advisor to supplement or expand depth subject matter courses chosen from Animal Biology, Animal Genetics, Animal Science, Agricultural and Resource Economics, Avian Sciences, Environmental Horticulture, Environmental and Resource Sciences, Environmental Science and Policy, Food Science and Technology, International Agricultural Development, Nature and Culture, Neurobiology, Physiology, and Behavior, Nutrition, Plant Sciences, Plant Biology, or Viticulture and Enology.

Total Units For Major149-151

Master Adviser. Cary J. Trexler, Associate Profes-

Major Advisers. Heidi Ballard, Assistant Professor of Environmental Education; Lynn Martindale, Lecturer/Supervisor School of Education; Cary J. Trexler. Associate Professor

Undergraduate Advising Center for the major (including peer advising) is located in the Animal Science Advising Center in 1202 Meyer Hall (530) 754-7915; http://asac.ucdavis.edu/.

Courses in Agricultural Education (AED)

Questions pertaining to the following courses should be directed to the instructor or Lynn Martindale (530) 754-6655.

Lower Division Courses 92. Internship (1-12)

Internship - 3-36 hours. Prerequisite: lower division standing; consent of instructor. Supervised internship off and on campus in areas of agricultural education. (P/NP grading only.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading

99. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading

Upper Division Courses 100. Concepts in Agricultural and **Environmental Education (3)**

Lecture — 2 hours; laboratory — 3 hours. Prerequisite: upper division standing. Philosophy and nature of formal and non-formal agricultural and environmental education programs. Emphasis on understanding the role of the teacher and observing a variety of programs. GE credit: SocSci, Wrt.—II. (II.) Martin-

160. Vocational Education (3)

Lecture—3 hours. Philosophy and organization of vocational education, with particular reference to educational principles for agriculture commerce, home economics, and industry. GE credit: SocSci,

171. Audiovisual Communications (2)

Lecture - 1 hour; laboratory - 3 hours. Prerequisite: upper division standing. Theory and principles of audiovisual communications. Comparison of audiovisual materials such as transparencies, slides, computer-generated graphics, and videos. Operation and use of audiovisual equipment is stressed.

172. Multimedia Productions (3)

Lecture — 2 hours; laboratory — 3 hours. Prerequisite: course 171 recommended. Design and production of educational, technical, and professional multimedia presentations. Instructional or professional presentations using a variety of media, including slides, video, transparencies, and computer-generated graphics. Offered in alternate years. GE credit: Soc-Sci, Wrt.

190. Seminar in Agricultural Education (2)

Seminar-2 hours. Discussion of selected critical issues in agricultural education. May be repeated for credit with consent of instructor. (P/NP grading only.) — II. (II.)

192. Internship (1-12)

Internship—3-36 hours. Prerequisite: upper division standing; consent of instructor. Supervised internship off and on campus in areas of agricultural education. (P/NP grading only.)

198. Directed Group Study (1-5)

(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Professional Courses

300. Directed Field Experience in Teaching

Discussion-1 hour; field experience-3 hours. Prerequisite: course 100. Experience as teaching assistant in agriculture or home economics programs in public schools. May be repeated one time for credit. (S/U grading only.)

301. Planning for Instructional Programs (3)

Lecture - 3 hours. Prerequisite: course 100; course 300 (may be taken concurrently). Major paradigms in program planning and development. Emphasis on key steps in curriculum development, including selection and organization of educational objectives, learning experiences and teaching materials and resources. — III. (III.) Trexler

302. Teaching Methods in Agricultural Education (3)

Lecture — 2 hours, laboratory — 2 hours. Prerequisite: course 100, course 300 (may be taken concurrently). Development of teaching strategies with special emphasis on the designing of learning experiences, instructional execution, and use of teaching aids in agricultural education.

306A. Field Experience with Future Farmers of America and Supervised Experience Programs (4)

Lecture/discussion-2 hours; field work-6 hours. Prerequisite: acceptance into a teacher education program; course 306B (concurrently). Develop an understanding of the Future Farmers of America and supervised occupational experience programs through planning, conducting, and evaluating actual programs.

306B. Field Experience in Teaching Agriculture (5-18)

Student teaching (corresponds with public school session). Prerequisite: acceptance into a teacher education program; course 306A (concurrently); courses 100, 300, 301, 302. Directed teaching including supervision of occupational experience programs and youth activities in secondary schools or community colleges. May be repeated for credit up to a maximum of 18 units.

323. Resource Development: Agricultural Education (3)

Lecture — 3 hours. Prerequisite: courses 306A, 306B. Selection and implementation of community resources in teaching.

390. Seminar: Issues in Agricultural Education (2)

Discussion/laboratory-4 hours. Prerequisite: acceptance into a teacher education program and courses 306A-306B. Discussion and evaluation of current issues, theories and research in agricultural education. (S/U grading only.)

Agricultural Management and Rangeland Resources

(College of Agricultural and Environmental Sciences) This major was discontinued as of Fall 2008; see Ecological Management and Restoration, on page

Faculty. See Plant Sciences, on page 467. Courses. See Plant Sciences, on page 467.

Agricultural and **Managerial Economics**

See Managerial Economics, on page

Agricultural and **Resource Economics**

(College of Agricultural and Environmental Sciences) Richard J. Sexton, Ph.D., Chair of the Department

Department Office. 2116 Social Sciences and Humanities Building (530) 752-9995

Undergraduate Student Information, 1176 Social Sciences and Humanities Building (530) 754-9536; http://www.agecon.ucdavis.edu

Graduate Student Information, 1171 Social Sciences and Humanities Building (530) 752-6185; http://www.agecon.ucdavis.edu

Faculty

Julian M. Alston, Ph.D., Professor Stephen R. Boucher, Ph.D., Associate Professor Colin A. Carter, Ph.D., Professor Michael R. Carter, Ph.D., Professor James A. Chalfant, Ph.D., Professor Y. Hossein Farzin, Ph.D., Professor Rachael E. Goodhue, Ph.D., Professor Richard D. Green, Ph.D., Professor Richard E. Howitt, Ph.D., Professor Lovell S. Jarvis, Ph.D., Professor Katrina K. Jessoe, Ph.D., Assistant Professor Douglas M. Larson, Ph.D., Professor C.-Y. Cynthia Lin, Ph.D., Assistant Professor Travis J. Lybbert, Ph.D., Associate Professor Philip L. Martin, Ph.D., Professor Pierre R. Mérel, Ph.D., Assistant Professor Quirino Paris, Ph.D., Professor Richard J. Sexton, Ph.D., Professor Aaron D. Smith, Ph.D., Associate Professor Daniel A. Sumner, Ph.D., Professor J. Edward Taylor, Ph.D., Professor James E. Wilen, Ph.D., Professor

Emeriti Faculty

Oscar R. Burt, Ph.D., Professor Emeritus Hoy F. Carman, Ph.D., Professor Emeritus Benjamin C. French, Ph.D., Professor Emeritus B. Delworth Gardner, Ph.D., Professor Emeritus Arthur M. Havenner, Ph.D., Professor Emeritus Warren E. Johnston, Ph.D., Professor Emeritus Sylvia Lane, Ph.D., Professor Emerita Elmer W. Learn, Ph.D., Professor Emeritus
Samuel H. Logan, Ph.D., Professor Emeritus
Alexander F. McCalla, Ph.D., Professor Emeritus Chester O. McCorkle, Jr., Ph.D., Professor Emeritus Refugio I. Rochin, Ph.D., Professor Emeritus Lawrence E. Shepard, Ph.D., Senior Lecturer SOE Emeritus

Stephen H. Sosnick, Ph.D., Professor Emeritus

Affiliated Faculty

Leslie J. Butler, Ph.D., Specialist in Cooperative

John H. Constantine, Ph.D., Lecturer Roberta L. Cook, Ph.D., Specialist in Cooperative

Shermain D. Hardesty, Ph.D., Specialist in Cooperative Extension

Karen Klonsky, Ph.D., Specialist in Cooperative Extension

Gerald T. Lundblad, M.B.A., Lecturer

Ralph Pavey, B.S., Lecturer Stephen A. Vosti, Ph.D., Associate Adjunct Professor Marilyn D. Whitney, Ph.D., Lecturer

Major Program and Graduate Study. See the major in Managerial Economics, on page 382; and for graduate study, see Graduate Studies, on page

Major Advisers. Contact the Department office. Related Courses. See Environmental Biology and Management 110; Environmental Science and Policy 160, 168A, 168B, 173; and courses in Econom-

Courses in Agricultural and **Resource Economics (ARE)**

Lower Division Courses

1. Economic Basis of the Agricultural Industry (4)

Lecture — 4 hours. Agriculture and man; the agricultural industry in U.S. and world economies; production and supply, marketing and demand; agricultural land, capital and labor markets; economic and social problems of agriculture in an urban and industrialized economy emphasizing California. GE credit: SocSci | ŚS.

15. Economic Basis of the Agricultural Industry (4)

Lecture-4 hours. Agriculture and man; the agricultural industry in Australia and world economies; production and supply, marketing and demand; agricultural land, capital and labor markets; economic and social problems of agriculture in an urban and industrialized economy emphasizing Australia. Taught in Australia under the supervision of a UC Davis faculty member. Not open for credit to students who have completed course 1. GE credit: SS,

15. Population, Environment and World Agriculture (4)

Lecture—3 hours; discussion—1 hour. Economic analysis of interactions among population, environment, natural resources and development of world agriculture. Introduces students to economic thinking about population growth, its causes and consequences for world food demand, and environmental and technological limits to increasing food supplies. GE credit: SocSci, Div, Wrt | SS, WC, WE.—III.

18. Business Law (4)

Lecture - 4 hours. Prerequisite: sophomore standing. General principles of business law in the areas of contracts, business organization, real property, uniform commercial code, sales, commercial paper, employment relations, and creditor-debtor against a background of the history and functioning of our present legal system. GE credit: SS.-I, II. (I, II.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. Restricted to lower division students. (P/NP grading only.) GE credit:

99. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SS.

Upper Division Courses

100A. Intermediate Microeconomics: Theory of Production and Consumption (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Economics 1A, 1B; Mathematics 16B. Theory of individual consumer and market demand; theory of

production and supply of agricultural products, with particular reference to the individual firm; pricing, output determination, and employment of resources under pure competition. (Not open for credit to students who have completed Economics 100 or the equivalent; however, Economics 100 will not serve as prerequisite to course 100B.) GE credit: QL, SS.—I, II, III. (I, II, III.)

100B. Intermediate Microeconomics: Imperfect Competition, Markets and Welfare Economics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 100A. Pricing, output determination, and employment of resources under conditions of monopoly, oligopoly, and monopolistic competition. GE credit: QL, SS.-I, II, III. (I, II, III.)

106. Quantitative Methods in Agricultural Economics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 100A, Statistics 103. Statistical methods for analyzing quantitative agricultural economics data: linear and multiple correlation and regression analysis. GE credit: QL, SS.—I, II, III. (I, II, ĬĬI.)

112. Fundamentals of Business Organization (4)

Lecture - 2 hours; discussion - 2 hours. Prerequisite: upper division standing or consent of instructor. The role of organizational design and behavior in business and public agencies. Principles of planning, decision making; individual behavior, motivation, leadership; informal groups; conflict and change in the organization. GE credit: SS.—I, III. (I, III.)

113. Fundamentals of Marketing Management (4)

Lecture—4 hours. Prerequisite: Economics 1A. For non-majors only. Nature of product marketing by the business firm. Customer-product relationships, pricing and demand; new product development and marketing strategy; promotion and advertising; product life cycles; the distribution system; manufacturing, wholesaling, retailing. Government regulation and restraints. (Not open for credit to students who have completed course 136.) GE credit: SS.

115A. Economic Development (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Economics 1A and 1B. Major issues encountered in emerging from international poverty, problems of growth and structural change, human welfare, population growth and health, labor markets and internal migration. Important issues of policy concerning international trade and industrialization. (Same course as Economics 115A.) GE credit: Div, SocSci | SS, WC.—I, III. (I, III.)

115B. Economic Development (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: Economics 1A and 1B. Macroeconomic issues of developing countries. Issues include problems in generating capital, conduct of monetary and fiscal policies, foreign aid and investment. Important issues of policy concerning international borrowing and external debt of developing countries. (Same course as Economics 115B.) GE credit: SocSci | SS, WC.-II, III. (II, III.)

118. Tax Accounting (4)

Lecture-4 hours. Prerequisite: Management 11A, 11B; course 18 recommended. Development and application of a framework to understand the tax effects of typical management decisions on both entities and their owners. Impacts that different methods of taxation have on business entities with emphasis on tax planning, using income and deduction strategies, retirement plans, and choice of business entity for tax minimization.

120. Agricultural Policy (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 100A or the equivalent. Analytical treatment of historical and current economic problems and governmental policies influencing American agriculture. Uses of economic theory to develop historical and conceptual understanding of the economics of agriculture; how public policy influences the nature and performance of American agriculture. GE credit: SocSci | ACGH, SS.-III. (III.)

120S. Agricultural Policy (4)

Lecture—4 hours. Prerequisite: course 100A or consent of instructor. Analytical treatment of historical and current economic problems and governmental policies influencing agriculture. Uses of economic theory to develop historical and conceptual understanding of the economics of agriculture; how public policy influences the nature and performance of agriculture. Taught in Australia under the supervision of a UC Davis faculty member. Not open for credit to students who have completed course 120. GE credit: SS, WC.

121. Economics of Agricultural Sustainability (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Plant Sciences 15; Community and Regional Development 20; Economics 1A; Mathematics 12 or equivalent. Application of economic concepts to agro-environmental issues relevant to agricultural sustainability. Topics include market efficiency, production externalities, government policies, agricultural trade, product differentiation, all linked to sustainability issues. Case studies include biofuels, genetically modified foods and geographically differentiated products. GE credit: SS.—III. (III.)

130. Agricultural Markets (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 100A. The nature, function, organizational structure, and operation of agricultural markets; prices, costs, and margins; market information, regulation, and controls; cooperative marketing. GE credit: SS.-II. (II.)

132. Cooperative Business Enterprises (3)

Lecture — 3 hours. Prerequisite: Economics 1A. Study of cooperative business enterprise in the United States and elsewhere; economic theories of behavior, principles of operation, finance, decision-making, and taxation. GE credit: SS.

135. Agribusiness Marketing Plan Development (2)

Lecture/discussion - 2 hours. Prerequisite: upper division standing. Fundamental components required to develop a marketing plan. Appreciation of the concept of a marketing plan, appropriate research required, including the use of library and Internet, survey and interview instruments, government documents, market analysis, business proposition, action planning, financial evaluation and monitoring. (P/ NP grading only.) GE credit: SS.

136. Managerial Marketing (4)

Lecture — 4 hours. Prerequisite: course 100A; Statistics 103. Application of economic theory and statistics in the study of marketing. Marketing measurement and forecasting, market planning, market segmentation, determination of optimal product market mix, sales and cost analysis, conduct of marketing research, marketing models and systems. GE credit: SS.-II, III. (II, III.)

138. International Commodity and Resource Markets (3)

Lecture - 3 hours. Prerequisite: course 100A, Economics 100 or 104. Basic nature and scope of international trade in agricultural commodities, agricultural inputs, and natural resources. Market dimensions and policy institutions. Case studies to illustrate import and export problems associated with different regions and commodities. GE credit: SS.-

139. Futures and Options Markets (3)

Lecture - 3 hours. Prerequisite: course 100A; Statistics 103. History, mechanics, and economic functions of futures and options markets; hedging; theory of inter-temporal price formation and behavior of futures and options prices; price forecasting; futures and options as policy tools. GE credit: SS.—I, III. (I,

140. Farm Management (5)

Lecture — 5 hours. Prerequisite: Economics 1A. Farm organization and resources; economic and techno logical principles in decision making; analytical techniques and management control; problems in organizing and managing the farm business. GE

142. Personal Finance (3)

Lecture - 3 hours. Prerequisite: Economics 1B. Management of income and expenditures by the household. Use of consumer credit, savings, and insurance by households. Principles of tax, retirement, and estate planning. GE credit: SS.—I, III. (I, III.)

143. Investments (3)

Lecture — 3 hours. Prerequisite: course 142 or consent of instructor. Survey of investment institutions, sources of investment information, and portfolio theory. Analysis of the stock, bond and real estate markets from the perspective of the investor. GE credit:

144. Real Estate Economics (3)

Lecture - 3 hours. Prerequisite: course 100A. The economic theory, analysis, and institutions of real estate markets and related financial markets. Case studies drawn from the raw land, single family, multifamily, industrial and office real estate markets. GE credit: SS.-III. (III.)

145. Farm and Rural Resources Appraisal (4)

Lecture/discussion-4 hours. Principles, procedures, and practice of the valuation process with specific emphasis placed on farm real estate. Concepts of value, description of land, identification of the major physical and economic determinants of value, the three primary appraisal approaches to valuation, discussion of appraisal activity and practice. GE credit: SS.-II. (II.)

146. Government Regulation of Business (3)

Lecture - 3 hours. Prerequisite: course 100A or the equivalent. Variety, nature and impact of government regulation: anti-trust laws and economic and social regulation. Nature of the legislative process, promulgation of regulations, and their impact, especially as analyzed by economists. GE credit: SocSci | ACGH, SS.—I. (I.)

147. Resource and Environmental Policy Analysis (3)

Lecture - 3 hours. Prerequisite: Economics 1A; enrollment open to non-majors only. Natural resource use problems with emphasis on past and current policies and institutions affecting resource use; determinants, principles, and patterns of natural resource use; property rights; conservation; private and public resource use problems; and public issues. (Students who have had or are taking course 100A, Economics 100, or the equivalent, may receive only 2 units of credit, so must enroll in course 147M instead.) GE credit: SocSci | SS.-II. (II.)

147M. Resource and Environmental Policy Analysis (2)

Lecture - 3 hours. Prerequisite: Economics 1A; enrollment open to non-majors only. Natural resource use problems with emphasis on past and current policies and institutions affecting resource use; determinants, principles, and patterns of natural resource use; property rights; conservation; private and public resource use problems; and public issues. (Students who have had or are taking course 100A, Economics 100, or the equivalent, must enroll in this course (for 2 units) rather than course 147.) GE credit: SS.

150. Agricultural Labor (4)

Lecture - 3 hours; discussion - 1 hour. Importance of family and hired labor in agriculture; farm labor market; unions and collective bargaining in California agriculture; simulated collective bargaining exercise; effects of unions on farm wages and earnings. GE credit: SocSci, Div, Wrt | ACGH, DD, SS, WE.-I. (I.)

155. Quantitative Analysis for Business Decisions (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 100A; Statistics 103. Introduction to selected topics in management science and operations research: decision analysis for management, mathematical programming, competitive analysis, and others. GE credit: QL, SS.-I, II, III. (I, II, III.)

156. Introduction to Mathematical Economics (4)

Lecture - 4 hours. Prerequisite: courses 100A and 155; Mathematics 16C or 21C recommended (students should note that the formal mathematical content of this course is higher than other courses in the curriculum). Linear algebra for economists; necessary and sufficient conditions in static optimization problems; implicit function theorem; economic methodology and mathematics; comparative statics; envelope theorem; Le Chatelier principle; applications to production and consumer models. GE credit:

157. Analysis for Production Management (4)

Lecture-4 hours. Prerequisite: course 100A; Statistics 103. Application of economic theory and quantitative methods in analyzing production management problems including inventory control, production scheduling, quality control, simulation, systems approach, and work measurement. GE credit: SS. –I, II. (I, II.)

171A. Financial Management of the Firm (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 106; Management 11A-11B. Financial analysis at the firm level: methods of depreciation; influence of the tax structure; inventory, cash, and accounts receivable management; sources of shortterm and long-term financing, and financial problem solving using a computer spreadsheet program. Not open for credit to students who have completed Economics 134. GE credit: QL, SS.-I, II. (I, II.)

171B. Financial Management of the Firm

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 171A. Financial analysis at the firm level: methods of capital budgeting; calculating the cost of capital; dividend policies; mergers and acquisitions; and special current topics in finance. GE credit: QL, SS.—İI, III. (II, III.)

175. Natural Resource Economics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 100B or Economics 100 or the equivalent. Economic concepts and policy issues associated with natural resources, renewable resources, (ground water, forests, fisheries, and wildlife populations) and non-renewable resources (minerals and energy resources, soil). (Same course as Environmental Science and Policy 175.) GE credit: SocSci | SS.-III. (III.)

176. Environmental Economics (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 100B or Economics 100. Role of the environment in economic activity and methods for protecting and enhancing environmental quality; implications of market failures for public policy; design of environmental policy; theory of welfare measurement; measuring the benefits of environmental improvement. GE credit: SocSci | SS.-I. (I.)

190. Topics in Agricultural and Resource Economics (3)

Lecture-3 hours. Prerequisite: passing grades in course 100A and Statistics 103; consent of instructor. Selected topics in agricultural and resource economics, focusing on current research. May be repeated four times for credit when topic differs. Not offered every year. GE credit: SS.

192. Internship (1-6)

Internship—3-18 hours. Internship experience off and on campus in all subject areas offered in the Department of Agricultural and Resource Economics. Internships are supervised by a member of the staff. (P/NP grading only.) GE credit: SS.

194HA-194HB. Special Study for Honors Students (4-4)

Independent study—3 hours; seminar—1 hour. Pre-requisite: Minimum GPA of 3.500; course 100B; courses 106 and 155 (may be taken concurrently); major in Agricultural and Managerial Economics or Managerial Economics; senior standing. A program

of research culminating in the writing of a senior honors thesis under the direction of a faculty adviser. (Deferred grading only, pending completion of sequence.) GE credit: QL, SS, WE.—I, II. (I, II.)

197T. Tutoring in Agricultural Economics (1-3)

Hours and duties will vary depending upon the course being tutored. Prerequisite: senior standing in Agricultural and Resource Economics and consent of Department Chairperson. Tutor will lead small discussion groups affiliated with one of the department's regular courses, under the supervision of, and at the option of the instructor in charge of the course. (P/NP grading only.) GE credit: SS.

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SS.

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SS.

Graduate Courses

200A. Microeconomic Theory (5)

Lecture — 4 hours; discussion — 1 hour. Prerequisite: graduate standing. Linear and non-linear optimization theory applied to develop the theory of the profit-maximizing firm and the utility-maximizing consumer. (Same course as Economics 200A.)—I. (I.)

200B. Microeconomic Theory (5)

Lecture — 4 hours; discussion — 1 hour. Prerequisite: course 200A. Characteristics of market equilibrium under perfect competition, simple monopoly and monopsony. Emphasis on general equilibrium and welfare economics; the sources of market success and market failures. (Same course as Economics

200C. Microeconomic Theory (5)

Lecture - 4 hours; discussion - 1 hour. Prerequisite: course 200B. Uncertainty and information economics. Individual decision making under uncertainty. Introduction to game theory, with emphasis on applications to markets with firms that are imperfect competitors or consumers that are imperfectly informed. (Same course as Economics 200C.)—III. (III.)

202A. Introduction to Applied Research Methods (3)

Lecture/discussion—3 hours. Prerequisite: courses 204A and 256, or the equivalent; course 200A concurrently. Study of philosophy and methodology of applied research in agricultural economics. Methods of conceptualization of researchable topics. Method of communication and constructive criticism.—I. (I.)

202B. Applied Microeconomics I: Consumer and Producer Behavior (3)

Lecture/discussion—3 hours. Prerequisite: courses 200A and 202A; course 200B concurrently. Application of consumer and producer theory in models of individual behavior and market-level phenomena. Implications of consumer and producer theory for specification of empirical models of supply and demand for inputs and outputs and market equilibrium displacement models. - II. (II.)

202C. Applied Microeconomics II: Welfare Analysis and Imperfect Competition (3)

Lecture/discussion—3 hours. Prerequisite: course 202B; course 200C concurrently. Methods of applied welfare economics with emphasis on problems arising in agriculture and the environment. Models of imperfectly competitive markets and their application to industries and institutions in the agricultural sector.—III. (III.)

204A. Microeconomic Analysis I (4)

Lecture-4 hours. Prerequisite: course 100B or Economics 100; advanced undergraduates with consent of instructor. Behavior of consumers and producers and their interactions; tools and methods needed to analyze economic behavior in the marketplace. Application of those methods to real-world problems. — I. (I.)

204B. Microeconomic Analysis II (4)

Lecture-4 hours. Prerequisite: course 204A or consent of instructor. Behavior in imperfectly competitive markets-monopoly and price discrimination; oligopoly. Introduction to noncooperative game theory. Analysis of decisions made under risk and uncertainty and imperfect information. The economics of externalities and public goods.—II. (II.)

214. Development Economics (4)

Lecture—4 hours. Prerequisite: course 100A, 100B, Economics 101; course 204A and Economics 160A, 160B recommended. Review of the principal theoretical and empirical issues whose analysis has formed development economics. Analysis of economic development theories and development strategies and their application to specific policy issues in developing country contexts. (Same course as Economics 214.)-III. (III.) Boucher

215A. Microdevelopment Theory and Methods I (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 200A or 204A; course 240A recommended. Agricultural development theory, with a focus on microeconomics. Agricultural household behavior with and without imperfections and uncertainty. Analysis of rural land, labor, credit and insurance markets, institutions, and contracts. (Same course as Economics 215A.)—I. (I.)

215B. Open Macroeconomics of Development (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 200A or 204A; 200D or 205, and 214 or 215A. Models and policy approaches regarding trade, monetary and fiscal issues, capital flows and debt are discussed in the macroeconomic framework of an open developing country. The basic analytical focus is real exchange rate and its impact on sectoral allocation of resources. (Same course as Economics 215B.)—II. (II.)

215C. Microdevelopment Theory and Methods II (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 215A. Extension of development theory and microeconomic methods. Agricultural growth and technological change; poverty and income inequality; multisectoral, including village and regional models. Computable general equilibrium methods and applications. (Same course as Economics 215C.) - III. (III.)

215D. Environment and Economic Development (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A, 204A or 275. Interdisciplinary course drawing on theoretical and empirical research on interactions between environmental resource use and economic development processes. Analysis of issues emerging at the interface of environmental and development economics. (Same course as Economics 215D.)

222. International Agricultural Trade and Policy (3)

Lecture-3 hours. Prerequisite: course 100B or 204A; Economics 160A or the equivalent. Analysis of country interdependence through world agricultural markets. Partial equilibrium analysis is used to study the impacts of national intervention on world markets, national policy choice in an open economy and multinational policy issues.—I. (I.)

231. Supply and Demand for Agricultural Products (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 200A, 202A, and 240A or consent of instructor. Analysis of supply and demand for agricultural commodities emphasizing the effective use of microeconomic theory with econometric methods, and other empirical procedures, in conducting applied analysis of supply and demand at the firm and industry level. — I. (I.)

232. Agricultural Commodity Markets (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: courses 200A, 202A, and 240A or consent of instructor. Economic analysis of industries that produce, market, transport, store, and process basic commodities. Analysis of market equilibrium under perfect and imperfect competition, with and without government involvement. - II. (II.)

233. Agricultural Policy (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 200A, 202A, and 240A or consent of instructor. Nature, formation, evolution, and institutions of economic policy applied to food, agricultural, and rural issues. Examples for detailed consideration include food security, commodity issues, and trade policy. Analytical approaches include static and dynamic welfare analysis, policy design, and political-economic analysis.—III. (III.)

239. Econometric Foundations (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: one course in undergraduate-level econometrics. The course will prepare students for econometric theory and empirical work by examining the statistical foundation of econometrics. Special attention is paid to problems specific to non-experimental data common to social sciences. Topics from matrix algebra are also covered. (Same course as Economics 239.)—I.

240A. Econometric Methods (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Statistics 133 and a course in linear algebra or the equivalent. Least squares, instrumental variables, and maximum likelihood estimation and inference for single equation linear regression model; linear restrictions; heteroskedasticity; autocorrelation; lagged dependent variables. (Same course as Economics 240A.)—II. (II.)

240B. Econometric Methods (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 240A. Topics include asymptotic theory and instrumental variables, pooled time-series cross-section estimation, seemingly unrelated regression, classical hypothesis tests, identification and estimation of simultaneous equation models, cointegration, errorcorrection models, and qualitative and limited dependent variable models. (Same course as Economics 240B.) - III. (III.)

240C. Time Series Econometrics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 240B. Probability theory; estimation, inference and forecasting of time series models; trends and non-standard asymptotic theory; vector time series methods and cointegration; time series models for higher order moments and transition data; statespace modeling; the Kalman filter. (Same course as Economics 240C)—II. (II.)

240D. Cross Section Econometrics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 240B. Estimation and inference for nonlinear regression models for cross-section data; models for discrete data and for limited dependent variables; models for panel data; additional topics such as bootstrap and semiparametric regression. (Same course as Economics 240D)—I. (I.)

240E. Topics in Time Series Econometrics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: courses 240A, 240B and 240C. Modern econometric techniques for time series data. Expand on topics covered in Economics 240A, 240B and 240C. Contents may vary from year to year. (Same course as Economics 240E.)—III. (III.)

240F. Topics in Cross Section Econometrics

Lecture - 3 hours; discussion - 1 hour. Prerequisite: courses 240A, 240B and 240D. Modern econometrics techniques for cross-section data. Expand on topics covered in Economics 240A, 240B and 240D. Contents may vary from year to year. (Same course as Economics 240F.)—III. (III.)

252. Applied Linear Programming (4)

Lecture — 3 hours; discussion — 1 hour. Applied linear programming methods emphasizing uses for business decisions: production, diet, blending, network and related problems.—II. (II.)

253. Optimization Techniques with **Economic Applications (4)**

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 200C. Optimization techniques and methods including linear and nonlinear programming. Empirical applications to household, firm, general equilibrium and economic growth problems.

254. Dynamic Optimization Techniques with Economic Applications (4)

Lecture — 4 hours. Prerequisite: course 253 and elementary knowledge of ordinary differential equations. Necessary and sufficient conditions in the calculus of variátions and optimal control, economic interpretations, the dynamic envelope theorem and transversality conditions, infinite horizon problems and phase diagrams, local stability and comparative statics of the steady state, comparative dynamics.

255. Advanced Topics in Economic Dynamics (3)

Lecture—3 hours. Prerequisite: course 254. Local stability analysis, steady state comparative statics and comparative dynamics, dynamic duality theory and the principle of optimality, differential games, numerical solution of deterministic and stochastic dynamic models using GAMS, stochastic optimal control, plus other advanced topics in economic dynamics

258. Demand and Market Analysis (4)

Lecture—4 hours. Prerequisite: courses 204B and 256 or consent of instructor. Application of theoretical material covered in 204A/B, with particular focus on production theory/factor demand and imperfect competition/market power. Use of theoretical models as a foundation for empirical economic analysis, and empirical exercises. Independent research on chosen topics, with empirical applica-

275. Economic Analysis of Resource and **Environmental Policies (4)**

Lecture/discussion-4 hours. Prerequisite: course 204A. Development of externality theory, market failure concepts, welfare economics, theory of renewable and non-renewable resource use, and political economic models. Applications to policy issues regarding the agricultural/environment interface and managing resources in the public domain. (Same course as Environmental Science and Policy 275.)—III. (III.)

276. Environmental Economics (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 204A or consent of instructor. Applications of externality theory to the design of efficient environmental policies. Evaluation of pollution control policy instruments in light of information limitations and market imperfections. Methods for nonmarket valuation of the benefits of environmental improvement.-II. (II.) Lin, Larson

277. Natural Resource Economics (4)

Lecture - 4 hours. Prerequisite: course 254 or consent of instructor. Application of capital theory and dynamic methods to issues of optimal use of renewable and nonrenewable resources. Examination of policy issues associated with forests, fisheries, groundwater, energy resources, watersheds, soil, global climate, and wildlife.—III. (III.)

290. Topics in Agricultural and Resource Economics (3)

Lecture - 3 hours. Selected topics in agricultural and resource economics, focusing on current research. May be repeated 4 times for credit. Not offered every year. —I, II, III. (I, II, III.)

293. Analysis of California Agriculture and Resources (3)

Lecture - 1.5 hours; fieldwork - 45 hours total, including one 5-day summer field trip. Review and analysis of production, marketing, and resource issues facing agricultural firms in California. Application of economic theory and measurement to individual firm and industry decisions in an applied setting. (S/U grading only.)-II. (II.)

298. Directed Group Study (1-5)

Advanced study through special seminars, informal group studies, or group research on problems for analysis and experimentation. Sections: (1) Managerial Economics; (2) Agricultural Policy; (3) Community and Regional Development; (4) Natural Resources; (5) Human Resources; (6) Research Methods and Quantitative Analysis.

299. Individual Study (1-12)

Sections: (1) Managerial Economics; (2) Agricultural Policy; (3) Community and Regional Development; (4) Natural Resources; (5) Human Resources; (6) Research Methods and Quantitative Analysis; and (7) Dissertation Research Prospectus. (S/Ú grading

299D. Special Study for Doctoral Dissertation (1-12)

(S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum

Agricultural Systems and Environment

(College of Agricultural and Environmental Science)

Minor Program Requirements:

Agricultural Systems and

Preparatory material: Course in statistics such as Statistics 13, 32, 100, Plant Sciences 120, Sociology 42B or equivalent. Course in plant science such as Plant Sciences 2, Biological Sciences 1C, or equivalent; completion of Biological Sciences 2A and 2B and 2C also fulfills this requirement. Select one of the two following tracks:

Sustainable Agriculture track Plant Sciences 142 or 150 4 Soil Science 100......5 Plant Sciences 105 or 176 or

Plant Sciences 112, 131, 135, 150, Environmental Science and Policy 123, 172, Wildlife, Fish and Conservation Biology 110, 151

Minor Advisers. K.J. Rice (Plant Sciences) Advising Center is located in 1220A Plant and Environmental Sciences (530) 752-1715.

Agronomy

See Plant Sciences, on page 467.

Agronomy and Range Science

See Plant Sciences, on page 467.

American Studies

(College of Letters and Science) Julie Sze, Ph.D., Program Director

Program Office. 2134A Hart Hall (530) 752-3377; http://ams.ucdavis.edu

Committee in Charge

Charlotte Biltekoff, Ph.D. (American Studies) Carolyn de la Peña, Ph.D. (American Studies) Caren Kaplan, Ph.D. (American Studies) Michael L. Smith, Ph.D. (American Studies) Eric Smoodin, Ph.D. (American Studies) Julie Sze, Ph.D. (American Studies) Patricia Turner, Ph.D. (African American and African Studies, American Studies) Grace Wang, Ph.D. (American Studies)

Faculty

Charlotte Biltekoff, Ph.D., Assistant Professor Carolyn de la Peña, Ph.D., Professor Caren Kaplan, Ph.D., Professor Michael L. Smith, Ph.D., Senior Lecturer

Academic Senate Distinguished Teaching Award Eric Smoodin, Ph.D., Professor Julie Sze, Ph.D., Associate Professor Patricia Turner, Ph.D., Professor Grace Wang, Ph.D., Assistant Professor

Emeriti Faculty

Jay Mechling, Ph.D., Professor Emeritus Academic Senate Distinguished Teaching Award David Scofield Wilson, Ph.D., Senior Lecturer

The Major Program

American Studies offers an alternative approach to the study of American experience for students who feel too limited by departmental approaches. Lower division, introductory classes explore the ways in which cultural systems shape and reflect life in the United States. These classes pay close attention to the ways in which differences of class, race, gender, generation, ethnicity, religion, and sexual orientation unevenly affect American lives.

The Program. American Studies majors take five upper division, in-depth classes and seminars devoted to close study of major thinkers and of issues crucial to the practice of American Studies. Advanced work in at least two other departments or programs allows each student to emphasize a period, a problem, or a subject tailored to his or her own individual education goals. Students have the option of writing a senior thesis within this emphasis.

Career Alternatives. As an interdisciplinary program, American Studies provides a good liberal arts and sciences undergraduate education. American Studies maximizes a student's contact with a variety of subject matter and approaches. Graduates have moved into a broad range of career settings, including journalism, law, medicine, nursing, law enforcement, teaching, environmental planning, library science, museum curatorship, and business. Some students discover new career possibilities through their internships in American institutions.

A.B. Major Requirements:

American Studies 10......4 One additional lower division American Studies course 4 One course from African American and African Studies 10, Asian American Studies 1, Chicana/o Studies 10, Native American Studies 1, or an equivalent course in racial

Preparatory Subject Matter.....24

2, Women's Studies 50, or an equivalent course in social science approaches to

One course from History 17A, 17B, 72A, One course from English 30A, 30B, Film Studies 1, or an equivalent course introducing critical approaches to literary and visual texts in the humanities......4

Depth Subject Matter40 American Studies 100 and 1608 American Studies Electives: Three additional upper-division American Studies courses......12 In consultation with the American Studies Undergraduate Adviser, the student designs a program of 20 units (typically five courses) of upper division course work around a unifying theme, period, or subject matter in American cultures. The courses should come from two or more departments or programs and can include up to 8 units of American Studies courses. Only 4 units of course 192 (internship) can be included

remaining 12 units outside the program. Total Units for the Major64 Recommended

in the emphasis. The student may choose

units of the emphasis and take the

the senior thesis option (190A-190B) for 8

Completion of the college requirement in English composition before enrollment in American Studies

Minor Program Requirements:

UNITS

American Studies20 American Studies, upper division courses..... No more than 8 units of course 192 may be counted toward this total.

Faculty Advisers. C. Biltekoff, C. de la Peña, C. Kaplan, M. Smith, E. Smoodin, J. Sze, G. Wang

Courses in American Studies (AMS) Lower Division Courses

1A. Science and American Culture (4)

Lecture - 3 hours; discussion - 1 hour. American science as a cultural system. Mutual influence and inter-action of that system with other cultural systems including religion, social thought, art, architecture, literature, music, and common sense. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, DD, WE.-

1B. Religion in American Lives (4)

Lecture—3 hours; discussion—1 hour. Religions and spiritual practices in the United States, and their interrelationships with other aspects of U.S. history, society and culture; indigenous and imported faiths, and the impact of immigration, colonization and culture contact on religious systems. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, DD, WE.—I. (I.) Kel-

1C. American Lives Through Autobiography

Lecture—3 hours; discussion—1 hour. American culture as understood through the individual life stories told by Americans, with attention to the roles of gender, race, ethnicity, social class, and sexual orientation in the individual's life course. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.—

1E. Nature and Culture in America (4)

Lecture-3 hours; discussion-1 hour. Uses and abuses of nature in America; patterns of inhabitation, exploitation, appreciation, and neglect; attention to California; emphasis on metaphor as a key to understanding ourselves and the natural world; attention to models of healing: stewardship, ecology, the "rights" movement. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.-III. Smith, Sze

4. Freshman Seminar (2)

Seminar - 2 hours. Prerequisite: open only to students who have completed fewer than 40 quarter units. Investigation of a special topic in American Studies through shared readings, discussions, written assignments, and special activities (such as fieldwork, site visits). Emphasis on student participation in learning. Limited enrollment.—II, III. (II, III.)

5. Technology in American Lives (4)

Lecture - 2 hours; discussion - 2 hours. Prerequisite: completion of Subject A requirement. Technology as both a material cultural force and a symbol in American culture; the lives of engineers at work and play; images of the engineer and technology in popular culture; social political and ethical issues raised by technology. GE credit: ArtHum or SocSci, Wrt | AH or SS, WE.—I. (I.) Smith

10. Introduction to American Studies (4)

Lecture-3 hours; discussion-1 hour. United States history, culture and society. Examination of cultural objects and social practices. Topics include popular culture (film, TV, Internet), cultural diversity, social activism, play, and communication. GE credit: GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.—III. Wang, Sze

21. Objects and Everyday Life (4)

Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: completion of subject A requirement. Material culture (objects and artifacts ranging from everyday objects like toys and furnishings to buildings and constructed landscapes) as evidence for understanding the everyday (vernacular) lives (gender, social class, ethnicity, region, age, and other factors; collecting and displaying material. Offered in alternate years. GE credit: ArtHum, Div, Wrt | ACGH, AH, DD, WE.—III. de la Peña, Kaplan

25. United States as a Business Culture (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: completed Subject A requirement. Business as a cultural system and its relation to religion, politics, arts, science, technology, and material culture; business themes of success, creativity, invention, and competition in American autobiographies, fiction, advice literature, film, and television; cultures of the workplace; multinational business. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.—I. (I.) de la Peña

30. Images of America and Americans in Popular Culture (4)

Lecture—3 hours; discussion—1 hour. Investigation of verbal and visual discourses about American identity in various popular culture products, including film, television, radio, music, fiction, art, advertising, and commercial experiences; discourses about the United States in the popular culture of other societies. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE. - (I.) Kaplan, Smoodin

55. Food in American Culture (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: complete Subject A requirement. Food as a cultural system in the United States; food in the performance of individual and group identity, including gender and ethnicity; food in literature, art, popular culture (film, television, advertising), and folk culture; the food industry and business. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.—II. (II.) Biltekoff, de la Peña

59. Music and American Culture (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: completed Subject A requirement. An examination of music and American culture. Studies will explore music in its cultural contexts, which may include examinations of recording and broadcasting, of race, class, and gender, the role of technology, and relationships between musical production, consumption and listening. GE credit: ArtHum or SocSci, Div, Wrt.-I. (I.) Wang

95. Careers and Identity in American Culture (2)

Lecture—1 hour; discussion—1 hour. Defining one's identity through the career. The life course, preparation, and choices. Personality and career. Ethics. Gender, ethnicity, sexuality, and social class in the workplace. The transnational workplace. Conflicts between the career and other social roles.-I, II, III, IV. (I, II, III, IV.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading

99. Individual Study for Undergraduates (1-5)

(P/NP grading only.)

Upper Division Courses

100. Methods in American Studies (4)

Lecture/discussion-3 hours; term paper. Design and implementation of interdisciplinary research, analysis and writing for American Studies and other cultural studies fields. Library and Internet research skills, project/problem definition, methods for study of texts, individuals, communities. Hand-on, skillbuilding, focused reading, discussion.

101A-H. Special Topics (4)

Seminar-3 hours, intensive reading, writing, and special projects. Interdisciplinary group study of special topics in American Culture Studies, designed for non-majors as well as majors. Content will vary according to the instructor and in accord with the following titles: (A) Popular Culture Studies; (B) Women's Studies; (C) Material Aspects of American Culture; (D) American National Character; (E) American Lives Through Autobiography; (F) The Interrelationship Between Arts and Ideas; (G) New Directions in American Culture Studies; (H) Problems in Cross-Cultural American Studies. May be repeated for credit in different subject area only. - 1, II, III. (I, II,

110. A Decade in American Civilization (4)

Lecture - 2 hours; discussion - 2 hours. Prerequisite: one of courses 1A, 1B, 1C, 1D, 1E or 1F. Close examination of a single decade in American civilization; the connections between the history, literature, arts, customs, and ideas of Americans living in the decade. Issues and representations of race, class, gender, age, and sexuality in the decade. May be repeated for credit if decades studied are different. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.-I. (I.)

120. American Folklore and Folklife (4)

Lecture - 3 hours; fieldwork - 1 hour. Theory and method of the study of American folk traditions, including oral lore, customs, music, and material folk culture; the uses and meanings of those traditions in various folk communities, including families, ethnic institutions, voluntary organizations, and occupational groups. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE. - III. (III.)

125. Corporate Cultures (4)

Lecture—2 hours; discussion—1 hour; fieldwork—1 hour. Prerequisite: one course chosen from course 120, Anthropology 2, Psychology 16, or Sociology 1; or consent of instructor. Exploration of the small group cultures of American corporate workplaces, including the role of environment, stories, jokes, rituals, ceremonies, personal style, and play. The effects of cultural diversity upon corporate cultures, both from within and in contact with foreign corporations.—III. (III.) de la Peña

130. American Popular Culture (4)

Lecture/discussion-3 hours; fieldwork-1 hour. Prerequisite: course 1 or upper division standing. American popular expression and experience as a cultural system, and the relationship between this system and elite and folk cultures. Exploration of theories and methods for discovering and interpreting patterns of meaning in American popular culture.
GE credit: ArtHum or SocSci, Div, Wrt| ACGH, AH or SS, DD, WE.-II. (II.) Smoodin

139. Feminist Cultural Studies (4)

Lecture/discussion-4 hours. Prerequisite: one course in Women's Studies or American Studies. The histories, theories, and practices of feminist traditions within cultural studies. (Same course as Women's Studies 139.) GE credit: SocSci, Div, Wrt | ACGH, DD, SS, WE.—III. (III.)

151. American Landscapes and Places (4)

Lecture - 2 hours; discussion - 1 hour; fieldwork - 3 hours. Prerequisite: course 1, upper division standing. Comparative study of several American cultural populations inhabiting a region, including their relationship to a shared biological, physical, and social environment, their intercultural relations, and their relationships to the dominant American popular and elite culture and folk traditions. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.-II. (II.) Smith

152. The Lives of Children in America (4)

Lecture - 2 hours; discussion - 2 hours. Experience of childhood and adolescence in American culture, as understood through historical, literary, artistic, and social scientific approaches. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.— III. (III.) Smith, Smoodin

153. The Individual and Community in America (4)

Lecture - 2 hours; discussion - 2 hours. Interdisciplinary examination of past and present tensions between the individual and the community in American experience, as those tensions are expressed in such cultural systems as folklore, public ritual, popular entertainment, literature, fine arts, architecture, and social thought. GE credit: ArtHum or SocSci Div, Wrt | ACGH, AH or SS, DD, WE.-II. (II.) Sze

154. The Lives of Men in America (4)

Lecture - 2 hours; discussion - 2 hours. Interdisciplinary examination of the lives of boys and men in America, toward understanding cultural definitions of masculinity, the ways individuals have accepted or resisted these definitions, and the broader consequences of the struggle over the social construction of gender. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.-I. (I.)

155. Symbols and Rituals in American Life

Lecture - 2 hours; discussion - 2 hours. Prerequisite: course 1. Interdisciplinary examination of selected, richly expressive events (parades, festivals, holidays) and symbols (flags, memorials, temples) which encode nationwide values and understandings (Thanksgiving, New Year's, etc.) or which realize more limited, special meanings (Mardi Gras, rodeo, Kwanza, graduation, bar mitzvah, etc.). Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.-III. Biltekoff, de la Peña

156. Race, Culture and Society in the United States (4)

Lecture - 2 hours; discussion - 2 hours. Prerequisite: course 1. Interdisciplinary examination of the significance of race in the making of America; how race shapes culture, identities and social processes in the United States; the interweaving of race with gender, class and nationhood in self and community. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.-II. (II.) Wang

157. Animals in American Culture (4)

Lecture - 3 hours, discussion - 1 hour, Animals as symbols in American thought, as found in folklore, popular culture, literature, and art; customs and stories around human-animal interactions, including hunting, religion, foodways, pets, zoos, circuses, rodeos, theme parks, and scientific research on animals. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.— II. Sze

158. Technology and the Modern American Body (4)

Lecture/discussion—3 hours; term paper. Prerequisite: Technocultural Studies 1 and either course 1A or 5. The history and analysis of the relationships between human bodies and technologies in modern society. Dominant and eccentric examples of how human bodies and technologies influence one another and reveal underlying cultural assumptions. (Same course as Technocultural Studies 158.) GE credit: ArtHum | AH. - I, III. de la Pena

160. Undergraduate Seminar in American

Seminar—3 hours; term paper. Prerequisite: open to junior and senior American Studies majors only. Intensive reading, discussion, research, and writing by small groups in selected topics of American Studies scholarship; emphasis on theory and its application to American material. Limited enrollment. May be repeated one time for credit when content differs. - II, III. (II, III.)

190A. Senior Thesis Research Seminar (4)

Seminar—2 hours; extensive writing. Prerequisite: senior standing in American Studies major. Research and prospectus writing for senior thesis. - I. (I.) Sze,

190B. Senior Thesis (4)

Independent study—12 hours. Prerequisite: senior standing in American Studies major and course 190A. In consultation with advisor, student writes an extended research paper on a topic proposed in course 190A.—I, II, III. (I, II, III.)

192. Internship in American Institutions

Internship - 1-12 hours. Prerequisite: enrollment dependent on availability of intern positions, with priority to American Studies majors. Supervised internship and study within and about key organizations in American civilization at archives, museums schools, historical societies, governmental and social agencies, etc., with attention to the techniques of participant observation and the collection of ethnographical data. May be repeated for credit for a total of 12 units. (P/NP grading only.)

197T. Tutoring in American Studies (1-5)

Tutorial - 1-5 hours. Prerequisite: consent of Chairperson of American Studies Program. Tutoring in lower division American Studies courses, usually in small discussion groups. Periodic meetings with the instructor in charge; reports and readings. May be repeated for credit when the tutoring is for a different course. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor and chairperson of American Studies Program. (P/NP grading only.)

Graduate Courses

220. American Folklore and Folklife (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Theory and methods for the study of the folklore and the folk customary behavior of Americans; contributions of folklore studies to scholarship in humanities and social science disciplines. — III. (III.) Turner

250. Cultural Study of Masculinities (4)

Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Interdisciplinary approaches to understanding the social and cultural construction of masculinities; attention to the effects of biology, gender, race, class, sexual and national identities; criticism of oral, printed, visual, and mass mediated texts, and of social relations and structures. (Same course as Women's Studies 250.)—II.

255. Food in American Culture (4)

Seminar — 3 hours; term paper. Prerequisite: graduate standing or advanced undergraduate with consent of instructor. Interdisciplinary theories and methods for the study of food in American culture; food studies in relation to issues of identity (age, gender, ethnicity, religion, region, etc.), social relations, systems of production, and cultures of consumption. Not offered every year. Biltekoff, de la Pena

298. Group Study in Animal Biology (1-5)

Prerequisite: graduate standing.

299. Individual Study (1-12)

Prerequisite: consent of instructor. (S/U grading

Professional Course

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Anatomy

See Anatomy, Physiology and Cell Biology, on page 147; and Courses in Cell Biology and Human Anatomy (CHA), on page 394.

Anatomy, Physiology and Cell Biology

See Veterinary Medicine, School of, on page 523.

Anesthesiology and **Pain Medicine**

See Medicine, School of, on page

Animal Behavior (A Graduate Group)

Thomas P. Coombs-Hahn, Ph.D., Chairperson of the Group

Group Office. 310 Life Sciences (530) 752-2981; Fax (530) 752-8822; animalbehavior@biosci.ucdavis.edu; http://biosci3.ucdavis.edu/GradGroups/ANB/

Faculty. The Group includes faculty from 12 departments in five schools and colleges

Graduate Study. The Ph.D. program in Animal Behavior is an interdepartmental program focusing on the mechanisms underlying and evolution of behavior, and applications of animal behavior to current problems in conservation biology and animal welfare. The program trains students for teaching and research in a variety of areas, including anthropology, animal science, ecology, entomology, neurobiology, psychology, physiology, veterinary science, wildlife biology, and zoology. Resources available to students, in addition to various departmental facilities, include those of the California National Primate Research Center, Bodega Marine Laboratory, and the UC Natural Reserve System.

There is an application deadline of Dec 15 for fall quarter.

Preparation. Appropriate preparation is a bachelor's or master's degree in a discipline relevant to the biology of behavior. In addition, at least one course from each of the following areas must be taken before admission into the program or before the end of the first year in the program.

Ecology: e.g., Evolution and Ecology 101, Environmental Science and Policy 100 Genetics: e.g., Biological Sciences 101 Statistics: e.g., Statistics 102 or Psychology Evolution: e.g., Evolution and Ecology 100

Animal behavior: Neurobiology, Physiology, and Behavior 102

Physiology: e.g. Neurobiology, Physiology, and Behavior 101

Core Requirements. Students take two "breadth" courses, at least one course in statistics, a methodology and grant writing course, and a graduate seminar. Required courses:

Fundamentals of Animal Behavior: Animal Behavior 218A and 218B Methodology and grant writing: Animal Behavior 201

Advanced statistics: Psychology 204A, 204B, 204C, or 204D, Statistics 106, 108, 138, 205, Agronomy 204, 206

Graduate seminars: Animal Behavior 290 Strongly recommended: a course on teaching science: Biological Sciences 310, Psychology 390A, 390B

Electives: Students also take two additional courses (of at least 3 units each) in the student's area of specialization, chosen in consultation with and approved by the Course Guidance Committee.

Strongly recommended: at least one additional course in statistics or modeling. In addition to the above listed courses, modeling courses include Population Biology 231 and Psychology 120.

Courses in Animal Behavior (ANB) Graduate Courses

201. Scientific Approaches to Animal Behavior Research (3)

Lecture-3 hours. Prerequisite: consent of instructor. Philosophical issues, goals, strategies and tools in field and laboratory research. May be repeated for credit when topics differ.—III. (III.)

210. History of Animal Behavior (1)

Discussion - 1 hour. Prerequisite: consent of instructor. Classic, seminal papers in animal behavior. Discussion of readings and broader historical context in which papers were written. (S/U grading only.)

218A. Fundamentals of Animal Behavior

Lecture/discussion-4 hours; discussion-1 hour. Prerequisite: consent of instructor; upper-division undergraduate introduction to the biology of behavior, such as Psychology 101, 122, 123, Neurobiology, Physiology, and Behavior 102, 150, 152, Wildlife, Fish, and Conservation Biology 141, Entomology 104, or Animal Science 105. Survey of the phenomena and theory of animal behavior from the perspectives of multiple biological disciplines, including evolution, ecology, psychology, genetics, neurobiology, endocrinology, and animal science. (Same course as Psychology 218A.)—I. (I.) Schank

218B. Fundamentals of Animal Behavior

Lecture/discussion-4 hours; discussion-1 hour. Prerequisite: consent of instructor; course 218A or Psychology 218A. Survey of the phenomena and theory of animal behavior from the perspectives of multiple biological disciplines, including evolution, ecology, psychology, genetics, neurobiology, endo-crinology, and animal science. (Same course as Psychology 218B.)—II. (II.) Sih

221. Animal Behavior, Ecology and Evolution (3)

Lecture-3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 102, Evolution and Ecology 100, 101 or the equivalent, graduate standing, and consent of instructor. The interface between animal behavior, ecology and evolution. New developments in behavioral ecology and development and testing of hypotheses in this discipline. (Same course as Population Biology 221.)

230A. Interdisciplinary Approaches to Animal Behavior (3)

Seminar — 3 hours; term paper. Prerequisite: consent of instructor. Analysis of literature in behavior and an allied discipline or disciplines that offer the potential, in combination, to advance the understanding of a topic in animal behavior conceptually and empirically. Topics will vary from year to year.

230B. Interdisciplinary Approaches to **Animal Behavior (5)**

Workshop-4 days total; discussion-3 hours; term paper. Prerequisite: course 230A the previous quarter. Development of an empirical or theoretical interdisciplinary approach to research on a current topic in animal behavior.

270. Research Conference in Behavioral Ecology (1)

Conference - 1 hour. Prerequisite: graduate standing and consent of instructor. Critical presentation and evaluation of current literature and ongoing research in behavioral ecology. Limited enrollment. May be repeated for credit. (S/U grading only.)

287. Advanced Animal Behavior (2)

Seminar - 2 hours. Prerequisite: graduate standing and consent of instructor, courses in animal behavior (Neurobiology, Physiology, and Behavior 102 or the equivalent), and either evolution (Evolution and Ecology 100 or the equivalent) or ecology (Evolution and Ecology 101 or the equivalent). Reading, reports and discussion on current topics in animal behavior, with a focus on topics that lie at the interface between animal behavior, ecology and evolution. (Same course as Population Biology 287.) May be repeated two times for credit.

290. Seminar in Animal Behavior (1-3)

Seminar - 1-3 hours. Prerequisite: consent of instructor. Selected topics in animal behavior. (S/U grading only.)—I, II, III. (I, II, III.)

294. Seminar in Behavioral Ecology of Predators and Prey (3)

Seminar-2 hours. Prerequisite: graduate standing. Presentation and analysis of research papers on social and foraging behavior of predatory animals, antipredator strategies of prey species, co-evolution of predators and prey, and ecology of predator prey interactions. May be repeated two times for credit. (Same course as Wildlife, Fish, and Conservation Biology 294.) Offered in alternate years.—II. Caro

298. Group Study (1-5)

Prerequisite: graduate standing and consent of instructor.

299. Research (1-12)

Prerequisite: and consent of instructor. (S/U grading

Professional Course

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)

Animal Biology

(College of Agricultural and Environmental Sciences) Faculty, Faculty includes members of the Departments of Animal Science, on page 150, Entomology, on page 291; Nematology, on page 436; and Wildlife, Fish, and Conservation Biology, on page

The Major Program

530.

The Animal Biology major offers students training in the biological and natural sciences as they apply to animals. The major covers the basic biological sciences that explain animal evolution, systematics, ecology, physiology and molecular biology. Students in the Animal Biology major are encouraged to think

beyond particular groups of animals in which they are interested and to consider science as a process and a way of advancing society. Emphasis is on biological principles that can be used in research or in solving societal problems associated with animals in agriculture, urban areas, or natural environments.

The Program. The Animal Biology major consists of core courses in the biological sciences that build an understanding of animal biology from the molecular to the ecological and evolutionary levels of organization. After completing these core courses, students have the option of specializing in various interdisciplinary aspects of animal biology, and plan their chosen emphasis of study as part of a required discussion course and in consultation with their adviser. The Animal Biology major emphasizes courses on biological principles as opposed to courses on animal care and husbandry. This program includes a senior thesis, which each student designs to bridge the disciplines of the major.

Internships and Career Alternatives. The program and interests of each student in solving societal problems guides him or her to logical internship and career choices. On- and off-campus internship opportunities are available in research laboratories, in field situations, with governmental agencies, with private industry, and in international programs. A degree in Animal Biology prepares students for careers in research, teaching, governmental regulation, health or agriculture as each relates to the integrative biology or ecology of animals. Careers in veterinary medicine, animal husbandry and animal management are open to Animal Biology majors, however, other preparation may be required. Students in the major gain research experience and may choose to continue their training at the graduate or professional level in a variety of biological disciplines.

Preparatory Subject Matter 68-74

B.S. Major Requirements:

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Biological Sciences 2A, 2B, and 2C	
Depth Subject Matter 29-	38
Biological Sciences 101	
Animal Biology 1872 Animal Biology 189 and 189D	
Restricted Electives	25
Focused specialty upper division courses as outlined in the student's major proposal (from course 187) with approval of an adviser.	

Total Units for the Degree 122-137 Master Adviser. R. Kimsey

Advising Center for the major, including peer advising, is located in 152 Hutchison Hall (530) 754-7277; abi-advising@ucdavis.edu.

Courses in Animal Biology (ABI) Lower Division Courses

50A. Animal Biology Laboratory (2)

Lecture/laboratory-4 hours. Scientific methods for answering questions in animal biology by doing exercises to demonstrate hypothesis testing and reporting, short laboratory, population and field experiments. Maintain notebooks, analyze data, interpret results and write reports.—I. (I.) Kimsey

50B. Animal Biology (3)

Lecture — 3 hours. Prerequisite: Biological Sciences 1A, Biological Sciences 1B (may be taken concurrently). Basic biological disciplines important to an understanding of practical animal biology issues including the evolution of animal groups, genetic mechanisms, animal physiology as it relates to maintenance and production, and aspects of comparative anatomy, behavior and ecology. - II. (II.) Karban, Williams

50C. Animal Biology (3)

Lecture — 3 hours. Prerequisite: Biological Sciences 1B, 1C, courses 50A, 50B. Animal management and conservation. Societal concerns arising from management and conservation issues, including economics, aesthetics, regulations, safety, public perspectives and advocacy. - III. (III.) Caswell-Chen, Ferris, Lanzaro

92. Internship in Animal Biology (1-12)

Internship - 3-36 hours. Prerequisite: consent of instructor. Office, laboratory or fieldwork off or on campus in research, governmental regulation, policy making, and private enterprise dealing with animal related issues of production, welfare, pest management, biodiversity and the environment. All requirements of Internship Approval Request form must be met. (P/NP grading only.)

98. Directed Group Study (1-5)

(P/NP grading only.)

UNITS

99. Special Study for Undergraduates (1-5) (P/NP grading only.)

Upper Division Courses

102. Animal Biochemistry and Metabolism

Lecture — 4 hours; discussion — 1 hour. Prerequisite: Chemistry 2A-2B, 8A-8B. Water and biological buffers; thermodynamics of metabolism; structure and function of biomolecules; enzyme kinetics and function; membrane biology; digestion and absorption; carbohydrate metabolism. Not open for credit to students who have completed Biological Sciences 102.-I. (I.) Calvert

103. Animal Biochemistry and Metabolism

Lecture - 4 hours; discussion - 1 hour. Prerequisite: course 102. Physiological function and metabolism of lipids and amino acids; integrative metabolism; biochemical basis for nutrient requirements; structure and function of vitamins; mineral metabolism and requirements. Not open for credit to students who have completed Biological Sciences 103.-II. (II.) Calvert

187. Animal Biology Seminar (2)

Seminar — 1 hour; discussion — 1 hour. Prerequisite: junior standing, courses 50A, 50B, 50C. Seminar leading to development of the Major Proposal for the Animal Biology major.—I. (I.) R. Kimsey

189. Senior Practicum (2)

Independent study-6 hours. Prerequisite: junior standing, courses 50A, 50B, 50C, and 187; course 189D concurrently the first time course 189 is taken. The practicum may be an experimental research project, a library research project or some other creative activity that will serve as a capstone experience for the Animal Biology major. May be repeated one time for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

189D. Senior Practicum Discussion (1)

Discussion - 1 hour. Prerequisite: junior standing, courses 50A, 50B, 50C, and 187; course 189 required concurrently. Course helps prevent or solve problems during the students' senior practicum activity. (P/NP grading only.) - I, II, III. (I, II, III.)

192. Internship in Animal Biology (1-12)

Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Office, laboratory or fieldwork off or on campus in research, governmental regulation, policy making, and private enterprise dealing with animal related issues of production, welfare, pest management, biodiversity and the environment. All requirements of Internship Approval Request form must be met. (P/NP grading only.)

198. Directed Group Study (1-5)

(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Animal Biology (A Graduate Group)

Trish Berger, Ph.D., Chairperson of the Group

Group Office. 1249 Meyer Hall

(530) 752-2382; Fax (530) 752-0175 http://animalbiology.ucdavis.edu

Faculty

Thomas E. Adams, Ph.D., Professor (Animal Science)

Danika L. Bannasch, Ph.D., Associate Professor (Population Health and Reproduction; School of . Veterinary Medicine)

Trish Berger, Ph.D., Professor (Animal Science) Chris C. Calvert, Ph.D., Professor (Animal Science) Ernie Chang, Ph.D., Professor

(Animal Science; located at Bodega Marine Lab) Alan J. Conley, Ph.D., Professor

(Population Health and Reproduction; School of

Veterinary Medicine)
Mary E. Delany, Ph.D., Professor (Animal Science)
Edward J. DePeters, Ph.D., Professor (Animal Science)

Serge I. Doroshov, Ph.D., Professor (Animal Science) Holly B. Ernest, D.V.M., Ph.D., Associate Professor (Population, Health and Reproduction; School of . Veterinary Medicine)

James G. Fadel, Ph.D., Professor (Animal Science) Thomas R. Famula, Ph.D., Professor (Animal Science)

Nann A. Fangue, Ph.D., Assistant Professor (Wildlife, Fish, and Conservation Biology)

Russell C. Hovey, Ph.D., Associate Professor (Animal Science)

Silas S.O. Hung, Ph.D., Professor (Animal Science) Ermias Kebreab, Ph.D., Professor (Animal Science) Kirk C. Klasing, Ph.D., Professor (Animal Science) Dietmar Kueltz, Ph.D., Professor (Animal Science)

Leslie A. Lyons, Ph.D., Associate Professor (Population Health and Reproduction; School of Veterinary Medicine)

Elizabeth Maga, Ph.D., Associate Researcher and Lecturer (Animal Science)

Brenda J. McCowan, Ph.D., Adjunct Associate Professor (Veterinary Medicine Teaching and Research Center and California National Primate Research Center)

Juan F. Medrano, Ph.D., Professor (Animal Science) Joy A. Mench, Ph.D., Professor (Animal Science) Deanne Meyer, Ph.D., Specialist in Cooperative Extension and Lecturer (Animal Science)

Stuart Meyers, Ph.D., Professor (Anatomy, Physiology and Cell Biology; School of Veterinary Medicine)

James R. Millam, Ph.D., Professor (Animal Science) Frank M. Mitloehner, Ph.D., Associate Professor (Animal Science)

James D. Murray, Ph.D., Professor (Animal Science) Anita M. Oberbauer, Ph.D., Professor (Animal Science)

James W. Oltjen, Ph.D., Specialist in Cooperative

Extension and Lecturer (Animal Science)
Peter H. Robinson, Ph.D., Specialist in Cooperative
Extension and Lecturer (Animal Science) Jan F. Roser, Ph.D., Professor (Animal Science) Pablo J. Ross, Ph.D., Assistant Professor

(Animal Science)

Heidi A. Rossow, Ph.D., Assistant Professor (Population, Health, and Reproduction; School of Veterinary Medicine)
Benjamin N. Sacks, Ph.D., Assistant Adjunct
Professor (Population, Health, and Reproduction;

School of Veterinary Medicine)
Roberto D. Sainz, Ph.D., Professor (Animal Science)

Susan A. Stover, D.V.M., Ph.D., Professor (Anatomy, Physiology, and Cell Biology; School of Veterinary Medicine)

Carolyn L. Stull, Ph.D., Specialist in Cooperative Extension (School of Veterinary Medicine)

M. Cecilia Torres-Penedo, Ph.D., Associate Research Geneticist (Veterinary Genetics Laboratory; School of Veterinary Medicine)

Cassandra B. Tucker, Ph.D., Associate Professor (Animal Science)

Alison L. Van Eenennaam, Ph.D., Specialist in Cooperative Extension and Lecturer (Animal Science)

Huaijun Zhou, Ph.D., Assistant Professor (Animal Science)

Richard A. Zinn, Ph.D., Professor (Animal Science; located at Desert Research and Extension Center)

Graduate Study. The Graduate Group in Animal Biology offers programs of study and research leading to the M.S. and the Ph.D. degrees. The Animal Biology Graduate Group focuses on integrated animal biology. Each student individually tailors his/her program of study to meet individual needs. The Animal Biology Graduate Group is unique in encouraging a multidisciplinary or interdisciplinary approach involving physiology, nutrition, genetics, ecology and/or behavior within the context of organismal animal biology.

Preparation. Applicants should have undergraduate preparation in a field appropriate to the course of study selected, including upper division coursework in most of the following subjects: biochemistry, genetics, nutrition, physiology, and integrative animal biology such as animal management.

Graduate Advisers. R.C. Hovey, S.S.O. Hung, E.A. Maga, J.D. Murray

Courses in Animal Biology (ABG) Graduate Courses

200A. Integrated Animal Biology I (3)

Lecture/discussion-3 hours. Prerequisite: graduate standing; Biological Sciences 101 or the equivalent or the consent of the instructor. Natural history, management, historical and current uses, and specialized disciplinary features of model and novel animal systems used in research. Development of conceptual approaches in organismal biology to improve experimental design and interpretation of interdisciplinary research studies. Limited enrollment; first pass restricted to Animal Biology Graduate Group students.—I. (I.) Berger, DePeters

200B. Integrated Animal Biology II (3)

Lecture/discussion - 3 hours. Prerequisite: course 200A. Natural history, management, historical and current uses, and specialized disciplinary features of model and novel animal systems used in research. Development of conceptual approaches in organismal biology to improve experimental design and interpretation of interdisciplinary research studies. Limited enrollment; first pass restricted to Animal Biology Graduate Group students.—II. (II.) Delany

202. Grant Procurement and Administration (2)

Lecture - 1 hour; discussion/laboratory - 1 hour. Prerequisite: course 200B. Pass 1 restricted to Animal Biology Graduate Group students. Topics include: structure of grants, attention to specifications, concise persuasive writing, and grant budgeting. Identify grant opportunities, write a persuasive research grant proposal, and administer grants. Limited enrollment.—I. (I.) Mitloehner

250. Mathematical Modeling in Biological Systems (4)

Lecture/discussion-4 hours. Prerequisite: graduate standing; Mathematics 16A, 16B, or equivalents required; Mathematics 16C or equivalent recommended; Statistics 100 or equivalent required; more than one course in statistics recommended; Animal Biology 102 or Biological Sciences 102 recommended or equivalent course in biochemistry. Limited enrollment. Model development and evaluation including sensitivity analyses using R. Four principle modeling methodologies included: algebraic functions of biological processes, physiological-based compartmental models, linear programming and meta-analysis. Fundamental background and understanding of mathematical modeling principles in biological systems.—II. (II.) Fadel, Kebreab

255. Physiology of the Stress Response (2)

Lecture/discussion-2 hours. Prerequisite: graduate student. Definition of Stress; Physiological mechanisms of adaptation to stress; Hormonal control of the systemic stress response; Mechanisms of the cellular stress response; Discussion of current trends in stress physiology and current methods for studying the stress response. (Same course as Molecular, Cellular, and Integrative Physiology 255.)—III. (III.) Kue-

290. Seminar in Animal Biology (1)

Seminar-1 hour. Prerequisite: graduate standing. Seminar on advanced topics in animal biology. Presentations by members of the Animal Biology Graduate Group and guest speakers. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

290C. Research Conference (1)

Discussion - 1 hour. Prerequisite: graduate standing and consent of instructor. Student presentations of research in Animal Biology and discussions among participating students and Animal Biology faculty. May be repeated for credit. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.)

298. Group Study in Animal Biology (1-5) Prerequisite: graduate standing.

299. Research (1-11)

Prerequisite: graduate standing and consent of instructor. Research with a faculty member in Animal Biology Graduate Group. May be repeated for credit. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.)

Professional Courses

300. Methods in Teaching Animal Biology (2)

Lecture/discussion-2 hours. Prerequisite: graduate standing and consent of instructor. Practical experience in the methods and problems of teaching animal biology. Includes analysis of laboratory exercises, discussion of teaching techniques, grading scientific essays, preparing for and conducting discussion or laboratory sections, formulating quiz and exam questions under instructor supervision. May be repeated up to three times for credit. (S/U grading only.)—I, II. (I, II.) Famula, Oberbauer

396. Teaching Assistant Training Practicum

Variable - 3-12 hours. Prerequisite: graduate standing and consent of instructor. May be repeated for credit. (S/U grading only.) - I, II, III. (I, II, III.)

Professional Course

401. Ethics and Professionalism in Animal Biology (2)

Discussion-2 hours. Prerequisite: graduate standing; first pass Animal Biology graduate group students. Case studies and discussion of ethical and professional issues for animal biologists, including the use of animals in research and teaching, patenting and intellectual property, consulting and conflict of interest, scientific integrity, dealing with the media, and mentoring relationships.—III. (III.) Mench

Animal Genetics

(College of Agricultural and Environmental Sciences) Faculty. See under Department of Animal Science,

Major Program. See the major in Animal Science, on page 150.

Related Courses. See Biological Sciences 101, 101D; Evolution and Ecology 102, 175; Genetics Graduate Group courses; Microbiology 150, 170, 215, 260, 274, 292; Molecular and Cellular Biology 121, 141, 160L, 161, 162, 163, 164, 178, 182, 221C, 257, 262, 263; Neurobiology, Physiology, and Behavior 131; Plant Biology 151, 152, 154, 161A, 161B; Plant Pathology 215X, 217; Plant Sciences 220, 221.

Courses in Animal Genetics (ANG)

Questions pertaining to the following courses should be directed to the instructor or to the Animal Science Advising Center in 1202 Meyer Hall (530) 754-

Upper Division Courses 101. Animal Cytogenetics (3)

Laboratory/discussion-1 hour; laboratory-6 hours. Prerequisite: Biological Sciences 101, 102 or the equivalent. Principles and techniques of cytoge netics applied to animal systems; chromosome harvest techniques, analysis of mitosis and meiosis, karyotyping, chromosome banding, cytogenetic mapping, chromosome structure and function, com-parative cytogenetics. GE credit: SE.

105. Horse Genetics (2)

Lecture—2 hours. Prerequisite: course 15 and Biological Sciences 101. Coat color, parentage testing, medical genetics, pedigrees, breeds, the gene map and genus Equus. Emphasis on understanding horse genetics based on the unity of mammalian genetics and making breeding decisions based on fundamental genetic concepts. GE credit: SE, SL.-III. (III.)

107. Genetics and Animal Breeding (5)

Lecture—4 hours; laboratory—3 hours. Prerequisite: Biological Sciences 101. Principles of quantitative genetics applied to improvement of livestock and poultry. Effects of mating systems and selection methods are emphasized with illustration from current breeding practices. GE credit: SE.-I. (I.) Medrano

111. Molecular Biology Laboratory Techniques (4)

Lecture —2 hours; laboratory —6 hours. Prerequisite: Biological Sciences 1C, 101, 102, 103. Introduction to the concepts and techniques used in molecular biology; the role of this technology in both basic and applied animal research, and participation in laboratories using some of the most common techniques in molecular biology. GE credit: SE, SL, VL, WE.-I. (I.) Kueltz, Murray

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. Selected topics relating to animal genetics. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

204. Theory of Quantitative Genetics (3)

Lecture - 3 hours. Prerequisite: course 107 or the equivalent. Theoretical basis of quantitative genetics and the consequences of Mendelian inheritance. Concepts used to estimate quantitative genetic differences and basis for partitioning the phenotypic variance. Offered irregularly.

206. Advanced Domestic Animal Breeding

Lecture—3 hours. Prerequisite: course 107 and Animal Science 205; course 204 recommended. Procedures for the genetic evaluation of individuals to include selection indices and mixed model evaluation for single and multiple traits. Methods of estimating genetic trends. Offered in alternate years.

208. Estimation of Genetic Parameters (3)

Lecture-3 hours. Prerequisite: course 107 and Animal Science 205; courses 204 and 108 recommended. General methods for the estimation of components of variance and covariance and their application to the estimation of heritability, repeatability and genetic correlations are considered. Specific emphasis is given to procedures applicable to livestock populations under selection. Offered irregu-

211. Genetic Engineering of Animals (2)

Lecture - 1 hour; lecture/discussion - 1 hour. Review of techniques for the genetic engineering of animals and their limitations and applications. Student-led discussions of recent papers in the field and possible future applications of genetically engineered animals in basic research and applied agricultural and medical research. Offered in alternate years. (S/U grading only.)

212. Sequence Analysis in Molecular Genetics (2)

Lecture/laboratory-2 hours. Prerequisite: Biological Sciences 101 or the equivalent; graduate standing or consent of instructor. Use of computer algorithms and online databases to analyze nucleic acid and protein sequences in molecular genetics research. Offered in alternate years.-II.

298. Group Study (1-5)

Prerequisite: consent of instructor. Lectures and discussions of advanced topics in animal genetics. (S/ U grading only.)

299. Research in Animal Genetics (1-12)

Prerequisite: consent of instructor. (S/U grading

Animal Physiology

See Animal Biology, on page 148; Animal Science, on page 150; Neurobiology, Physiology, and Behavior, on page 436; Philosophy, on page 451; and Molecular, Cellular, and Integrative Physiology (A Graduate Group), on page 426.

Animal Science

(College of Agricultural and Environmental Sciences) Anita M. Oberbauer Ph.D., Chairperson of the Department

Department Office. 2223 Meyer Hall (530) 752-1250; http://animalscience.ucdavis.edu/

Master Adviser. E.J. DePeters

Undergraduate Advising. 1202 Meyer Hall (530) 754-7915; http://asac.ucdavis.edu

Advising Center for the major, minors and course offerings (including peer advising) is located in the Animal Science Advising Center in 1202 Meyer Hall (530) 754-7915. Each student will be assigned a faculty adviser through this office upon entering the

Graduate Advising. 1249 Meyer Hall (530) 752-2382

Faculty

Thomas E. Adams, Ph.D., Professor, Academic Senate Distinguished Teaching Award Trish J. Berger, Ph.D., Professor

C. Christopher Calvert, Ph.D., Professor,

Academic Senate Distinguished Teaching Award Ernest S. Chang, Ph.D., Professor

(Biological Sciences, Bodega Marine Laboratory) Mary E. Delany, Ph.D., Professor and Associate Dean in CA&ES

Edward J. DePeters, Ph.D., Professor, Academic Senate Distinguished Teaching Award, UC Davis Prize for Undergraduate Teaching and Scholarly Achievement

Serge I. Doroshov, Ph.D., Professor John M. Eadie, Ph.D., Professor James G. Fadel, Ph.D., Professor Thomas R. Famula, Ph.D., Professor

Academic Senate Distinguished Teaching Award Russell C. Hovey, Ph.D., Associate Professo Silas S. O. Hung, Ph.D., Professor Ermias Kebreab, Ph.D., Professor Annie J. King, Ph.D., Professor

Kirk C. Klasing, Ph.D., Professor Dietmar Kueltz, Ph.D., Professor Juan F. Medrano, Ph.D., Professor Joy A. Mench, Ph.D., Professor

James R. Millam, Ph.D., Professor Frank M. Mitloehner, Ph.D., Associate Professor and Associate Specialist in Cooperative Extension

James D. Murray, Ph.D., Professor Anita M. Oberbauer, Ph.D., Professor, Academic Senate Distinguished Teaching Award

Janet F. Roser, Ph.D., Professor Pablo J. Ross, Ph.D., Assistant Professor Roberto D. Sainz, Ph.D., Professor Cassandra B. Tucker, Ph.D., Associate Professor Barry W. Wilson, Ph.D., Professor Huaijun Zhou, Ph.D., Assistant Professor Richard A. Zinn, Ph.D., Professor

Emeriti Faculty

Hans Abplanalp, Ph.D., Professor Emeritus Gary B. Anderson, Ph.D., Distinguished Professor Emeritus, Distinguished Teaching Award-Graduate/Professional, UC Davis Prize for Undergraduate Teaching and Scholarly Achievement, Academic Senate Distinguished Teaching Award

C. Robert Ashmore, Ph.D., Professor Emeritus Wallis H. Clark, Jr., Ph.D., Professor Emeritus Douglas E. Conklin, Ph.D., Professor Emeritus Graham A. E. Gall, Ph.D., Professor Emeritus William N. Garrett, Ph.D., Professor Emeritus Yu-Bang Lee, Ph.D., Professor Emeritus Edward O. Price, Ph.D., Professor Emeritus Kathryn Radke, Ph.D., Professor Emeritus Wesley W. Weathers, Ph.D., Professor Emeritus

Affiliated Faculty

Fred S. Conte, Ph.D., Specialist in Cooperative Extension and Lecturer

Joshua Hull, Ph.D., Assistant Adjunct Professor Elizabeth A. Maga, Ph.D., Associate Researcher and Lecturer

Bernard P. May, Ph.D., Adjunct Professor Deanne Meyer, Ph.D., Specialist in Cooperative Extension and Lecturer

Kenji Murata, Ph.D., Assistant Researcher James W. Oltjen, Ph.D., Specialist in Cooperative Extension and Lecturer

Peter H. Robinson, Ph.D., Specialist in Cooperative Extension and Lecturer

Alison L. Van Eenennaam, Ph.D., Specialist in Cooperative Extension and Lecturer

Dana B. Van Liew, M.Ed., Lecturer Academic Federation Excellence in Teaching

The Major Program

The Animal Science major is devoted to the sciences central to understanding biological function of domestic and captive animals, their care, management, and utilization by people for food, fiber, companionship and recreation. Advances in science and technology, and an ever-growing human population, have increased the complexity of issues surrounding the care and management of animals. Specializations within the major allow students to develop a scientific appreciation of animals and their relationship to their environment. Graduates in Animal Science are able to advance the science and technology of animal care and management in an objective and effective manner for the betterment of animals and society.

The Program. The curriculum provides depth in the biological and physiological sciences and allows students to specialize within the broad field of applied animal science. Study begins with introductory courses in animal science, biology, chemistry, mathematics, and statistics. Students undertake advanced courses in animal behavior, biochemistry, genetics, nutrition, and physiology and the integration of these sciences to animal function, growth, reproduction, and lactation. Students complete the curriculum by choosing a specialization in either an animal science discipline (behavior, biochemistry, genetics, nutrition, or physiology) or in the sciences particular to a class of animals (aquatic, avian, comparity of the sciences) animals (aquatic, avian, comparity of the science). panion and captive, equine, laboratory, livestock and dairy, or poultry).

Career Alternatives. A wide range of career opportunities are available to graduates. The primary goal of the major is to prepare students for graduate study leading to the M.S. and Ph.D. degrees; for continued study in a professional school such as veterinary medicine, human medicine or dentistry; for careers in research, agricultural production, farm and ranch management, or positions in business, sales, financial services, health care, agricultural extension, consulting services, teaching, journalism, or laboratory technology.

B.S. Major Requirements:

J	
	UNITS
Preparatory Subject Matter	56-61
Animal Science 1, 2, 41, 41L Biological Sciences 2A, 2B, 2C Chemistry 2A, 2B and 8A, 8B or 118A, 118B Plant Sciences 21 or Engineering Computer Science 15 Mathematics 16A, 16B or 17A, 12 21B Plant Sciences 120 or Statistics 10 Note: Some professional and graceschools may require additional presubject matter. Please consult the ocenter	14 16-18 3-4 7B or 21A, 6-8 00 4 duate

Depth Subject Matter 38-42

Biology: Biological Sciences 101; Animal Genetics 107; Animal Biology 102, 103; Neurobiology, Physiology, and Behavior and Cellular Biology 120L or 160L; Neurobiology, Physiology, and Behavior 101L or 104L; Pathology, Microbiology, and Immunology 126L 2-6

Area of Specialization.....20-23

Choose one area of specialization below; the program of study must be approved in advance by your faculty adviser.

Animal Science with a Disciplinary

Select 20 upper division units, with approval from your faculty adviser, to form a coherent series of courses in one of the following disciplines: animal behavior, biochemistry, genetics, nutrition, or physiology.

Aquatic Animals20

Animal Science 18 and 131; Nutrition 124; and Animal Science 118 or 119. Select additional units from any Animal Genetics or Animal Science course, or other courses approved by your faculty adviser. Students in this specialization must take Animal Science 136 and 137 to meet their Laboratory Depth Subject Matter requirement. Students in this specialization may elect to substitute any of Biological Sciences 104, Evolution and Ecology 112, or Wildlife, Fish, and Conservation Biology 120 and 121 for the 12-unit requirement under Integrative Animal Biology, with approval of your faculty

Avian Sciences......20

Avian Sciences 13, 100, 150; Nutrition 123, 123L. Select additional upper division units from any Animal Genetics, Animal Science, or Avian Sciences courses or other courses approved by your adviser. Students in this specialization must substitute Avian Sciences 103, 121, and

Neurobiology, Physiology, and Behavior 117 for the Animal Science 124 and Neurobiology, Physiology, and Behavior 121 and 121L requirement under Integrative Animal Biology.

Companion and Captive Animals 20

Animal Science 42, 142; Nutrition 122 or 123 and 1231; Animal Science 170. Select additional units from any Animal Genetics, Animal Science or Avian Sciences course, or from Nutrition 115, 122, 123, 123L or other courses approved by your

Equine Science20

Animal Science 15, 115, 141 and one of Animal Science 125, 126 or 127. Select additional units from any Animal Genetics or Animal Science course, or from Nutrition 115, 122, 123, 123L or other courses approved by your faculty adviser.

faculty adviser.

Laboratory Animals23

Animal Science 42, 103, 140, Nutrition 123, 123L, Animal Science 104 or Neurobiology, Physiology, and Behavior 102, and Anatomy, Physiology and Cell Biology 100 or Neurobiology, Physiology, and Behavior 123.

Livestock and Dairy20

Select two of Animal Science 143, 144, 146; Animal Science 145 or 147; Nutrition 115. Select additional upper division units from any Animal Genetics, Animal Science or Avian Sciences course, or from Nutrition 122, 123, 123L or other courses approved by your faculty adviser.

Poultry 20

Avian Sciences 11, 100, 150; Animal Science 143; Avian Sciences 149 or Food Science and Technology 121; Nutrition 123,

Select additional upper division units from any Animal Genetics, Animal Science, Avian Sciences, or other courses approved by your faculty adviser.

Students in this specialization must substitute Avian Sciences 103, 121, and Neurobiology, Physiology, and Behavior 117 for the Animal Science 124 and Neurobiology, Physiology, and Behavior 121 and 121L requirement under Integrative Animal Biology

Total Units for the Major114-126

Minor Program Requirements:

The Department of Animal Science offers five minor programs open to students majoring in other disci-plines who wish to complement their study programs with a minor in Animal Science. Some courses have required prerequisites not included as part of the minor, and students should plan accordingly.

Animal Science—Animal Biology20 Animal Science 15, 42, 41 and 41L, or 41 and 21......3-4 Animal Science 103 or 1043-4 Animal Science 123, 124, or Neurobiology, Physiology, and Behavior 121 and 121L......4 Additional upper division courses 8-10 Select additional units to complete the 20-unit total from upper division Animal Science courses, Animal Genetics courses, Neurobiology, Physiology, and Behavior 121, 121L, Nutrition 115, 122, 123, 123L. Variable unit courses (92, 99, 192, 197T, 198, 199) are not allowed for the completion of this requirement. of this requirement. Animal Science—Animal Genetics20

Animal Science 15, 42, 41 and 41L, or 41

Select additional units to complete the 20-unit total from upper division Animal Science courses, Animal Genetics courses, Avian Science 103, Neurobiology, Physiology, and Behavior 121, 121L, Nutrition 115, 122, 123, 123L. Variable unit courses (92, 99, 192, 197T, 198, 199) are not allowed for the completion of this requirement.

Animal Science—Aquaculture20

Additional upper division courses8 Select additional units to complete the 20-unit total from upper division Animal Science courses, Animal Genetics courses, Applied Biological Systems Technology 161, Nutrition 124, Wildlife, Fish, and Conservation Biology 121. Variable unit courses (92, 99, 192, 197T, 198, 199) are not allowed for the completion of this requirement.

Animal Science—Dairy/Livestock......20

Animal Science 41 and 41L or 21.....4 Animal Science 1044 Additional upper division courses Select 4 or 8 units from Animal Science 143, 144, 146.

Select additional units to complete the 20-unit total from upper division Animal Science courses, Animal Genetics courses, Neurobiology, Physiology, and Behavior 121, 121L, Nutrition 115, 122, 123, 123L. Variable unit courses (92, 99, 192, 197T, 198, 199) are not allowed for the completion of this requirement.

Animal Science—Equine21

Animal Science 125 or 1263 One additional upper division course..... 2-3 Select from upper division Animal Science courses, Animal Genetics courses, Neurobiology, Physiology, and Behavior 121, 121L, Nutrition 115, 122, 123, 123L. Variable unit courses (92, 99, 192, 197T, 198, 199) are not allowed for the completion

Minor Adviser. E.J. DePeters

of this requirement.

Graduate Study. The Animal Biology Graduate Group offers a program of study and research leading to the M.S. or Ph.D, degree in Animal Biology. See Animal Biology (A Graduate Group), on page 149; see also Graduate Studies, on page 111.

Courses in Animal Science (ANS) Lower Division Courses

1. Domestic Animals and People (4)

Lecture-3 hours; laboratory-3 hours. Animal domestication and factors affecting their characteristics and distribution. Animal use for food, fiber, work, drugs, research and recreation; present and future roles in society. Laboratory exercises with beef and dairy cattle, poultry, sheep, swine, laboratory animals, fish, horses, meat and dairy products. GE credit: SciEng, Wrt | SE, WE.—I. (I.) Famula

2. Introductory Animal Science (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 1 and Biological Sciences 1A recommended. Growth, reproduction, lactation, inheritance, nutrition, and disease control in domesticated animals and species used in aquaculture; the application of sciences to animal production. GE credit: SciEng, Wrt | SE, SL, VL, WE.—III. (III.) Murray

15. Introductory Horse Husbandry (3)

Lecture - 3 hours. Prerequisite: course 2 recommended. Introduction to care and use of light horses emphasizing the basic principles for selection of horses, responsibilities of ownership, recreational use and raising of foals. GE credit: QL, SE, VL.—II.

18. Introductory Aquaculture (4)

Lecture—3 hours; discussion—1 hour. Historical and contemporary aquacultural practices. Interaction between the aqueous culture environment and the biology of aquatic animals. Impact of economics and governmental policies on the development of aquaculture. Interaction of aquacultural practices with larger societal goals. GE credit: SciEng | SE, OL, QL, VL, WE.-I. (I.) Kueltz

21. Livestock and Dairy Cattle Judging (2)

Laboratory-6 hours. Prerequisite: course 1 or 2 recommended. Evaluation of type as presently applied to light horses, meat animals and dairy cattle. Relationship between form and function, form and carcass quality, and form and milk production. GE credit: OL, SE.—III. (III.) Van Liew

22A. Animal Evaluation (2)

Laboratory-3 hours; fieldwork-30 hours (total). Prerequisite: course 21 or the equivalent. Attendance at 3 one-day weekend field trips required. Domestic livestock species with emphasis on visual appraisal, carcass evaluation, and application of performance information. Emphasis on accurate written and oral descriptions of evaluations. Prerequisite to intercollegiate judging competition. Offered in alternate years. (P/NP grading only.) GE credit: OL, SE. — (I.) Ýan Liew

22B. Animal Evaluation (2)

Laboratory—3 hours; fieldwork—30 hours (total). Prerequisite: course 22A or the equivalent. Attendance at 3 one-day weekend field trips required. Continuation of course 22A with emphasis on specific species: swine, beef cattle and sheep. Application of animal science principles to selection and management problem-solving scenarios. Prerequisite to intercollegiate judging competition. Offered in alternate years. (P/NP grading only.) GE credit: OL, SE. — (II.) Van Liew

41. Domestic Animal Production (2)

Lecture - 2 hours. Principles of farm animal management, including dairy and beef cattle, sheep, and swine. Industry trends, care and management, nutrition, and reproduction. GE credit: SE. -I. (I.) Mitloehner

41L. Domestic Animal Production Laboratory (2)

Discussion - 1 hour; laboratory - 3 hours. Prerequisite: course 41 (may be taken concurrently). Animal production principles and practices, including five

field trips to dairy cattle, beef cattle, sheep, and swine operations and campus labs. (P/NP grading only.) GE credit: QL, SE, SL, VL, WE. - I, II. (I, II.) Mitloehner, Van Liew

42. Introductory Companion Animal Biology (4)

Lecture — 3 hours; discussion — 1 hour. Companion animal domestication. Historical, contemporary perspectives. Legislation concerning companion animals. Selected topics in anatomy, physiology, genetics, nutrition, behavior and management. Scientific methods in studying the human-animal bond. Discussions: application of biological concepts to problems related to companion animals. GE credit: SciEng, Wrt | QL, SE, SL, WE.—II. (II.) Oberbauer

49A-J. Animal Management Practices (2)

Discussion - 1 hour; laboratory - 3 hours. The application of the principles of elementary biology to the management of a specific animal species. Among the topics offered: (A) Aquaculture, (B) Beef, (C) Dairy, (D) Goats, (E) Horses, (F) Laboratory Animals, (G) Meats, (H) Poultry, (I) Sheep, (J) Swine. Up to four different topics may be taken. (P/NP grading only.)—I, II, III. (I, II, III.)

90C. Research Group Conference (1)

Discussion - 1 hour. Prerequisite: lower division standing, consent of instructor. Weekly conference on research problems, progress and techniques in the animal sciences. May be repeated for credit. (P/ NP grading only.) — I, II, III. (I, II, III.)

92. Internship in Animal Science (1-12)

Internship - 3-18 hours. Prerequisite: consent of instructor. Internship off and on campus in dairy, livestock, and aquaculture production, research and management; or in a business, industry, or agency associated with these or other animal enterprises. All requirements of Internship Approval form must be met. (P/NP grading only.)—I, II, III. (I, II, III.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading

99. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading

Upper Division Courses 103. Animal Welfare (4)

Lecture - 2 hours; discussion - 2 hours. Prerequisite: course 104 or Neurobiology, Physiology, and Behavior 102 or the equivalent or consent of instructor. The application of principles of animal behavior and physiology to assessment and improvement of the welfare of wild, captive, and domestic animals. Topics include animal pain, stress, cognition, motivation, emotions, and preferences, as well as environmental enrichment methods. GE credit: SE, SL.-I. (I.) Mench

104. Principles and Applications of Domestic Animal Behavior (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 2 or Biological Sciences 2B. Basic principles of animal behavior as applied to domesticated species. Emphasis placed on application of the principles of animal behavior. GE credit: SciEng | OL, SE.—II. (II.) Tucker

106. Domestic Animal Behavior Laboratory

Laboratory-6 hours. Prerequisite: course 104 or the equivalent. Research experience with the behavior of large domestic animals. Experimental design, methods of data collection and analysis, and reporting of experimental results. GE credit: SciEng, Wrt | QL, SE, SL, VL, WE.—III. (III.) Tucker

112. Sustainable Animal Agriculture (3)

Lecture/discussion-3 hours. Prerequisite: Biological Sciences 2B or course 1; Statistics 100 or Plant Sciences 120 recommended. Current applications of sustainable animal agriculture including the challenges of animal production, animal needs, animal well-being, and protection of the environment and resources for future food supply systems. Various scenarios for meeting sustainability objectives are evaluated using computing modeling. GE credit: OL, QL, SE or SS.—III. (III.) Kebreab

115. Advanced Horse Production (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 15; Biological Sciences 101; Nutrition 115; Neurobiology, Physiology, and Behavior 101; or consent of instructor. Feeding, breeding, and management of horses; application of the basic principles of animal science to problems of production of all types of horses. Designed for students who wish to become professionally involved in the horse industry. GE credit: SciEng | QL, SE, SL, WE.—I. (I.) Roser

118. Fish Production (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: Wildlife, Fish, and Conservation Biology 120 and 121. Current practices in fish production; relationship between the biological aspects of a species and the production systems, husbandry, management, and marketing practices utilized. Emphasis on species currently reared in California. GE credit: SE.-II. (II.) Doroshov

119. Invertebrate Aquaculture (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Biological Sciences 1B. Management, breeding and feeding of aquatic invertebrates; application of basic principles of physiology, reproduction, and nutrition to production of mollusks and crustaceans for human food; emphasis on interaction of species biology and managerial techniques on production efficiencies. GE credit: SE.

120. Principles of Meat Science (3)

Lecture—3 hours. Prerequisite: Biological Sciences 1A. Anatomical, physiological, developmental, and biochemical aspects of muscle underlying the conversion of muscle to meat. Includes meat processing, preservation, microbiology, and public health issues associated with meat products. (Same course as Food Science and Technology 120.) GE credit: SciEng | SE.

120L. Meat Science Laboratory (2)

Discussion-1 hour; laboratory-3 hours. Prerequisite: Biological Sciences 1A; course 120 (may be taken concurrently). Laboratory exercises and student participation in transformation of live animal to carcass and meat, structural and biochemical changes related to meat quality, chemical and sensory evaluation of meat, and field trips to packing plant and processing plant. (Same course as Food Science and Technology 120L.) GE credit: SE.

123. Animal Growth and Development (4)

Lecture - 3 hours; lecture/discussion - 1 hour. Prerequisite: Animal Biology 103 or Biological Sciences 103. Growth and development of animals from conception to maturity, viewed from practical and biological perspectives; includes genetic, metabolic, nutritional control of cell and organism function. GE credit: SciEng | OL, QL, SE, VL, WE.—III. (III.) Ross

124. Lactation (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101; Animal Biology 103 (may be taken concurrently); or the equivalent background knowledge. Consideration of the biochemical, genetic, physiological, nutritional, and structural factors relating to mammary gland development, the initiation of lactation, the composition of milk and lactational performance. GE credit: SciEng, Wrt | SE, SL.—II. (II.) Hovey

125. Equine Exercise Physiology (3)

Lecture - 3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101. Distance learning class broadcast from Cal Poly, Pomona, on basic and applied physiology of the exercising horse. Includes physiological systems, gait analysis, lameness, pharmacology, sports medicine; sport horse performance evaluation and conditioning. (Students and instructor have two-way communication capabilities.) Offered in alternate years. GE credit: SE.-III.

126. Equine Nutrition (3)

Lecture - 3 hours. Prerequisite: course 15, Nutrition 115. Distance learning class broadcast from Cal Poly, Pomona and CSU Fresno on equine nutrition. Includes equine digestion, digestive physiology, diet development and evaluation, and the relationship of the topics to recommended feeding practices and nutritional portfolios. GE credit: SE

127. Advanced Equine Reproduction (3)

Lecture—3 hours. Prerequisite: an upper division physiology course (e.g., Neurobiology, Physiology, and Behavior 101) and an advanced horse production and management course (e.g., course 115). Distance learning course that provides in-depth knowledge of the reproductive physiology, anatomy and endocrinology of the mare and stallion. Emphasis on structure/function relationships as they are applied to improving equine reproductive management and efficiency. GE credit: QL, SE, WE.—III. (III.) Roser

128. Agricultural Applications of Linear Programming (4)

Lecture - 2 hours; laboratory - 2 hours; discussion -1 hour. Prerequisite: upper division standing and Agricultural Systems and Environment 21 or the equivalent. Applications of linear programming in agriculture, emphasizing resource allocation problems and decision making. Problems include crop production, ration formulation, and farm management. Hands-on experience in developing linear programs and interpreting the results. GE credit: QL, SE, SL.—II. (II.) Fadel

129. Environmental Stewardship in Animal **Production Systems (3)**

Lecture—3 hours. Prerequisite: Biological Sciences 10 or 1A and 1B, Chemistry 2A, 2B, 8A, 8B. Management principles of environmental stewardship for grazing lands, animal feeding, operations and aquaculture operations; existing regulations, sample analyses, interpretation and utilization of data, evaluation of alternative practices, and policy development. GE credit: SE, SL.—II. Meyer

131. Reproduction and Early Development in Aquatic Animals (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Molecular and Cellular Biology 150; Wildlife, Fish, and Conservation Biology 120, 121; or consent of instructor. Physiological and developmental functions related to reproduction, breeding efficiency and fertility of animals commonly used in aquaculture. GE credit: SE, WE.—III. (III.) Doroshov

136A. Techniques and Practices of Fish Culture (2)

Lecture—1 hour; laboratory—3 hours. Prerequisite: course 2. Daily care and maintenance of fish in residential aquariums, research and commercial facilities. Biological and environmental factors important to sound management of fish. Laboratories focus on fish culture and include growth trials. Not open for credit to students who have completed course 136. GE credit: QL, SE, SL, VL, WE. - I. (I.) Hung

136B. Techniques and Practices of Avian Culture (2)

Lecture - 1 hour; laboratory - 3 hours. Prerequisite: course 2. Daily care and maintenance of birds for research, commercial production, and companion or hobby uses. Biological and environmental factors important to sound management of birds. Laboratories focus on bird husbandry, management and care, and include growth trials. GE credit: QL, SE, SL, VL, WE.—III. (III.) Hung

137. Animal Biochemistry Laboratory (2)

Lecture — 1 hour; laboratory — 3 hours. Prerequisite: Animal Biology 102 or Biological Sciences 102 or the equivalent. Chemical and biochemical methods, and instruments commonly used in animal science. Wet chemical methods, ÚV/visible and atomic absorption spectrophotometry, thin-layer and gas-liquid chromatography, commercial chemical kits. Attention to safety. GE credit: QL, SE, SL.—I, III. (I, III.) Hung

140. Management of Laboratory Animals

Lecture — 3 hours; laboratory — 3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101. Laboratory animal management procedures in view of animal physiology, health and welfare, government regulations, and experimental needs. Clinical techniques using rodents and rabbits as models. GE credit: SE.-I. (I.)

141. Equine Enterprise Management (4)

Lecture/discussion-4 hours. Prerequisite: course 115; Economics 1A, 1B recommended. Examination of the concepts and principles involved in the operation of an equine enterprise. Essential aspects of equine enterprise management, including equine law, marketing, cash flow analysis, and impact of state and federal regulations. GE credit: SocSci, Wrt | SS.-II.

142. Companion Animal Care and Management (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 42, Biological Sciences 101, Neurobiology, Physiology, and Behavior 101; Animal Biology 102 and 103 recommended. Management and production of companion animals. Integration of the disciplinary principles of behavior, genetics, nutrition, and physiology as related to the care of companion animals. GE credit: OL, QL, SE, SL, VL, WE.-I. (I.) Oberbauer

143. Pig and Poultry Care and Management (4)

Lecture-3 hours; laboratory-3 hours; Saturday field trips. Prerequisite: Nutrition 115, Neurobiol ogy, Physiology, and Behavior 101. Care and management of swine, broilers and turkeys as related to environmental physiology, nutrition and metabolism, disease management and reproduction. Offered in alternate years. GE credit: SE, SL.—(I.) King

144. Beef Cattle and Sheep Production (4)

Lecture—3 hours; laboratory—3 hours; one or two Saturday field trips. Prerequisite: course 41, Animal Genetics 107, Nutrition 115, or consent of instructor; a course in Range Science and a course in microcomputing are recommended. Genetics, physiology, nutrition, economics and business in beef cattle and sheep production. Resources used, species differences, range and feedlot operations. Emphasis on integration and information needed in methods for management of livestock enterprises. GE credit: OL, QL, SE, SL, VL, WE.-III. (III.) Sainz, Zinn

145. Meat Processing and Marketing (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 143 or 144 or consent of instructor. Distribution, processing and marketing of meat and meat products. Meat and meat animal grading and pricing. Government regulations and social/consumer concerns. Future trends and impact on production management practices. Includes poultry. GE credit:

146. Dairy Cattle Production (4)

Lecture - 3 hours; laboratory - 3 hours; one mandatory Saturday field trip. Prerequisite: course 124, Animal Genetics 107, and Nutrition 115, or consent of instructor. Scientific principles from genetics, nutrition, physiology, and related fields applied to conversion of animal feed to human food through dairy animals. Management and economic decisions are related to animal biology considering the environment and animal well-being. GE credit: SciEng, Wrt | OL, QL, SE, SL, VL, WE.—III. (III.) DePeters

147. Dairy Processing and Marketing (3)

Lecture - 2 hours; laboratory - 3 hours. Prerequisite: course 146 or consent of instructor. Examination of distribution systems, processing practices, product quality, impact of government policy (domestic and foreign), marketing alternatives, and product development. GE credit: SE.

148. Enterprise Analysis in Animal Industries (4)

Lecture/discussion-4 hours. Prerequisite: course 141 or 145 or 147 or consent of instructor. Examination and application of decision making and problem solving in the production enterprise. The areas

of production analysis, problem solving, risk analysis and cost-benefit analysis will be examined in terms of the total enterprise. GE credit: SocSci, Wrt | OL, QL, SS, WE.-IIİ. (III.) Kebreab

149. Farrier Science (3)

Lecture - 3 hours. Prerequisite: course 115. Distance learning class broadcast from California Polytechnic State University San Luis Obispo, California Polytechnic State University Pomona, and California State University Fresno. In-depth examination of the structure-function relationship of the equine hoof and how it relates to conformation, injury, and performance. GE credit: SE.

149L. Farrier Science Laboratory (1)

Laboratory—3 hours. Prerequisite: course 149 (may be taken concurrently) or consent of instructor. The art and science of horseshoeing in equine related fields. Proper use of the tools, materials and techniques in the fabrication of shoes and safe preparation of the hoof for application of shoes. (P/NP grading only.)

170. Ethics of Animal Use (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: any basic course in composition or speech. Ethical issues relating to animal use in contemporary society. Integration of philosophical theories with scientific evidence relating to animal behavior, mentality, and welfare. Uses of animals in agriculture, research, and as companions. Ethical responsibilities regarding wildlife and the environment. GE credit: SocSci, Wrt | SL, SS, WE.-III. (III.) Mench

190C. Research Group Conference (1)

Discussion-1 hour. Prerequisite: advanced standing; consent of instructor. Weekly conference on research problems, progress and techniques in the animal sciences. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

192. Internship in Animal Science (1-12)

Internship - 3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Internship off and on campus in dairy, livestock and aquaculture production, research and management; or in a business, industry, or agency associated with these or other animal enterprises. All requirements of Internship Approval Form must be met. (P/NP grading only.) — İ, II, III. (I, II, III.)

194. Research in Animal Science (3)

Laboratory-6 hours; discussion-1 hour. Prerequisite: upper division standing, course 193, one laboratory course in animal biology and consent of instructor. Research with a faculty mentor. Weekly discussion and laboratory on specific research topic. May include a seminar to research group. Choose from sections: (1) Animal Behavior; (2) Animal Genetics; (3) Animal Nutrition; (4) Animal Physiology. May be repeated for credit for a total of four times. —I, II, III. (I, II, III.)

194HA. Undergraduate Honors Thesis in Animal Science (4)

Lecture—1 hour; laboratory—9 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101, Animal Biology 103; minimum cumulative GPA of 3.200 and selection by the Honors Selection Committee. Students will carry out a research project (chosen from faculty-suggested or approved proposals) during the academic year under the guidance of a faculty member. Upon completion, student will write a thesis and present a public seminar describing his/her research. (Deferred grading only, pending completion of sequence.) GE credit: OL, SE.

194HB. Undergraduate Honors Thesis in Animal Science (4)

Lecture-1 hour; laboratory-9 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101, Animal Biology 103; minimum cumulative GPA of 3.200 and selection by the Honors Selection Committee. Students will carry out a research project (chosen from faculty-suggested or approved proposals) during the academic year under the guidance of a faculty member. Upon completion, student will write a thesis and present a public seminar describing his/her research. (Deferred grading only, pending completion of sequence.) GE credit: SE, VL

194HC. Undergraduate Honors Thesis in Animal Science (4)

Lecture - 1 hour: laboratory - 9 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101, Animal Biology 103; minimum cumulative GPA of 3.200 and selection by the Honors Selection Committee. Students will carry out a research project (chosen from faculty-suggested or approved proposals) during the academic year under the guidance of a faculty member. Upon completion, student will write a thesis and present a public seminar describing his/her research. (Deferred grading only, pending completion of sequence.) GE credit: SE, WE.

197T. Tutoring in Animal Science (1-2)

Tutorial - 1-2 hours. Prerequisite: Animal Science or related major, advanced standing, consent of instructor. Tutoring of students in lower division animal science courses; weekly conference with instructors in charge of courses; written critiques of teaching procedures. May be repeated one time for credit. (P/ NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

200. Strategies in Animal Production (4)

Lecture/discussion-4 hours. Prerequisite: consent of instructor. Examines the forces and issues in animal agriculture through the strategic management process.

206. Models in Agriculture and Nutrition (3)

Lecture - 2 hours; laboratory - 3 hours. Prerequisite: Mathematics 16B; Statistics 108. Basic model building principles and techniques for statistical and systems simulation models. Optimization techniques for non-linear experimental designs and management models are presented. Quantitative analysis and evaluation of linear and non-linear equations used in agriculture and nutrition.

259. Literature in Animal Science (1)

Seminar-1 hour. Prerequisite: graduate standing. Critical presentation and analysis of recent journal articles in animal science. May be repeated for credit up to nine times. (S/U grading only.)

290. Seminar (1)

Seminar - 1 hour. Reports and discussions of topics of interest in genetics, nutrition, and physiology as they apply to animal science. (S/U grading only.)-1, 11, 111. (1, 11, 111.)

290C. Research Group Conference (1)

Discussion - 1 hour. Prerequisite: graduate standing. Weekly conference on research problems, progress and techniques in the animal sciences. May be repeated for credit. (S/U grading only.)-I, II, III. (I, 11. 111.)

291. Current Research in Animal Science (1)

Seminar — 1 hour. Prerequisite: graduate standing Current research in animal science explored at weekly seminars presented by guest lecturers. Discussion of research presented. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, İII.)

297. Supervised Teaching in Animal Science

Supervised teaching — 6 hours. Prerequisite: consent of instructor. Practical experience in teaching Animal Science at the University level; curriculum design and evaluation; preparation and presentation of material. Assistance in laboratories, discussion sections, and evaluation of student work. An evaluation letter sent to the Graduate Adviser with a copy to the student. (S/U grading only.)—I, II, III. (I, II, İİI.)

298. Group Study (1-5)

Prerequisite: consent of instructor. (Sect. 1, 2, 3-letter grading; from Sect. 4 on—S/U grading only.)

299. Research (1-12)

(S/U grading only.)

Animal Science and Management

(College of Agricultural and Environmental Sciences)

Master Adviser. J.G. Fadel

Advising Center for the major (including peer advising) is located in 1202 Meyer Hall (530) 754-7915. Each student will be assigned a faculty adviser through this office upon entering the major. http://asac.ucdavis.edu

The Major Program

The Animal Science and Management major combines a thorough education in the basic biology of domestic animal species with a strong background in agricultural economics. Graduates of this interdisciplinary major will be well positioned to adjust to our rapidly changing world and job market.

The Program. The interdisciplinary program in Animal Science and Management combines a fundamental background in the natural sciences (chemistry, biology, physiology, nutrition, genetics, mathematics, and behavior), with an understanding of economics and humanities. After completing preparatory courses, students focus on both the animal species that interest them (horses, cattle, sheep, companion animals, goats, fish, crustaceans or mollusks, among others) and principles of managerial eco-nomics (marketing, finance, business organization or systems analysis). Students preparing for medical or veterinary school can meet professional entrance requirements with those of this major if they plan

Career Alternatives. Job opportunities for successful graduates are plentiful and include positions with banking and financial institutions, agribusiness, Peace Corps, and farms of all scales. Most Animal Science and Management graduates are well prepared for professional study (medical, law, veterinary, and graduate business schools) as well as graduate research programs leading to the M.S. or Ph.D. degrees. Advanced degrees open doors to work as extension specialists, farm advisers, and teachers, and prepare students for international ser-

B.S. Major Requirements:

UNITS

Written and Oral Expression...... 8

Select two courses (if not selected for English college requirement) from Communication 130, 134, 135, 136, 140; Nematology 150; University Writing Program 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 104A, 104B, 104C, 104D, 104E, 104F...... 8

Preparatory Subject Matter 69-72

Animal Science 1 and 2 8 Biological Sciences 2A, 2B, and 2C; or Biological Sciences 1A, 1B, and one of

Biological Sciences 1C, Plant Science 110A, 112, or Environmental Horticulture 6	13-15 16 nce 3-4 IA, 16 the more
Plant Sciences 120, Statistics 100 o	
other courses in quantitative skills w	ith prior
approval of the Master Adviser	
Depth Subject Matter	27-30
Biological Sciences 101	
Nutrition 115	
Neurobiology, Physiology, and Beha	_
Pusings Management	1417

Business Management 14-17 Agricultural and Resource Economics One course from Agricultural and Resource Economics 113, 130, 136, 138; One course from Agricultural and Resource Economics 120, 132, 140, 145, 157; Plus one course from Animal Science 128 or Agricultural and Resource Economics

Area of Specializations 14-16 Choose one area of specialization below. Aquatic Animals 16 Animal Science 18, 118 or 119, 131, and

Companion Animals16 Animal Science 42, 140, 142, and 148. Dairy...... 15 Animal Science 41, 41L, 146, 147, and

Equine 15 Animal Science 15, 115, 141, and 148. Livestock 16

Poultry 15 Avian Sciences 11, Animal Science 143, 145, and 148.

Animal Science 41, 41L, 143 or 144, 145,

148.

and 148.

Individualized......14-16

Students may, with prior approval of their adviser and the Master Adviser, design their own individualized specialization within the major. The specialization will consist of 4 to 6 courses with one of the courses being Animal Science 148. The other courses will include an introduction, care and management, and processing and/or marketing aspects of the animal of interest.

Restricted Electives.....8-10

At least two additional courses (minimum 8 units; duplicate from Depth courses not counted) selected with approval of adviser from: Agricultural and Resource Economics 18, 112, 113, 118, 120, 130, 132, 136, 138, 140, 142, 143, 144, 145, 150, 155, 157, 171A, 171B, 176; Animal Science 103, 104, 106, 115, 118, 119, 120, 120L, 123, 124, 125, 126, 127, 128, 129, 131, 136, 137, 140, 141, 142, 143, 144, 145, 146, 147, 149, 170, 192, 194, 194H; Avian Sciences 100, 103, 115, 121, 123, 149, 150; Animal Genetics 101, 105, 107, 111; Nutrition 122, 123, 123L, 124; Animal Biology 102 (strongly recommended), 103; Computer Science Engineering 124; Management 100; Neurobiology, Physiology, and Behavior 117, 121, 121L, 130; Wildlife, Fish, and Conservation Biology 120, 120L, 130.

Total Units for the Major 126-136

Anthropology

(College of Letters and Science) Li Zhang, Ph.D., Chairperson of the Department Department Office. 328 Young Hall (530) 752-0745; http://www.anthroplogy.ucdavis.edu

Faculty

Robert L. Bettinger, Ph.D., Professor Monique Borgerhoff Mulder, Ph.D., Professor Christyann Darwent, Ph.D., Associate Professor Marisol de la Cadena, Ph.D., Professor Timothy K. Choy, Ph.D., Associate Professor (Science and Technology Studies) Donald L. Donham, Ph.D., Professor Joseph Dumit, Ph.D., Professor (Science and Technology Studies)
Jelmer W. Eerkens, Ph.D., Professor Cristiana L. M. Giordano, Ph.D., Assistant Professor Lynne A. Isbell, Ph.D., Professor Academic Senate Distinguished Teaching Award Suad Joseph, Ph.D., Professor (Women and Gender Studies)

Alan Klima, Ph.D., Associate Professor Andrew J. Marshall, Ph.D., Associate Professor Richard McElreath, Ph.D., Associate Professor Suzana M. Sawyer, Ph.D., Associate Professor Janet S. Shibamoto-Smith, Ph.D., Professor David Glenn Smith, Ph.D., Professor James Smith, Ph.D., Associate Professor Smriti Srinivas, Ph.D., Professor Teresa E. Steele, Ph.D., Assistant Professor Timothy D. Weaver, Ph.D., Associate Professor Bruce P. Winterhalder, Ph.D., Professor Aram A. Yengoyan, Ph.D., Professor Li Zhang, Ph.D., Professor

Emeriti Faculty

David J. Boyd, Ph.D., Professor Emeritus Richard T. Curley, Ph.D., Senior Lecturer Emeritus William G. Davis, Ph.D., Professor Emeritus Alexander H. Harcourt, Ph.D., Professor Emeritus Sarah B. Hrdy, Ph.D., Professor Emerita Henry M. McHenry, Ph.D., Professor Emeritus UC Davis Prize for Undergraduate Teaching and Scholarly Achievement David L. Olmsted, Ph.D., Professor Emeritus Peter S. Rodman, Ph.D., Professor Emeritus Carol A. Smith, Ph.D., Professor Emerita Carolyn F. Wall, Senior Lecturer Emerita

The Major Program

Anthropology is the systematic study of human beings. The student of anthropology learns about human biology, ecology, and social life—past and present—and gains a broad understanding of humans and societies. It is a diverse field, and the courses, faculty, and degree programs at UC Davis are subdivided into two wings—Evolutionary and Sociocultural.

Evolutionary. Evolutionary anthropologists are united by their common application of science to understand the behavior, ecology, history, and evolution of humans and non-human primates, as individuals and as societies. The many useful approaches to these topics bring together archaeology, human behavioral ecology, molecular anthropology, paleoanthropology, biogeography, conservation biology, and primatology. Archaeology is the study of the history or prehistory by analysis of a people's artifacts, or their material culture, with the goal of constructing culture history and reconstructing human behavior. Human behavioral ecology is the study of how variation in ecology and social organization can help us understand variation in human behavior. Molecular anthropology uses DNA to study the genetic relationships among different populations and the adaptive significance of specific genetic traits. Paleoanthropology uses comparisons among fossilized remains to understand what morphological changes occurred during the course of human evolution. Biogeography investigates the biology behind the geographic distribution of species, and also of human cultures. Conservation biology explores the causes of loss of biological diversity—in this department, it focuses on threatened non-human primates and the conservation of natural resources by a rapidly growing population. Primatology is the study of behavior, ecology and morphology of pri-mates to address questions about the evolution and function of behavioral and morphological patterns in nonhuman primates and to test models of the origins of human morphology and behavior.

Sociocultural. Sociocultural anthropologists study the varied ways in which people around the world organize their lives and interpret the circumstances in which they operate. Their main method is extended field research, which combines attention to global issues with the close study of human relations and culture. Among the themes addressed in the department's undergraduate courses are globalization and transnationalism; human ecology and environmental change; cultures of healing, health and medicine, the global spread of media and technology; migration, multiculturalism and urban life; colonialism and neocolonialism development and postdevelopment; race, class and gender; politics and the political; cultures of everyday life; language use and discourse; and self, identity and family. The track in sociocultural anthropology thus offers a rich set of resources for understanding and engaging pressing issues in a globalizing world characterized by new forms of international culture and community as well as by increasing material inequality and political volátility.

The Program. The Bachelor of Arts program is divided into two tracks, Sociocultural and Evolutionary, which parallel the two wings described above. Students interested in the study of recent and contemporary human languages and societies should follow the Sociocultural Track. To obtain a A.B. degree in sociocultural anthropology, each student is required to complete courses that provide (1) foundational skills, (2) language and cultural skills, (3) comprehensive skills, and (4) specialized skills. Students interested in the study of archaeology; primate studies; or human biology, ecology or origins should follow the Evolutionary Track. The B.A. degree offered by the Evolutionary Track provides general training in anthropology from an evolutionary perspective. The Evolutionary Track also offers a B.S. degree that requires more rigorous lower division coursework in math and science than the A.B. degree and upper division coursework in biological anthropology and closely related disciplines.

Students in both tracks are encouraged to gain practical experience through courses taken while studying abroad (under the administration of the Education Abroad Center) and through internships performed for credit (under the administration of the Internship and Career Center). Students showing exceptional ability are welcome to seek permission from instructors to participate in graduate seminars offered by the department and to have these courses count towards the fulfillment of upper division requirements for the major.

Career Alternatives. A Bachelor of Arts degree in Anthropology is suited for students seeking a solid liberal arts education. With its broad goal to facilitate understanding across lines of cultural difference, sociocultural anthropology prepares students for lives that are influenced by increasingly pervasive cultural exchange, as well as cultural conflict, around the world. The program serves as excellent preparation for careers in which inter-cultural skills are increasingly needed, including social and environmental activism, business, diplomacy and social administration, journalism, law, education and international relations. Students that focus on evolutionary processes will be well prepared to enter fields such as medical or health anthropology, museum studies, cultural resource management and wildlife conservation. A Bachelor of Science degree in Anthropology provides suitable pre-medical, predental, and pre-veterinary training, and the educational background for further training in the health

professions, biological/evolutionary sciences and forensic investigation. The A.B. or B.S. degree in anthropology with appropriate courses in education is good preparation for high school teaching in social, biological and natural sciences. An anthropology degree also provides the foundation for advanced study leading to careers in college-level teaching and research.

A.B. Major Requirements:

UNITS

UNIIS
Evolutionary Track:
Preparatory Subject Matter19-21
Anthropology 1, 2, 312
Anthropology 15 or 23
Anthropology 13, Statistics 13, 32, 100 or 1023-4
Depth Subject Matter42-47
Two courses from Anthropology 101, 102, 103, 105, 122A, 128A, 154A, 154B, 158, 178
Total Units for the Major61-68

Note: Evolutionary track courses at the upper division level are courses 101, 102, 103, 105, 122A, 128A, and 151 to 184

Sociocultural Track:

Preparatory Subject Matter.....20-22 Anthropology 2 Two courses from: Anthropology 1, 3, Select one of the following three options: (1) Two additional quarters of the foreign language used to meet the L&S language

requirement......8-10 (2) Two additional lower division sociocultural track courses......8-10 (3) Eight quarter units Study Abroad 8

Depth Subject Matter38-41 Anthropology 100, 110......8 Two upper division area-focus sociocultural track courses8 Select one of the following two options in consultation with, and only after prior written approval of, sociocultural track undergraduate adviser (see list below identifying upper division sociocultural; see list above identifying evolutionary track

(1) Six additional upper division anthropology courses (two courses may be in the evolutionary track; and up to six units can be internships)......24-28 (2) Six additional upper division courses that may combine four sociocultural track courses with up to two related courses in a single academic discipline (including but not limited to: African American and African Studies, American Studies, Art Studio, Art History, Asian American Studies, Chicana/o Studies, Communication, Community and Regional Development, Economics, East Asian Studies, History, Linguistics, Music, Native American Studies, Nature and Culture, Philosophy, Political Science, Psychology, Religious Studies, Sociology, Textiles and Clothing, Theatre and Dance, Women and Gender Studies)......24-28

Evolutionary emphasis 18-30

Anthropology courses chosen in consultation

Any five upper division Evolutionary

with an evolutionary track adviser.

156 Anthropology	
Total Units for the Major	50-66
Note: Sociocultural track courses at the upp division level are those with numbers from 100 to 149B, with the exception of 101, 103, 105, 128A, and 141B. Area-focus sociocultural track courses are those that rel in their titles to one or more peoples or regions of the world.	_
B.S. Major Requirements:	
	UNITS
Preparatory Subject Matter	
Anthropology 1, 2, 3	4
Chemistry 2A, 2B, and 8A, 8B, or 118A, 118B16-1 Mathematics 16A-16B-16C or	8
Mathematics 16A-16B-16C or 17A-17B-17C or 21A-21B-21C 9-1	2
Anthropology 13, Statistics 13, 32, 100,	
or 1023. Depth Subject Matter	
Anthropology 152, 153, 154A	
Three additional courses in anthropology chosen in consultation with evolutionary tra	ck
undergraduate adviser8-1	2
Biological Sciences 101 Evolution and Ecology 100	4
Additional units from the list below to achieve a minimum of 45 upper division	
units	4
Anthropology 101, 102, 103, 105, 122 128A, 151, 154B, 154BL, 155, 156,	Α,
128A, 151, 154B, 154BL, 155, 156, 157, 157L, 158, 159, 180; Anatomy,	
Physiology and Cell Biology 100; Biological Sciences 102, 103; Cell Biological	ду
and Human Anatomy 101, 101L; Environmental Science and Policy 100;	
Evolution and Ecology 101, 102, 103, 104, 105, 138, 141, 147, 149, 175;	
Exercise Science 103, 115; Geology, 10	7,
107L, 108, 144, 146; History and Philosophy of Science 131; Molecular ar	
Cellular Biology 120L, 121, 150, 150L.	
160L, 161, 162, 163, 164; Neurobiolog Physiology, and Behavior 101, 101L, 10	ју, 2,
123, 124, 150, 152; Psychology 101,	1
113, 121, 122, 123, 124; Statistics 10- 106, 108, 130A, 130B; Wildlife, Fish, a	nd
Conservation Biology 141, 154 Total Units for the Major	2.105
Recommended	-105
Anthropology 5, 15, 50; Geology 1; Psycho	logy 1
Major Advisers. Consult Department office	€.
Minor Program Requirements:	
Anthropology	UNITS
General emphasis	
One course from Anthropology 101, 102,	
103, 105, 122A, 128A, 151, 152, 153, 154A, 155, 156, 157, 158, 1593	-5
One course from Anthropology 170, 171, 172, 173, 176, 180, 183, 184	
	4
One course from Anthropology 140A throu	gh
One course from Anthropology 140A through 149B, 178 or any other sociocultural track	gh
One course from Anthropology 140A through 149B, 178 or any other sociocultural track course that refers in its title to one or more peoples or regions of the world	gh 4
One course from Anthropology 140A through 149B, 178 or any other sociocultural track course that refers in its title to one or more peoples or regions of the world	gh 4 ah
One course from Anthropology 140A through 149B, 178 or any other sociocultural track course that refers in its title to one or more peoples or regions of the world	gh 4 gh 8
One course from Anthropology 140A through 149B, 178 or any other sociocultural track course that refers in its title to one or more peoples or regions of the world	gh 4 gh 8 20-25
One course from Anthropology 140A through 149B, 178 or any other sociocultural track course that refers in its title to one or more peoples or regions of the world	gh 4 gh 8 20-25 4
One course from Anthropology 140A through 149B, 178 or any other sociocultural track course that refers in its title to one or more peoples or regions of the world	gh 4 gh 8 20-25 4
One course from Anthropology 140A through 149B, 178 or any other sociocultural track course that refers in its title to one or more peoples or regions of the world. Two courses from Anthropology 100 through 139BN, excluding 101, 103, 105, 128A, and 141B. Archaeology emphasis	gh 4 gh 8 20-25 4

or the Major 60-66	Sociocultural emphasis19-21
cultural track courses at the upper are those with numbers from	Anthropology 100
s, with the exception of 101,	track course4

n area-focus sociocultural track course..... (area-focus sociocultural track courses are those that refer in their titles to one or more peoples or regions of the world) Two courses from Anthropology 102 through 139BN, excluding 103, 105, and One additional upper division Anthropology course chosen in consultation with

adviser 3-5 Minor Advisers. Consult Department office.

sociocultural track undergraduate

Honors Program. Candidates for high or highest honors in Anthropology must write a senior thesis under the direction of a faculty member. The thesis project will have a minimum duration of two quarters. Honors candidates must take at least six units of Anthropology 194H. Only students who, at the end of their junior year (135 units), have attained a cumulative grade point average of 3.500 in Anthro pology courses will be eligible for the honors program. The quality of the thesis work will be the primary determinant for designating high or highest honors at graduation.

Teaching Credential Subject Representative. ; see the Teaching Credential/M.A. Program on page 115.

Graduate Study. The Department offers a program of study leading to the M.A. and Ph.D. degrees in Anthropology. Further information regarding graduate study may be obtained at the Department office and at Graduate Studies.

Courses in Anthropology (ANT)

Lower Division Courses

1. Human Evolutionary Biology (4)

Lecture - 3 hours; discussion - 1 hour. Processes and course of human evolution; primatology; biological and social diversity within Homo sapiens; human paleontology. GE credit: SciEng, Div, Wrt | SE, SL,

2. Cultural Anthropology (4)

Lecture—3 hours; discussion—1 hour. Introduction to cultural diversity and the methods used by anthropologists to account for it. Family relations, economic activities, politics, gender, and religion in a wide range of societies. Current problems in tribal and peasant societies. GE credit: SocSci, Div, Wrt | ACGH, DD, SS, WC, WE.

3. Introduction to Archaeology (4)

Lecture—3 hours; discussion—1 hour. Development of archaeology as an anthropological study; objectives and methods of modern archaeology. GE credit: SocSci, Div | SE, SL.

4. Introduction to Anthropological Linguistics (4)

Lecture - 3 hours; discussion - 1 hour. Exploration of the role of language in social interaction and world view, minority languages and dialects, bilingualism, literacy, the social motivation of language change. Introduction of analytical techniques of linguistics and demonstration of their relevance to language in sociocultural issues. GE credit: SocSci, Div, Wrt | SS, WC, WE.

5. Proseminar in Biological Anthropology (4)

Seminar—3 hours; term paper. Prerequisite: course 1 and consent of instructor. Course primarily for majors. Integration of related disciplines in the study of biological anthropology through discussion and research projects. Principal emphasis in human adaptation to the environment. GE credit: SciEng, Wrt | SE, OL, WE.

13. Scientific Method in Physical Anthropology (4)

Lecture - 2 hours; laboratory/discussion - 1 hour; fieldwork - 1 hour. Skills for scientific thinking; designing, implementing, analyzing, interpreting,

presenting, and criticizing research. Collection and analysis of original data. Basic statistical methods. GE credit: SocSci, Wrt | OL, SE, VL, WE

15. Behavioral and Evolutionary Biology of the Human Life Cycle (5)

Lecture—3 hours; discussion—1 hour; term paper. Introduction to the biology of birth, childhood, marriage, the family, old age, and death. Examines comparative characteristics of nonhuman primates and other animals as well as cross-cultural variation in humans by study of selected cases. GE credit: Sci-Eng, Div, Wrt | SE, SL, WE.

20. Comparative Cultures (4)

Lecture — 3 hours; discussion — 1 hour. Introduction to the anthropological study of cultural diversity. Case studies of eight societies will be presented to illustrate and compare the distinctive features of major cultural regions of the world. Concludes with a discussion of modernization. GE credit: SocSci, Div | ACGH, AH or SS, DD, WC, WE.

23. Introduction to World Prehistory (4)

Lecture - 3 hours; discussion - 1 hour. Broadly surveys patterns and changes in the human species physical and cultural evolution from earliest evidence for "humanness" to recent development of largescale complex societies or "civilizations." Lectures emphasize use of archaeology in reconstructing the past. GE credit: SocSci, Div, Wrt | SS, WC, WE.

24. Ancient Crops and People (4)

Lecture — 3 hours; discussion — 1 hour. The archaeological evidence for domestication of plants and the origins of agricultural societies. Anthropological context of agriculture and the effects on sexual division of labor, social inequality, wealth accumulation, warfare, human health, and sedentism. GE credit: Soc-Sci, Div, Wrt | SS, WC, WE.

30. Sexualities (4)

Lecture/discussion-4 hours. Introduction to the study of sexuality, particularly to the meanings and social organization of same-sex sexual behavior across cultures and through time. Biological and cultural approaches will be compared, and current North American issues placed in a wider comparative context. GE credit: ACGH, AH or SS, DD, WC.

32. Drugs, Science and Culture (4)

Lecture - 3 hours; discussion - 1 hour. Drugs, politics, science, society in a cultural perspective: emphasis on roles of science, government and the media in shifting attitudes toward alcohol, marijuana, Prozac and other pharmaceuticals; drug laws, war on drugs and global trade in sugar, opium, cocaine. (Same course as Science and Technology Studies 32.) GE credit: SocSci, Div, Wrt | SS, VL, WE.

34. Cultures of Consumerism (4)

Lecture/discussion—4 hours; term paper. Aspects of modern consumer cultures in capitalist and socialist countries. Transformations of material cultures over the past century. Case studies on the intersections of gender, class, and culture in everyday consumption practices. Offered in alternate years. GE credit: Soc-Sci, Div, Wrt | SS, WC.

50. Evolution and Human Nature (4)

Lecture - 3 hours; discussion - 1 hour. Evolutionary analyses of human nature, beginning with Lamarck, Darwin, Spencer and contemporaries, and extending through social Darwinism controversies to contemporary evolutionary anthropology research on human diversity in economic, mating, life-history, and social behavior. GE credit: SocSci, Div, Wrt | SE, SL, WE.

54. Introduction to Primatology (4)

Lecture/discussion -3 hours; term paper. Basic survey of the primates as a separate order of mammals; natural history and evolution of primates; consideration of hypotheses for their origin. GE credit: SE, SL, WE.

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading

99. Special Study for Lower Division Students (1-5)

Prerequisite: consent of instructor. (P/NP grading

Upper Division Courses 100. Theory in Social-Cultural Anthropology (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 2 or consent of instructor. Discussion of the theoretical and philosophical developments in cultural anthropology from the 19th century to the present. Not open for credit to students who have completed course 137. (Former course 137.) GE credit: SocSci | SS, WE.

101. Ecology, Nature, and Society (4)

Lecture - 3 hours: discussion - 1 hour. Prerequisite: course 1 or 2 or Environmental Science and Policy 30 or Evolution and Ecology 100 or Biological Sciences 101. Interdisciplinary study of diversity and change in human societies, using frameworks from anthropology, evolutionary ecology, history, archaeology, psychology, and other fields. Topics include population dynamics, subsistence transitions, family organization, disease, economics, warfare, politics, and resource conservation. (Same course as Environmental Science and Policy 101.) GE credit: SocSci, Div, Wrt | SS, WC, WE.

103. Indigenous Peoples and Natural Resource Conservation (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 2 or Geology 1 or Environmental Science and Policy 30. Integration of the interests of resident and indigenous peoples with the conservation of natural resources and ecosystems, using case study examples from both the developing and the developed world. Not open for credit to students who have completed course 121N. (Former course 121N.) GE credit: ACGH, DD, OL, SS, WC, WE.

104N. Cultural Politics of the Environment

Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Political economy of environmental struggles. Relationship between social inequality (based on race, class, and/or gender) and ecological degradation. Articulation of local peoples, national policy, and the international global economy in the contestation over the use of environmental resources. Not open for credit to students who have completed course 134N. (Former course 134N.) GE credit: SocSci, Div | ACGH, DD, SS, WC, WE.

105. Evolution of Societies and Cultures (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 1 or 2 or Environmental Science and Policy 30 or Evolution and Ecology 100 or Biological Sciences 101. Interdisciplinary study of social and cultural evolution in humans. Culture as a system of inheritance, psychology of cultural learning, culture as an adaptive system, evolution of maladaptations, evolution of technology and institutions, evolutionary transitions in human history, coevolution of genetic and cultural variation. Only two units of credit to students who have completed Environmental Science and Policy 101 or course 101 prior to fall 2004. (Same course as Environmental Science and Policy 105.) GE credit: SocSci, Wrt | QL, SS, WC, WE.

109. Visualization in Science: A Critical Introduction (4)

Lecture — 3 hours; extensive writing or discussion — 1 hour. Prerequisite: course 2 or Science & Technology Studies 1 or Science & Technology Studies 20. Anthropological approaches to scientific visualization techniques, informatics, simulations. Examination of different visualization techniques toward understanding the work involved in producing them, critical assessment of their power and limits, especially when visualizations are used socially to make claims. Offered in alternate years. (Same course as Science & Technology Studiés 109.) GE credit: Soc-Sci, Wrt | SS, VL, WE.

110. Language and Sociocultural Anthropology (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. The role of language analysis and linguistic theory in the development of sociocultural anthropology. Language, culture, and thought; the linguistic accomplishment of social action; language ideology; language and social power. Language as cultural mediator of politicoeconomic process. GE credit: SocSci, Div, Wrt | SS, WC, WE.

117. Language and Society (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 4, or Linguistics 1 and course 2. Consider ation of language in its social context. Methods of data collection and analysis; identification of socially significant linguistic variables. Contributions of the study of contextualized speech to linguistic theory. GE credit: SocSci, Div, Wrt | SS, WC, WE.

120. Language and Culture (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 4; or course 2 and Linguistics 1. Culture, cognition, meaning, and interpretation; language and the classification of experience; communication and learning in crosscultural perspective. GE credit: Soc-Sci, Div, Wrt | ACGH, DD, SS, WC, WE.

121. Special Topics in Medical Anthropology (4)

Lecture/discussion-4 hours. Prerequisite: course 2 or Science and Technology Studies 1. Introduction to critical medical anthropology. Topics include anthropological analysis of bio-medicine, psychiatry, systems of knowledge and healing, the body, emotions, and clinical encounters in a cross-cultural perspective. (Same course as Science and Technology Studies 121.) GE credit: SocSci, Div, Wrt | SS, WC,

122A. Economic Anthropology (4)

Lecture - 3 hours; discussion - 1 hour. Varieties of production, exchange, and consumption behavior in precapitalist economies, their interaction with culture and social-political organization, and the theories that account for these phenomena. The effects of capitalism on precapitalist sectors. Not open for credit to students who have completed course 122. (Former course 122.) GE credit: SocSci, Div, Wrt | ACGH, DD, SS, WC, WE.

122B. Anthropology and Political Economy

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 2 or consent of instructor. Survey of anthropological approaches to the study of political organizations; inter-relationships among political institutions, economic infrastructures and cultural complexity. Not open for credit to students who have completed course 123A. (Former course 123A.) GE credit: Soc-Sci, Div, Wrt | SS, WC, WE.

123AN. Resistance, Rebellion, and Popular Movements (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 2 or the equivalent. Analysis of popular protest in Third World and indigenous societies ranging from covert resistance to national revolts. Comparative case studies and theories of peasant rebellions, millenarian movements, social bandits, Indian 'wars", ethnic and regional conflicts, gender and class conflicts. Not open for credit to students who have completed course 123B. (Former course 123B.) GE credit: SS, WC, WE

124. Religion in Society and Culture (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 2. Discussion of anthropological theories of religion with emphasis on non-literate societies. Survey of shamanism, magic and witchcraft, ritual and symbols, and religious movements. Extensive discussion of ethnographic examples and analysis of social functions of religious institutions. GE credit: SocSci, Div, Wrt | AH, WC, WE.

125A. Structuralism and Symbolism (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 2. Survey of anthropological approaches to understanding the logic of structuralism and symbolism in cultural analysis. Focus on how structural and symbolic interpretations relate to cultural and linguis-

tic universals and to the philosophical basis of relativism in the social sciences. (Former course 125.) GE credit: SocSci, Div | SS, WC, WE.

125B. Postmodernism(s) and Culture (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 2. The U.S.-European postmodern condition. "Modernity" as an incomplete project for subordinated groups. The economic, social, technological and political conditions leading to postmodern aesthetics, in comparison with postcolonialism, feminism and minority discourse. GE credit: SocSci, Div, Wrt | SS, WC, WE.

126A. Anthropology of Development (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 2 or consent of instructor. Theories of development and current critiques. Colonial legacies and post-colonial realities. Roles of the state and NGOs, population migrations, changing gender identities, cash-earning strategies, and sustainability issues. Stresses importance of cultural understandings in development initiatives. Case studies emphasizing non-industrial societies. Not open for credit to students who have completed course 126. (Former course 126.) GE credit: SocSci, Div, Wrt | SS, WC,

126B. Women and Development (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 2 or consent of instructor. Current Third World and Western development issues concerning women in agriculture, industry, international division of labor, political movements, revolutions, politics of health, education, family and reproduction. Impact of colonialism, capitalism, the world system, and international feminism on women and development. Not open for credit to students who have completed course 131. (Former course 131.) GE credit: SocSci, Div, Wrt | SS, WC, WE.

127. Urban Anthropology (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 2 or consent of instructor. Survey of approaches to urban living: political structures, organization of labor, class relations, world views. The evolution of urban life and its contemporary dilemmas. Cross-cultural comparisons discussed through case studies. GE credit: SocSci, Div, Wrt | SS, WC,

128A. Kinship and Social Organization (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 2. Comparative examination of personal kinship, descent, marriage, household and family organizations; the theories that account for variation, and recent advances in the treatment of these data. Not open for credit to students who have completed course 128. (Former course 128.) GE credit: SocSci, Div, Wrt | SS, WC, WE.

128B. Self, Identity, and Family (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Exploration of self, identity, and family systems cross-culturally. Impact of class, gender, race, ethnicity, ruralization, urbanization, and globalization on notions of selfhood in different social/cultural systems. Not open for credit to students who have completed course 129. (Former course 129.) GE credit: SocSci, Div, Wrt | SS, WC, WE.

129. Health and Medicine in a Global Context (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 2 or Science and Technology Studies 1. Recent works in medical anthropology and the science studies of medicine dealing with social and cultural aspects of global health issues such as AIDS, pandemics, clinical trials, cultural differences in illnesses, diabetes, organ trafficking, medical technologies, illness narratives, and others. (Same course as Science and Technology Studies 129.) GE credit: SocSci, Div, Wrt | SS, WC, WE.

130A. Cultural Dimensions of Globalization (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. The cultural dimensions of recent economic and political developments frequently termed "globalization." GE credit: SocSci, Wrt | SS, WC, WE.

130BN. Migration and the Politics of Place and Identity (4)

Lecture/discussion-4 hours Prerequisite: course 2 or consent of instructor. Internal and international migration from an anthropological perspective, including causes, processes, and political, economic, and cultural effects of spatial mobility and displacement. Emphasizes the interplay of identity, place, and power in diverse cultural and historical contexts. Not open for credit to students who have completed course 123D. (Former course 123D.) GE credit: SocSci, Wrt | SS, WC, WE.

131. Ecology and Politics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 2 or consent of instructor. Analysis of the complex interactions between ecological dynamics and political processes employing the emerging approach of political ecology. Case studies of envi-ronmental degradation (e.g., desertification, logging, mineral extraction, petroleum, water) from various cultural and geographic regions. GE credit: SocSci, Div.

132. Psychological Anthropology (4)

Lecture/discussion—3 hours. Prerequisite: course 2 or Science and Technology Studies 1. History of the relationship between anthropology and psychoanal-ysis. Topics include the anthropology of emotions, colonial psychology, contemporary ethno-psychiatry, studies on personhood, possession, magic, altered states, subjectivity, and definitions of the normal and the pathological in different contexts and cultures. GE credit: SocSci, Div, Wrt | SS, WC, WE.

134. Buddhism in Global Culture (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: one lower division course in Anthropology, Sociology, History, or Religious Studies. Buddhist meditation and ritual as a cultural system that adapts to global and local forces of change. Anthropological theory and method in understanding global culture transmission, including Buddhist reform movements in Asia and Buddhist practice in the West. Limited enrollment. GE credit: SocSci, Div, Wrt | AH or SS,

136. Ethnographic Film (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 2. Overview of the use of film in anthropology and its advantages and limitations in comparison to written ethnographic descriptions. Essential features of ethnographic films. Film production in anthropological research and problems encountered in producing films in the field. GE credit: SocSci, Wrt | SS, VL, WC, WE.

137. Meditation and Culture (4)

Lecture/discussion-3 hours; discussion-1 hour. Prerequisite: one lower division course in Anthropology, Sociology, History, Philosophy, Psychology, or Religious Studies. Study and practice of the relation between meditation and cultural conditioning; comparison of Buddhist practice with other cultural constructions of mind, body, brain, thought, emotion, and self. Limited enrollment. Not offered every year.

138. Ethnographic Research Methods in Anthropology (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 2 and 137. Basic concepts in and approaches to ethnographic field research. Problem formulation, research design, qualitative and quantitative data collection procedures, and techniques for organizing, retrieving, and analyzing information. Ethnographic description and constructed inference. Students will organize and conduct individual research projects. GE credit: SocSci | SS, WC, WE.

139AN. Race, Class, Gender Systems (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 2. Comparative analysis of class/race/gender inequality, concentrating on the ways in which beliefs about descent, "blood," and biological difference interact with property and marital systems to affect the distribution of power in society. Not open for credit to students who have completed course 139. (Former course 139.) GE credit: SocSci, Div, Wrt | ACGH, DD, SS, WC, WE.

139BN. Gender and Sexuality (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 2 or consent of instructor. Gender and sexuality in foraging bands, horticultural and pastoral tribes, agricultural and industrial states. Debates on cultural evolution and distribution of gender hierarchies. Impact of politics, economics, religion, social practices, women's movements on gender and sexuality. Culture, nature, and sexuality. Not open for credit to students who have completed course 130. (Former course 130.) GE credit: SocSci, Div, . Wrt | ACGH, DD, SS, WC, WE.

140A. Cultures and Societies of West and Central Africa (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 2. Ethnographic survey of West Africa and Congo Basin with analyses of representative societies which illustrate problems of general theoretical concern. Major consideration will be the continuities and discontinuities between periods prior to European contact and the present. GE credit: SocSci, Div, Wrt | SS, WC, WE.

140B. Cultures and Societies of East and South Africa (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 2. Ethnographic survey of Eastern and Southern Africa with analyses of selected societies which illustrate problems of interest to anthropologists. Major consideration will be given to continuities and discontinuities between periods prior to European contact and the present. GE credit: SocSci, Div, Wrt | SS, WC, WE.

141B. Ethnography of California and the Great Basin (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 2 or consent of instructor. Description and analysis of the native peoples of California and the Great Basin, and their lifeways at the time of European contact. (Former course 141C.) GE credit: Soc-Sci, Div, Wrt | ACGH, DD, SS, WE. – Bettinger

141C. People of the Arctic: Contemporary and Historic Cultures of the Circumpolar

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 2 or 3. Social, economic, political, and religious lives of Russian, American, Canadian, and Greenlandic Arctic people (Yup'ik, Iñupiat, İnuit). Topics include Arctic ecosystems, archaeological record of human occupation, ethnohistorical and ethnographic accounts, arctic people in popular culture, and contemporary issues. Offered in alternate years. - I. Darwent

142. Peoples of the Middle East (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Peoples of the Middle East (including North Africa). Discussions of class relations, kinship organization, sex/gender systems, religious beliefs and behavior, ethnic relations, political systems. Impact of world systems, political and religious movements and social change. (Former course 136.) GE credit: SocSci, Div, Wrt | SS, WC, WE.

143A. Ethnology of Southeast Asia (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 2. Patterns of culture and social organization from prehistory to the present, in the context of historical, ecological, economic, and political settings. Emphasis on the relation of ethnic minorities to national states. GE credit: SocSci, Div, Wrt | SS, WC, WE.

144. Contemporary Societies and Cultures of Latin America (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Introduction to contemporary social structure of Latin America. Origins, maintenance and changes in inequality: economic responses to poverty, sociocultural responses to discrimination, and political responses to powerlessness. GE credit: Soc-Sci, Div, Wrt | SS, WC, WE.

145. Performance, Embodiment, and Space in South Asia (4)

Lecture/discussion-4 hours. Prerequisite: course 2 or consent of instructor. South Asian cultures and societies with a focus on performance, embodiment,

and space from several disciplinary fields. Topics may include colonialism, nationalism, religious traditions, media, popular culture, cities, social move ments, modernity, body-cultures, identity, gender, and diasporas. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

146N. Topics in the Anthropology of Europe

Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Recent ethnographies of different nationstates and socio-political spaces in Europe. Topics include the question of old and new boundaries, historical and contemporary constructions of Europe, migration and ethnicity, citizenship, belonging, multi-culturalism, and post/socialisms. Offered in alternate years. GE credit: SocSci, Div, Wrt | SS, WC,

148A. Culture and Political Economy in Contemporary China (4)

Lecture/discussion-4 hours. Prerequisite: course 2 or consent of instructor. Examining contemporary Chinese culture and political economy through reading ethnographic studies on recent transformations in rural and urban Chinese society. Special attention is given to state power, popular culture, spatial mobility, city space, and gender. GE credit: SocSci, Div, Wrt | SS, WC, WE.

149A. Traditional Japanese Society (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 2. Patterns of culture and social organization from prehistoric to early twentieth-century Japan. Origins, prehistory, and traditional religious and political systems, marriage and kinship, language and culture. Changes and continuities in traditional and contemporary Japanese culture are addressed. GE credit: SocSci, Div, Wrt | SS, WC, WE.

149B. Contemporary Japanese Society (4)

Lecture — 3 hours; discussion — 1 hour. Introduction to contemporary Japanese social structure, social organization, and patterns of culture. Analysis of ruralurban cultural continuities and contrasts, class relations, political and economic systems, kinship, sex/ gender systems, contemporary religious beliefs and behavior, conflict, consensus, and cultural stereo types. GE credit: SocSci, Div, Wrt | SS, WC, WE.-Śhibamoto-Smith

151. Primate Evolution (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 1 or Biological Sciences 1B. Origin and relationships of the prosimians, monkeys, and apes. GE credit: SciEng, Wrt | SE, WE.

152. Human Evolution (5)

Lecture — 3 hours; discussion — 1 hour; term paper. Prerequisite: course 1 or Biological Sciences 1B. Nature and results of the evolutionary processes involved in the formation and differentiation of humankind. GE credit: SciEng, Wrt | SE, WE.

153. Human Biological Variation (5)

Lecture—3 hours; discussion—1 hour; term pape Prerequisite: course 1 or Biological Sciences 1B. Origin, adaptive significance and methods of analysis of genetic differences among human populations. Special attention given to racial differences such as those in blood groups, plasma proteins, red cell enzymes, physiology, morphology, pigmentation and dermatoglyphics. GE credit: SciEng, Wrt | QL, SE, WE.-D.G. Smith

154A. The Evolution of Primate Behavior

Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: course 1. Examines ecological diversity and evolution of social systems of prosimians, monkeys, and apes, placing the social behavior of the primates in the context of appropriate ecological and evolutionary theory. GE credit: SciEng, Wrt | SE, VL, WE.

154BN. Primate Evolutionary Ecology (5)

Lecture - 3 hours; lecture/discussion - 1 hour; term paper. Prerequisite: course 1 or introductory course in evolutionary biology or ecology. Examination of the ecology of primates within an evolutionary framework. Theoretical concepts in individual, population, and community ecology, illustrated with primate (and other vertebrate) examples. Includes topics in primate and rainforest conservation. GE credit: Wrt | QL, SE, VL, WE.

154C. Behavior and Ecology of Primates (2)

Lecture/discussion-2 hours. Prerequisite: course 54, 154A, or 154BN; Statistics 13 or its equivalent. Scientific methods of studying, describing and analyzing the behavior and ecology of primates. Offered in alternate years. (P/NP grading only. GE credit: SE.-Isbell

154CL. Laboratory in Primate Behavior (4)

Laboratory-6 hours; term paper. Prerequisite: course 54, 154A, or 154BN; Statistics 13 or its equivalent. Design and conduct of scientific "field studies" of the behavior of group-living primates at the California National Primate Research Center Offered in alternate years. GE credit: OL, SE, WE.-

156A. Human Osteology (4)

Lecture—2 hours; laboratory—4 hours. Prerequisite: course 1 or equivalent. Human skeleton from archaeological, forensic, and paleontological perspectives, including anatomical nomenclature, variation with sex and age, function, evolution, growth, and development of bones and teeth. Hands-on study and identification of human skeletal remains. Cannot be taken by students who have previously completed course 156. GE credit: SE.

156B. Advanced Human Osteology (4)

Lecture — 2 hours; laboratory — 4 hours. Prerequisite: course 156A or equivalent. Human skeletons from archaeological, forensic, and paleontological contexts. Bone and tooth structure, growth, and development; measurement, statistics, and biomechanics; assessment of age, sex, weight, height, and ancestry; and indicators of illness, injuries, diet, and activities. Offered in alternate years. GE credit: SE.

157. Anthropological Genetics (3)

Lecture - 3 hours. Prerequisite: course 1 or Biological Sciences 1A. Method and theory of genetic and genomic analysis of molecular evolution of human and non-human primate populations. Special attention to the molecular evolutionary transition to humans and genetic differences among extant human populations and their adaptive significance. Offered in alternate years. GE credit: SciEng | QL, SE.-D. G. Smith

157L. Laboratory in Anthropological Genetics (2)

Lecture - 1 hour; laboratory - 3 hours. Prerequisite: course 1 or Biological Sciences 1A, and either Genetics 100 or enrollment in course 157 (concurrently or following). Methods for identifying genetic variation in human blood group antigens, serum proteins and red cell enzymes (hemaglutination), general electrophoresis on starch, cellulose acetate and polyacrylamide, immunodiffusion and immunoelec trophoresis on agarase. (P/NP grading only.) GE credit: Wrt | QL, SE.

158. The Evolution of Females and Males: **Biological Perspective (4)**

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 1. Current theoretical frameworks for explaining the evolution of sex differences and for under standing the interrelationship between biological processes and cultural construction of gender roles. GE credit: SciEng, Div, Wrt | OL, WE.—Marshall

159. Molecular Anthropology of Native America (4)

Seminar — 3 hours; term paper. Prerequisite: course 1 or Biological Sciences 1B or consent of instructor. Use of DNA and other genetic polymorphisms to test hypotheses regarding genetic relationships among different Native American tribal groups and about prehistoric population replacements and migrations to and within the Americas. Integration with craniometric, archaeological, paleoenvironmental, linguistic and ethnohistorical evidence. GE credit: QL, SE. - D. G. Smith

160. Neandertals and Modern Human Origins (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 1 or equivalent. Origins, evolution, and disappearance of Neandertals. Emergence of humans like us in both anatomy and behavior. Interpretation of the fossil and archaeological records of Europe and Africa. Genetics of living and fossil humans. Offered in alternate years. GE credit: SE.—Weaver

170. Archeological Theory and Method (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: courses 1 and 3. Introduction to history and development of archeological theory and method, with par ticular emphasis on the basic dependence of the latter on the former. Stress is on historical development of archaeology in the New World. GE credit: SocSci, Div, Wrt | SS, WE. - Bettinger

172. New World Prehistory: The First Arrivals (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 3 or consent of instructor. Survey of data relating to the peopling of the New World. Cultural adaptation and development of early inhabitants of North and South America. Offered in alternate years. GE credit: SocSci, Div, Wrt | SS, WC, WE.—Darwent

173. New World Prehistory: Archaic Adaptations (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 3 or consent of instructor; course 170 recommended. Introduction to and survey of prehistoric hunting and gathering adaptations across North America with particular emphasis on the East, Southeast, Midwest, Plains, Southwest, and Northwest. Offered in alternate years. GE credit: SocSci, Div, Wrt | SS, WE.

174. European Prehistory (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 3 or consent of instructor. Survey of the prehistory of Europe from its earliest human inhabitants, to the Neandertals and first modern humans, and through early agricultural and complex societies. Analysis and interpretation of the European archaeological record for understanding human dispersals into Europe. Offered in alternate years. GE credit: SS, WC, WE.-Steele

175. Andean Prehistory: Archaeology of the Incas and their Ancestors (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 3. Prehistory of the Andean region, especially Peru, from the earliest hunting and gathering societies through the Inca. Focus on the use of archaeological data to reconstruct ancient human adaptations to the varied Andean environments. Offered in alternate years. GE credit: SS, WC, WE. - Eerkens

176. Prehistory of California and the Great Basin (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 or consent of instructor. Description and analysis of the prehistoric peoples of California and the Great Basin from earliest times to European contact. Offered in alternate years. GE credit: SocSci, Div, Wrt | ACGH, DD, SS, WE.—Eerkens

177. African Prehistory (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 3 or consent of instructor. Survey of prehistory of Africa from early human ancestors, through modern human origins, and into early agricultural and complex societies and the Bantu expansion. Analysis and interpretation of the African archaeological record, incorporating human paleontology and genetics. Offered in alternate years. GE credit: SS, WC, WE.-Steele

178. Hunter-Gatherers (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 2. Study and interpretation of the ancient and modern lifeway in which peoples support themselves with primitive technologies and without benefit of domesticated plants and animals. Offered in alternate years. GE credit: SocSci, Div, Wrt | SS, WC, WE. - Bettinger

180. Zooarcheology (4)

Lecture - 2 hours; discussion/laboratory - 3 hours. Prerequisite: course 1 and 3 or consent of instructor. Theories and methods for studying animal skeletal remains from archaeological sites. Identification and quantification of zooarchaeological material, cultural and natural processes affecting animal bones pre and postburial, and use of faunal remains for determining past human diets and past environments. Offered in alternate years. GE credit: SE. – Darwent, Steele

181. Field Course in Archeological Method

Lecture-6 hours; daily field investigation. Prerequisite: course 3. On-site course in archeological methods and techniques held at a field location in the western United States, generally California or Nevada. Introduces basic methods of archeological survey, mapping, and excavation. GE credit: SciEng | SE. - IV.

182. Archaeometry (4)

Lecture - 3 hours; discussion/laboratory - 1 hour. Prerequisite: course 3; Statistics 13 or the equivalent recommended. Scientific techniques used to study the chemical and physical properties of archaeological materials. Types of anthropological questions that can be addressed with different methods. Preparation and analysis of archaeological materials. GE credit: QL, SE, VL, WE. Offered in alternate years. -Eerkens

183. Laboratory in Archeological Analysis (4)

Lecture - 2 hours; laboratory - 6 hours. Prerequisite: course 181 or consent of instructor. Museum preparation, advanced field investigation, and guidance in preparation of museum material for publication. May be repeated for credit with consent of instructor. Limited enrollment. GE credit: SciEng, Wrt | OL, QL, SE, WE

184. Prehistoric Technology: The Material Aspects of Prehistoric Adaptation (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 2 or 3. Examination of the role of lithic, ceramic, textile and wooden implements as elements in prehistoric survival and development. Emphasis is descriptive, but the significance of material resources as factors in prehistoric adaptation, settlement patterns, and culture change are discussed. Offered in alternate years. GE credit: SocSci | SS, WE. - Eerkens

191. Topics in Anthropology (4)

Lecture/discussion-3 hours; term paper. Prerequisite: junior or senior standing in anthropology. Intensive treatment of a special anthropological topic or problem. May be repeated one time for credit when topic differs.

192. Internship in Anthropology (1-12)

Internship - 3-36 hours. Prerequisite: Upper division standing; consent of instructor. Work experience off and on campus in all subject areas offered in the Department of Anthropology under the supervision of a member of the faculty. Limited to Anthropology majors. May be repeated for a total of 12 units including 192 courses taken in other departments. (P/NP grading only.)

194H. Special Study for Honors Students

Prerequisite: open only to majors of senior standing who qualify for honors program. Independent study of an anthropological problem involving the writing of an honors thesis. May be repeated for a total of 12 units. (P/NP grading only.) GE credit: WC.

197T. Tutoring in Anthropology (1-5)

Tutorial — 1-5 hours. Prerequisite: upper division standing with major in Anthropology and consent of Department Chairperson. Leading of small voluntary discussion groups affiliated with one of the department's regular courses. May be repeated for credit. (P/NP grading only.)

198. Directed Group Study (1-5)

(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

200. History of Anthropology (4)

Lecture/discussion-2 hours; term paper. Historical development of socio-cultural theory within anthropology, from mid-19th to mid-20th Centuries. Focus on original theory texts in context of historical developments in the field as a whole.

201. Critical Readings in Ethnography (4)

Seminar — 3 hours; term paper. Critical readings of selected ethnographies that examine a wide range of important topics and analytical issues in social and cultural anthropology. Emphasis on how and why ethnographic writing has changed over time and its relationship with contemporary theoretical explorations.

202. History and Theory of Biological Anthropology (4)

Seminar—3 hours; term paper. History of thought in biological anthropology and analysis of major theoretical problems in the field. Suggested for all firstyear graduate students lacking intensive preparation in biological anthropology.

203. History and Theory of Archaeology (4)

Seminar-3 hours; term paper. History of archaeology and archaeological theory and analysis of archaeological research methodology. Generally restricted to graduate students; outstanding undergraduates with extensive training in archaeology with consent of instructor.

204. Contemporary Issues in Anthropological Theory (4)

Seminar-3 hours; term paper. Prerequisite: course 2, 137 or consent of instructor. Advanced consideration of fundamental issues in anthropological theory. Emphasis on critical examination of major contemporary debates between proponents of competing theories.

205. History and Theory in Anthropological Linguistics (4)

Seminar—3 hours; term paper. History of thought in anthropological linguistics. Consideration of the historical development of fundamental ideas in anthropological linguistics, of major theoretical issues, and of research methodology.

206. Research Design and Method in Social Anthropology (5)

Seminar-4 hours; individual student-instructor session (in-depth work on proposal writing). Prerequisite: consent of instructor. Formulation of research problems and preparation of research proposals; relationships between theory and method, funding, pre-fieldwork preparations, entering the community, field research techniques, and problems of ethics; intensive work on proposal writing. May be repeated one time for credit. Limited enrollment.

207. Ethnographic Writing (4)

Seminar — 3 hours; term paper. Prerequisite: courses 137, 201, or the equivalent. Relationship between conducting participant observation of others and writing it up, emphasizing the processual rift between the reality of fieldwork and its written representation. Study of various literary genres and textual strategies used in cultural anthropology. May be repeated for credit.

210. Aspects of Culture Structure (4)

Seminar - 3 hours; term paper. Analysis of various phases of culture, such as religion, economics, law, and folklore. May be repeated for credit when topic differs. — I, II, III. (I, II, III.)

211. Advanced Topics in Cultural Ecology

Lecture/discussion—3 hours; term paper. Prerequisite: Environmental Science and Policy/Anthropology 133, graduate standing in Anthropology or Ecology. Topics of current analytical and methodological importance in cultural ecology. Examination of general issues in cultural ecology through study of human response to and influence on climate. (Same course as Ecology 211.)

212. Political Ecology (4)

Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Interdisciplinary seminar evaluating contributions from ecological anthropology, political economy, cultural constructivism, postmodernism, and feminism towards development of theories of political ecology. Historical relationships between local/global power structures, environmental degradation, and resistance movements. Case studies of desertification, deforestation, mining, conservation, development.

216. Problems in Archeological Method (4)

Seminar-3 hours; term paper. Techniques for analyzing archeological data; application to various prehistoric cultures. May be repeated for credit with consent of instructor.—Darwent, Steele

217. Quantitative Modeling in Archaeology (4)

Lecture/discussion-3 hours; term paper. Examination of the nature of archaeological data with a focus on the quantitative and statistical techniques available to model, analyze, display, and make sense of such data. Offered in alternate years. - III.

218. Topics in New World Prehistory (4)

Seminar — 3 hours; term paper. Advanced study on current problems in New World Prehistory and archaeology. May be repeated for credit only if material is unique for that student and with consent of instructor. May be repeated for credit. Not offered every year.

219. Topics in Old World Prehistory (4)

Seminar-3 hours; term paper. Advanced study on current problems in Old World prehistory and archaeology. May be repeated for credit only if material is unique for that student and with consent of instructor. May be repeated for credit. Not offered every year.

220. Field Course in Linguistics (4)

Seminar-2 hours; laboratory-2 hours. Prerequisite: courses 110, 111. Techniques of eliciting, recording, and analyzing; work with a native speaker.

221. Rural Transformation in Postcolonial Societies (4)

Seminar—3 hours; term paper. Prerequisite: courses 223, 265, or consent of instructor. Problems of rural transformation arising out of political and economic interaction between national elites and rural regional and local populations under varying conditions of induced change in postcolonial societies. Attention will be given to the implications of this interaction for rapid economic growth. May be repeated for credit.

222. Cities and Citizenship (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing. The nature of modern cities, urban socio-economic life, and urban culture and politics from an anthropological perspective

223. Economic Anthropology (4)

Seminar-3 hours; term paper. Prerequisite: course 122 or consent of instructor. Selected current methodological and theoretical problems in the analysis of nonindustrial economic systems.

224. Problems in Comparative Religion (4)

Seminar-3 hours; term paper. Advanced study of current problems in the anthropological study of religion.

225. State and Nation in the Modern World (4)

Seminar-3 hours; term paper. A presentation of current anthropological theories of the origins and nature of the modern nation-state in both the First and Third Worlds, with special reference to state ideology (nationalism) and forms of control.

226. Consciousness and Resistance (4)

Seminar-3 hours; term paper. Prerequisite: completion of first-year graduate work or consent of instructor. Consideration of approaches to the study of social inequality, and responses of subordinated groups. Emphasis on situating approaches to contemporary social theory, concrete research prob-lems, and political strategies. Topics: formation of consciousness and identity; collective action, accommodation to frontal resistance

228. Culture and Power (4)

Seminar—3 hours; extensive writing. Prerequisite: graduate standing or consent of instructor. Exploration of one of the core paradigms within contempo-rary anthropological inquiry, "culture and power." Focus on how distinct theoretical perspectives— Marxism, post-Marxism, structuralism, post-structuralism, and feminism-have examined the mutually constitutive nature of culture and power. - II. (II.) Sawyer

229. Gender, Identity, and Self (4)

Seminar-3 hours; term paper. Intersections of gender, identity, and selfhood cross-culturally and historically. How the self is feminized and masculinized, and interfaces with sexual, race, class, work, national, minority, and majority identities under different historical, cultural, and social structural conditions. May be repeated for credit when topic differs. — Íl. (II.) Joseph

230. Family Systems and Reproduction: Theory and Comparisons (4)

Lecture — 1.5 hours; seminar — 1.5 hours; term paper. Prerequisite: graduate standing in one of the social sciences including History. Comparative examination of family systems in historical context and of reproductive behaviors and strategizing. A major theme is how family-system norms specify the relative desirability of differently configured offspring sets. Cases are drawn from Western Europe and South and East Asia.

232. Political Movements (4)

Seminar-3 hours; term paper. Prerequisite: completion of first-year graduate work recommended. An interdisciplinary approach to political movements of protest, reform, and revolution emphasizing historical comparison and evaluation of major theoretical approaches including world systems, resource mobi-lization, state and culture, rational choice, moral economy, social class and gender.

239. Problems in African Society and Culture (4)

Seminar—3 hours; term paper. Diachronic analyses of traditional institutions in sub-Saharan Africa.

241. Topics in North American Ethnology (4)

Seminar-3 hours; term paper. Advanced study on current problems in North American ethnography and culture history. May be repeated for credit with consent of instructor.

245. Ethnology of Northern and Central Asia (4)

Seminar-3 hours; term paper. Prerequisite: a reading knowledge of German, Russian, Chinese, or Japanese. Lectures on the culture aboriginally found north of the Caucasus-Korea line. Supervised study of the primary and secondary sources. Work with informants when available.

246. Ethnology of Europe (4)

Seminar—3 hours; term paper. Prerequisite: reading knowledge of a European language other than English. Supervised study of the primary and secondary sources dealing with the ethnography and ethnology of the peoples of Europe. Emphasis upon folk, peasant, and minority groups.

248. Topics in Chinese Culture and Society

Seminar - 3 hours; term paper. Prerequisite: graduate standing in the social sciences, history, or the humanities. Selected topics in the anthropology of Chinese society. Focus on one or more of the following topics: state-society dynamics, family and gender, city formation and urban life, social movement, labor politics, and religion and ideology in Chinese society. May be repeated for credit when topic dif-

250. Behavioral Ecology of Primates (4)

Seminar — 3 hours; term paper. Prerequisite: course 154A (may be taken concurrently) or the equivalent, graduate standing. Concepts, issues, and hypotheses in primate behavioral ecology, with emphasis on the social and ecological determinants and consequences of variation in social organization for individuals

252. Human Evolution Seminar (4)

Seminar—3 hours; term paper. Prerequisite: course 152 or the equivalent; consent of instructor. Study of selected topics in human evolutionary studies. Each year course will focus on one or more of the following: molecular evolution, primate evolutionary biology, Tertiary hominoids, Australopithecus, Homo erectus, archaic Homo sapiens, brain evolution. May be repeated for credit.

253. Seminar in Human Biology (4)

Seminar-3 hours; term paper. Prerequisite: course 153, 157, or consent of instructor. Study of selected topics in human biology. May be repeated for credit when topics vary.

254. Current Issues in Primate Sociobiology

Seminar—3 hours; term paper. Prerequisite: course 154B or the equivalent. Analysis of primate behavior, with particular emphasis on preparation for field studies. May be repeated for credit when topic dif-

256. Primate Conservation Biology (4)

Seminar—3 hours; term paper. Prerequisite: course 154, graduate standing or upper division undergraduate with consent of instructor. Application of understanding of primate biology to conservation of primates and their habitat. Topics include evolution ary anthropology, behavioral ecology, biogeography, macroecology, population biology, and socioecology of primates. May be repeated one time for credit if term paper differs. (S/U grading only.)

261. Modeling the Evolution of Social Behavior (4)

Lecture - 3 hours; extensive problem solving. Prerequisite: Mathematics 16C or the equivalent or consent of instructor. Tools and topics in modeling the evolution of social behavior in humans and other animals. Game theory, basic population genetics, animal conflict, altruism, reciprocity, signaling, and group selection. - McElreath

262. Evolution and Human Behavior (4)

Discussion—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Exploration of the links between behavioral ecological theory and human cultural variation, focusing on reproduction, marriage, parental investment and family structure; implications of evolutionary theory for social organization in human communities, historical and contemporary. - Borgerhoff, Mulder

263. Human Applications of Foraging Theory (4)

Discussion - 3 hours; laboratory - 3 hours. Foraging theory models and their use in ethnographic and archaeological analyses of human behavior, with a focus on hunter-gathers and resource selection, patch use, population and habitat, central places, sharing, stochastic processes, population dynamics, and conservation behavior. Not open for credit to students who have completed course 258.—Winterhalder

265. Language, Performance, and Power

Seminar—3 hours; term paper. Graduate standing or consent of instructor. Exploration of the intersection between linguistic and social theories in the language-state relation and the performance of identity. Ideological sources of language differentiation; nation-building and linguistic difference. Political

economic, sociolinguistic, and ethnographic approaches to understanding linguistic inequality. (Same course as Linguistics 265.)—Shibamoto-Smith

270. Anthropology Colloquium Seminar (1)

Seminar - 1 hour. Reports and discussions of recent advances in the four subfields of anthropology. To be presented by guest speakers. May be repeated two times for credit. (S/U grading only.)—I, II, III. (I, II,

280. Current Anthropology Journal Editorial Workshop (4)

Workshop-1 hour; independent study-3 hours. Students must enroll for all three quarters. Reading and offering workshop critiques of manuscripts submitted for publication, and reading and discussion of other relevant work in anthropology and human ecology. Track and edit published comments and authors' replies that accompany major features. Participation in the development of new sections for the electronic edition of the journal, including a "news and views" section and a debate section. (Same course as Ecology 280.) May be repeated for 12 units of credit with consent of instructor. (S/U grad-

291. Advanced Topics in Human Behavioral

Discussion—3 hours; term paper. Prerequisite: course 261, 262, or 263, or comparable experience in anthropology or related disciplines and consent of instructor. Topically focused, critical discussion of current and emerging research in the field of human behavioral ecology, giving special attention to theory, concepts, models, and methods for the evolutionary analysis of ethnographic and archaeological evidence. May be repeated one time for credit if topic differs.

292. Seminar in Linguistic Anthropology (4)

Seminar—3 hours; term paper. Selected topics in linguistic anthropology. May be repeated for credit when topic differs.

298. Group Study (1-4)

(S/U grading only.)

299. Research (1-12)

(S/U grading only.)

299D. Dissertation Research (1-12)

(S/U grading only.)

Professional Courses

390. Teaching Anthropology (4)

Seminar — 3 hours; practice — 1 hour. Prerequisite: graduate standing in Anthropology or closely related discipline. Intellectual and practical elements of college teaching in the field of Anthropology, from curriculum design and the syllabus through grading and course evaluations, including classroom and information technology methods, and problems and rewards of teaching in higher education. Offered in alternate years.

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III.

Applied Behavioral Sciences

See Community and Regional Development, on page 203.

Applied Biological Systems Technology

(College of Agricultural and Environmental Sciences)

Faculty. See under Department of Engineering: Biological and Agricultural, on page 243.

Courses in Applied Biological Systems Technology (ABT)

Lower Division Courses

15. Wood Properties and Fabrication (2)

Lecture/discussion-1 hour; laboratory-3 hours. Study of wood properties and techniques for fabrication with wood. Gain experience working with various woods and woodworking tools for specific applications. (P/NP grading only.) GE credit: OL, QL, SE, VL.—II. (II.) Grismer, Shafii

16. Metal Properties and Fabrication (2)

Lecture—1 hour; laboratory—3 hours. Study of metal properties and of techniques for fabricating in metal. Physical principles, design considerations, effects of techniques on quality and appearance, and evaluation procedures. Experience in working with metal. (P/NP grading only.) GE credit: QL, SE, VL.—I. (I.) Shafii

17. Plastic Properties and Fabrication (2)

Lecture-1 hour; laboratory-3 hours. Study of the properties of plastic materials and the fundamentals of fabrication techniques. Experience in working with common plastics, with applications to biological systems. (P/NP grading only.) GE credit: QL, SE, VL. —Ⅲ. (Ⅲ.)

49. Field Equipment Operation (2)

Lecture-1 hour; laboratory-3 hours. Operation, adjustment, and troubleshooting of farm tractors and field equipment. Principles of operation, equipment terminology and uses of tilling, cultivating, thinning, and planting equipment. Typical sequences in cropping practices. (P/NP grading only.) GE credit: QL, SE, VL.—III. (III.) Shafii

52. Field Equipment Welding (2)

Lecture - 1 hour; laboratory - 3 hours. Prerequisite: course 16 or consent of instructor. Intermediate welding to include hardfacing and inert gas welding Class projects on repair and fabrication by welding. Troubleshooting and major repair of field equip ment. (P/NP grading only.) GE credit: QL, SE, VL. — II. (II.) Shafii

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE

99. Special Study for Lower Division Students (1-5)

(P/NP grading only.) GE credit: SE.

Upper Division Courses 101. Engine Technology (3)

Lecture — 2 hours; laboratory — 3 hours. Prerequisite: upper division standing or consent of instructor. Principles of 2-stroke cycle, 4-stroke cycle gasoline and 4-stroke cycle diesel engine construction and operation. Engine systems, performance, troubleshooting, and overhaul. GE credit: QL, SE, VL.-II. (II.) Rosa

110L. Experiments in Food Engineering (2)

Laboratory-6 hours. Prerequisite: Food Science and Technology 110B (may be taken concurrently). Use of temperature sensors; measurement of thermal conductivity and heat transfer in foods; refrigeration, freezing, concentration and dehydration of foods. GE credit: QL, SE, VL, WE.-III. (III.) Singh

121. Animal Housing and Environment Management (2)

Lecture-2 hours. Prerequisite: Animal Science 1 or 2. Optimal structures and environments for animal growth and comfort; heat and moisture transfer principles; heating, cooling, ventilating principles and equipment; animal housing design; environmental

regulations and waste management practices.

Offered in alternate years. GE credit: SE.—(II.)
Thana

142. Equipment and Technology for Small Farms (2)

Lecture—1 hour; laboratory—3 hours. Types and characteristics of agricultural equipment and technologies appropriate for small commercial farming. Adjustment and calibration of equipment. Selection of and budgeting for equipment. (Same course as International Agricultural Development 142.) GE credit: QL, SE, VL.—III. (III.) Perkins

150. Introduction to Geographic Information Systems (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Plant Sciences 21 or equivalent with consent of instructor. Priority given to College of Agricultural and Environmental Science majors. Basic concepts, principles and methods of GIS are presented. Data structures, database design, GIS data creation, GPS, and spatial analysis techniques are emphasized. Lab topics include: online data sources, aerial photography, GPS data input, suitability analysis, cartographic design and graphic communication. Not open for credit to students who have completed Applied Biological Systems Technology 1810. (Same course as Landscape Architecture 150.) GE credit: SE, VL.—I. (I.) Greco, Upadhyaya

161. Water Quality Management for Aquaculture (3)

Lecture—3 hours. Prerequisite: Biological Sciences 1B, Mathematics 16B, Chemistry 2B. Basic principles of water chemistry and water treatment processes as they relate to aquacultural systems. Offered in alternate years. GE credit: QL, SE, SL, VL.—II. Piedrahita

163. Aquaculture Systems Engineering (3)

Lecture—3 hours. Prerequisite: course 161. Design of aquacultural systems: design methodology, principles of fluid mechanics, site selection and facility planning, management operations, computer modeling. Offered in alternate years. GE credit: OL, QL, SE, SL, VL, WE.—III. Piedrahita

165. Irrigation Practices for an Urban Environment (2)

Lecture—2 hours. Prerequisite: Physics 1A or 5A. Basic design, installation, and operation principles of irrigation systems for turf and landscape: golf courses, parks, highways, public buildings, etc. Emphasis on hardware association with sprinkler and drip/trickle systems. GE credit: QL, SE, VL.—II. (II.) Delwiche, Grismer

180. Introduction to Geographic Information Systems (4)

Lecture—3 hours; laboratory/discussion—3 hours. Prerequisite: Agricultural Management and Rangeland Resources 21 or equivalent familiarity with computers, Agricultural Management and Rangeland Resources 120 or the equivalent, Mathematics 16A. Management and analysis of georeferenced data. Spatial database management and modeling. Applications to agriculture, biological resource management and social sciences. Cartographic modeling. Vector and raster-based geographic information systems. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 132. (Same course as Plant Sciences 180.) GE credit: SE, VL.—I. (I.) Plant

181N. Concepts and Methods in Geographic Information Systems (4)

Lecture/laboratory—8 hours.Prerequisite: course 180 or Agricultural Management and Rangeland Resources 180 or Landscape Architecture 50 or consent of instructor. Data representation and analysis in geographic information systems (GIS). Creation of spatial data sets from analog and digital sources such as aerial photography and maps; data structures, data management, database design, georeferencing, georectification, surface models, analysis, and spatial data visualization. Offered in alternate years. GE credit: SE, SL, VL.—II. Plant

182. Environmental Analysis using GIS (4)

Lecture — 2 hours; laboratory — 4 hours. Prerequisite: course 180 or equivalent GIS experience and skills; general biology and/or ecology courses recommended. Ecosystem and landscape modeling with emphasis on hydrology and solute transport. Spatial analysis of environmental risk analysis including ecological risk assessment, natural resource management. Spatial database structures, scripting, data models, and error analysis in GIS. Offered in alternate years. GE credit: SE, SL, VL.—III. Zhang

190C. Research Conference for Advanced Undergraduates (1)

Discussion—1 hour. Prerequisite: consent of instructor. Research conferences for specialized study in applied biological systems technology. May be repeated for credit. (P/NP grading only.) GE credit: SE.—I, II, III. (I, II, III.)

192. Internship in Applied Biological Systems Technology (1-5)

Internship—3-15 hours. Prerequisite: upper division standing; approval of project prior to period of internship. Supervised internship in applied biological systems technology. May be repeated for credit. (P/NP grading only.) GE credit: SE.

197T. Tutoring in Applied Biological Systems Technology (1-5)

Tutorial. Tutoring individual students, leading small voluntary discussion groups, or assisting the instructor in laboratories affiliated with one of the department's regular courses. May be repeated for credit if topic differs. (P/NP grading only.) GE credit: SE.

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.) GE credit: SE.

Graduate Courses

233. Pest Control Practices (3)

Lecture — 2 hours; laboratory — 3 hours. Prerequisite: graduate standing or consent of instructor. Practical and theoretical considerations of pest control systems and techniques. Design, selection, and use of mechanical systems for field, orchard, greenhouse, and vector control use. Biological, legal, and environmental considerations in pest control and pesticide application.—II. Giles

290C. Graduate Research Conference (1)

Discussion—1 hour. Prerequisite: consent of instructor. Research problems, progress, and techniques in applied biological systems technology. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II. III.)

298. Group Study (1-5) 299. Research (1-12)

(S/U grading only.)

Professional Course

317. Teaching Agricultural Mechanics (2)

Lecture—1 hour; laboratory—3 hours. Prerequisite: a course in physics; 6 units related to agricultural mechanics; enrolled in Agricultural Education Teacher Credential Program. Preparation of the teacher to plan, organize, and conduct an agricultural mechanics program in secondary schools. Development of and presentation of lesson plans and teaching aids. Review of subject matter in metal fabrication, power and machinery and agricultural structures areas.—1. (I.) Perkins

Applied Computing and Information Systems

(College of Agricultural and Environmental Sciences) This minor is for students interested in applying modern computer technology to management problems in agriculture, resource management, and other areas. Course work provides knowledge of the use of information technology and the methodology of applied quantitative and systems analysis. The minor is offered by the Department of Plant Sciences.

Minor Program Requirements:

UNITS

Applied Computing and Information

analysis in data manipulation:
Agricultural and Resource Economics 106, 155, Plant Sciences 180, Applied Biological Systems Technology 180, 181, 182, Community and Regional Development 160, Economics 102, Engineering: Computer Science 124, Hydrologic Science 182, International Agricultural Development 170, Statistics 141

Communication and business organization: Agricultural and Resource Economics 112, Community and Regional Development 168, Communication 103, 130, 134, 135, 136, International Agricultural Development 111

Minor Adviser. T. R. Famula (*Animal Science*) **Advising Center** is located in 1220A Plant and Environmental Sciences (530) 752-1715.

Applied Mathematics (A Graduate Group)

Group Office. 1130 Mathematical Sciences Bldg. (530) 752-8130)

studentservices@math.ucdavis.edu; http://math.ucdavis.edu/grad/ggam

Faculty. The Group includes approximately 90 faculty members, of whom about one-third are in the Department of Mathematics. Membership comprises chemists, biologists, physicists, geologists, statisticians, computer scientists, and engineers. Research interests include biology, atmospheric sciences, mechanics, solid and fluid dynamics, optimization and control, theoretical chemistry, computer and engineering sciences, mathematical physics, signal and image processing, harmonic analysis, numerical analysis and nonlinear partial differential equations. A complete list of faculty and their research areas are available at https://math.ucdavis.edu/grad/ggam/faculty.

Graduate Study. Students prepare for careers where mathematics is applied to problems in the physical and life sciences, engineering, and management. The degree requirements consist of rigorous training in applied mathematics, including course work and a research dissertation under the direction of a member of the Graduate Group in Applied Mathematics. The M.S. degree provides preparation for further study in applied mathematics

or an application area, or for a career in industry or public service. The Ph.D. degree provides preparation for a career in research and/or teaching, or in industrial or national research laboratories. For further information, please contact studentservices@math.ucdavis.edu or (530) 752-

New applicants are admitted to the fall guarter only.

Preparation. The program admits qualified students with a bachelor's degree in mathematics, physics, chemistry, engineering, economics, the life sciences and related fields. General and advanced mathematics GRE scores are required, and applicants should display evidence of strong quantitative skills. Undergraduate courses should include calculus (including vector calculus), linear algebra, and ordinary differential equations. Advanced calculus (introduction to real analysis) is strongly recom mended. Additional background in probability, partial differential equations, and/or numerical analysis is a plus. The ability to program in a high-level computer programming language (e.g., C, Fortran, MAT-LAB, Python, R, etc.) is assumed.

Graduate Advisers. Contact the Student Services Office at (530) 752-8130 or by e-mail at studentservices@math.ucdavis.edu.

Courses. For a list of the courses in applied mathematics and mathematics, see Mathematics, on page

Applied Physics

See Physics, on page 457.

Aquaculture

See Animal Biology, on page 148; Animal Science, on page 150; **Applied Biological Systems** Technology, on page 161; and Wildlife, Fish, and Conservation Biology, on page 530.

Arabic

See Classics, on page 195.

Art History

(College of Letters and Science)

Department Office. 101 Art Building (530) 752-0105; http://arthistory.ucdavis.edu

Faculty

Katharine Burnett, Ph.D., Associate Professor Lynn Roller, Ph.D., Professor Jeffrey Ruda, Ph.D., Professor Diana Strazdes, Ph.D., Associate Professor Hegnar Watenpaugh, Ph.D., Associate Professor

Emeriti Faculty

Mary H. Fong, Ph.D., Professor Emerita Robert J. Grigg, Ph.D., Professor Emeritus Seymour Howard, Ph.D., Professor Emeritus Dianne Sachko Macleod, Ph.D., Professor Emerita

The Major Program

Art History studies the changing visual expression of values, beliefs and experiences across diverse cultures and over time. It provides training in historical, social and aesthetic understanding, critical thinking, scholarly research, and lucid, thoughtful analysis and writing. More than any other discipline art history sharpens its students' visual acuity and deepens their visual literacy. In so doing, it prepares them to face the increasingly complex visual world we find ourselves in today.

The Program. The major begins with a series of courses that surveys major landmarks in the history of visual culture, art and architecture in Asia, Europe, and the United States. More advanced lecture courses and proseminars focus on particularly important periods and issues. Students are encouraged to personalize their training with internships, independent study, and focused upper-division study. Top students considering graduate study are encouraged to engage in more advance study in the Hon-

Career Options. A major in Art History develops critical thinking and the integration of research, interpretation and understanding. It provides an excellent liberal arts basis for professions as far ranging as advertising, law, medicine, politics and business. The major prepares students for advanced study in Art History, Architecture, Museum Studies and Cultural Studies. It also serves as the foundation for careers in teaching, arts, administration, museums galleries, historic preservation, art libraries, publishing, journalism, advertising, art conservation, and art investment. As the world becomes increasingly flooded with images, the critical visual literacy gained through the study of art history becomes more important for a wide variety of careers.

A.B. Major Requirements:

Preparatory Subject Matter......20

Any four of the following courses: Art History 1A, 1B, 1C, 1D, 1E, 5, 10 and 25....... 16 Any lower division Art Studio or Design course except Art 10, 30, Design 40A,

Depth Subject Matter40

Four courses, one each in four of the following six areas. Two courses must be from areas a, b, and c, and two courses must be

(c) Art History 155

Any combination of upper division courses to be chosen in consultation with the major adviser. Appropriate course substitutions may be made with the consent of the major adviser. Art History 401 and 402 may be counted among the elective units.

Total Units for the Major60 **Minor Program Requirements:**

Art History20

Three courses chosen from three of the following six areas with at least one course in area a, b, or c, and one course in area d, e,

(a) Art History 172A, 172B, 173, 175 (b) Art History 163A, 163B, 163D, 164 (c) Art History 155 (d) Art History 178A, 178B, 178C, 179B (e) Art History 168, 182, 183A, 183B, 183C, 188A, 188B, 188D, 188E (f) Art History 184, 185, 186, 189

Two additional Art History courses; Art History 190A-H strongly recommended..... One lower division course may be

substituted for upper-division study in any of

these areas. Other appropriate substitutions may be made for the course options listed above with the prior consent of the major adviser

Honors Program. The Honors Program is encouraged for Art History majors who are considering attending graduate school. To be eligible for the program, a student must have a grade point average of 3.700 in the major or consent of the major adviser. In addition to meeting the standard major requirements, the honors student completes one undergraduate proseminar (course 100 or 190A-H), and writes an honors thesis (course 194H). Students participating in this Program are candidates for Departmental recommendation for graduation with High or Highest Honors. See the Academic Information chapter, Letters and Science honors section, of this catalog and consult the department for more information.

Teaching Credential Subject Representative. Department Chairperson; see the Teacher Education

Graduate Study. The Program in Art History offers studies leading to the Master of Arts degree in History of Art as preparation for further graduate study or professional work. For more information, contact the Graduate Staff Adviser at (530) 752-8710, or see http://arthistory.ucdavis.edu.

Courses in Art History (AHI) **Lower Division Courses**

1A. Ancient Mediterranean Art (4)

Lecture — 3 hours; discussion — 1 hour. Introduction to the art and architecture of the ancient Mediterranean world, including Mesopotamia, Egypt, Greece, and Rome. GE credit: ArtHum | AH, VL, WC.-I. (I.)

1B. Medieval and Renaissance Art (4)

Lecture - 3 hours; discussion - 1 hour. Christian, Barbarian, Moslem, and Classical traditions in Euro-pean Art from the fourth through the sixteenth centuries. GE credit: ArtHum | AH, VL, WC.

1C. Baroque to Modern Art (4)

Lecture-3 hours; lecture/discussion-1 hour. Survey of developments in western art and visual culture from 1600–present. Major artists and movements, theories of visuality, focused study on changing interpretations of class, gender, sexuality, and ethnicity from the Baroque period through modernism, to the present. May be repeated for credit. GE credit: ArtHum, Div | AH, WC.—III. (III.) Strazdes

1D. Arts of Asia (4)

Lecture - 3 hours; discussion - 1 hour. Introduction to major forms and trends in the arts and material culture of Asia from the Neolithic to the contemporary emphasizing the visual manifestation of secular and religious ideas and ideals. Not open for credit to students who have completed course 1DV. GE credit: ArtHum, Div | AH, WC, WE.-Burnett

1DV. Arts of Asia (Virtual) (5)

Web virtual lecture - 2.5 hours; discussion - 1 hour; lecture/discussion - 1.5 hours. Introduction to major forms and trends in the arts and material culture of Asia from the Neolithic to the contemporary, emphasizing the visual manifestation of secular and religious ideas and ideals. Not open for credit to students who have completed course 1D. GE credit: ArtHum, Div | AH, VL, WC, WE.—I. (I.) Burnett

1E. Islamic Art and Architecture (4)

Lecture - 3 hours; discussion - 1 hour. Introduction to the art and architecture of the Islamic world including the Middle East, Africa, Europe, and South Asia, from the 7th century CE to the 20th. GE credit: ArtHum, Div | AH, VL, WC.—(I.) Watenpaugh

5. Introduction to Visual Culture (4)

Lecture — 2 hours; film viewing — 2 hours; discussion — 1 hour. Development of visual literacy for an increasingly visual world. Critical analyses focus on a wide variety of visual media—art, television, film, advertising, the Internet-intended for a diverse spectrum of audiences. GE credit: ArtHum, Div, Wrt.

10. Twenty Monuments (4)

Lecture - 3 hours; lecture/discussion - 1 hour. Demonstration of the breadth and depth of art-historical interpretation through the consideration of the meaning and significance of world-historical monuments from pre-history to the present. GE credit: ArtHum | AH, VL, WC.—II. (II.)

25. Introduction to Architectural History (4)

Lecture-3 hours; discussion-1 hour. Formal and social history of architecture, examining design principles, major traditions, and concepts of architec tural history with a focus on issues in Western architecture. Emphasis on nineteenth and twentieth centuries. GE credit: ArtHum | AH, VL, WC, WE.-

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. Restricted to lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

100. Proseminar: Research and Writing Methods in Art History (4)

Extensive writing or discussion-3 hours; term paper. Prerequisite: two upper-division Art History courses; intended primarily for junior and senior students in Art History. Methods of art historical research and analysis, and general issues in critical thought. Writing skills appropriate to art history nonfiction writing. Offered irregularly. GE credit: ArtHum, Wrt. - (III.) Ruda

110. Cultural History of Museums and Art Exhibitions (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 1A or 1B or 1C or 1D. Evolution of museums in the western world from the "cabinet of curiosities" of sixteenth-century Europe to the modern "art center." The changing motives behind collecting, exhibiting, and interpretation of objects. Attention to museums' historical legacies and their continuing philosophical dilemmas. Offered in alternate years. GE credit: ArtHum, Wrt | AH.-I. Strazdes

150. Arts of Subsaharan Africa (4)

Lecture - 3 hours; term paper or gallery studies and review. Traditional arts and crafts of subsaharan Africa; particular attention to the relationships between sculpture and culture in West and Central Africa. GE credit: ArtHum, Div | AH, VL, WC

151. Arts of the Indians of the Americas (4)

Lecture - 3 hours; term paper or gallery studies and review. Development of art in North America, emphasizing ancient Mexico. South American relationships and parallels. Recent and contemporary Indian arts and crafts from Alaska to Chile. GE credit: ArtHum, Div | AH, VL, WC

152. Arts of Oceania and Prehistoric Europe (4)

Lecture—3 hours; term paper. Traditional arts of aboriginal Australia, Melanesia, Polynesia, and Micronesia, as seen in their cultural contexts. Prehistoric art of Europe and the Near East. GE credit: ArtHum, Div | AH, VL, WC.

153. Art, Storytelling and Cultural Identity in the Pacific (4)

Lecture/discussion-3 hours; term paper. Representation of the cultural identities of indigenous and migrant groups of the Pacific in visual arts and storytelling. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, VL, WC.

155. The Islamic City (4)

Lecture — 3 hour; term paper. Prerequisite: course 1E recommended. Introduction to the urban history of the Islamic world. Includes critical study of the historiography of the Islamic city, development of urban form, institutions and rituals, and analysis of selected themes. GE credit: ArtHum, Div, Wrt.—(II.) Watenpaugh

156. Arts of the Islamic Book (4)

Lecture-3 hours; term paper. Prerequisite: course 1E recommended. Critical study of the arts of the luxury book in the pre-modern Islamic world. Representation in Islam, the relationship of word and image, the discipline of calligraphy, aesthetics and representation in Persianate painting. GE credit: ArtHum, Div, Wrt | AH, VL, WC.—I, II, III. (I, II, III.) Watenpaugh

163A. Chinese Art (4)

Lecture - 3 hours; term paper or gallery studies and review. A survey from the beginning to the twelfth century focusing on the major art forms that are traditionally known as well as newly discovered through archaeology in China. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.—(II.) Burnett

163B. Chinese Painting (4)

Lecture—3 hours; term paper or gallery studies and review. The unique form of ink painting, with or without colors, depicting human and animal figures, flowers-and-birds, and landscape—the favorite and enduring theme of the Chinese scholar-painter. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.—Bur-

163C. Painting in the People's Republic of China (4)

Lecture—3 hours; term paper. Prerequisite: course 1D or upper division standing. Analysis of the interaction between art and politics in the emergence of China into the modern world. Integration of Western influence, implementation of Mao Zedong's thought on art, and the formation of contemporary Chinese painting. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.—Burnett

163D. Visual Arts of Early Modern China (4)

Lecture—3 hours; term paper. Prerequisite: course 163B or consent of instructor. Variable topics in Chinese art history during the 17th-19th centuries, considering artists' statements (visual and textual) within their historical contexts, asking what was at stake in the creation of new art forms. May be repeated for credit with consent of instructor. GE credit: ArtHum, Wrt, Div | AH, VL, WC, WE.-II. Burnett

164. The Arts of Japan (4)

Lecture — 3 hours; term paper and/or gallery studies and review (determined by instructor each quarter course offered). Study of the significant achievements in architecture, painting, sculpture, and decorative arts from prehistoric age to nineteenth century. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.

168. Great Cities (4)

Lecture—3 hours; term paper. Transformation in architecture and urban form in Paris, London, and Vienna in the context of varying social, political, and economic systems as well as very different cultural traditions, concentrating on the years 1830-1914. Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WE. - Sadler

172A. Early Greek Art and Architecture (4)

Lecture-3 hours; term paper. Examination of the origin and development of the major monuments of Greek art and architecture from the eighth century to the mid-fifth century B.C. Not open for credit to students who have completed course 154A. (Same course as Classics 172A.) Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WC.-II.

172B. Later Greek Art and Architecture (4)

Lecture—3 hours; term paper. Study of the art and architecture of later Classical and Hellenistic Greece, from the mid-fifth century to the first century B.C. Not open for credit to students who have completed course 154B. (Same course as Classics 172B.) Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WC.—II. Roller

173. Roman Art and Architecture (4)

Lecture-3 hours; term paper. The art and architecture of Rome and the Roman Empire, from the founding of Rome through the fourth century C.E. Not open for credit to students who have completed

course 155. (Same course as Classics 173.) Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WC.-III. Roller

175. Architecture and Urbanism in Mediterranean Antiquity (4)

Lecture - 3 hours; extensive writing. Prerequisite: a lower division Classics course (except 30, 31) course 1A recommended. Architecture and urban development in the ancient Near East, Greece, and Rome. Special emphasis on the social structure of the ancient city as expressed in its architecture, and on the interaction between local traditions and the impact of Greco-Roman urbanism. (Same course as Classics 175.) Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, VL, WC.—(II.) Roller

176A. Art of the Middle Ages: Early Christian and Byzantine Art (4)

Lecture—3 hours; term paper or gallery studies and review. Painting, sculpture and architecture of the early Christian era and Byzantine Empire: through the later Roman Empire in the West and to the final capture of Constantinople in the East. GE credit: ArtHum, Wrt | AH, VL, WC, WE.

176B. Art of the Middle Ages: Early Medieval and Romanesque Art (4)

Lecture—3 hours; term paper or gallery studies and review. Painting, sculpture and architecture of western Europe in the early medieval era: from the rise of the barbarian kingdoms through the twelfth century. GE credit: ArtHum, Wrt | AH, VL, WC, WE.

176C. Art of the Middle Ages: Gothic (4)

Lecture—3 hours; term paper or gallery studies and review. Painting, sculpture and architecture in northern Europe from the twelfth through the fifteenth centuries. GE credit: AH, VL, WC, WE.

177A. Northern European Art (4)

Lecture—3 hours; term paper or gallery studies and review. Painting and sculpture of the fifteenth century in Austria, Germany, France and the Lowlands, including such artists as Jan van Eyck and Hieronymus Bosch. GE credit: ArtHum, Wrt | AH, VL, WC,

177B. Northern European Art (4)

Lecture—3 hours; term paper or gallery studies and review. Painting and sculpture of the sixteenth century in Germany, France and the Lowlands, including such artists as Albrecht Dürer and Pieter Bruegel. GE credit: ArtHum, Wrt | AH, VL, WC, WE.

178A. Italian Renaissance Art (4)

Lecture—3 hours; term paper or gallery studies and review. Giotto and the origins of the Renaissance; painting and sculpture in Italy from Nicola Pisano through Lorenzo Monaco, with emphasis on Duccio, Giotto, and other leading artists of the early fourteenth century. GE credit: ArtHum, Wrt | AH, VL, WC, WE. - Ŕuda

178B. Italian Renaissance Art (4)

Lecture - 3 hours; term paper or gallery studies and review. Early Renaissance in Florence; fifteenth-century artists from Donatello and Masaccio through Botticelli, in their artistic and cultural setting. GE credit: ArtHum, Wrt | AH, VL, WE.-Ruda

178C. Italian Renaissance Art (4)

Lecture-3 hours; term paper or gallery studies and review. The High Renaissance: Leonardo, Michelangelo, Raphael, and Titian in their artistic and cultural settings - Florence, Rome, and Venice in the early sixteenth century. GE credit: ArtHum, Wrt | AH, VL, WC, WE.-I. (III.) Ruda

179B. Baroque Art (4)

Lecture-3 hours; term paper or gallery studies and review. Seventeenth-century painting, including such artists as Caravaggio, Rubens, Rembrandt, and Velázquez. Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WC, WE.—(I.) Ruda

182. British Art and Culture, 1750-1900 (4)

Lecture—3 hours; term paper. Prerequisite: course 1C recommended. British painting in relation to the position of women in society and the rise of the middle-class art market. Topics include Hogarth and popular culture, Queen Victoria and the female

gaze, and Pre-Raphaelite artists and collectors. Not offered every year. GE credit: ArtHum, Wrt | AH, VL, WC, WE.—III.

183A. Art in the Age of Revolution, 1750-1850 (4)

Lecture—3 hours; term paper. Prerequisite: course 1C recommended. Emergence of modernism in Europe from the late 18th century to the middle of the 19th century. Major artistic events viewed against a revolutionary backdrop of changing attitudes toward identity, race, and gender. Not offered every year. GE credit: ArtHum | AH, VL, WC,

183B. Impressionism and Post-Impressionism: Manet to 1900 (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 1C recommended. Innovations of Impressionists, Post-Impressionists, and Symbolists in relation to social changes. Assessment of role of dealers and critics, myth of the artist-genius, and gender relations in French art and culture of the late 1800s. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.-II.

183C. Modernism in France, 1880-1940 (4)

Lecture - 10 hours; discussion - 3 hours; fieldwork -11 hours. Course will take place as a 3-week summer course in France. A survey of gender and patronage in the development of modern art in France, Post-Impressionism, Fauvism, Cubism, and Surrealism are considered in relation to the intervention of dealers and women collectors in the formulation of modernism. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.-IV. (IV.)

183D. Modern Sculpture (4)

Lecture — 3 hours; term paper or gallery studies and review. Sculpture from Neo-Classicism to the present. GE credit: AH, VL, WE.-Cogdell

184. Twentieth Century Architecture (4)

Lecture—3 hours; term paper. Prerequisite: course 25 recommended. Major movements in architecture of the twentieth century in Europe and America. Formal innovations are examined within the social, political, and economic circumstances in which they emerged. GE credit: ArtHum, Wrt | AH, VL, WE.-

185. Avant-Gardism and its Aftermath, 1917-1960 (4)

Lecture/discussion-4 hours. Prerequisite: one course in art history, or upper division standing and a major or minor in the arts or humanities recommended. Social, cultural, aesthetic, and theoretical development for artists and their audiences in the context of larger issues like the Mexican, Russian and German revolutions, WWI, the Depression, WWII, etc., and a critical-theoretical inquiry into questions of modernism, modernity, and avant-gard-ism. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, VL, WC.

186. Art After Modernism, 1948-Present

Lecture/discussion-4 hours. Prerequisite: one course in art history, or upper division standing and a major or minor in the arts or humanities recommended. Social, cultural, aesthetic, and theoretical developments for artists and their audiences in the context of such larger issues as McCarthyism, the New Left, free love, feminism, Reaganomics, globalization, etc., and a critical-theoretical inquiry into questions of neoavantgardism, postmodernism, and postmodernity. Offered in alternate years. Not open for credit to students who have completed course 183E. GE credit: ArtHum, Div, Wrt | ACGH, AH, VL.-I. Stimson

187. Contemporary Architecture (4)

Lecture—3 hours; term paper. Prerequisite: course 25 and/or course 184 recommended. Introduction to world architecture and urban design since circa 1966. Relation of influential styles, buildings, and architects to postmodern debates and to cultural, economic, technological and environmental change. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, VL, WE. - I, II, III. Sadler

188A. The American Home (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 188B or any lower division course in Art History or Design; not open to freshmen. American domestic architecture and its responsiveness to changes in daily life from Colonial times to the present. Vernacular developments, effects of different socioeconomic conditions, and women's role in shaping the home receive special attention. GE credit: ArtHum, Div, Wrt | AH, VL.—Strazdes

188B. Architecture of the United States (4)

Lecture - 3 hours; discussion - 1 hour. Major move ments from colonial times to the present. The role of buildings in a changing society, the interplay of styles with technologies of construction, the relationship between American and European developments, and developments of the architectural profession. GE credit: ArtHum, Wrt | AH.-I. Cogdell

188D. American Painting and Sculpture to the Civil War (4)

Lecture/discussion-3 hours; term paper. Prerequisite: one lower division Art History course or junior standing. Major movements in American painting and sculpture to 1865. Colonial portraiture, development of history painting, rise of genre painting, and the Hudson River School of landscape painting. Emphasis on European cultural currents and their effects. GE credit: ArtHum, Wrt | AH. - (II.) Strazdes

188E. American Painting and Sculpture from the Civil War to World War II (4)

Lecture/discussion-3 hours; term paper. Prerequisite: one lower division course in Art History or junior standing. Major developments in American painting and sculpture from 1865 to 1940. The American adaptations of Barbizon painting, French Impressionism, late 19th-century American Realism, the Ashcan School, Modernist Ideologies, Regionalism. GE credit: ArtHum, Wrt.-III. Strazdes

189. Photography in History (4)

Lecture/discussion-4 hours. Prerequisite: one course in art history, or upper division standing and a major or minor in the arts or humanities recommended. Social, cultural, aesthetic and technical developments in the history of photography including patronage and reception, commercial, scientific, political and artistic applications, and a critical-theoretical inquiry into photography's impact on the social category "art" and the history of subjectivity. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, VL.—III. (I.) Stimson

190A-H. Undergraduate Proseminar in Art History (4)

Lecture/discussion-3 hours; term paper. Prerequisite: Art History major, minor, or other significant training in Art History recommended. Study of a broad problem or theoretical issue. Intensive reading, discussion, research, writing. Topics (A) Mediterranean Antiquity; (B) Medieval; (C) Renaissance; (D) American Art; (E) Gendering of Culture; (F) Chinese Art and Material Culture, GE credit: AH, OL, VL, WC, WE.; (G) Japanese Art and Material Culture; (H) Late Modern Art and Theory, GE credit: ACGH, AH, DD, OL, VL, WC, WE. May be repeated one time for credit when topic differs.-I, II, III. (I, II, III.)

192. Internship (2-12)

Internship—term paper or catalogue. Supervised program of internships at professional art institutions such as museums, galleries, and art archives includ-ing collections of slides and photographs. May be repeated one time for credit. (P/NP grading only.)

194H. Special Study for Honor Students (4)

Independent study-12 hours. Prerequisite: course 190 or the equivalent, as determined by the major adviser. Open only to students in the Art History Honors Program. Independent study of an art historical problem culminating in the writing of an honors thesis under the supervision of a faculty guidance

198. Directed Group Study (1-5)

(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

200A. Visual Theory and Interpretive Methods (4)

Discussion - 3 hours; extensive writing. Close study of selected recent developments in interpretive methodology used by art historians and other analysts of visual culture and the place of those developments within art history's history and in the larger field of social, cultural and historical analysis. May be repeated one time for credit.—I. (I.) Roller, Watenpaugh

200B. Research and Writing Methods in Art History (4)

Discussion—3 hours; term paper. Restricted to graduate students in art history. Development of the research, writing, and editing skills necessary for producing publishable work. Focus on reference tools used by art historians and the mechanics of scholarship, from question framing and organization of ideas to writing clear, effective prose.—II. (II.) Burnett, Strazdes

200C. Thesis Writing Colloquium (1)

Discussion - 1.5 hour; autotutorial. Prerequisite: course 200B, taken by all Art History M.A. students in their first year. Restricted to graduate students in Art History. Meeting concurrently with AHI 200B, the colloquium provides a structured, supportive environment for second-year art-history graduate students drafting masters' theses. It offers a forum for technical discussions, discussion of writing/editing procedures, and peer review of writing in progress. (S/U grading only.)—II. (II.) Burnett, Strazdes

250. Problems in Art Historical Research (4)

Seminar-3 hours; term paper. Major topics in art historical research, emphasizing special methods of investigation, and of historical and critical analysis. May be repeated for credit.-II.

251. Seminar in Tribal Arts (4)

Seminar—3 hours; term paper. Selected topics in the art and aesthetics of small scale societies. May be repeated for credit when topic differs and with consent of instructor.

254. Seminar in Classical Art (4)

Seminar-3 hours; term paper. Selected areas of special study in classical art of the Greek and Roman tradition. Course may be repeated for credit with consent of instructor.—Roller

263. Seminar in Chinese Art (4)

Seminar-3 hours; term paper. Selected areas of special study in Chinese Art. May be repeated for credit with consent of instructor.—II. Burnett

276. Seminar in Medieval Art (4)

Seminar—3 hours; term paper. Selected areas of special study in medieval art from Early Christian to late Gothic. May be repeated for credit with consent of instructor.

278. Seminar in Italian Renaissance Art (4)

Seminar-3 hours; term paper. Selected areas of special study in Italian art from the fourteenth to the sixteenth century. May be repeated for credit with consent of instructor.—III. Ruda

283. Seminar in Visual Culture and Gender (4)

Seminar-3 hours; term paper. Selected areas of special study in the relationship between visual culture and gender in Europe and America from 1750 to present. May be repeated for credit with consent of instructor. Offered in alternate years. - I.

288. Seminar in European and American Architecture (4)

Seminar — 3 hours; term paper. Exploration of selected topics in European and American architectural history with concentration on the Modern Period. May be repeated for credit with consent of instructor. – (II.) Cogdell, Sadler, Strazdes

290. Special Topics in Art History (4)

Seminar-3 hours; term paper. Special research seminar in the theory or methods of Art History, or in a period of Art History. Topic will vary depending on the interests of the instructor or students. May be repeated for credit when topic differs and with consent of instructor. Not offered every year. - I, II, III.

292. Internship (1-4)

Internship - 3-12 hours. Prerequisite: graduate student; consent of instructor. Supervised internship at professional art or cultural institution including museums, galleries, archives, government offices, visual resources libraries, etc. May be repeated up to eight units for credit. Graduate students in Art History only. Not offered every year. Limited enrollment. (S/ U grading only.)

298. Directed Group Study (1-5)

(S/U grading only.)

299. Individual Study (1-6)

(S/U grading only.)

Professional Courses

Note: Various of the below courses are not offered each year; check the quarterly Registration Guide.

390. Introduction to Teaching Art History for Teaching Assistants (1)

Discussion — 1 hour. Designed for teaching assistants with emphasis on problems and procedures encountered by teachers of undergraduate art history. (S/U grading only.)

396. Teaching Assistant Training Practicum

Seminar—2 hours; Practice—10 hours. Prerequisite: graduate standing. Principles and techniques of the effective teaching of undergraduate courses in the history of art. May be repeated for credit as often as the student is awarded a TA-ship. (S/U grading only.) - I, II, III. (I, II, III.)

Professional Courses

401. Museum Training: Curatorial Principles (4)

Seminar-3 hours. Approved for graduate degree credit. Study of private and public collections. Museum personalities. Appraisal of works of art; ethics of appraisal. Auction and sales: methods and catalogues. Registration. Technical problems of the museum. Connoisseurship. Collateral reading. Visits to museums. Seminar with assigned papers.—II.

402. Museum Training: Exhibition Methods (4)

Seminar - 3 hours; exhibition. Approved for graduate degree credit. History of exhibition methods in private and public collections. Comparisons of different types of museums and their exhibition problems. Lighting and techniques of display with emphasis on actual design. Experimentation with unusual presentation forms. — (II.)

Art Studio

(College of Letters and Science)

Hearne Pardee, M.F.A., Chairperson of the Depart-

Department Office. 101 Art Building (530) 752-0105; http://art.ucdavis.edu

Faculty

Tom Bills, M.F.A., Professor Matthias Geiger, M.F.A, Assistant Professor William Henderson, M.F.A., Professor Robin Hill, B.F.A., Professor David Hollowell, M.F.A., Professor Darrin Martin, M.F.A., Associate Professor Hearne Pardee, M.F.A., Professor Lucy Puls, M.F.A., Professor Annabeth Rosen, M.F.A., Professor Youngsuk Suh, M.F.A., Assistant Professor Gina Werfel, M.F.A., Professor

Emeriti Faculty

Conrad Atkinson, R.A.S. (honors), Professor Emeritus Lynn Hershman, M.A., Professor Emerita Harvey Himelfarb, M.A., Professor Emeritus

Academic Senate Distinguished Teaching Award Malaquias Montoya, B.F.A., Professor Emeritus Maunel Neri, Professor Emeritus Roland C. Petersen, M.A., Professor Emeritus Cornelia Schulz, M.F.A., Professor Emerita

Academic Senate Distinguished Teaching Award Wayne Thiebaud, M.A., hon. D.F.A. (C.C.A.C., D.C.) Professor Emeritus

UC Davis Prize for Teaching and Scholarly Achievement

The Major Program

The Studio Art Major provides the studio experience necessary for a broad understanding of the practice and interpretation of the visual arts.

The Program. The Art Studio program is designed to deliver a broad range of hands-on studio practices to the art major. Areas of focus include painting, sculpture, drawing, photography, ceramics, printmaking, and time-based media. Course choices/sequences are determined by the student according to major distribution requirements. Students are encouraged to explore a broad range of disciplines and are expected to take advantage of beginning classes which provide a critical introduc-tion to the research possibilities within the major, across disciplines. In addition to studio classes, students are encouraged to participate in a distinguished visiting artist lecture series, professional practice seminars, student exhibitions/competitions, internships, and benefit from exposure to cultural events and exhibitions in Davis, Sacramento, and the Greater Bay Area.

Portfolios. While portfolios are not required for admission to the art major, students at all levels are expected to maintain current portfolios of completed work in order to qualify and compete for the numerous internships, fellowships, grants, awards, and exhibitions the program has to offer, as well as to better prepare for the rigors of graduate school and/or an independent studio practice

Career Options. Graduates of the Studio Art Program attend prestigious post-baccalaureate and graduate programs in studio art. Alumni often go on to develop professional studio practices. Commitment to the development of one's studio work leads to exhibition opportunities as well as accomplishments in the realm of fellowships, commissions, collaborations, and a host of other professional projects and opportunities. For the student wishing to explore additional arts-related trajectories, in the private or public sector, a studio arts education provides a strong foundation for careers and/or graduate work in K-12 art education, art therapy, arts administration, curatorial studies, set design, architecture, culinary arts, design, film, animation, art criticism/ journalism among others

A.B. Major Requirements:

Preparatory Subject Matter 3	2
Five courses chosen from Art Studio 2, 4,	
5, 7, 8, 9, 11, 12	
Three lecture courses chosen from Art	
Studio 24, 26, 30, or Art History 1A, 1B,	
1C, 1D, 1E, 5, 10, 25 12	

UNITS

Depth Subject Matter 44

Nine courses, chosen from Art Studio 101,
102A, 102B, 103A, 103B, 105A, 105B,
105C, 110A, 110B, 111A, 111B, 113,
114A, 114B. 114C, 114D, 117, 121,
125A, 125B, 125C, 125D, 129, 138,
142A, 142B, 143A, 143B, 147, 148, 150
151, 152A, 152B, 152C, 152D, 152E,
152F, 152G, 171, 190
Any two upper division Art History
courses 8

Total Units for the Major......76

Major Advisers. Information on the current Academic Advisors can be obtained by contacting the Art Department Main Office at (530) 752-0105.

Minor Program Requirements:

UNITS

Art Studio......20

Prerequisite courses must be taken prior to enrollment in upper division courses. Independent study courses are not applicable.

Upper division art studio courses in two of the following areas:

Area 1 (Painting, Drawing, Printmaking) Area 2 (Sculpture and Ceramic Sculpture) Area 3 (Photography and Video) 20 Note: One lower division substitute course

Teaching Credential Subject Representative. Department Chairperson; see the Teacher Education program.

Graduate Study. The Department of Art offers programs of study and research leading to the M.F.A. degree in the practice of art. For more information contact the Graduate Staff Adviser at (530) 752-8710.

Courses in Art Studio (ART) Lower Division Courses

2. Beginning Drawing (4)

permissible

Studio-6 hours. Introduction to drawing using various black and white media. Drawing techniques covered are contour line, ink bleeds, rendering, "blind" drawing, and self portraiture.—I, II, III, IV. (I, II, III, IV.)—Henderson, Hollowell, Pardee, Puls, Werfel

4. Beginning Figure Drawing (4)

Studio-6 hours. Prerequisite: course 2. Form in composition using the human figure as subject. -Hollowell, Pardee, Werfel

5. Beginning Sculpture (4)

Studio-6 hours. Basic sculpture techniques using a variety of media. Form in space using cardboard, plaster, and/or cement, wood and/or metal and other media.—I, II, III. (I, II, III.) Bills, Hill, Puls

7. Beginning Painting (4)

Studio-6 hours. Introduction to techniques and concepts in the practice of painting.—Henderson, Hollowell, Pardee, Werfel

8. Beginning Ceramic Sculpture (4)

Studio-6 hours. Introduction to ceramic sculpture construction and processes. - Rosen

9. Beginning Photography (4)

Studio-6 hours. Introduction to the fundamental technical, aesthetic, and formal aspects of photography. Camera skills, film developing and printing in the black and white darkroom.—Geiger, Suh

10. Introduction to Art Appreciation (3)

Lecture-3 hours. The understanding and appreciation of painting, sculpture, architecture and industrial art. Illustrated lectures. Intended for non-majors. GE credit: ArtHum | AH, VL.

11. Beginning Printmaking (4)

Studio-6 hours. Introduction to printmaking techniques such as monography, relief, and intaglio. Investigation of personal imagery through use of these techniques.

12. Beginning Video (4)

Studio-6 hours. Production techniques of video shooting, editing, lighting, sound and effects. A conceptual framework for video-art techniques.—Martin

24. Introduction to Experimental Video and Film (4)

Lecture - 3 hours; discussion - 1 hour; term paper. Evolution of moving image technologies. Shifts within avant-garde artistic practices. Conceptual and historical differences between film and video Offered in alternate years. GE credit: ArtHum | AH, VL. - (I.) Martin

26. Photospectacle (4)

Lecture - 3 hours; discussion - 1 hour; term paper. Photography as performance-based art. History of performance art and performances designed specifically for the camera. Offered in alternate years. GE credit: ArtHum, Wrt.—(I.) Geiger, Suh

30. Introduction to Contemporary Visual Culture (4)

Lecture—3 hours; discussion/laboratory—1 hour. Establishing visual literacy across the media of fine art, photography, advertising, television and film; media culture; focus on critical decoding of contemporary visual culture. GE credit: ArtHum, Div, Wrt | AH, VL.-II. (I.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. Restricted to lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

Pre-enrollment in upper division courses is restricted to art majors.

101. Intermediate Painting (4)

Studio-6 hours. Prerequisite: courses 2, 7. Individualized projects exploring color and space in a variety of subject matter and approaches. Builds on basic skills and concepts from beginning drawing and painting courses. Study of historical and contemporary art in relation to studio practice. GE credit: AH, VL.—Henderson, Hollowell, Pardee, Werfel

102A. Advanced Painting: Studio Projects (4)

Studio-6 hours. Prerequisite: course 101. Sustained development of painting for advanced stu-dents. Approaches will vary according to the instructor. Pass 1 restricted to Art Studio majors. May be repeated for credit one time. GE credit: AH, VL. - Henderson, Hollowell, Iliatova, Pardee, Werfel

102B. Advanced Painting: Figure (4)

Studio-6 hours. Prerequisite: course 101. Advanced painting using the human figure as subject. Pass 1 restricted Art Studio majors. May be repeated for credit one time. GE credit: AH, VL.-Henderson, Hollowell, Pardee, Werfel

102C. Advanced Painting: Special Topics (4)

Studio-6 hours. Prerequisite: courses 2, 7, 101 course 102A or 102B. Special topics in painting for upper division students. Emphasis on development of a personal practice of painting informed by awareness of contemporary issues in painting and their historical background. Topics will vary with instructor. Pass 1 restricted Art Studio majors. May be repeated for credit one time. GE credit: AH, VL.—Henderson, Hollowell, Pardee, Werfel

103A. Intermediate Drawing: Black and White (4)

Studio – 6 hours. Prerequisite: courses 2. Advanced study of drawing composition using black and white media. Pass 1 restricted Art Studio majors. GE credit: AH, VL.-Henderson, Hollowell, Pardee, Werfel

103B. Intermediate Drawing: Color (4)

Studio - 6 hours. Prerequisite: courses 2. Study of drawing composition in color media. Pass 1 restricted Art Studio majors. GE credit: AH, VL. -Henderson, Hollowell, Pardee, Werfel

105A. Advanced Drawing: Studio Projects (4)

Studio-6 hours. Prerequisite: courses 2; course 103A or 103B. Exploration of composition and process in drawing. Emphasis on the role of drawing in contemporary art and on drawing as an interdisciplinary practice. Pass 1 restricted Art Studio majors. May be repeated for credit one time. GE credit: AH, VL. - Henderson, Hollowell, Pardee, Werfel

105B. Advanced Drawing: Figure (4)

Studio-6 hours. Prerequisite: courses 4; course 103A or 103B. Study of the figure through drawing of the model. Exploration of different methods and

process of figure-drawing. Pass 1 restricted Art Studio majors. May be repeated for credit one time. GE credit: AH, VL. - Henderson, Hollowell, Pardee, Werfel

110A. Intermediate Photography: Black and White Analog (4)

Studio—6 hours. Prerequisite: course 9. Introduction to 35mm and medium format camera. Development of personal aesthetic and portfolio of black and white prints. Pass 1 restricted Art Studio majors. GE credit: AH, VL.—Geiger, Suh

110B. Intermediate Photography: Digital Imaaina (4)

Studio-6 hours. Prerequisite: course 9. Comprehensive introduction to all elements of digital photography, including scanning, imaging software and printing. Pass 1 restricted Art Studio majors. GE credit: AH, VL. – Geiger, Suh

111A. Advanced Photography: Special Topics (4)

Studio-6 hours. Prerequisite: courses 9 and 110A. Restricted to Art Studio majors in pass 1. Special topics related to photography and contemporary art practice. Multiple projects in a variety of approaches. May be repeated two times for credit. GE credit: AH, VL. - Geiger, Suh

111B. Advanced Photography: Digital Imaging (4)

Studio-6 hours. Prerequisite: courses 9, 110B. In depth exploration of digital photography, including refined digital imaging techniques. Theoretical issues involved in digital media. May be repeated for credit one time. Pass 1 restricted Art Studio majors. GE credit: AH, VL.—Geiger, Suh

112. Sound for Vision (4)

Studio-6 hours. Prerequisite: course 12 or Technocultural Studies 100. Sound composition and development of an audio databank. Study of repetition and phase shifts. Creation of descriptive acoustic space recordings in combination with other artistic media. Audio as stand alone or accompaniment. May be repeated for credit one time. Pass 1 restricted Art Studio majors. GE credit: AH.—Martin

113. Interdisciplinarity Art (4)

Studio-6 hours. Prerequisite: Upper division standing in Art Studio, Theater and Dance, Design, Technocultural Studies, or Music. Experimental interdisciplinary strategies. Use of various media in creation of collaborative or independent works. Production of participatory audio-visual works, installations, or two dimensional explorations. May be repeated for credit one time. GE credit: AH, VL.— Geiger, Hill, Martin, Puls, Suh

114A. Intermediate Video: Animation (4)

Studio-6 hours. Prerequisite: course 12 or Technocultural Studies 100 and one drawing course. Exploration of animation. Relationship between drawing, digital stills, and multiple images. Animation using traditional drawing techniques, collage, and digital processes. May be repeated for credit one time. Pass 1 restricted Art Studio majors. GE credit: AH, VL.-Martin

114B. Intermediate Video: Experimental Documentary (4)

Studio-6 hours. Prerequisite: course 12 or Technocultural Studies 100. Experimental documentary practice. Use of interviews, voice-overs, and still and moving images. Production of alternative conceptual and visual projects. May be repeated for credit one time. Pass 1 restricted Art Studio majors. GE credit: AH, VL.-Martin

114C. Intermediate Video: Performance Strategies (4)

Studio—6 hours. Prerequisite: course 12 or Technocultural Studies 100. Use of video to expand performance art production. Exploration of improvisation, direction, projection, and image processing in real time. May be repeated for credit one time. Pass 1 restricted Art Studio majors. GE credit: AH, VL.—Martin

117. Advanced Video and Electronic Arts

Studio-6 hours. Prerequisite: course 12 or Technocultural Studies 100; one of course112, 114A, 114B, or 114C; upper division standing Art Studio Majors. Independently driven video, digital, and/or performance projects. Further development in the electronic arts ranging from video installation to performance. May be repeated for credit one time. Pass 1 restricted Art Studio majors. GE credit: AH, VL.—Martin

121. Reinterpreting Landscape (4)

Studio-6 hours. Prerequisite: courses 2, 7. Interpretation of landscape through painting, drawing, and related media. Emphasis on the integration of historical, cultural, natural, and artistic contexts. May be repeated for credit one time. Pass 1 restricted Art Studio majors. GE credit: AH, VL.—Pardee, Werfel

125A. Intermediate Printmaking: Relief (4)

Studio-6 hours. Prerequisite: course 11. Woodcut linocut, metal-plate, relief, and experimental uses of other materials for printmaking. Additive and reductive relief techniques. May be repeated for credit one time. Pass 1 restricted Art Studio majors. GE credit: AH, VL.

125B. Intermediate Printmaking: Intaglio (4)

Studio-6 hours. Prerequisite: course 11. Metal plate etching, aquatint, hard and soft ground, burin engraving and related printmaking techniques. May be repeated for credit one time. Pass 1 restricted Art Studio majors. GE credit: AH, VL.—Berry

125C. Intermediate Printmaking: Lithography (4)

Studio-6 hours. Prerequisite: course 11. Stone and metal-plate lithography and other planographic printmaking methods. Exploration of the basic chemistry and printing procedure inherent in stone lithogrphay. May be repeated for credit one time. Pass 1 restricted Art Studio majors. GE credit: AH, VL. — Berry

125D. Intermediate Printmaking: Serigraphy (4)

Studio-6 hours. Prerequisite: course 11. Printmaking techniques in silk screen and related stencil methods. Development of visual imagery using the language of printmaking. May be repeated for credit one time. Pass 1 restricted Art Studio majors. GE credit: AH, VL.

129. Advanced Printmaking (4)

Studio-6 hours. Prerequisite: completion of two of: 125A, 125B, 125C, or 125D. Development of intermedia printmaking. Advanced modes in print technologies: relief, serigraphy, intaglio, surface, as well as addition of digitized imagery. May be repeated for credit two times. Pass 1 restricted Art Studio majors. GE credit: AH, VL.

138. The Artist's Book (4)

Studio-6 hours. Prerequisite: completion of three upper division Art Studio courses. Creation of an artist's book in an edition of three. Use of a variety of media. May be repeated for credit one time. Pass 1 restricted Art Studio majors. Offered in alternate years. GE credit: AH, VL.-Geiger, Hill, Suh

142A. Intermediate Ceramic Sculpture: Mold Work (4)

Studio-6 hours. Prerequisite: course 8. Creation of ceramic sculpture employing moldworking processes such as: slip casting, hump molds, and sprigging. Pass 1 restricted Art Studio majors. GE credit: AH, VL. - Rosen

142B. Intermediate Ceramic Sculpture: Clay, Glaze, and Kiln (4)

Studio-6 hours. Prerequisite: course 8. Study and practice of glaze formation. Concentration on the use of color in ceramic sculpture. Practical experience with kiln firing. Pass 1 restricted Art Studio majors. GE credit: AH, VL.—Rosen

143A. Advanced Ceramic Sculpture: Studio Projects (4)

Studio-6 hours. Prerequisite: course 8; 142A or 142B. Exploration of ceramic fabrication. Hollow and solid building, casting, throwing, using fired, found, and fabricated ceramic elements. May be repeated for credit two times. Pass 1 restricted Art Studio majors. GE credit: AH, VL.-Rosen

143B. Advanced Ceramic Sculpture: Issues in Contemporary Ceramics (4)

Studio-6 hours. Prerequisite: course 8; 142A or 142B. Individual studio work in conjunction with readings, field trips, critiques and writing about contemporary ceramic art. May be repeated for credit two times. Pass 1 restricted Art Studio majors. GE credit: AH, VL.-Rosen

147. Theory and Criticism of Photography

Lecture—3 hours; term paper. Prerequisite: course 9. Development of camera vision, ideas, and aesthetics and their relationship to the fine arts from 1839 to the present. Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL.-II. Geiger, Suh

148. Theory and Criticism: Painting and Sculpture (4)

Lecture—3 hours; term paper. Prerequisite: course 5 or 7. Study of forms and symbols in historic and contemporary masterpieces. Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL.—I. Thiebaud

149. Introduction to Critical Theory (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: two of Art History 1B, 1C, or 183F. An overview of 20th century critical theories of culture and their relation to visual art and mass media culture. GE credit: ArtHum, Div, Wrt | AH, VL.

150. Theory and Criticism of Electronic Media (4)

Lecture—3 hours; term paper. Prerequisite: course 24 recommended. Study of electronic media, focusing on critique, application, and relationship to art practice. Analysis of the conceptual basis of electronic media as an artistic mode of expression. Offered in alternate years. GE credit: ArtHum, Wrt | AH. — (I.) Martin

151. Intermediate Sculpture (4)

Studio-6 hours. Prerequisite: course 5. Individualized explorations through multiple projects in a variety of sculpture media and techniques. Builds upon technical skills and concepts covered in course 5. May be repeated one time for credit when topic differs. GE credit: AH, VL.-I, II, III. (I, II, III.) Bills, Hill,

152A. Advanced Sculpture: Studio Projects (4)

Studio-6 hours. Prerequisite: courses 5, 151. Sculpture for advanced students. Emphasis on concept, idea development and honing technical skills. Approaches and projects will vary according to the instructor. May be repeated for credit one time when topic differs. Pass 1 restricted Art Studio majors. GE credit: AH, VL.-Bills, Hill, Puls

152B. Advanced Sculpture: Material **Explorations (4)**

Studio-6 hours. Prerequisite: courses 5, 151. Primary application and exploration of a single sculpture material chosen by the student. Examination of its properties, qualities, and characteristics for threedimensional expression. May be repeated for credit one time. Pass 1 restricted Art Studio majors. GE credit: AH, VL.-Puls

152C. Advanced Sculpture: Concepts (4)

Studio-6 hours. Prerequisite: courses 5, 151. Investigation of a specific idea chosen by the class. Relationship of idea to form and content. Individual development of conceptual awareness. May be repeated for credit one time. Pass 1 restricted Art Studio majors. GE credit: AH, VL.—Puls

152D. Advanced Sculpture: Metals (4)

Studio-6 hours. Prerequisite: courses 5, 151. Technical aspects of the use of metals in contemporary art practice. Projects assigned to demonstrate the

evolution of concepts and processes. May be repeated for credit one time. Pass 1 restricted Art Studio majors. GE credit: AH, VL.—Bills

152E. Advanced Sculpture: Site Specific Public Sculpture (4)

Studio - 6 hours. Prerequisite: courses 5, 151. Place and site specificity in contemporary sculpture. Individual and group work to conceive and fabricate sculpture in a public space. May be repeated for credit one time. Pass 1 restricted Art Studio majors. GE credit: AH, VL.—Hill

152F. Advanced Sculpture: Figure (4)

Studio – 6 hours. Prerequisite: courses 5, 151. Exploration of historical and contemporary approaches to the body in three-dimensions. Projects based on observational and conceptual strategies. Variety of media and techniques, including clay, wax, plaster, plastics, found objects, and others May be repeated for credit one time. Pass 1 restricted Art Studio majors. GE credit: AH, VL

152G. Advanced Sculpture: The Miniature and Giaantic (4)

Studio-6 hours. Prerequisite: courses 5, 151. Exploration of scale, from the very small to the very large in a series of projects in a variety of media. Tools and techniques of enlargement and miniaturization. May be repeated for credit one time. Pass 1 restricted Art Studio majors. GE credit: AH, VL.

171. Mexican and Chicano Mural Workshop (4)

Studio - 8 hours; independent study - 1 hour. Prerequisite: Chicana/o Studies 70 and/or written consent of instructor. The Mural: a collective art process that empowers students and people through design and execution of mural paintings in the tradition of the Mexican Mural Movement; introduces materials and techniques. May be repeated one time for credit. (Same course as Chicana/o Studies 171.) GE credit: AH, VL.-III. (III.)

190. Seminar in Art Practice (4)

Studio-6 hours. Prerequisite: upper division standing Art Studio major. I Introduction to professional practices. Development of an artist's packet including a resume, cover letter, artist statement, and statement of purpose. Ongoing independent studio work with group critiques. Research on galleries and museums, and readings in contemporary theory and criticism. Pass 1 restricted Art Studio majors. GÉ credit: AH, VL.-I, II, III. (I, II, III.) Hill, Puls, Rosen,

192. Internship (2-12)

Internship. Supervised program of internships in artists' studios and at professional art institutions such as museums, galleries, and art archives including collections of slides and photographs. May be repeated for credit for a total of 12 units. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

290. Seminar (4)

Seminar—3 hours. Original works produced for group discussion and criticism; associated topics of a contemporary and historical nature. May be repeated for credit. - I, II, III, (I, II, III.)

291. Seminar: Critical Evaluation (1)

Seminar-1 hour. May be repeated for credit. (S/U grading only.)—II. (II.)

292. Seminar: Comprehensive Qualifying (1)

Seminar - 1 hour. Further critical evaluation of the student's work to determine his eligibility to begin the Comprehensive Project. May be repeated for credit. (S/U grading only.)—(I.)

299. Individual Study (1-6)

(S/U grading only.)

299D. Comprehensive Project (9)

An original body of work accompanied by a catalog summarizing the student's aesthetic position. May be repeated for credit. (S/U grading only.)—III. (III.)

Professional Courses

Note: Various of the below courses are not offered each year; check the quarterly Registration Guide.

401. Museum Training: Curatorial **Principles**

Seminar-3 hours; papers. Approved for graduate degree credit. Study of private and public collections. Museum personalities. Appraisal of works of art; ethics of appraisal. Auction and sales: methods and catalogues. Registration. Technical problems of the museum. Connoisseurship. Collateral reading. Visits to museums. Offered in alternate years.

402. Museum Training: Exhibition Methods (4)

Seminar—3 hours; exhibition. Approved for graduate degree credit. History of exhibition methods in private and public collections. Comparisons of different types of museums and their exhibition problems. Lighting and techniques of display with emphasis on actual design. Experimentation with unusual presentation forms. Offered in alternate years.

Asian American Studies

(College of Letters and Science)

Nolan Zane, Ph.D., Chairperson of the Department

Program Office. 3102 Hart Hall (530) 752-3625; http://asa.ucdavis.edu

Faculty

Darrell Y. Hamamoto, Ph.D., Professor Wendy Ho, Ph.D., Senior Lecturer Richard S. Kim, Ph.D., Associate Professor Sunaina Maira, Ed.D., Professor Susette Min, Ph.D., Associate Professor Robyn Rodriguez, Ph.D., Associate Professor Sarita See, Ph.D., Associate Professor Caroline Kieu Linh Valverde, Ph.D., Assistant Professor

Nolan Zane, Ph.D., Professor **Emeriti Faculty**

Isao Fujimoto, M.A., Senior Lecturer Emeritus Bill Ong Hing, J.D., Professor Emeritus Stanley Sue, Ph.D., Professor Emeritus

The Major Program

The Asian American Studies Program offers an interdisciplinary major that examines the experiences of various Asian American groups in the United States. Pertinent to these experiences are the historical, cultural, legal, political, social-psychological, class, racial, and gender contexts for Asian Americans.

The Program. Majors take a prescribed set of lower division and upper division courses in Asian American Studies. These courses offer diverse theoretical and methodological tools to develop and encourage student critical thinking, creativity, initiative, and independent research about a complex, multiethnic and racialized society in the United States and in a global world.

Career Alternatives. Asian American Studies prepares students for a variety of careers. Given the multicultural nature of society and the increasing relations with different societies, many occupations seek individuals with background and expertise in ethnic relations and cultural issues. Graduates often enter the fields of teaching, research, government service, law, social services, etc., as well as graduate schools for advanced degrees in various disci-

A.B. Major Requirements:

UNITS

Humanities Emphasis
Preparatory Subject Matter34
Asian American Studies 1, 2, 20
One Asian language: Chinese 1, 2, 3; Japanese 1, 2, 3; or equivalent Asian

Chinese and Japanese (under East Asian Languages and Cultures). For other Asian courses, see East Asian Languages and Culture and East Asian Studies. At least two lower division courses from the following departments or programs: African American and African Studies, Chicana/o Studies, Native American Studies, Women and Gender Studies (all lower division courses of at least 4 units are acceptable except those numbered 92, 97T, 98, and 99)......8

Depth Subject Matter 44-47

At least seven upper division Asian American Studies courses (excluding 1977, 198, 199) and not more than 6 units of tracks.....
Literature/Culture Track

Comparative Literature 153; Dramatic Art 154, 155; English 178, 179, 185A, 185B

History/Culture Track Dramatic Art 154, 155; History 191F, 194C, 196B, 173, 178

Total Units for the Major.....78-81 **Social Science Emphasis**

Preparatory Subject Matter..... 32

Asian American Studies 1, 2.. Select four courses from the following: Anthropology 2, 4, 20; Communication 1, 3; Human Development 30; Psychology 41; Sociology 46A, 46B; Statistics 13 (at least two of the courses must be methodological/ statistical in nature and selected from Anthropology 2; Psychology 41; Sociology At least two lower division courses from the following departments or programs: African American and African Studies, Chicana/o Studies, Native American Studies, Women and Gender Studies (all lower division courses of at least 4 units are acceptable except those numbered 92, 97T, 98, and 99)......8

Depth Subject Matter 44-46

At least seven upper division Asian American Studies courses (excluding 197T, 198, 199) and not more than 6 units of Select four courses from one of the following

Anthropology Track Anthropology 123BN, 132, 133, 134,

138, 139AN, 143B, 147 Sociology/Psychology Track Human Development 103; Psychology 142; Sociology 125, 128, 129, 130, 172

Total Units for the Major.....76-78

Major Adviser. Consult Department office

Substitutions for disciplinary track courses will be considered by the Program Director on a case by case basis. Likewise, any substitutions of Major/ Minor criteria will be considered by the Program

Minor Program Requirements:

UNITS

Asian American Studies 20 Five courses from Asian American Studies

100, 110, 111, 112, 120, 130, 136, 140,

150, 150B, 150C, 150D, 155, 192, 198, and 199 (no more than 4 units of 192, 198, and 199 may be counted toward this total)

Minor Adviser. M. D. Nguyen (530) 752-4447 or mdnguyen@ucdavis.edu

American History and Institutions. This university requirement can be satisfied by one of the fol-lowing courses in Asian American Studies: 1, 2; see also under University Requirements.

Courses in Asian American Studies

Direct questions pertaining to the following courses to the instructor or to Asian American Studies Department in 3102 Hart Hall (530) 723-9767.

Lower Division Courses

1. Historical Experience of Asian Americans

Lecture - 3 hours; discussion - 1 hour. Introduction to Asian American Studies through an overview of the history of Asians in America from the 1840s to the present within the context of the development of the United States. GE credit: SocSci, Div, Wrt | ACGH, DD, SS, VL, WC, WE.—I, III.

2. Contemporary Issues of Asian Americans (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Introduction to Asian American Studies through the critical analysis of the impact of race, racism, ethnicity, imperialism, militarism, and immigration since post-World War II on Asian Americans. Topics may include sexuality, criminality, class, hate crimes, and inter-ethnic relations. GE credit: SocSci, Div, Wrt | ACGH, AH or SS, DD, VL, WC, WE.-I, II, IİI.

3. Social and Psychological Perspectives of Asian Americans (4)

Lecture - 3 hours; discussion - 1 hour. Major psychosocial issues of Asian Americans. Theories and empirical research that address cultural values, behavioral norms, ethnic stereotypes, racism, acculturation, ethnic identity development, family communication, stressors and social support systems, academic achievement, interpersonal effectiveness, and psychopathology. GE credit: SocSci, Div | ACGH, DD, SS.—II, III. Zane

4. Asian American Cultural Studies (4)

Lecture—3 hours; discussion—1 hour. This interdisciplinary course examines the multiple ways in which race, class, sexuality and gender, as well as the recent turn to transnationalism and postcolonial theory, have changed the ways we read Asian American literature and see art, theater and film. GE credit: ArtHum, Div, Wrt | ACGH, AH, DD, OL, VL, WE.-I, II, III. Hamamoto, Ho, Min

92. Internship (1-3)

Internship - 3-9 hours. Prerequisite: enrollment dependent on availability of intern positions and consent of instructor. Supervised internship in community and institutional settings related to Asian American concerns. (P/NP grading only.)

98. Directed Group Study (1-5)

Primarily intended for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) (P/NP grading only.)

Upper Division Courses

100. Asian American Communities (4)

Lecture/discussion-4 hours. Prerequisite: course 1, 2, or 3, or consent of instructor. Survey and analysis of Asian American communities within both historical and contemporary contexts. Presentation of the analytical skills, theories, and concepts needed to describe, explain, and understand the diversity of Asian American communities within the larger, dominant society. GE credit: SocSci, Div | ACGH, AH or SS, DD, WE.—III. Hamamoto, Kim, Maira

102. Theoretical Perspective in Asian American Studies (4)

Lecture/discussion-4 hours. Prerequisite: course 1, 2, 3, or 4 or consent of instructor; upper division standing. Explores major theories of race and its intersections with class, gender, and sexuality from interdisciplinary perspective. Introduces key theoretical developments, issues, debates. Through case studies, analyzes ways various theoretical frameworks and perspectives have been incorporated into range of scholarship. GE credit: SocSci, Div.—I, IV. (I, IV.) Hamamoto, Ho, Kim, Valverde

112. Asian American Women (4)

Lecture/discussion-4 hours. Prerequisite: course 1, 2, or 3, or consent of instructor. Experiences of Asian American women from major ethnic subgroups comparatively examined in their social, economic and historical contexts using theoretical perspectives from social sciences, humanities/arts: identity, racialization, immigration, gender, sexuality, labor, socialization, cultural expression, social movements and feminist theorizing. GE credit: ArtHum or SocSci, Div | ACGH, AH or SS, DD, VL, WC, WE.-I. Ho

113. Asian American Sexuality (4)

Lecture/discussion-4 hours. Prerequisite: course 1, 2, or 3. Restrictive US immigration laws, labor exploitation, race-based exclusionary laws, removal and internment, anti-miscegenation laws, and other examples of social control are surveyed to assess their role in shaping the sexuality of the different Asian American groups. GE credit: ACGH, AH or SS, DD, WC, WE.—II. Hamamoto

114. Asian Diasporas (4)

Lecture-4 hours. Prerequisite: course 1 or 2; upper division status or consent of instructor. Asian diasporic communities and the experiences of its members in the United States and internationally. Community building, cyberspace, gender issues, labor, transnational practices, effects of globalization, political organizing, homeland politics, humanitarian projects, citizenship and nationalism. Offered in alternate years. GE credit: SocSci, Div | ACGH, DD, SS, WC.—I. Kim, Valverde

115. Multiracial Asian Pacific American Issues (4)

Lecture/discussion—4 hours. Prerequisite: course 1, 2, or 3, or consent of instructor. Introduction to the experiences of biracial and multiracial Asian Pacific people in the U.S., concentrating on theories of race, racial identity formation, culture, media, and anti-racist struggles. Critical approaches to the analysis of popular media and academic representations. Offered in alternate years. GE credit: Div | ACGH, DD, OL, SS, WC, WE.—Valverde

116. Asian American Youth (4)

Lecture - 3 hours; term paper. Prerequisite: course 1, 2, or 3. Social experiences of diverse groups of Asian American youth. Ways in which youth themselves actively create cultural expressions and political interventions. GE credit: Div | ACGH, AH or SS, DD, OL, WE.-Maira

121. Asian American Performance (4)

Lecture/discussion-4 hours. Prerequisite: course 1, 2, or 3, or consent of instructor. Performance work by, for, and/or about Asian Pacific Americans including dramatic literature, performance art, dance, and film. Ethnicity, gender and sexuality, class and age as they intersect with Asian Pacific American identities in and through dramatic performance. Offered in alternate years. GE credit: ACGH, AH, DD, OL, WE.—II. Min, See

130. Asian American Literature (4)

Lecture/discussion-4 hours. Prerequisite: course 1, 2 or 3 or consent of instructor. Works of Asian American literature by writers from the major ethnic subgroups, examined in their social, economic and historical contexts. Intertextual analysis of their thematic and formal elements to form an understanding of Asian American literary traditions. GE credit: ArtHum, Div | ACGH, AH, DD, OL, WE.-II. Ho,

131. Ethnicity, Culture, and the Self (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 1, 2, or 3. Cultural and social psychological influences on Asian Americans focusing on the individual. GE credit: SocSci, Div | ACGH, DD, SS.-

132. Health Issues Confronting Asian Americans and Pacific Islanders (4)

Lecture/discussion-4 hours. Health issues confronting Asian Americans and Pacific Islanders. (Same course as Public Health Sciences 132.) GE credit: SS.-Chen

140. Asian Americans and Media (4)

Lecture - 4 hours. Prerequisite: course 1 or 2. Upper division standing. The politics of Asian American representation in print, radio, television, film, and new media will be examined in tandem with sustained discussion of alternatives offered by independent Asian American media arts. GE credit: ArtHum, SocSci, Div, Wrt.-I. (I.) Hamamoto

141. Asian Americans and the Political Culture of Fashion in the U.S. and Asia (4)

Lecture — 4 hours; term paper; project. Prerequisite: course 1; course 2, 3, or 4 or consent of instructor. Historical, cultural and sociopolitical development of fashion in Asia and the U.S. as it relates to the Asian Diasporas. Specific aspects of material culture: textiles, clothing and fashion. Offered in alternate years. GE credit: ArtHum, SocSci, Div | ACGH, AH or SS, DD, OL, VL, WC, WE.—I. Valverde

150. Filipino American Experience (4)

Lecture/discussion-4 hours. Prerequisite: course 1 or 2. Examination of the relationship between the Filipino-American community, the Philippine home community and the larger American society through a critical evaluation of the historical and contemporary conditions, problems and prospects of Filipinos in the U.S. GE credit: ACGH, DD, SS, WC. - III. Rodriguez

150B. Japanese American Experience (4)

Lecture — 3 hours; term paper. Prerequisite: course 1 and upper division standing or consent of instructor. Analytical approaches to understanding Japanese American history, culture and society. Offered in alternate years. GE credit: SocSci, Div, Wrt | ACGH, AH or SS, DD, VL, WC, WE.-II. Hamamoto

150C. Chinese American Experience (4)

Lecture/discussion-4 hours. Prerequisite: course 1, 2, or 3, or consent of instructor. Survey of the historical and contemporary experiences of Chinese in the United States, starting with the gold rush era and concluding with the present-day phenomenon of Chinese transnational movement to the United States and its diasporic significance. Offered in alternate years. GE credit: SocSci, Div | ACGH, AH or SS, DD, VL, WC.-Ho

150D. Korean American Experience (4)

Lecture/discussion-4 hours. Prerequisite: course 1, 2, or 3 or consent of instructor. Interdisciplinary survey of the historical and contemporary experiences of Koreans in the United States from the late nineteenth century to the present. Offered in alternate years. GE credit: SocSci, Div | ACGH, AH or SS, DD, WC.-Kim

150E. Southeast Asian American Experience (4)

Lecture/discussion-4 hours. Prerequisite: course 1, 2, or 3, or consent of instructor. Upper division status. Historical survey of Southeast Asian experiences with special focus on United States involvement and post 1975 migrations. Defines international and transnational conditions that led up to the large exodus and resettlement of Southeast Asians. Offered in alternate years. GE credit: SocSci, Div | ACGH, AH or SS, DD, OL, WC, WE.-III. Valverde

150F. South Asian American History, Culture, & Politics (4)

Lecture/discussion-4 hours. Prerequisite: course 1, 2, 3, or 4 or consent of instructor. South Asian American experiences, focusing on the histories, cultures, and politics of Indian, Pakistani, Bangladeshi, and

Sri Lankan communities in the U.S. Interdisciplinary approaches to migration, labor, gender, racialization, ethnicity, youth, community mobilization. Offered in alternate years. GE credit: ArtHum, SocSci | ACGH, AH or SS, DD, OL, WE.-II. Maira

155. Asian American Legal History (4)

Lecture/discussion - 4 hours. Prerequisite: course 1, 2, or 3 or consent of instructor. Legal history of Asian Americans, from the mid-19th century to present. Laws and administrative policies affecting Asian American communities, including those governing immigration, social and economic participation, WWII internment, and affirmative action. GE credit: ACGH, DD, SS.-(II.)

189A. Topics in Asian American Studies (4)

Lecture — 4 hours. Prerequisite: course 1, 2, or 3 and upper division standing, or consent of instructor. Intensive treatment of a topic in Asian American Studies. History. May be repeated for credit when topic differs. Not offered every year. GE credit: ACGH, DD, SS, WC.

189B. Topics in Asian American Studies (4)

Lecture - 4 hours. Prerequisite: course 1, 2, or 3 and upper division standing, or consent of instructor. Intensive treatment of a topic in Asian American Studies. Culture. May be repeated for credit when topic differs. Not offered every year. GE credit: AH

189C. Topics in Asian American Studies (4)

Lecture-4 hours. Prerequisite: course 1, 2, or 3 and upper division standing, or consent of instructor. Intensive treatment of a topic in Asian American Studies. Health. May be repeated for credit when topic differs. Not offered every year. GE credit: SS.

189D. Topics in Asian American Studies (4)

Lecture — 4 hours. Prerequisite: course 1, 2, or 3 and upper division standing, or consent of instructor. Intensive treatment of a topic in Asian American Studies. Policy and Community. May be repeated for credit when topic differs. Not offered every year. GE credit: ACGH, DD, SS.

189E. Topics in Asian American Studies (4)

Lecture-4 hours. Prerequisite: course 1, 2, or 3 and upper division standing, or consent of instructor. Intensive treatment of a topic in Asian American Studies. Comparative Race Studies. May be repeated for credit when topic differs. Not offered every year. GE credit: ACGH, AH or SS, DD, OL,

189F. Topics in Asian American Studies (4)

Lecture - 4 hours. Prerequisite: course 1, 2, or 3 and upper division standing, or consent of instructor. Intensive treatment of a topic in Asian American Studies. Asian and Asian American Studies. May be repeated for credit when topic differs. Not offered every year. GE credit: SS.

189G. Topics in Asian American Studies (4)

Lecture-4 hours. Prerequisite: course 1, 2, or 3 and upper division standing, or consent of instructor. Intensive treatment of a topic in Asian American Studies. Race, Class, Gender, and Sexuality. May be repeated for credit when topic differs. Not offered every year. GE credit: SS.

189H. Topics in Asian American Studies (4)

Lecture - 4 hours. Prerequisite: course 1, 2, or 3 and upper division standing, or consent of instructor. Intensive treatment of a topic in Asian American Studies. Society and Institutions. May be repeated for credit when topic differs. Not offered every year. GE credit: AH or SS.

1891. Topics in Asian American Studies (4)

Lecture-4 hours. Prerequisite: course 1, 2, or 3 and upper division standing, or consent of instructor. Intensive treatment of a topic in Asian American Studies. Politics and Social Movements. May be repeated for credit when topic differs. Not offered every year. GE credit: ACGH, AH or SS, DD, OL,

192. Internship (1-5)

Internship - 3-15 hours. Prerequisite: enrollment dependent on availability of intern position with priority to Asian American Studies minors. Supervised

internship in community and institutional settings related to Asian American concerns. (P/NP grading

197T. Tutoring in Asian American Studies (1-5)

Tutoring — 1-5 hours. Prerequisite: upper division standing and completion of appropriate course with distinction; consent of instructor. Tutoring in lower division Asian American Studies courses in small group discussion. Weekly meetings with instructor.
May be repeated for credit once for a given course and also for a different course. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. Primarily intended for upper division students. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading

Asian Studies

See Asian American Studies, on page 168; East Asian Languages and Cultures, on page 218; and East Asian Studies, on page 222.

Astronomy

See Physics, on page 457.

Atmospheric Science

(College of Agricultural and Environmental Sciences) Faculty. See under Department of Land. Air and Water Resources, on page 361.

The Major Program

Atmospheric science is the study of the air that surrounds the planet. It includes all weather phenomena and climate including the chemistry of trace constituents and cloud and particle formation, as well as quantitative studies of severe weather events such as hurricanes and tornadoes. It includes the study of the impacts of human and other biotic activity on the quality of the air we breathe. Changes in regional and global climate are also central to this field of

The Program. Modern meteorology is a quantitative science that is becoming increasingly computer dependent. In addition to the study of daily weather events, the program deals with fundamental dynamical and physical processes that involve the general circulation of the atmosphere; turbulent mass and energy transfer at the planetary surface as well as within the free atmosphere; the transfer of solar and terrestrial radiation throughout the atmosphere; atmospheric interaction with the biosphere; climate variations; and developments in remote sensing using satellites with modern meteorological instrumentation. In addition, the program has significant expertise in the areas of air quality and its related atmospheric chemistry. As well as providing a broad background in meteorology, the major includes an informal minor area to be chosen from mathematics, computer science, environmental studies, resource management or a physical or biological science.

Internships and Career Alternatives. Atmospheric science students have participated in internships with the California Air Resources Board, various county Air Pollution Control Districts, and the National Weather Service. Job opportunities include: national weather services, weather forecasting for broadcast media or private forecasting firms,

environmental consulting firms (such as environmental impact reports, wind farm siting), government agencies at all levels from local (air quality districts, planning departments, etc.) to State (Air Resources Board) to national (NOAA), and companies whose operations are impacted by weather (such as airlines, futures markets). About half of our graduates continue their education by seeking the M.S. or Ph.D. degree in atmospheric science or related

B.S. Major Requirements:

UNITS

Written Expression. Also counts toward College English Composition Requirement......3-4

University Writing Program 101 or one course from 102 or 104 sequences or course selected with adviser's approval Cubicat Mattou

Preparatory Subject Matter59	9-60
Plant Sciences 24	
Chemistry 2A, 2B 10	
Computer Science Engineering 30 or course selected with adviser's approval 4 Mathematics 21A, 21B, 21C, 21D, 22A,	
22B22	
Atmospheric Science 60 4	
Physics 9A, 9B, 9C	
Statistics 13	

Depth Subject Matter 41 Atmospheric Science 110, 111, 111L, 120, 121A, 121B, 124, 128......28

Internship-Atmospheric Science 192 Two upper division Atmospheric Science courses selected with adviser's approval, not including courses 192 and 199... Engineering 6, Atmospheric Science 150, Civil and Environmental Engineering 119A or course selected with adviser's approval 4

Restricted Electives...... 15

Coordinated group of courses (minor area) to be chosen with adviser's approval from mathematics, computer science, environmental studies, communication, resource management, or a physical or biological science (at least 10 upper division

Total Units for the Major 118-120 Major Adviser. Shu-Hua Chen

Advising Center the major, is located in 1150 Plant and Environmental Sciences Building in Land, Air and Water Resources Teaching Center (530) 752-1603; lawradvising@ucdavis.edu.

Note. Alternative options for students who are interested in atmospheric science are to minor in ATM or to major in ESM choosing climate change and air pollution track. However, both the ATM minor and the ESM climate change and air quality track do not meet the Federal civil service requirements for meteorologists

Minor Program Requirements:

Minor Program. The minor in Atmospheric Science provides a broad treatment of weather and climate, with the option to focus on such topics as climate change, meteorological instrumentation, and satellite remote sensing. Students undertaking the minor should have completed minimum preparatory course work in calculus and physics (Mathematics 16A-16B, Physics 5A or 7A). Some upper division courses in Atmospheric Science have the Mathematics 21 and 22 series and the Physics 9 series as prerequisites.

		UNITS
Atmospheric	Science	20-24

Atmospheric Science 60, 110 8	
Four courses selected with the approval of the	
minor program adviser from upper division	
Atmospheric Science courses (excluding 192	
or 199) or Environmental and Resource	
Sciences 131 12-16	

Minor Adviser. Shu-Hua Chen

Graduate Study. You can specialize in particular areas of atmospheric science through graduate study and research leading to the M.S. and Ph.D. degrees. For details, see the Atmospheric Science (A Graduate Group), on page 173, and see Graduate Studies, on page 111.

Related Courses. See Environmental Science and Policy 150A; Physics 104A, 104B; Environmental and Resource Sciences 131.

Courses in Atmospheric Science (ATM)

Questions pertaining to the following courses should be directed to the instructor or to the Land, Air and Water Resources Teaching Center in 1150 Plant & Environmental Sciences Building (530) 752-1603.

Lower Division Courses 5. Global Climate Change (3)

Lecture - 2 hours; discussion - 1 hour. Scientific concepts needed to understand climate and climate change. Principles of regional variations in climate. Understanding observed seasonal, decadal and millennial changes. Analysis of the Antarctic ozone hole, El Nino and human-induced global warming. GE credit: SciEng | QL, SE, SL, VL.-III. (III.) Weare

6. Fundamentals of Atmospheric Pollution (3)

Lecture - 3 hours. Effects of human emissions on the atmosphere: smog, ozone pollution, and ozone depletion; indoor air pollution; global warming; acid rain. Impacts of these problems on the earth, ecosystems, and humans. Strategies to reduce atmospheric pollution. GE credit: SciEng | SE, SL, VL.—I. (I.) Anastasio

10. Severe and Unusual Weather (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: high school physics. Introduction to physical principles of severe and unusual weather: flood, blizzards, thunderstorms, lightning, tornadoes, and hurricanes. Emphasis on scientific perspective and human context. Not open to students who have received credit for course 100. (Former course 100.) GE credit: SciEng, Wrt | QL, SE, SL, VL.—I, II. (I, II.) Grotjahn, Paw U

30. Issues in Atmospheric Science (2)

Lecture - 1 hour; discussion - 1 hour. Prerequisite: high school physics. Introduction to selected topics in atmospheric science, such as: meteorological aspects of air pollution, use of computer models in weather forecasting, theories of global climate change, impact of satellites on meteorology, and modern meteorological instrumentation. (P/NP grading only.) GE credit: SE, SL, VL.-II. (II.) Anastasio

60. Introduction to Atmospheric Science (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Mathematics 16A or 21A and Physics 5A, 7A or 9A. Fundamental principles of the physics, chemistry, and fluid dynamics underlying weather and climate. Solar radiation, the greenhouse effect, and the thermal budget of the Earth. Clouds and their formation, convection, precipitation, mid-latitude storm systems. GE credit: QL, SE, VL.—I. (I.) Faloona

92. Atmospheric Science Internship (1-12)

Internship - 3-36 hours. Prerequisite: lower division standing and consent of instructor. Internship off and on campus in atmospheric science. Internship supervised by a member of the faculty. (P/NP grading

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading

99. Special Study for Undergraduates (1-5) (P/NP grading only.)

Upper Division Courses

110. Weather Observation and Analysis (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 60. Acquisition, distribution and analysis of meteorological data. Vertical sounding analysis, stability indices, probability of local severe weather,

weather map analysis. Use of National Weather Service analyses and forecast products. Laboratory makes use of computer-generated analyses. GÉ credit: OL, QL, SE, VL. - III. (III.) Chen

111. Weather Analysis and Prediction (3) Lecture-3 hours. Prerequisite: courses 110, 121B,

111L (concurrently), knowledge of a programming language. Tools for analyzing observed properties of mid-latitude weather systems. The analysis-forecast system, including various weather forecast models. General structure and properties of mid-latitude weather systems. GE credit: QL, SE, VL.-II. (II.) Grotjahn

111L. Weather Analysis and Prediction Laboratory (2)

Laboratory-2 hours; Online lecture-4 hours. Prerequisite: course 111 (concurrently). Subjective and objective analysis of weather data. Web-based learning of the analysis-forecast system and various weather forecasting situations. Weather map interpretation and forecast discussions. (P/NP grading only.) GE credit: OL, QL, SE, VL.—II. (II.) Grotjahn

112. Weather Forecasting Practice (2)

Discussion - 2 hours; laboratory - 1 hour. Prerequisite: course 110. Formal practice in preparing local weather forecasts. Analysis of current weather conditions and recent model performance. Verification and discussion of prior forecast. Interpretation of current forecast model guidance. Posting of forecast. May be repeated for credit up to three times. (P/NP grading only.)—I. (I.) Grotjahn

115. Hydroclimatology (3)

Lecture — 3 hours. Prerequisite: course 60. Examination of climate as the forcing function for the hydrologic system. Emphasis on seasonal variations in the relationship between precipitation and evapotranspiration for meso-scale areas. Watershed modeling of floods and drought for evaluating the effects of climatic fluctuations. GE credit: SE, SL.—III. (III.)

116. Climate Change (4)

Lecture — 3 hours; extensive writing. Prerequisite: University Writing Program 1; consent of instructor. Climate trends and patterns spanning the recent past and the future. Emphasis on natural processes that produce climate variations and human influence on these processes. Evidence of climate change and the role of global climate models in understanding climate variability. GE credit: QL, SE, WE.-III. (III.)

120. Atmospheric Thermodynamics and Cloud Physics (4)

Lecture - 3 hours, extensive problem solving. Prerequisite: Mathematics 21C, Physics 9B, course 60 (may be taken concurrently). Atmospheric composition and structure, thermodynamics of atmospheric gases, thermal properties of dry and moist air, atmospheric stability spheric stability; cloud nucleation, cloud growth by condensation and collision, cloud models. GE credit: QL, SE, VL.—I. (I.) Faloona

121A. Atmospheric Dynamics (4)

Lecture — 3 hours; extensive problem solving. Prerequisite: course 120, Mathematics 21D, Physics 9B. Fundamental forces of atmospheric flow; noninertial reference frames; development of the equations of motion for rotating stratified atmospheres; isobaric and natural coordinate systems; geostrophic flow; thermal wind; circulation and vorticity. GE credit: QL, SE.-II. (II.) Nathan

121B. Atmospheric Dynamics (4)

Lecture - 3 hours; extensive problem solving. Prerequisite: course 121A. Dynamics of fluid motion in geophysical systems; quasi-geostrophic theory; fundamentals of wave propagation in fluids; Rossby waves; gravity waves; fundamentals of hydrodynamic instability; two-level model; baroclinic instability and cyclogenesis. GE credit: QL, SE.—III. (III.) Chen

124. Meteorological Instruments and Observations (3)

Lecture — 2 hours; laboratory — 3 hours. Prerequisite: course 60; Physics 5C. Modern meteorological instruments and their use in meteorological observations and measurements. Both standard and micrometeorological instruments are included. GE credit: QL, SE, SL, VL.-I. (I.) Paw U

128. Radiation and Satellite Meteorology

Laboratory/discussion-3 hours; extensive problem solving—1 hour. Prerequisite: course 60, Physics 9B, Mathematics 22B, 21D. Concepts of atmospheric radiation and the use of satellites in remote sensing. Emphasis on the modification of solar and infrared radiation by the atmosphere. Estimation from satellite data of atmospheric variables such as temperatures and cloudiness. GE credit: QL, SE, VL.—II. (II.) Nathan

133. Biometeorology (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: one course in a biological discipline and Mathematics 16B or consent of instructor. Atmospheric and biological interactions. Physical and biological basis for water vapor, carbon dioxide and energy exchanges with the atmosphere associated with plants and animals, including humans. Microclimate of plant canopies and microclimatic modification such as frost protection and windbreaks. GE credit: QL, SE, SL, VL.-II. (II.) Paw U, Snyder

149. Air Pollution (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Mathematics 21D, 22B, Chemistry 2B, Atmospheric Science 121A or Engineering 103. Physical and technical aspects of air pollution. Emphasis on geophysical processes and air pollution meteorology as well as physical and chemical properties of pollutants. (Same course as Civil and Environmental Engineering 149.) GE credit: QL, SE, SL.—I. (I.) Cappa

150. Introduction to Computer Methods in Physical Sciences (4)

Lecture—3 hour; lecture/discussion—2 hours. Prerequisite: Mathematics 22B, Physics 9B, and a computer programming course such as Engineering Computer Science 30. Additional courses in fluid dynamics (course 121A or Engineering 103) and in Fourier transforms (Mathematics 118C or Physics 104A) are helpful, but not required. Computational techniques used in physical sciences. Integral and differential equation numerical solution: mainly finite differencing and spectral (Fourier transform) methods. Time series applications (time-permitting). Specific applications drawn from meteorology. Accelerated introduction to FORTRAN including programming assignments. Enrollment limited to 12 preference to Atmospheric Science majors. Offered in alternate years. (P/NP grading only.) GE credit: SE. - I. Grotjahn

158. Boundary-Layer Meteorology (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 121A. Dynamics of the atmosphere nearest the Earth's surface. Friction and heat transfer. Properties of turbulent flows; statistical and spectral techniques; use and interpretation of differential equations. Emphasis on the importance to weather, air pollution, and the world's oceans. GE credit: QL, SE, VL.—III. (III.) Faloona

160. Introduction to Atmospheric Chemistry

Lecture — 3 hours; discussion — 1 hour. Prerequisite: Chemistry 2B. Quantitative examination of current local, regional and global problems in atmospheric chemistry (including photochemical smog, acid deposition, climate change, and stratospheric ozone depletion) using fundamental concepts from chemistry. Basic chemical modeling of atmospheric reaction systems. GE credit: QL, SE, SL, VL.—II. (II.) Anastasio

192. Atmospheric Science Internship (1-12)

Internship - 3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Internship off and on campus in atmospheric science. Internship supervised by a member of the faculty. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: three upper division units in Atmospheric Science. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: three upper division units in Atmospheric Science and at least an overall B average. (P/NP grading only.)

Graduate Courses

215. Advanced Hydroclimatology (3)

Lecture - 3 hours. Prerequisite: course 115. Theoretical and applied aspects of energy and mass fluxes linking the earth's surface, atmosphere, and hydrologic system. Emphasis on regional scale analysis and modeling, spatial data representation, and climate change influences on precipitation and its hydroclimatic expression. Offered in alternate years. — (III.)

221. Advanced Atmospheric Dynamics (3)

Lecture - 3 hours. Prerequisite: course 121B. Conditions for instability in stratified atmospheres; baro-clinic instability; forced topographic Rossby Waves; wave-mean flow interaction theory; tropical dynamics; stratospheric dynamics. Offered in alternate years. — (II.) Nathan

223. Advanced Boundary-Layer Meteorology (3)

Lecture—3 hours. Prerequisite: course 230. Characteristics of the atmospheric boundary layer under convective and nocturnal conditions. Heat budget at the surface and boundary layer forcing. Similarity theory and scaling of the boundary layer. Measurement and simulation techniques. Offered in alternate years. — (III.) Faloona

230. Atmospheric Turbulence (3)

Lecture — 3 hours. Prerequisite: + course 121B or 158. Dynamics and energetics of turbulence in the atmosphere including vorticity dynamics. Statistical description of turbulence; Eulerian and Lagrangian scales, spectral analysis, conditional sampling techniques. Turbulent diffusion; the closure problem, gradient-diffusion and second-order methods. Offered in alternate years.—II. Paw U

231. Advanced Air Pollution Meteorology (3)

Lecture - 3 hours. Prerequisites: Course 149A, 160 and one course in fluid dynamics. Processes determining transport and diffusion of primary and secondary pollutants. Models of chemical transformation, of the atmospheric boundary layer and of mesoscale wind fields, as applicable to pollutant dispersion problems. Offered in alternate years. — (İ.)

233. Advanced Biometeorology (3)

Lecture/discussion-3 hours. Prerequisite: course 133 or consent of instructor. Current topics in biometeorology. Physical and biological basis for water vapor, other gases, and energy exchange with the atmosphere. Topics include modeling and measuring turbulent transport from plant canopies, surface temperatures and energy budgets, bio-aerosol physics and aerobiology. Offered in alternate years. — (II.) Paw U

240. General Circulation of the Atmosphere

Lecture/discussion-4 hours. Prerequisite: course 121B. Large-scale, observed atmospheric properties. Radiation, momentum, and energy balances derived and compared with observations. Lectures and homework synthesize observations and theories, then apply them to understand the large-scale circulations. Offered in alternate years—I. Grotjahn

241. Climate Dynamics (3)

Lecture/discussion—3 hours. Prerequisite: course 121B. Dynamics of large-scale climatic variations over time periods from weeks to centuries. Description of the appropriate methods of analysis of atmospheric and oceanic observations. Conservation of mass, energy and momentum. Introduction to the range of climate simulations. Offered in alternate years.—I. (I.)

250. Meso-Scale Meteorology (3)

Lecture — 3 hours. Prerequisite: graduate standing, course 150, a course in partial differential equations; or consent of instructor. The study of weather

phenomena with horizontal spatial dimensions between 2.5 and 2500 kilometers. Methods of observational study and numerical modeling of the structure and temporal behavior of these weather systems. Offered in alternate years. - I. Chen

255. Numerical Modeling of the Atmosphere (4)

Lecture - 2 hours; laboratory - 6 hours. Prerequisite: course 121B and Engineering 5; course 150 recommended. Principles of numerical modeling of the dynamic, thermodynamic and physical processes of the atmosphere. Hands-on experiments on model development using the shallow water equations and the primitive equations. Operational forecast models. Offered in alternate years. — (I.) Chen

260. Atmospheric Chemistry (3)

Lecture - 3 hours. Prerequisite: course 160. Chemistry and photochemistry in tropospheric condensed phases (fog, cloud, and rain drops and aerosol particles). Gas-drop and gas-particle partitioning of compounds and effects of reactions in condensed phases on the fates and transformations of tropospheric chemical species. Offered in alternate years. - III. Anastasio

270A-G. Topics in Atmospheric Science (1-3)

Discussion - 1-3 hours. Applications and concepts in (A) Meteorological Statistics; (B) Computer Modeling of the Atmosphere; (C) Design of Experiments and Field Studies in Meteorology; (D) Solar and Infrared Radiation in the Atmosphere; (E) Aerosol and Cloud Physics; (F) Atmospheric Chemistry; (G) General Meteorology. —I, II, III. (I, II, III.)

280A. Air Quality Policy in the Real World

Project. Prerequisite: consent of instructor; Atmospheric Science 149 or Engineering: Civil and Environmental 149, and Engineering: Civil and Environmental 242 or equivalent. In-depth investigation of an air quality problem with a team and mentor from government or industry. Science, engineering and policy will be involved. Findings will be presented orally and in writing. Not offered every year. (Deferred grading only, pending completion of sequence.) - II, III. (II, III.)

280B. Air Quality Policy in the Real World

Project. Prerequisite: course 280A; consent of instructor. In-depth investigation of an air quality problem with a team and mentor from government or industry. Science, engineering and policy will be involved. Findings will be presented orally and in writing. (Deferred grading only, pending completion of sequence.) Not offered every year.—II, III. (II, III.)

290. Seminar (1)

Seminar — 1 hour. Prerequisite: graduate standing in Atmospheric Science or related field. Current developments in selected areas of atmospheric research. Topics will vary according to student and faculty interests. (S/U grading only.)—I, II, III. (I, II, III.)

291 A-F. Research Conference in Atmospheric Science (1-3)

Lecture/discussion - 1-3 hours. Prerequisite: consent of instructor. Review and discussion of current literature and research in: (A) Air Quality Meteorology; (B) Biometeorology; (C) Boundary Layer Meteorology; (D) Climate Change; (E) General Meteorology; (F) Atmospheric Chemistry. May be repeated up to a total of 6 units per segment. (S/U grading only.)-I, II, III. (I, II, III.)

298. Group Study (1-5)

Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

299. Research (1-12)

Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Atmospheric Science (A Graduate Group)

lan Faloona, Ph.D., Chairperson of the Group (530)

Group Office. 1152 Plant and Environmental Sciences Building (530) 752-1669; http://atm.ucdavis.edu

Faculty

Cort Anastasio, Ph.D., Professor Christopher Cappa, Ph.D., Assistant Professor (Civil and Environmental Engineering) Shu-Hua Chen, Ph.D., Associate Professor Ian Faloona, Ph.D., Associate Professor Richard Grotjahn, Ph.D., Professor Levent Kavvas, Ph.D., Professor (Civil and Environmental Engineering) Michael J. Kleeman, Ph.D., Professor (Civil and Environmental Engineering) John Largier, Ph.D., Professor (Environmental Science and Policy) Terrence R. Nathan, Ph.D., Professor Kyaw Tha Paw U, Ph.D., Professor Ruth Reck, Ph. D., Professor Susan Ustin, Ph.D., Professor Anthony Wexler, Ph. D., Professor (Mechanical and Aerospace Engineering; Civil and Environmental Engineering)
Bruce White, Ph.D., Professor (Mechanical and

Toxicology) **Emeriti Faculty**

Aerospace Engineering)

Thomas A. Cahill, Ph.D., Professor Emeritus Robert Flocchini, Ph.D., Professor Emeritus (Crocker Nuclear Laboratory) Bryan Weare, Ph.D., Professor Émeritus

Zhang, Qi, Assistant Professor (Environmental

Affiliated Faculty

Lowell Ashbaugh, Ph.D., Associate Researcher Emeritus (Crocker Nuclear Laboratory) Steven S. Cliff, Ph.D., Assistant Researcher (Applied Science) Ann Dillner, Ph.D., Assistant Researcher (Crocker Nuclear laboratory) Richard L. Snyder, Ph.D., Biometeorology Specialist

Graduate Study. The Graduate Group in Atmospheric Science offers both the M.S. and Ph.D. degree programs. A student may place emphasis on graduate work in one or more of the following fields: air quality meteorology, atmospheric chemistry, biometeorology, micrometeorology, numerical weather prediction, remote sensing, climate dynamics, large scale dynamics, and meso-scale meteorology. The diverse and extensive backgrounds of the faculty allow opportunities for interdisciplinary training and

Preparation. The Group encourages applications from all interested students with backgrounds in the physical or natural sciences. Basic qualifications for students entering the Atmospheric Science graduate program include mathematics to the level of vector calculus and differential equations, and one year of college-level physics. Flexibility may be allowed for students with high academic potential, but it is expected that deficiencies in preparatory material and in key undergraduate atmospheric science courses be completed within the first year of graduate study.

Graduate Adviser. Terrence Nathan Ph.D. Graduate Admissions Officer. Christopher Cappa, Ph.D.

Avian Medicine

See Medicine and Epidemiology (VME), on page 523.

Avian Sciences

This major has been discontinued as of Fall 2011; see Animal Science, on page 150.

(College of Agricultural and Environmental Sciences)

Faculty. See under Animal Science, on page 150.

Master Adviser. A. J. King

Advising Center for the major, minor and course offerings (including peer advising), is located in the Animal Science Advising Center in 1202 Meyer Hall (530) 754-7915; http://asac.ucdavis.edu/

The Major Program

Avian Sciences is the study of birds and the ways in which they relate to and are useful to humans. The major combines the study of avian wildlife and their environments, production and marketing of domestic birds and eggs, caged exotic bird management, and basic and applied laboratory research on birds with a broad introduction to biological science.

The Program. The flexibility of the program and the close personal interaction between students, faculty, and specialists in the field give students a large role in selecting and designing their own course work. Students may specialize in a bachelor's program that qualifies them for a particular career or they may choose a program to meet other broader intellectual and cultural interests.

Internships and Career Alternatives. Independent study, undergraduate research, and internships are emphasized in the Avian Sciences program Birds for laboratory or special study are housed within the main building as well as at the research farm and the experimental aviary. An Avian Sciences major has a variety of career options: healthoriented research, teaching biology, game bird production, domestic and foreign agricultural extension and advisory services, governmental agencies, or the domestic or exotic bird industries. A recent survey has shown that the majority of Avian Sciences graduates enter graduate school or are employed by the domestic bird industry. The remainder of the graduates were evenly distributed in the categories of professional schools, avian biology agencies, educational fields, and individual jobs indirectly associated with birds.

B.S. Major Requirements:

		OINII
9	reparatory Subject Matter	61-7
	At least 3 units from Avian Sciences 11	,
	13, 14L, 15L, 16L	3-5
	Biological Sciences 1A, 1B, 1C or	
	2A, 2B, 2C1	4-15
	Chemistry 2A, 2B, 2C, 8A, 8B	21
	Plant Sciences 21 or Engineering	
	Computer Science 15	3-4
	Mathematics 16A-16B-16C or	
	17A-17B-17C or 21A-21B-21C	9-12
	Physics 1A-1B or 7A-7B-7C	.6-12
	One course from Statistics 13, 100, or	
	Plant Sciences 120	4
)	epth Subject Matter	20
	Animal Biology 102 and 103 or Biolog	ical
	Sciences 102, 103 and Nutrition 123,	
	123L	10
	Biological Sciences 101	
	Avian Sciences 103, 150	
	, (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	· · · · · · · · · · · · · · · · · · ·

UNITS

(Recommended courses include Animal Genetics 101; Animal Science 136, 137 Avian Sciences 160; Molecular and Cellular Biology 120L, 150L, 160L; or Neurobiology, Physiology, and Behavior 101L.)

Restricted Electives28

Specialized courses related to avian species to supplement or expand depth subject matter courses. Courses must be approved by an

Total Units for the Major115-127 **Minor Program Requirements:**

Avian Sciences18 Choose one from Avian Sciences 11, 13, 14L, 15L, 16L......2-3 Choose remaining units from Avian Sciences 100, 103, 115, 121, 123, 149, 150, 160; Animal Science 143; Neurobiology,

Physiology, and Behavior 117; Wildlife, Fish, and Conservation Biology 111, 136 15-16

Graduate Study. The Avian Sciences Graduate Group offers a program of study and research leading to the M.S. degree in Avian Sciences. The M.S. degree is offered in Avian Sciences. For details, see Graduate Studies, on page 111.

Related Courses. See Agricultural and Resource Economics 130; Animal Science 143; Food Science and Technology 120, 120L, 121; Molecular and Cellular Biology 150, 150L; Nutrition 123, 123L.

Courses in Avian Sciences (AVS) **Lower Division Courses**

11. Introduction to Poultry Science (3)

Lecture - 3 hours. The mosaic of events that have tied poultry science to other scientific disciplines and poultry to humans. Poultry science techniques and production methods from the time of domestication to the present. One field trip required. GE credit: Sci-Eng, Wrt | SE.

13. Birds, Humans and the Environment (3)

Lecture - 2 hours; discussion - 1 hour. Interrelationships of the worlds of birds and humans. Lectures, discussions, field trips and projects focus on ecology, avian evolution, physiology, reproduction, flight, behavior, folklore, identification, ecotoxicology and conservation. Current environmental issues are emphasized. Half-day field trip. GE credit: SciEng, Wrt | SE, SL.-I. (I.) King

14L. Management of Captive Birds (2)

Fieldwork-3 hours; lecture/discussion-1 hour. Prerequisite: consent of instructor. One weekly discussion and field trip to study practical captive management (housing, feeding, equipment, market-ing, diseases). Visit facilities rearing birds such as commercial parrots, hobbyist exotics, ostrich, raptors, waterfowl, game birds, poultry and pigeons. GE credit: SE.

15L. Captive Raptor Management (2)

Laboratory-3 hours; independent study-3 hours; one field trip. Hands-on experience handling birds of prey. Students are taught all of the skills required to handle and care for raptors, including their husbandry, biology, habitat requirements, cage design, veterinary care, rehabilitation methods, research potential and long-term care requirements. GE credit: SE.—I. (I.)

16LA-16LB-16LC. Raptor Migration and Population Fluctuations (2-2-2)

Fieldwork-3 hours; discussion-1 hour; one Saturday field trip. Prerequisite: consent of instructor. Identify raptors; study effects of weather, crops, agri-cultural practices on fluctuations in raptor species and numbers. Familiarize with literature; design a project; survey study sites; collect, computerize, analyze data; compare with previous years. Species, observations, emphasis are different each quarter. GE credit: SE.—III. (III.)

Neurobiology, Physiology, and Behavior

Laboratory units in above listed subjects ... 3

92. Internship in the Avian Sciences (1-12)

Internship—3-36 hours. Prerequisite: sophomore standing preferred; consent of instructor. Internship on and off campus in poultry, game birds or exotic bird production, management and research; or in a business, industry, or agency concerned with these entities. Compliance with Internship Approval form essential. (P/NP grading only.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor (P/NP grading

Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses 100. Avian Biology (3)

Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1B. Survey of avian natural history and study of the diversity, functional morphology, behavior, ecology and evolution of birds. GE credit: SE.

103. Avian Development and Genetics (3)

Lecture—2 hours; laboratory—3 hours. Prerequisite: Biological Sciences 1A and 1B. Unique features of avian development and genetics. Development topics: gametogenesis, fertilization, pre- and post-oviposital development, morphogenesis, sex differentiation, specialized organ systems, incubation, hatching. Genetic topics: genome organization, inheritance, sex determination, avian models. Laboratory exercises: embryology, genetics, model systems. GE credit: SE.

115. Raptor Biology (3)

Lecture—3 hours. Prerequisite: Biological Sciences 1A or the equivalent. Study of birds of prey: classification, distribution, habits and habitats, migration, unique anatomical and physiological adaptations, natural and captive breeding, health and diseases, environmental concerns, conservation, legal considerations, rehabilitation, and falconry. Includes two Saturday field trips. GE credit: SE.

121. Avian Reproduction (2)

Lecture — 2 hours. Prerequisite: Biological Sciences 1A, 1B. Breeding cycles and reproductive strategies, egg and sperm formation, incubation, sexual development, imprinting, hormonal control of reproductive behavior and song. Species coverage includes wild and companion birds. Course has a physiological orientation. Offered in alternate years. GE credit: SE, SL.—II.

123. Management of Birds (3)

Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1B. Captive propagation of birds, including reproduction, genetic management, health, feeding, artificial incubation, artificial insemination, and related legal aspects, including trade and smuggling. Emphasis on exotic species and the role of captive propagation in conservation. Offered in alternate years. GE credit: SE, SL, WE.—(II.)

149. Egg Production Management (2)

Lecture — 2 hours. Prerequisite: course 11 or the equivalent, or consent of instructor. Management of commercial table egg flocks as related to environment, nutrition, disease control, economics, housing, equipment, egg processing and raising replacement pullets. One Saturday field trip required. Offered in alternate years. GE credit: SE.

150. Nutrition of Birds (1)

Lecture—1 hour. Prerequisite: Animal Biology 103 (may be taken concurrently). Principles of nutrition specific to avian species, including feedstuffs, feed additives, nutrient metabolism, energy systems, and nutritional support of egg production and growth. Use of computers for feed formulation to support production. Offered in alternate years. GE credit: QL, SE.—[III.] Klasing

160. Designing and Performing Experiments in Avian Sciences (2)

Laboratory—6 hours. Prerequisite: course 100 or Wildlife, Fish, and Conservation Biology 111 or Evolution and Ecology 137 or consent of instructor. Experiments in current problems in avian biology. Introduction to experimental design. Students choose a project, design a protocol, perform an experiment and report their findings. May be repeated for credit with consent of instructor. GE credit: SE.—I, II, III. (I, III, III.)

170. Advanced Avian Biology (4)

Lecture/discussion—3 hours; project—1 hour. Prerequisite: course 100 or Evolution and Ecology 137 or Wildlife, Fish, and Conservation Biology 111. Ecology, behavior, functional morphology and lifehistory evolution of birds. Emphasis on the importance of body size as a principle determinant of most aspects of avian performance from lifespan to reproduction and species abundance. Analytical synthesis and critical thought emphasized. Offered in alternate years. GE credit: SE.

190. Seminar in Avian Sciences (1)

Seminar—1 hour. Prerequisite: upper division standing in Avian Sciences and consent of instructor. May be repeated three times for credit. (P/NP grading only.)—I, III. (I, III.)

192. Internship in Avian Sciences (1-12)

Internship—3-36 hours. Prerequisite: completion of a minimum of 84 units; consent of instructor. Internship on and off campus in poultry, game birds or exotic bird production, management and research; or in a business, industry, or agency concerned with these entities. Compliance with Internship Approval form essential. (P/NP grading only.)

195. Topics in Current Research (1-3)

Lecture/discussion—1-3 hours. Prerequisite: consent of instructor. Discussion of topics of current interest in avian sciences. May be repeated three times for credit.—I, II, III. (I, II, III.)

197T. Tutoring in Avian Sciences (1-3)

Tutorial—1-3 hours. Prerequisite: Avian Sciences or related major, advanced standing, consent of instructor. Tutoring of students in lower division avian sciences courses; weekly conference with instructors in charge of courses; written critiques of teaching procedures. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

290. Seminar (1)

Seminar—1 hour. Reports and discussions of recent advances and selected topics of current interest in avian genetics, physiology, nutrition, and poultry technology.—I. (I.)

290C. Research Conference (1)

Discussion—I hour. Prerequisite: graduate standing and consent of instructor. Major professors lead research discussions with their graduate students. Research papers are reviewed and project proposals presented and evaluated. Format will combine seminar and discussion. (S/U grading only.)—I, II, III II III III)

297T. Supervised Teaching in Avian Sciences (1-4)

Tutoring—1-4 hours. Prerequisite: graduate standing and consent of instructor. Tutoring of students in lower, upper division, and graduate courses in Avian Sciences; weekly conference with instructor in charge of course; written critiques of teaching methods in lectures and laboratories. (S/U grading only.)

298. Group Study (1-5)

Prerequisite: consent of instructor.

299. Research (1-12)

Prerequisite: consent of instructor. (S/U grading only.)

Avian Sciences (A Graduate Group)

John M. Eadie, Ph.D., Chairperson of the Group

Group Office. 1249 Meyer Hall

(530) 752-2382; http://aviansciences.ucdavis.edu

Faculty

C. Christopher Calvert, Ph.D., Professor (Animal Science)

Thomas P. Coombs-Hahn, Ph.D., Associate Professor (Neurobiology, Physiology, and Behavior)

Mary E. Delany, Ph.D., Professor (Animal Science) John M. Eadie, Ph.D., Professor

(Wildlife, Fish, and Conservation Biology, Animal Science)

Holly B Ernest, D.V.M., Ph.D., Associate Professor (Veterinary Genetics Laboratory and Population Health and Reproduction; School of Veterinary Medicine)

Michelle Hawkins, V.M.D., ABVP, Associate Professor (Medicine and Epidemiology, School of Veterinary Medicine)

Joshua M. Hull, Ph.D., Assistant Adjunct Professor (Animal Science)

Annie J. King, Ph.D., Professor (Animal Science) Kirk C. Klasing, Ph.D., Professor (Animal Science) Jenella E. Loye, Ph.D., Research Associate (Entomology)

(Entomology)
Joy A. Mench, Ph.D., Professor (Animal Science)
James R. Millam, Ph.D., Professor (Animal Science)
Gabrielle Nevitt, Ph.D., Professor

(Neurology, Physiology, and Behavior)
Joanne R. Paul-Murphy, D.V.M., Ph.D. Professor
(Medicine & Epidemiology; School of Veterinary
Medicine)

Lisa A. Tell, D.V.M., Professor (Medicine and Epidemiology, School of Veterinary Medicine)

Barry W. Wilson, Ph.D., Professor (Animal Science, Environmental Toxicology)

Emeriti Faculty

Hans Abplanalp, Ph.D., Professor Emeritus Dan Anderson, Ph.D., Professor Francine A. Bradley, Ph.D., Specialist Emeritus Ralph A. Ernst, Ph.D., Specialist Emeritus Peter Marler, Ph.D., Professor Emeritus

Graduate Study. The Graduate Group in Avian Sciences offers the M.S. degree program to students who wish to pursue specialized advanced work on avian species. Specializations students may choose include behavior, nutrition, physiology, reproduction, pathology, immunology, toxicology, food chemistry, management, ecology, genetics, comparative incubation, environmental physiology, and cellular and developmental studies using wild and domestic birds as experimental animals. Both master's degree plans, thesis or comprehensive examination, are available.

Preparation. Applicants should have undergraduate preparation in a field appropriate to the course of study selected, including courses in most of the folowing subjects: general biology, general and organic chemistry, biochemistry, avian biology, genetics, nutrition, physiology, and statistics.

Graduate Advisers. C.C. Calvert, J.M. Eadie, K.C. Klasing.

Biochemistry and **Molecular Biology**

See Biochemistry, Molecular, Cellular and Developmental Biology, on page 175; Molecular and Cellular Biology, on page 423

Biochemistry and **Molecular Biology** (A Graduate Group)

The Biochemistry and Molecular Biology program has merged with the Cell and Developmental Biology program to form Biochemistry, Molecular, Cellu-lar, and Developmental Biology (BMCDB); see Biochemistry, Molecular, Cellular and Developmental Biology, on page 175.

Group Office. 306 Life Sciences (530) 752-9091;

http://biosci3.ucdavis.edu/GradGroups/BMCDB/

Biological Chemistry

See Medicine, School of, on page

Biochemistry, Molecular, Cellular and Developmental **Biology**

Ken Kaplan, Ph.D., Chairperson of the Group (530)

Group Office. 306 Life Sciences

Marie E. Burns, Ph.D., Professor

(Center for Neuroscience)

(530) 752-9091; http://biosci3.ucdavis.edu/GradGroups/BMCDB/

Faculty

Fa Jawdat Al-Bassam, Ph.D., Assistant Professor (Molecular and Cellular Biology) Peter Armstrong, Ph.D., Professor (Molecular and Cellular Biology) Enoch Baldwin, Ph.D., Assistant Professor (Chemistry)
Enoch Baldwin, Ph.D., Associate Professor
(Molecular and Cellular Biology) Peter A Beal, Ph.D., Professor (Chemistry)
Kenneth A Beck, Ph.D., Associate Professor
(Cell Biology and Human Anatomy)
Alan Bennett, Ph.D., Professor (Plant Sciences)
Charles Bevins, Ph.D., Professor
(Medical Microbiology (Medical Microbiology and Immunology) Linda F. Bisson, Ph.D., Professor (Viticulture and Enology) Eduardo Blumwald, Ph.D., Professor (Plant Sciences) Laura Borodinsky, Ph.D., Assistant Professor (Physiology and Membrane Biology)
Alexander Borowsky, Ph.D., Associate Professor (Pathology) Nigel Browning, Ph.D., Professor (Molecular and Cellular Biology) Sean Burgess, Ph.D., Associate Professor (Molecular and Cellular Biology)

Judy Callis, Ph.D., Professor Paul Henderson, Ph.D.., Assistant Adjunct Professor (Hematology-Oncology)
Wolf-Dietrich Heyer, Ph.D., Professor (Microbiology) (Molecular and Cellular Biology) Academic . Senate Distinguished Teaching Award Kermit L. Carraway, Ph.D. Professor James Hildreth, Ph.D., Dean (Cancer Center UCDMC) (Molecular and Cellular Biology) Mary Horne, Ph.D., Assistant Adjunct Professor Simon Chan, Ph.D., Assistant Professor (Plant Biology)
Frederic Chedin, Ph.D., Associate Professor (*Pharmacology*) Neil Hunter, Ph.D., Professor (Molecular and Cellular Biology) (Microbiology)

Kentaro Inoue, Ph.D., Associate Professor Hongwu Chen, Ph.D., Professor (Cancer Center UCDMC) Tsung-Yu Chen Ph.D., Professor (Plant Sciences) Yoshihiro Izumiya, Ph.D., Assistant Professor (Dermatology)

Ken Kaplan, Ph.D., Professor
(Molecular and Cellular Biology)
Jinoh Kim, Ph.D., Assistant Professor (Center for Neuroscience) Xinbin Chen, Ph.D., Professor and Director (Surgical and Radiological Science)
Hwai-Jong Cheng, Ph.D., Professor
(Neurobiology, Physiology, and Behavior)
Joanna Chiu, Ph.D., Assistant Professor (Pediatrics) Daniel Kliebenstein, Ph.D., Assistant Professor (Plant Sciences)
Paul Knoepfler, Ph.D., Associate Professor
(Cell Biology and Human Anatomy)
Anne Knowlton, Ph.D., Professor (Entomology) Gino A. Cortopassi, Ph.D., Professor Molecular Biosciences)
Sheila David, Ph.D., Professor (Chemistry) (Molecular and Cellular Cardiology) Artyom Kopp, Ph.D., Associate Professor Scott Dawson, Ph.D., Assistant Professor (Microbiology) (Center of Genetics and Development) lan Korf, Ph.D., Associate Professor (Molecular and Cellular Biology) Michael S. Denison, Ph.D., Professor (Environmental Toxicology) Elva Diaz, Ph.D., Associate Professor (Medical Pharmacology and Toxicology) Stephen C. Kowalczykowski, Ph.D., Distinguished Professor (*Microbiology*) John Marcus Labavitch, Ph.D., Professor Gordon Douglas, Ph.D., Adjunct Professo (Cell Biology and Human Anatomy) Georgia Drakakaki, Ph.D., Assistant Professor (Plant Sciences) J. Člark Lagarias, Ph.D., Professor Bruce Draper, Ph.D., Assistant Professor (Molecular and Cellular Biology) Jerold A. Last, Ph.D., Professor (Internal Medicine) (Molecular and Cellular Biology) JoAnne Engebrecht, Ph.D., Professor Walter Leal, Ph.D., Professor (Entomology) Julie A. Leary, Ph.D., Professor (Molecular and Cellular Biology) (Molecular and Cellular Biology) Carol Erickson, Ph.D., Distinguished Professor (Molecular and Cellular Biology) Jian-Jian Li, Ph.D., Professor (Radiation Oncology) Marilynn E. Etzler, Ph.D., Professor (Molecular and Cellular Biology) Su-Ju Lin, Ph.D., Associate Professor (Microbiology) Marc Facciotti, Ph.D., Assistant Professor Yu-Fung Lin, Ph.D., Assistant Professor (Biomedical Engineering)
Robert H. Fairclough, Ph.D., Associate Professor Physiology and Membrane Biology)
Bo Liu, Ph.D., Professor (Plant Biology) Bo Liu, Ph.D., Professor (Plant Biology)
Su Hao Lo, Ph.D., Professor
(Orthopedic Surgery)
Angie Louie, Ph.D., Associate Professor
(Biomedical Engineering)
Veronica Martinez-Cerdeno, Ph.D., Assistant
Professor (Pathology)
Francis J. McNally, Ph.D., Professor
(Molecular and Cellular Biology)
Maria Mudryi, Ph.D., Associate Professor
(Microbiology and Immunology)
Jeanette E. Natzle, Ph.D., Professor
(Molecular and Cellular Biology)
Lorena Navarro, Ph.D., Assistant Professor
(Microbiology) (Neurology)
Peggy Farnham, Ph.D., Professor (Medical Pharmacology and Toxicology) Michael Ferns, Ph.D., Associate Professor (Human Physiology)
Oliver Fiehn, Ph.D., Professor (Genome Center and Bioinformatics) Andrew Fisher, Ph.D., Professor (Chemistry)
Paul G. FitzGerald, Ph.D., Professor (Cell Biology and Human Anatomy)
Christopher Fraser, Ph.D., Assistant Professor
(Molecular and Cellular Biology)
J. David Furlow, Ph.D., Professor (Microbiology) Jan Nolta, Ph.D., Professor (Neurobiology, Physiology, and Behavior) Charles S. Gasser, Ph.D., Professor (Hematology-Oncology) Jodi M. Nunnari, Ph.D., Professor (Molecular and Cellular Biology)
Angela Gelli, Ph.D., Associate Professor (Molecular and Cellular Biology) Martha E. O'Donnell, Ph.D., Professor (Medical Pharmacology and Toxicology) Paramita Ghosh, Ph.D., Associate Professor (Physiology and Membrane Biology) (Urology) Cecilia Giulivi, Ph.D., Professor Rebecca Parales, Ph.D., Professor (Microbiology) John A. Payne, Ph.D., Professor (Molecular Biosciences) Aldrin Gomes, Ph.D., Assistant Professor (Physiology and Membrane Biology) (Human Physiology and Membrane Biology) David Pleasure, Ph.D., Professor (Neurology)
Jerry S. Powell, M.D., Professor Qizhi Gong, Ph.D., Assistant Professo (Cell Biology and Human Anatomy)
Paul Hagerman, Ph.D., Professor
(Biochemistry and Molecular Medicine) (Hematology-Oncology) Ted Powers, Ph.D., Professor Nobuko Hagiwara, Ph.D., Associate Professor (Molecular and Cellular Biology) Martin L. Privalsky, Ph.D., Professor (Microbiology) Robert H. Rice, Ph.D., Professor (Internal Medicine: Cardiovascular Medicine) Fawaz Haj, Ph.D., Associate Professor (Nutrition) Bruce D. Hammock, Ph.D., Professor (Environmental Toxicology)
Alan B. Rose, Ph.D., Associate Project Scientist
(Molecular and Cellular Biology) (Entomology) Academic Senate Distinguished Teaching Award John H. Harada, Ph.D., Professor (Plant Biology) Academic Senate Distinguished Lesilee Rose, Ph.D., Professor (Molecular and Cellular Biology) (Molecular and Cellular Biology)
Jonathan M. Scholey, Ph.D., Professor
(Molecular and Cellular Biology)
David Segal, Ph.D., Assistant Professor
(Medical Pharmacology and Toxicology)
Kazuhiro Shiozaki, Ph.D., Professor (Microbiology)
Mitchell Singer, Ph.D., Professor (Microbiology) Teaching Award
Stacey L. Harmer, Ph.D., Associate Professor (Plant Biology) Dominik Haudenschild, Ph.D., Associate Professor (Orthopedics) Mitchell Singer, Ph.D., Professor (Microbiology)

Jay Solnick, Ph.D., Professor (Medical Microbiology and Immunology) Dan Starr, Ph.D., Associate Professor (Molecular and Cellular Biology) Colleen Sweeney, Ph.D., Associate Professor (Cancer Center UCDMC) Fern Tablin, Ph.D., Professor (Anatomy, Physiology and Cell Biology)
Yoshikazu Takada, Ph.D., Professor (Dermatology)
Alice Tarantal, Ph.D., Professor (Cell Biology and Human Anatomy) Steven M. Theg, Ph.D., Professor (Plant Biology) Li Tian, Ph.D., Assistant Professor (Plant Sciences) Lin Tian, Ph.D., Assistant Professor (Center for Neuroscience) James Trimmer, Ph.D., Professor (Neurobiology, Physiology, and Behavior) Richard P. Tucker, Ph.D., Professor (Cell Biology and Human Anatomy) Judith L. Turgeon, Ph.D., Professor (Human Physiology) Catherine VandeVoort, Ph.D., Professor (Obstetrics & Gynecology) Ana Vazquez, Ph.D., Associate Adjunct Professor (Otolaryngology) Andrew T. Vaughan, Ph.D. Professor (Radiation Oncology) John V. Voss, Ph.D., Professor (Biochemistry and Molecular Medicine) David Wilson, Ph.D., Professor (Molecular and Cellular Biology) Matthew Wood, Ph.D., Assistant Professor (Environmental Toxicology)

(Biomedical Engineering)
Yohei Yokobayashi, Ph.D., Associate Professor (Biomedical Engineering) Konstantinos Zarbalis, Ph.D., Assistant Professor (Pathology)
Min Zhao, Ph.D., Professor (Dermatology)

Soichiro Yamada, Ph.D., Assistant Professor

Lifeng Xu, Ph.D., Assistant Professor

(Microbiology)

Chengji Zhou, Ph.D., Associate Professor (Cell Biology and Human Anatomy: MED)
Karen Zito, Ph.D., Assistant Professor (Neurobiology, Physiology, and Behavior)

Graduate Study. The Graduate Group in Biochemistry, Molecular, Cellular, and Developmental Biology offers programs of study and research leading to the M.S. and Ph.D. degrees. Strong prefer ence is given to Ph.D. applicants. Biochemistry, Molecular, Cellular, and Developmental Biology is a broad interdepartmental program.

Preparation. Appropriate preparation is an undergraduate degree in a biological or physical science. Preparation should include a year of calculus, physics, general chemistry and organic chemistry, and courses in statistics, biochemistry, genetics and cell

Graduate Advisers. F. McNally (Molecular and Cellular Biology), E. Diaz (Pharmacology), R. Tucker (Med: Cell Biology), R. Fairclough (Neurology), T. Powers (Molecular and Cellular Biology), L. Rose (Molecular and Cellular Biology), M. Singer (Micro-biology), J. Engebrecht (Molecular and Cellular Biology), C. Fraser (Molecular and Cellular Biology), S. Harmer (Plant Biology)

Courses in Biochemistry, Molecular, Cellular and Developmental Biology (BCB)

290. Seminar (1)

Seminar-1 hour. Prerequisite: consent of instructor and/or graduate standing. Presentation and discussion of faculty and graduate-student research. (S/U grading only.) — I, II, III. (I, II, III.)

298. Group Study (1-5)

Prerequisite: consent of instructor. (S/U grading only.) - I, II, III. (I, II, III.)

299. Research (1-12)

Prerequisite: consent of instructor. (S/U grading only.) - I, II, III. (I, II, III.)

Biological and **Agricultural Engineering**

(College of Agricultural and Environmental Sciences) Raul H. Piedrahita, Ph.D., Chairperson of the

Department Office. 2030 Bainer Hall; (530) 752-0102:

http://bae.engineering.ucdavis.edu

Faculty

Michael J. Delwiche, Ph.D., Professor Julia Fan, Ph.D., Assistant Professor Fadi A. Fathallah, Ph.D., Professor D. Ken Giles, Ph.D., Professor Mark E. Grismer, Ph.D., Professor (Land, Air and Water Resources) Bruce R. Hartsough, Ph.D., Professor Bryan M. Jenkins, Ph.D., Professor Tina Jeoh, Ph.D., Assistant Professor Kathryn McCarthy, Ph.D., Professor (Food Science and Technology) Michael J. McCarthy, Ph.D., Professor (Food Science and Technology) Nitin Nitin, Ph.D., Assistant Professor (Food Science and Technology) Ning Pan, Ph.D., Professor (Textiles and Clothing) Raul H. Piedrahita, Ph.D., Professor R. Paul Singh, Ph.D., Professor David C. Slaughter, Ph.D., Professor Shrinivasa K. Upadhyaya, Ph.D., Professor Jean S. VanderGheynst, Ph.D., Professor Stavros G. Vougioukas, Ph.D., Assistant Professor Wesley W. Wallender, Ph.D., Professor (Land, Air and Water Resources) Ruihong Zhang, Ph.D., Professor

Emeriti Faculty

William J. Chancellor, Ph.D., Professor Emeritus Pictiaw (Paul) Chen, Ph.D., Professor Emeritus Roger E. Garrett, Ph.D., Professor Emeritus John R. Goss, M.S., Professor Emeritus David J. Hills, Ph.D., Professor Emeritus John M. Krochta, Ph.D., Professor Emeritus Miguel A. Mariño, Ph.D., Professor Emeritus R. Larry Merson, Ph.D., Professor Emeritus John A. Miles, Ph.D., Professor Emeritus Stanton R. Morrison, Ph.D., Professor Emeritus Richard E. Plant, Ph.D., Professor Emeritus James W. Rumsey, M.S., Senior Lecturer Emeritus Thomas R. Rumsey, Ph.D., Professor Emeritus Verne H. Scott, Ph.D., Professor Emeritus James F. Thompson, M.S., Extension Specialist

Wesley E. Yates, M.S., Professor Emeritus

Affiliated Faculty

Dennis R. Heldman, Ph.D., Adjunct Professor Zhongli Pan, Ph.D., Associate Adjunct Professor Mir S. Shafii, Ph.D., Lecturer

Major Programs and Graduate Study. For the Bachelor of Science program, see the major in Engineering: Biological and Agricultural, on page 243; for graduate study, see also Graduate Studies, on page 111.

Minor Programs. The Department of Biological and Agricultural Engineering offers two minors through the College of Agricultural and Environmental Sciences: Geographic Information Systems and Precision Agriculture.

The minor in Geographic Information Systems is open to all majors, including those in engineering. This minor is for students interested in information processing of spatial data related to remote sensing for geographical and environmental planning and

The minor in Precision Agriculture is open to all majors, including those in engineering, and

acquaints students with recent developments and their applications to agriculture, in geographic information systems, global positioning systems, and variable rate technologies.

Courses. Courses are listed under Applied Biological Systems Technology, and Engineering: Biological and Agricultural (Biological Systems Engineering).

Biological Sciences

(College of Biological Sciences)

College of Biological Sciences Dean's Office. 202 Life Sciences

(530) 752-0410; http://www.biosci.ucdavis.edu

Faculty

The Biological Science major and the Bodega Marine Laboratory Spring Quarter Program are offered jointly by the departments of the college. The faculty in the college are members of the Departments of Evolution and Ecology; Microbiology; Molecular and Cellular Biology; Neurobiology, Physiology, and Behavior; Plant Biology. See each department for a list of their faculty.

The Biological Sciences Major

(Departments of Evolution and Ecology; Microbiology; Molecular and Cellular Biology; Neurobiology, Physiology, and Behavior; and Plant Biology)

The Program. The Biological Sciences major is broad in concept, spanning the numerous core disci-plines of biology. The Bachelor of Science program includes mathematics, general and organic chemistry, physics, and biology. While emphasizing breadth, the B.S. degree program also features an area of emphasis requirement that provides concentrated attention on one facet of biology at the upper division level. Each area of emphasis coincides with one of the departments of the college. The Bachelor of Arts program emphasizes biological diversity, evolution, and ecology, all built on a foundation of general and organic chemistry, physics and biology. Research and internships are encouraged in both

Career Alternatives. Both degree programs prepare students for admission to graduate schools or professional schools, leading to either a variety of professional health careers or further study in basic and applied areas of biology. They provide suitable preparation for careers in teaching, biological and biotechnological research with various governmental agencies or private companies, government regulatory agencies, environmental consulting, biological illustration and writing, pharmaceutical sales, biological/environmental law, and biomedical engi-

The A.B. degree program is also appropriate for students interested in teaching biology at the secondary school level and for careers that bear on the ecological problems that require the development of public

A.B. Major Requirements:

A.D. Major Requirements:	
3 .	UNITS
Preparatory Subject Matter	39-52
Biological Sciences 2A-2B-2C	14
Chemistry 2A-2B	10
Chemistry 8A-8B or 118A-118B-	
118C	6-12
Physics 1A-1B or 7A-7B-7C	6-12
Statistics 13, 32, 100, or 102	3-4
Recommended: Chemistry 2C and	
Mathematics* 17A-17B.	
*Mathematics 16A-16B accepted to fulf	ill this
recommendation only for transfer studer	ıts
admitted prior to fall 2013.	
Depth Subject Matter	38-42
Biological Sciences 101	4
Biological Sciences 102 or 105	

5 1 4 O 1 5 1 4 15 1
Evolution: One from Evolution and Ecology
100, 140; Geology 107; Plant Biology
116 3-5
Ecology: One from Environmental Science
and Policy 100; Evolution and Ecology 101,
117; Plant Biology 117, 147
Philosophy of Biological Science: One from
Philosophy of Biological Science: One from
Animal Science 170; Nature and Culture
100, 120, 140; Philosophy 108; Science
and Technology Studies 130A, 130B, 131;
und lectinology studies 130A, 130B, 131,
Veterinary Medicine 1704
Physiology: One from Environmental
Horticulture 102; Entomology 101, 102;
Neurobiology, Physiology, and Behavior
101 pl + p: 1 111 110 25
101; Plant Biology 111, 112 3-5
One course each in animal, microbial and
plant diversity 8-17
Animal Diversity: Entomology 100, 107,
Animal Diversity. Enfollology 100, 107,
109; Evolution and Ecology 105, 112 and 112L, 134; Nematology 110; Wildlife, Fish,
112L, 134; Nematology 110; Wildlife, Fish,
and Conservation Biology 110, 111, 120.
Ad:
Microbial Diversity: Microbiology 101, 162;
Pathology, Microbiology, and Immunology
127, 128; Plant Biology 148; Plant Pathology
148; Soil Science 111.
140, 30ii 3cience 111.
Plant Diversity: Evolution and Ecology 108,
119, 140; Plant Biology 102, 108, 116,
119, 147.
Additional upper division course work in
biological sciences to achieve a total of 38 or
more units (see "Approved Biology Electives"
list below).
Upper division course work must include at
least 2 units (6 hours per week) of laboratory
and/or fieldwork.
Note: Although a course may be
listed in more than one category, that
course may satisfy only one
requirement.
Tatalita fau thaiau 77 0/
Total units for the major77-94
B.S. Major Requirements:
B.S. Major Requirements:
B.S. Major Requirements: UNITS
B.S. Major Requirements: UNITS Preparatory Subject Matter
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B.S. Major Requirements: UNITS Preparatory Subject Matter

and Biodiversity; Marine Biology; or Microbiology,

please refer to that area of emphasis before choos-

ing field requirement classes as specific, designated

field courses are required. The required courses are

listed under that area of emphasis.

Although a course may be listed in more than one category (including the area of emphasis requirements), that course may be used only once and may satisfy only one requirement.

Field Course Lists

(a) Evolution: Anthropology 151, 152, 154A; Evolution and Ecology 100; Geology 107; Environmental Science and Policy 100, 121; Evolution and Ecology 101; Microbiology 120; Wildlife, Fish, and Conservation 150, 162; Pathology, Microbiology, and Immunology 127, 128; Soil Science (d) Neurobiology, Physiology, and Behavior: Anthropology 154A; Entomology 102, 104; Neurobiology, Physiology, and Behavior 100, 101, 102, 1413-5 (e) Plant Biology: Environmental Horticulture 102, 105; Evolution and Ecology 108, 117, 119, 140; Plant Biology 102, 105, 108, 111, 112, 113, 116, 117, 119, 143, 147, 148; Plant Pathology 120, 130, 148; Plant Sciences 144, 1763-5

Area of Emphasis Requirement: Depth in one area of biology is achieved by completing all requirements for one of the six areas of emphasis listed below. It will include at least 2 units (or 6 hours per week) of laboratory designated in the area of emphasis.

Although a course may be listed in more than one category (including the field requirements), that course may be used only once and may satisfy only

Evolution, Ecology and Biodiversity emphasis......12

Students choose to complete Biological Sciences 105 or 102+103 for this emphasis.

Field requirement: Students must take Evolution and Ecology 100 to satisfy Field requirement (a), and Evolution and Ecology 101 to satisfy Field requirement (b).

(1) At least 12 units including at least one course from each of the following two groups......12

(a) Biodiversity: Entomology 103; Evolution and Ecology 105, 106, 108, 112, 112L, 114, 134, 134L, 134F, 140; Microbiology 105, 105L; Nematology 110; Plant Biology 116, 147, 148; Wildlife, Fish, and Conservation Biology 110, 110L, 111, 111L, 120, 120L.

(b) Advanced Evolution and Ecology: Advanced Evolution and Ecology: Évolution and Ecology 102, 103, 107, 115, 117, 119, 120, 138, 141, 147, 149, 150, 180A, 180B, 181.

(2) Laboratory/Fieldwork Requirement. Included in the above 12 units, complete a total of 2 units or a total of 6 hours/week of fieldwork or laboratory work. Courses that may be used to satisfy this requirement are: One course from: Evolution and Tecquentient are. One Course from: Evolution and Ecology 105, 106, 108, 112L, 114, 134L; Microbiology 105L; Plant Biology 116, 148: Wildlife, Fish, and Conservation Biology 110L; 111L OR two courses from Evolution and Ecology 117, 119, 134F, 140, 180A, 180B; Plant Biology 147; Wildlife, Eigh, and Conservation Biology 147; Wildlife, Eigh, and life, Fish, and Conservation Biology 120L

Marine Biology emphasis12-19

Students choose to complete Biological Sciences 105 or 102+103 for this emphasis

Field requirement: Students must take Evolution and Ecology 100 to satisfy Field requirement (a), and Evolution and Ecology 101 to satisfy Field requirement (b), and Neurobiology, Physiology, and Behavior 102 or 141 to satisfy Field requirement (d).

```
(1) Ocean Processes: At least 3 units from Biological
Sciences 122; Environmental Science and Policy
124, 152; Environmental Science and Policy/
Geology 116N, 150A, 150B, 150C; Evolution and Ecology 115; Wildlife, Fish, and Conservation
(2) Marine Organismal Biology: At least 3 units from
Animal Science 119, 131; Evolution and Ecology
106, 110, 112 and 112L, 114; Neurobiology,
Physiology, and Behavior 141; Plant Biology 118; Wildlife, Fish, and Conservation Biology 120 and
(3) Immersion Requirement: Complete one of four
options listed below, offered in spring quarter or
summer sessions at Bodega Marine Laboratory, or
equivalent. Requires residence at Bodega Marine
Laboratory......6-10
  Option 1 (summer session 1):.....7
     Select one course from Environmental
    Science and Policy 124; Evolution and Ecology 106, 110, 114......3
    Biological Sciences 124 ......3
    Environmental Science and Policy/
    Evolution and Ecology 111 .....1
  Option 2 (summer session 2):.................................6-7
Select one course from Environmental
    Science and Policy 152; Geology
  Environmental Toxicology/Nutrition 127
Option 4 (spring quarter): Select one course from each of the following two groups......8
     (a.) Biological Sciences 122;
    Neurobiology, Physiology, and Behavior
    141 .....(b.) Biological Sciences 122P;
    Neurobiology, Physiology, and Behavior
    141P.....5
Each course may only be used in
    satisfaction of one area of emphasis or field
    requirement.
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Microbiology emphasis16-20

Complete one of four options listed below or complete an individual option with approval from your . faculty adviser.

Students choose to complete Biological Sciences 105 or 102+103 for all options.

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(1) Microbial Physiology and Molecular
to satisfy Field requirement (c)
  Microbiology 104L, 140, 150 ......9
 Select one course from Microbiology 170;
Molecular and Cellular Biology 121 .....3
Select one course from Microbiology 105
and 105L, 155L, 170; Pathology,
Microbiology, and Immunology 127 ... 3-6
(2) Microbial Diversity and Ecology
to satisfy Field requirement (c)
  Microbiology 104L, 105 and 105L,
 Technology 104; Microbiology 140, 150, 162, 170; Pathology, Microbiology, and Immunology 127, 128; Plant Biology
  148; Plant Pathology 148; Soil Science
(3) Biotechnology and Applied Microbiology
option ......16-19
  Students must complete Microbiology 104
  to satisfy Field requirement (c)
  Microbiology 104L .....
  Select two courses from Microbiology 140,
 Technology 102A, 104 ......3-4
Select one course from Microbiology 155L;
  Molecular and Cellular Biology 120L,
  160L......4-6
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(4) Medical Microbiology option 12:20 Students may choose to complete the Field (c) requirement and the laboratory requirement for this option with
Microbiology 101, or Microbiology 104
and 104L. Students are encouraged to
complete Microbiology 101 to satisfy Field
(c) and this option's laboratory requirement
simultaneously.
Students completing Microbiology 104 for
Field (c) must also complete Microbiology
104L to satisfy the laboratory requirement
for this option
Pathology, Microbiology, and Immunology 1263
Select one course from Medical
Microbiology and Immunology 115, 116;
Pathology, Microbiology, and Immunology
127 3-5
Select one course from Microbiology 105
and 105L, 162; Pathology, Microbiology,
and Immunology 128 3-6
Select one course from Microbiology 140,
150. 170

Molecular and Cellular Biology emphasis 12-17

Students must complete Biological Sciences 102+103 for this emphasis.

(1) Molecular Biology and Gene Expression: One course from Molecular and Cellular Biology 121 (2) Laboratory Experience: One or more laboratory courses from Biological Sciences 120P, 180L; Molecular and Cellular Biology 120L, 140L, 160L; or other laboratory course to total 3 units (or 9 hours per week) that emphasizes cellular or molecular biology with approval of your faculty adviser 3-6 Immunology 126; Plant Biology 113, 126; or other courses with faculty adviser's approval.

Neurobiology, Physiology, and Behavior emphasis 15

Students choose to complete Biological Sciences 105 or 102+103 for this emphasis.

Although a course may be listed in more than one category (including the field requirements) that course may be used only once and may satisfy only one requirement.

Select courses from at least two of the following three areas and include one laboratory from Neurobiology, Physiology, and Behavior 101L, 104L, 141P, or (1) Neurobiology: Neurobiology, Physiology, and Behavior 100, 106, 112, 124, 125, 126, 160, 160L, 161, 162, 163, 164, 165, 168, 169; Psychology 121, 124, 128, 129. 121, 124, 128, 129. (2) Physiology: Anatomy, Physiology: and Cell Biology 100; Entomology 102; Exercise Biology 101, 110, 111, 125; Neurobiology, Physiology, and Behavior 101, 101L, 103, 104L, 105, 106, 111C, 11L, 113, 114, 117, 121, 121L, 122, 123, 127, 128, 130, 132, 139, 140, 141, 141P, 152; Pathology, Microbiology, and Immunology 126; Wildlife, Fish, and Conservation Biology 121. (3) Behavior: Anthropology 154A, 154C; Conservation Biology 121. (3) Behavior: Anthropology 154A, 154C; Entomology 104; Neurobiology, Physiology, and Behavior 102, 150, 152, 159, 162; Psychology 122, 123, 129. Note: Neurobiology, Physiology, and Behavior 106, 152 or Psychology 129 may be used only

once to satisfy Area of Emphasis requirements.

Plant Biology emphasis 14-17

Students choose to complete Biological Sciences 105 or 102+103 for this emphasis

Select one course from each of the following four areas. A course may be listed in more than one area or field, but may be used to

satisfy only one requirement.
(1) Anatomy and morphology: Evolution and Ecology 140; Plant Biology 105, 116, 118... 161A, 161B; Evolution and Ecology 108; Plant Biology 105, 108, 116, 148; Plant Pathology 148.......4-5

Total Units for the Major...... 104-114

Approved Biology Electives

These courses are accepted without petition for upper division units in the Biological Science major. Many other biologically related courses may be substituted with consent of your adviser.

Anatomy, Physiology and Cell Biology 100 Animal Science 170

Anthropology 151, 152, 153, 154A, 154B, 157 Avian Sciences 100, 150

Biological Sciences—All upper division courses Cell Biology and Human Anatomy 101, 101L

Chemistry 107A, 107B, 108, 150

Entomology-All upper division courses Environmental Horticulture 102, 105

Environmental Science and Policy 100, 110, 121, 123, 124, 150A, 150B, 150C, 151, 151L

Evolution and Ecology-All upper division courses

Exercise Biology 101, 110, 111, 113

Food Science and Technology 102A, 104

Geology 107, 107L, 150A, 150B, 150C

Medical Microbiology 115, 116

Microbiology—All upper division courses

Molecular and Cellular Biology—All upper division

Nature and Culture 100, 120, 140

Nematology 100, 110

Neurobiology, Physiology, and Behavior-All upper division courses

Pathology, Microbiology, and Immunology 126, 126L, 127, 128

Philosophy 108

Plant Biology-All upper division courses, except

Plant Sciences 112, 130, 131, 135, 142, 144,

150, 152, 153, 157, 158

Plant Pathology 120, 130

Psychology 121, 122, 123, 124

Science and Technology Studies 130A, 130B, 131

Soil Science 111

Veterinary Medicine 170

Wildlife, Fish, and Conservation Biology 110, 110L, 111, 111L, 120, 120L, 121, 122, 130, 136, 140,

Other Upper Division Courses

There is a limitation on variable-unit courses that may be counted toward the major. Of these courses, up to 4 units of 199 courses may be counted, and no units of 192 or 197T courses may be counted.

Minor Program Requirements:

Biological Sciences......18 Complete at least 3 units from each of the five

numbered groups to total at least 18 units. Appropriate alternative courses may be used with approval of an adviser. (1) Cell and Molecular Biology: Biological Sciences 101, 102, 1053-4 (2) Animal Biology: Anthropology 151, Anatomy, Physiology and Cell Biology 100/ Neurobiology, Physiology, and Behavior 123; Entomology 100; Evolution and Ecology 105, 112 and 112L, 134; Nematology 100, 110; Neurobiology, Physiology, and Behavior 100, 101, 102, 117; Wildlife, Fish, and Conservation Biology 110, 111, (3) Microbiology: Microbiology 101, 102, Sciences/Plant Sciences 144; Plant Biology 105, 111, 112, 116, 126; Plant Biology/ Plant Pathology 148; Plant Sciences 141, Conservation Biology 1513-5 Additional courses (if necessary) from above numbered groups to reach 18 units.

Advisers and Advising. Information on the Biological Sciences major or minor can be obtained from the Undergraduate Academic Programs in the College of Biological Sciences Dean's Office in 202 Life Sciences.

Citation for Outstanding Performance. The College of Biological Sciences confers Citations for Outstanding Performance on undergraduates majoring in Biological Sciences who have demonstrated superior academic performance and individual achievement in research. Students who wish to be considered for a citation must first meet or exceed a specified grade point average and participate in an appropriate research project.

Teaching Credential Subject Representative. Associate Director of Teacher Education (School of Education); see the Teaching Credential/M.A. Program on page 115.

Bodega Marine Laboratory Program

See also Biological Sciences, Bodega Marine Laboratory Program, on page 184.

http://bml.ucdavis.edu/

A full quarter of undergraduate course work in marine biology is available each spring quarter at the Bodega Marine Laboratory, located in Bodega Bay, California. Course offerings include lecture and laboratory instruction in the developmental biology and physiological adaptation of marine organisms, and population biology and ecology; a weekly colloquium; and an intensive individual research experience under the direction of laboratory faculty (Biological Sciences courses 122, 122P, 123, Neurobiology, Physiology, and Behavior 141, 141P). This is a 15 unit program and course offerings and instructors may vary from year to year.

The program is residential, with students housed on the laboratory grounds. Participants are assessed a room and board fee in addition to standard campus registration fees. An application is required. Obtain forms from the Bodega Marine Laboratory website listed above. Applications are due January 31 for spring quarter. Additional information on the Bodega Marine Laboratory Program is available from the Undergraduate Programs office in 202 Life Sciences, or directly from Bodega Marine Laboratory, P.O. Box 247, Bodega Bay, CA 94923 (707) 875-2211.

Courses in Biological Sciences (BIS)

Lower Division Courses

2A. Introduction to Biology: Essentials of Life on Earth (4)

Lecture—3 hours; discussion—1 hour. Essentials of life including sources and use of energy, information storage, responsiveness to natural selection and cellularity. Origin of life and influence of living things on the chemistry of the Earth. Not open for credit to nave completed course 1A with a grade of C- or better. GE credit: SE. — I, II, III. (I, II, III.) Roth students who have completed course 1A with a

2B. Introduction to Biology: Principles of Ecology and Evolution (5)

Lecture — 3 hours; discussion — 1 hour; laboratory — 3 hours. Prerequisite: grade of C- in course 1A or 2A. Introduction to basic principles of ecology and evolutionary biology, focusing on the fundamental mechanisms that generate and maintain biological diversity across scales ranging from molecules and genes to global processes and patterns. Not open for credit for student who have completed Biological Sciences 1B with a grade of C- or better. GE credit: QL, SE, SL, VL. – I, II, III. (I, II, III.) Grosberg, Keen, Rosenheim, Stachowicz, Strauss

2C. Introduction to Biology: Biodiversity and the Tree of Life (5)

Lecture—4 hours; laboratory—3 hours. Prerequisite: course 1B or 2B completed with a C- or better. Introduction to organismal diversity, using the phylogenetic tree of life as an organizing theme. Introduction to organismal diversity, using the phylogenetic tree of life as an organizing theme. Lectures and labora-tories cover methods of phylogenetic reconstruction, current knowledge of the tree of life, and the evolution of life's most important and interesting innovations. Not open for credit to students who have completed course 1C with a grade of C- or better. GE credit: SciEng, Wrt | OL, QL, SE, SL, SS, VL.—I, II, III. (I, II, III.) Shaffer

10. General Biology (4)

Lecture/discussion-4 hours. Concepts and issues in biology. Emphasis on composition and structure of organisms; regulation and signaling; heredity, evolution and the interaction and interdependence among life forms and their environments. Designed for students not specializing in biology. Not open for credit to students who have completed course 1A, 2A or 10V. GE credit: SciEng.

10V. General Biology (4)

Web virtual lecture—3 hours; web electronic discussion – 1 hour. Concepts and issues in biology. Emphasis on composition and structure of organisms; regulation and signaling; heredity, evolution and the interaction and interdependence among life forms and their environments. Significant writing is required. Designed for students not specializing in biology. Not open for credit to students who have completed course 1A, 1B, 1C, 2A, 2B, 2C, or 10. (Same course as Nematology 10V.) GE credit: Sci-Eng, Wrt | SE, SL, WE.—III. (III.) Westerdahl

11. Issues in the Life Sciences (2)

Lecture - 1 hour; discussion - 1 hour. Prerequisite: enrollment limited to BUSP students, consent of instructor. The range of subjects and approaches in the field of biology, including both basic and applied research topics.—I. (I.)

11L. Basic Life Sciences Laboratory (2)

Laboratory - 6 hours. Prerequisite: enrollment limited to BUSP students, consent of instructor. Basic laboratory skills in life sciences research, including microbiology, molecular biology, and genetics. — IV. (IV.)

20Q. Modeling in Biology (2)

Lecture - 1 hour; discussion - 1 hour. Prerequisite: Mathematics 16B (may be taken concurrently). Introduction to the application of quantitative methods to biological problems. Students will use a mathematical software package to tackle problems drawn from all aspects of biology. - Mogilner, Sutter

92. Internship in Biological Sciences (1-12) Internship - 3-36 hours. Prerequisite: lower division standing and consent of instructor. (P/NP grading

only.) 98. Directed Group Study (1-5)

Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) Prerequisite: lower division standing and consent of

instructor. (P/NP grading only.) **Upper Division Courses**

101. Genes and Gene Expression (4)

Lecture—4 hours. Prerequisite: course 1A and 1B, or 2A, 2B and 2C (2C may be taken concurrently); Chemistry 8B or 118B or 128B (may be taken concurrently); Statistics 13 or 100 (recommended) or 102 or 130A or equivalent (may be taken concurrently). Nucleic acid structure and function; gene expression and its regulation; replication; transcription and translation; transmission genetics; molecular evolution. GE credit: SciEng | QL, SE, SL.—I, II, III. (I, II, III.) Brady, Chan, Draper, Dvorak, Engebrecht, Heyer, Kliebenstein, Langley, O'Neill, Rodriguez,

101D. Genes and Gene Expression Discussion (1)

Discussion - 1 hour. Prerequisite: course 101 concurrently. Discussion and problem solving related to fundamental principles of classical and molecular genetics as presented in course 101. (P/NP grading only.)—I, II, III. (I, II, III.)

102. Structure and Function of Biomolecules (3)

Lecture - 3 hours. Prerequisite: course 1A or 2A; Chemistry 8B or 118B or 128B. Structure and function of macromolecules with emphasis on proteins, catalysis, enzyme kinetics, lipids, membranes, and proteins as machines. Only one unit of credit for stu-dents who have completed Biological Sciences 10.5 or Animal Biology 102. GE credit: QL, SE.-I, II, III. (I, II, III.) Cheng, Etzler, Gasser, Hilt, Leary

102Q. Quantitative Biomolecule Concepts (1)

Project - 1 hour; autotutorial. Prerequisite: course 102 (may be taken concurrently). Study of the quantitative concepts and mathematical models fundo mental to biochemistry. Offered irregularly. GE credit: QL, SE.—Hilt, Theg

103. Bioenergetics and Metabolism (3)

Lecture - 3 hours. Prerequisite: course 102. Fundamentals of the carbon, nitrogen, and sulfur cycles in nature, including key reactions of biomolecules such as carbohydrates, amino acids, lipids, and nucleotides, and of energy production and use in different types of organisms. Principles of metabolic regulation. One unit of credit for students who have completed Biological Sciences 105 or Animal Biology 103. GE credit: SE.—I, II, III. (I, II, III.) Callis, Fiehn, Hilt, Inoue

104. Cell Biology (3)

Lecture — 3 hours. Prerequisite: course 101; 102 or 105. Membrane receptors and signal transduction; cell trafficking; cell cycle; cell growth and division; extracellular matrix and cell-cell junctions; cell development; immune system. GE credit: SciEng | SE.-I, II, III. (I, II, III.) Edwards, Etzler, Kaplan, Lin, Myles, Privalsky, Starr

105. Biomolecules and Metabolism (3)

Lecture—3 hours. Prerequisite: courses 1A, 1B, and 1C, or 2A, 2B, and 2C; course 101; Chemistry 8B or 118B or 128B. Fundamentals of biochemical processes, with emphasis on protein structure and activity; energy metabolism; catabolism of sugars, amino acids, and lipids; and gluconeogenesis. No credit for students who have completed both courses 102 and 103. One unit of credit for students who have completed course 102 or 103. No credit for students who have completed both course 102 and 103. One unit of credit for students who have completed Animal Biology 102 or 103. No credit for students who have completed both Animal Biology 102 and 103. GE credit: QL, SE.—I, II, III. (I, II, III.) Fiehn, Hilt, Murphy, Theg

122. Population Biology and Ecology (3)

Lecture—2 hours; laboratory—3 hours. Prerequisite: courses 1A, 1B, 1C, or 2A, 2B, 2C; residence at Bodega Marine Laboratory required. Biological and physical processes affecting plant and animal populations in the rich array of habitats at the Bodega Marine Laboratory ecological preserve. Emphasis on field experience, with complementing lectures to address population and community processes. See Bodega Marine Laboratory Program. GE credit: OL, QL, SE, SL, VL, WE.—III. (İII.) Morgan

122P. Population Biology and Ecology/ Advanced Laboratory Topics (5)

Laboratory-12 hours; discussion-1 hour. Prerequisite: course 122 concurrently. Residence at Bodega Marine Laboratory required. Training in scientific research, from hypothesis testing to publication, including methods of library research. Research related to topic covered in course 122. Final presentation both oral and written. (See Bodega Marine Laboratory Program.) GE credit: SE, VL, WE.-III. (III.) Chang, Cherr, Morgan

123. Undergraduate Colloquium in Marine Science (1)

Seminar - 1 hour. Prerequisite: enrolled student at the Bodega Marine Laboratory. Series of weekly seminars by recognized authorities in various disciplines of marine science from within and outside the UC system. Includes informal discussion with speaker. Course will be held at Bodega Marine Laboratory. (P/NP grading only.) (See above description for Bodega Marine Laboratory Program.)—III. (III.) Chang, Cherr, Morgan

124. Coastal Marine Research (3)

Laboratory-6 hours; fieldwork-6 hours; laboratory/discussion - 1 hour. Prerequisite: upper division standing or consent of instructor; concurrent enrollment in at least one course from Environmental Science and Policy 124, 152, Evolution and Ecology 106, 110, 114; residence at or near Bodega Marine Lab required. Student must complete the application available at http:// www.bml.ucdavis.edu. Independent research on topics related to the accompanying core Bodega Marine Laboratory summer courses. Students will select one instructor to be primary mentor, but integrative topics that draw on the expertise of several BML faculty members will be encouraged. May be repeated two times for credit. GE credit: OL, QL, SE, VĽ, WE.—IV. (IV.) Gaylord, Hill, Largier, Morgan, Sanford

132. Introduction to Dynamic Models in Modern Biology (4)

Lecture—3 hours; laboratory—2 hours. Prerequisite: Mathematics 16C, Statistics 13, one lower division course in biology, or the equivalents. Dynamic modeling in the biological sciences, including matrix models, difference equations, differential equations, and complex dynamics. Examples include classic models in ecology, cell biology, physiology, and neuroscience. Emphasis on understanding models, their assumptions, and implications for modern biology. GE credit: Wrt | QL, SE, SL, VL, WE.-I. (I.) Hom

133. Collaborative Studies in Mathematical Biology (3)

Lecture/discussion-3 hours. Prerequisite: Mathematics 16ABC or the equivalent, one course from course 1A, 1B, 1C, 2A, 2B, 2C, 10 or the equivalent in biology, consent of instructor. Interdisciplinary research and training that uses mathematics and computation to solve current problems in biology. Not offered every year. May be repeated six times for credit. GE crédit: QL, SE, SL, VL, WE.—I, II, III. (I, II, III.) Grosberg, Schreiber

134. Systems Biology: From Biological Circuits to Biological Systems (2)

Lecture/discussion—2 hours; term paper. Prerequisite: course 101 and one course from Molecular and Cellular Biology 121, 161 or Plant Biology 113, Mathematics 16ABC or 17ABC; or consent of

instructor. Applying systems theory to understand the properties of biological networks in a variety of model organisms. Emphasis on both local biological circuits, and genome-scale biological networks. Topics include network motifs, robustness, modeling, emergent properties and integration of networks. GE credit: OL, QL, SE, VL.-III. (II.) Brady

180L. Genomics Laboratory (5)

Lecture - 2 hours; laboratory - 6 hours; discussion -1 hour. course 181; course 183 (may be taken concurrently); Molecular and Cellular Biology 182. Computational approaches to model and analyze biological information about genomes, transcriptomes, and proteomes. Topics include genome assembly and annotation, mRNA and small RNA profiling, proteomics, protein-DNA and protein-protein interactions, network analysis, and comparative genomics. Computer programming experience not required. Students who have received credit for taking Computer Science Engineering 124 or Biotechnology 150 will receive 3 units for completing course 180L. GE credit: SciEng | QL, SE, VL.-III. (III.) Brady, Chan, Dawson, Dinesh-Kumar, Harada, Korf, Maloof

181. Comparative Genomics (3)

Lecture - 3 hours. Prerequisite: course 101. Comparison of genomes at the population and species level. Genomic techniques for mapping disease (and other) genes, reconstruction of evolutionary history and migration patterns, determination of gene function, prediction of organismal traits, and metagenomics: determination of community composition and function. GE credit: QL, SE, SL.—I. (I.) Dawson,

183. Functional Genomics (3)

Lecture - 3 hours. Prerequisite: course 101; course 102 or 105 recommended. Overview of genomic methodologies and key biological findings obtained using genome-wide analyses. RNA profiling, small RNAs, epigenomics, chromatin immunoprecipitation, protein-DNA interactions, proteomics and network analysis. GE credit: SciEng | QL, SE, VL.—III. (III.) Brady, Chan

192. Internship in Biological Sciences (1-12) Internship - 3-36 hours. Prerequisite: upper division

standing and consent of instructor. (P/NP grading only.)

194H. Research Honors (2)

Independent study-6 hours. Prerequisite: senior standing. Student's majoring in Biological Sciences who have completed two quarters (3-5 units per quarter) of 199 and who qualify for the honors program as defined by the current catalog. Opportunity for Biological Sciences majors to pursue intensive research culminating in the writing of a senior thesis with the guidance of faculty advisers. (P/NP grading only.) GE credit: SE, WE.

195A. Science Teaching Internship Program

Lecture/discussion-2 hours; internship-6 hours. Prerequisite: upper division standing in a science major or consent of instructor. Basic teaching techniques including lesson planning, classroom management, and presentation skills. Interns spend time in K-12 science classrooms working with a master teacher observing, assisting with labs and activities, managing students, and teaching lessons. (P/NP grading only.)

195B. Science Teaching Internship (1-5)

Internship - 3-15 hours. Prerequisite: course 195A. Reinforcement of teaching techniques learned in 195A with additional classroom experiences in K-12 science classrooms working with a master teacher observing, assisting with labs and activities, managing students, and teaching lessons. May be repeated one time for credit with consent of instructor. (P/NP aradina onlv.)

197T. Tutoring in Biological Sciences (1-5)

Discussion - 2-6 hours. Prerequisite: upper division standing and consent of instructor. Assisting the instructor by tutoring students in one of the Biological Sciences' regular courses. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading

199. Special Study in Biological Sciences (1-5)

Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

Graduate Course

298. Group Study (1-5)

Prerequisite: consent of instructor. College of Biological Sciences staff members may offer group study courses under this number.

Biomedical Engineering (A Graduate Group)

J. Kent Leach, Ph.D., Chairperson of the Group (530) 754-9149

Group Office. 2303 Genome and Biomedical Sciences Facility (530) 752-2611; http://www.bme.ucdavis.edu/graduate/

Faculty

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Kyriacos Athanasiou, Ph.D., Distinguished Professor (Biomedical Engineering, Orthopaedic Surgery) Keith Baar, Ph.D., Assistant Professor

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Alice Tarantal, Ph.D., Professor (Pediatrics, Cel Biology and Human Anatomy, Medicine)

Sebastian Wachsmann-Hogiu, Ph.D., Associate Professor (Pathology and Laboratory Medicine) John Werner, Ph.D., Professor (Ophthalmology) Jeffrey Walton, Ph.D., Project Physicist

(NMR Facility)

Keith R. Williams, Ph.D., Senior Lecturer (Neurology, Physiology and Behavior) Soichiro Yamada, Ph.D. Assistant Professor (Biomedical Engineering)

Yohei Yokobayashi, Ph.D., Associate Professor (Biomedical Engineering)

Graduate Study. The Graduate Group in Biomedical Engineering offers programs of study and research leading to the M.S. and Ph.D. degrees. The programs of study prepare students for professional work in the effective integration of engineering with medical and biological sciences. Research strengths lie in the areas of imaging, tissue engineering and regenerative medicine, sensor and MEMs systems, cellular and molecular mechanics, computational modeling, targeted therapeutics, orthopedic biomechanics, biofluids and transport, and human movement. This broad interdepartmental program is best suited for students who are capable of and comfortable with considerable independence. Each student, together with an adviser, defines a specific course of study suited to individual goals.

Preparation. The Group regards strong competence in mathematics and engineering as necessary for successful completion of study. Prior course work in these areas is emphasized in the evaluation of applications. Some undergraduate training can be acquired after admission to the Group, but it may require an additional year of study.

Courses. See Engineering: Biomedical, on page

Biophysics (A Graduate Group)

Alexei Stuchebrukhov, Ph.D., Chairperson of the Group

Group Office. 310 Life Sciences; (530) 752-4863:

http://biosci3.ucdavis.edu/GradGroups/BPH/

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R. Holland Cheng, Ph.D., Professor (Molecular and Cellular Biology)

Colleen Clancy, Ph.D., Associate Professor (Pharmacology)

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(Biomedical Engineering) Leighton T. Izu, Ph.D, .Associate Professor

(Pharmacology)
Niels G. Jensen, Ph.D., Professor (Applied Science)
Thomas Jue, Ph.D., Professor

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John C. Voss, Ph.D., Professor (Biochemistry and Molecular Medicine)

Sebastian Wachsmann-Hogiu, Ph.D., Associate

Professor (Pathology)
David K. Wilson, Ph.D., Professor
(Molecular and Cellular Biology) Vladimir Yarov-Yarovoy Ph.D., Assistant Professor (Physiology and Membrane Biology)

Emeriti Faculty

Morton Bradbury, Ph.D., Professor Emeritus John H. Crowe, Ph.D., Professor Emeritus William H. Fink, Ph.D., Professor Emeritus Jerry L. Hedrick, Ph.D., Professor Emeritus Distinguished Graduate Mentoring Award Gerd N. LaMar, Ph.D., Professor Emeritus Carl W. Schmid, Ph.D., Professor Emeritus

Graduate Study. The Biophysics Graduate Group offers a program leading to a Ph.D. degree in bio physics. The interdisciplinary program prepares students to conduct independent research at the interface of physics, chemistry, and biology. Faculty members have particular research interests in structural biology, membrane dynamics, electron transfer, computational biology, theory, cellular regulation, and imaging. Students choose from the broad biophysics research venues a research laboratory that matches their interests and career goals.

Courses in Biophysics (BPH)

Graduate Courses

200A. Current Techniques in Biophysics (3)

Lecture — 3 hours. Prerequisite: Biological Sciences 102 or equivalent; Chemistry 110A or equivalent. Current techniques in Biophysics. Topics in 200A include mathematical methods, modeling, mass spectrometry, stochastic process, scanning probe microscopy, electron microscopy, fluorescence, mem brane diffusion/mechanics, and single particle tracking. (S/U grading only.)—II. (II.) Faller

200B. Current Techniques in Biophysics (3)

Lecture—3 hours. Prerequisite: Biological Sciences 102 or equivalent; Chemistry 110A. Current Techniques in Biophysics. Topics include protein folding, membrane structure and dynamics, Raman spectroscopy, fluorescence resonance energy transfer, time

resolved fluorescence, quantum dot, fluorescence imaging, esr, high resolution nmr, and in vivo nmr. (S/U grading only.)—III. (III.) Jue

200LA. Biophysics Laboratory (3)

Laboratory – 18 hours. Prerequisite: course 200 (may be taken concurrently). One five-week laboratory assignment in the research laboratory of a Biophysics Ğraduate Group faculty member. Individual research problems with emphasis on methodological/procedural experience and experimental design. May be repeated for credit four times.—I, II, III. (I, II, III.)

200LB. Biophysics Laboratory (6)

Laboratory—two 18-hour rotations. Prerequisite: course 200 (may be taken concurrently). Two fiveweek laboratory assignments in the research laboratories of Biophysics Graduate Group faculty members. Individual research problems with emphasis on methodological/procedural experience and experimental design. May be repeated for credit two times. — I, II, III. (I, IÍ, III.)

225. Biophotonics in Medicine and the Life Sciences (3)

Lecture/discussion-3 hours. Prerequisite: Physics 108 and Biology 101-105; course 202 highly recommended; graduate standing. Introduction to the science and technology of biomedical optics and photonics, with an overview of applications in medicine and the life sciences. Emphasis on research supported by the NSF Center for Biophotonics at UC Davis Medical Center. (Same course as Applied Science 255 and Biomedical Engineering 255.)—II. (II.) Chuang, Matthews

231. Biological Nuclear Magnetic Resonance (3)

Lecture—3 hours. Prerequisite: Molecular and Cellular Biology 221A or the equivalent or consent of instructor. Principles and applications of magnetic resonance in biomedicine. Fundamental concepts and the biophysical basis for magnetic resonance applications in areas of tissue characterization/ imaging, metabolic regulation, and cellular bioenergetics. (Same course as Biological Chemistry 231.) Offered in alternate years.—III. (III.) Jue

241. Membrane Biology (3)

Lecture - 3 hours. Prerequisite: Biological Sciences 102, 103, 104 or consent of instructor. Advanced topics on membrane biochemistry and biophysics. Relationship of the unique properties of biomembranes to their roles in cell biology and physiology. (Same course as Molecular and Cellular Biology 241.)—III. (III.) Crowe, Longo, Voss

271. Optical Methods in Biophysics (4)

Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: Biological Sciences 102 or the equivalent, Applied Science Engineering 108B or the equivalent, and Chemistry 110A or the equivalent. Principal optical techniques used to study biological structures and their related functions. Specific optical techniques useful in the studies of protein-nucleic acid, protein-membrane and protein-protein interactions. Biomedical applications of optical techniques. (Same course as Applied Science Engineering 271.)—III. (III.) Huser, Parikh, Yeh

290. Biophysics Seminar (1)

Seminar-1 hour. Prerequisite: graduate standing or consent of instructor. Presentation of current research by experts in biophysics. May be repeated for credit. (S/U grading only.)—Í, II, III. (I, II, III.)

290C. Research Conference in Biophysics

Discussion - 1 hour. Prerequisite: graduate standing in Biophysics and/or consent of instructor; course 299 concurrently. Presentation and discussion of faculty and graduate-student research in biophysics. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

293. Introduction to Research Topics (1)

Seminar — 1 hour. Presentation of current research activities of the Biophysics Graduate Group faculty. Facilitation of students in developing their research interest, and promoting collegial interactions. May be repeated one time for credit. (S/U grading only.) - I. (I.)

298. Group Study (1-5)

(S/U grading only.)

299. Research (1-12) (S/U grading only.)

Biostatistics (A Graduate Group)

Wolfgang Polonik, Ph.D. (Statistics), Chairperson of the Group

Group Office, 4118 Mathematical Sciences Building (530) 692-5194; http://biostat.ucdavis.edu/

Faculty

Sharif Aly, Ph.D., Assistant Professor (Population Health & Reproduction) Rahman Azari, Ph.D., Lecturer (Statistics) Heejung Bang, Ph.D., Associate Professor (Public Health Sciences) Laurel Beckett, Ph.D., Professor (Public Health Sciences) Prabir Burman, Ph.D., Professor (Statistics) Owen Carmichael, Ph.D., Assistant Professor (Neurology) Andrew J. Clifford, Ph.D., Professor (Nutrition)

Christiana Drake, Ph.D., Professor (Statistics) Thomas R. Famula, Ph.D., Professor (Animal Science)

Thomas B. Farver, Ph.D., Professor (Population Health and Reproduction) Emilio Ferrer, Ph.D., Associate Professor (Psychology)
Valdimir Filkov, Ph.D., Associate Professor

(Computer Science)

Danielle Harvey, Ph.D., Assistant Adjunct Professor (Public Health Sciences)

Fushing Hsieh, Ph.D., Professor (Statistics) Ana-Maria Iosif, Ph.D., Assistant Professor (Public Health Sciences)

Jiming Jiang, Ph.D., Professor (Statistics)
Philip H. Kass, Ph.D., Professor (Population Health and Reproduction)

Kyoungmi Kim, Ph.D., Assistant Professor (Public Health Sciences) Thomas Lee, Ph.D., Professor (Statistics)

Chin-Shang Li, Ph.D., Assistant Professor (Public Health Sciences)
Hans-Georg Müller, M.D., Ph.D., Professor

(Statistics)

Debashis Paul, Ph.D., Assistant Professor (Statistics) Jie Peng, Ph.D., Associate Professor (Statistics) Richard Plant, Ph.D., Professor (Plant Sciences) Wolfgang Polonik, Ph.D., Professor (Statistics) Lihong Qi, Ph.D., Assistant Professor

(Public Health Sciences) David M. Rocke, Ph.D., Professor (Public Health Sciences)

George G. Roussas, Ph.D., Professor (Statistics) Francisco J. Samaniego, Ph.D., Professor (Statistics) Chih-Ling Tsai, Ph.D., Professor

(Graduate School of Management) Jane-Ling Wang, Ph.D., Professor (Statistics) Keith Widaman, Ph.D., Professor (Psychology) Xiaowei Yang, Ph.D., Assistant Professor (Public Health Sciences)

Graduate Study. Biostatistics is a field of science that uses quantitative methods to study life sciences related problems that arise in a broad array of fields. The program provides students with, first, solid training in the biostatistical core disciplines and theory; second, with state-of-the art knowledge and skills for biostatistical data analysis; third, substantial exposure to the biological and epidemiological sciences; and fourth, with a strong background in theoretical modeling, statistical techniques and quantitative as well as computational methods. Programs of study and research are offered leading to

the M.S. and Ph.D. degrees. The program prepares students for interdisciplinary careers ranging from bioinformatics, environmental toxicology and stochastic modeling in biology and medicine to clinical trials, drug development, epidemiological and medical statistics. The program draws on the strengths of the Biostatistics faculty at UC Davis.

Preparation. Students should have one year of calculus; a course in linear algebra or one year of biological course work; facility with a programming language; and upper-division work in at least one of Mathematics, Statistics and Biology.

Graduate Adviser. Fushing Hsieh (Statistics)

Courses in Biostatistics (BST) Graduate Courses

222. Biostatistics: Survival Analysis (4)

Lecture — 3 hours; discussion/laboratory — 1 hour. Prerequisite: Statistics 131C. Incomplete data; life tables; nonparametric methods; parametric methods; accelerated failure time models; proportional hazards models; partial likelihood; advanced topics. (Same course as Statistics 222.1-1.

223. Biostatistics: Generalized Linear Models (4)

Lecture - 3 hours; discussion/laboratory - 1 hour. Prerequisite: Statistics 131C. Likelihood and linear regression; generalized linear model; Binomial regression; case-control studies; dose-response and bioassay; Poisson regression; Gamma regression; quasi-likelihood models; estimating equations; multivariate GLMs. (Same course as Statistics 223.)—II.

224. Analysis of Longitudinal Data (4)

Lecture - 3 hours; discussion/laboratory - 1 hour. Prerequisite: course/Statistics 222, 223, Statistics 232B or consent of instructor. Standard and advanced methodology, theory, algorithms, and applications relevant for analysis of repeated measurements and longitudinal data in biostatistical and statistical settings. (Same course as Statistics 224.)— III. (III.)

225. Clinical Trials (4)

Lecture - 3 hours; discussion/laboratory - 1 hour. Prerequisite: course/Statistics 223 or consent of instructor. Basic statistical principles of clinical designs, including bias, randomization, blocking, and masking. Practical applications of widely-used designs, including dose-finding, comparative and cluster randomization designs. Advanced statistical procedures for analysis of data collected in clinical trials. (Same course as Statistics 225.) Offered in alternate years.-III.

226. Statistical Methods for Bioinformatics

Lecture - 3 hours; discussion/laboratory - 1 hour. Prerequisite: course 131C or consent of instructor; data analysis experience recommended. Standard and advanced statistical methodology, theory, algorithms, and applications relevant to the analysis of omics data. (Same course as Statistics 226.) Offered in alternate years. — (II.)

252. Advanced Topics in Biostatistics (4)

Lecture - 3 hours; discussion/laboratory - 1 hour. Prerequisite: course 222, 223. Biostatistical methods and models selected from the following: genetics, bioinformatics and genomics; longitudinal or functional data; clinical trials and experimental design; analysis of environmental data; dose-response, nutrition and toxicology; survival analysis; observational studies and epidemiology; computer-intensive or Bayesian methods in biostatistics. May be repeated for credit with consent of adviser when topic differs. (Same course as Statistics 252.) Offered in alternate

290. Seminar in Biostatistics (1)

Seminar - 1 hour. Seminar on advanced topics in the field of biostatistics. Presented by members of the Biostatistics Graduate Group and other guest speakers. May be repeated for up to 12 units of credit. (S/ U grading only.)—I, II, III.

298. Directed Group Study (1-5)

Prerequisite: consent of instructor.

299. Special Study for Biostatistics Graduate Students (1-12)

Prerequisite: consent of instructor. (S/U grading only.)

299D. Dissertation Research (1-12)

Prerequisite: advancement to Candidacy for Ph.D. and consent of instructor. Research in biostatistics under the supervision of major professor. (S/U grad-

Biotechnology

(College of Agricultural and Environmental Sciences)

Faculty. Faculty includes members of the Departments of Animal Science, on page 150; Engineering: Chemical Engineering and Materials Science, on page 252; Computer Science, on page 211; Engineering: Biological and Agricultural, on page 243; Food Science and Technology, on page 311; Land, Air and Water Resources, on page 361; Plant Pathology, on page 465, Plant Sciences, on page 467; Viticulture and Enology, on page 526; and the College of Biological Sciences, on page 176.

The Major Program

Every living organism, from the smallest and most primitive bacteria to every plant, insect, animal or human being, contains DNA as the primary genetic material. DNA directs all cellular processes, creating the incredible variety and diversity of living organisms in the biosphere. Biotechnology focuses on the mechanics of life processes and their application. Biotechnology means "life technology" and represents an integrated, multidisciplinary field, with a profound impact today on almost every aspect of

Preparatory Requirements. UC Davis students who wish to change their major to Biotechnology must complete the following preparatory courses with a combined grade point average of at least 2.500. All of these courses must be taken for a letter

UNI
Plant Sciences 120 or Statistics 100 4
Biotechnology 1
Biological Sciences 2A, 2B, 2C
Chemistry 2A, 2B, 2C
Organic Chemistry, one of the following
groups6-12
Chemistry 8A, 8B; or Chemistry 118A,
118B, 118C; or Chemistry 128A, 128B,
128C, 129A
Math, one of the following groups6-8
Math 16A, 16B; or Math 17A, 17B; or
Math 21A, 21B
Physics 7A, 7B 8

The Program. In the first two years, students develop a strong and general background in biological science with an emphasis on fundamental concepts and basic principles of genetics, molecular biology and cell biology. Four options, Animal Bio-technology, Plant Biotechnology, Fermentation/ Microbial Biotechnology, and Bioinformatics, provide in-depth training and specialized knowledge in an aspect of biotechnology. Each option has a strong laboratory component to reinforce the theoretical concepts. Students also do an internship in a biotechnology company or university or government laboratory.

Internships and Career Opportunities. In the last decade, more industries are turning to biotechnology to solve problems and improve products, creating a growing job market for individuals trained in biotechnology in the agricultural, food and beverage, health care, chemical, pharmaceutical and bio-chemical, and environmental and bioremediation industries.

Graduates trained in the technologies designed for biotechnology will find their training applicable to

advanced research in molecular biology, genetics, biochemistry, and the plant and animal sciences.

B.S. Major Requirements:

D.S. Major Requirements.	
3	UNITS
Preparatory Subject Matter	57-69
Biological Sciences 2A-2B-2C	14
Chemistry 2A-2B-2C	15
Chemistry 8A, 8B or 118A, 118B, 118C	
or 128A, 128B, 128C, 129A 6-	12
Mathematics 16A, 16B, or 17A, 17B, or	
21A, 21B	
Physics 7A-7B	
Plant Sciences 120 or Statistics 100	
Biotechnology 1	
Select one course from:	
University Writing Program 101, 102A,	
102B, 102C, 102D, 102E, 102F, 102C	
104A, 104B, 104C, 104D, 104E, 104	,F
(may overlap with college composition	
requirement)	
Depth Subject Matter	16-20

Biological Sciences 101	
1613	
Biotechnology 1713	
Internship or independent research; course	
192 or 199 or Biotechnology 189L 3	
Undergraduate research proposal:	
Biotechnology 188 (optional)	
Honors undergraduate thesis (optional) 1	

Areas of Specialization (choose one) Fermentation/Microbiology Biotechnology Option......38-45

Microbiology 102; Biological Sciences 102 and 103, or Animal Biology 102 and 103; Engineering: Chemical 160; Microbiology 102L or Food Science and Technology 104L; Molecular and Cellular Biology 160L or Biotechnology 161A; Two of Microbiology 140, 150, 170, Plant Pathology 130...... 26-33 Select from:

Biotechnology 150, 161B, 188, Chemistry 107A, 107B, 130A, 130B, Engineering: Chemical 161C, 161L, Evolution and Ecology 100, Food Science and Technology 102A, 102B, 104, 104L, 110A, 110B, 123, 123L, Microbiology 105, 105L, 115, 140, 150, 155L, 162 170, Molecular and Cellular Biology 120L, 164, Plant Pathology 130, 140, Plant Sciences 174, Viticulture and Enology 124, 124L, 128, 135

Plant Biotechnology Option38-45

Microbiology 101, Molecular and Cellular Biology 126, Plant Sciences 152, Biotechnology 160, 161A, 161B, Biochemistry: Biological Sciences 105; or Biological Sciences 102 and 103; or Animal Select at least one course from each of the following areas:

(a) Pests, Pathogens and Production: Biotechnology 150, 188, Chemistry 130A, 130B, Entomology 110, Evolution and Ecology 100, Microbiology 115, 162 Molecular and Cellular Biology 120L, 164, Nematology 100 or 110, Plant Pathology 120, 123, 130, 140, Plant Biology 143, Plant Sciences 153, 154, 172, 173, 174 (b) Growth and Development: Biotechnology 150, 188, Chemistry 130A, 130B, Evolution and Ecology 100, Microbiology 115, Molecular and Cellular Biology 120L, Plant Biology 105, 111, 112, 113, Plant Pathology 140, Plant Sciences 100A, 100AL, 100B, 100BL, 100C, 100CL, 157, 158

Animal Biotechnology Option39-46

Microbiology 101, Animal Genetics 111, Neurobiology, Physiology, and Behavior 101, Molecular and Cellular Biology 150, 150L, 182, Animal Science 170, Biochemistry: Biological Sciences 105; or Biological Sciences 102 and 103; or Animal Biology 102 and 10329-36 Restricted Electives 10 Select at least one course from each of the following areas:

(a) Animal Cell Biology/Microbiology/ Immunology: Animal Genetics 101, Biotechnology 150, 161A, 161B, 188, Evolution and Ecology 100, Medical Microbiology 188, Microbiology 115, 162, Molecular and Cellular Biology 120L, 160L, Pathology, Microbiology, and Immunology 126, 126L, 127, 128, Molecular, Cellular, and Integrative Physiology 2001, Neurology, Physiology, and Behavior 132, Plant Pathology 140 (b) Animal Reproduction And Breeding: Animal Genetics 107, Animal Science 131, 140, Avian Sciences 103, 121, Evolution and Ecology 102, Molecular and Cellular Biology 164, Neurobiology, Physiology, and Behavior 121, 121L, Plant Pathology

Bioinformatics Option37-44

Microbiology 101, Biotechnology 150, Engineering: Computer Science 20, 30, Engineering: Computer Science 124 or 129, Molecular and Cellular Biology 182, Biochemistry: Biological Sciences 105; or Biological Sciences 102 and 103; or Animal Biology 102 and 10327-34 Select from:

Animal Genetics 120, 212, Biological Sciences 132, Biotechnology 188, Engineering Applied Science 289 Engineering: Computer Science 40, 50, 60, 122A, 124, 129, 140A, 150, 154A, 166, 189K, Evolution and Ecology 100, 102, 103, Mathematics 124, Microbiology 115, Neurology, Physiology, and Behavior 132, Statistics 130A, 130B, 131A, 131B, 141

Total Units for the Major 110-135

Major Adviser: J.I. Yoder (Plant Sciences) in 101 Asmundson Hall

Advising Center for the major is located in 1220A Plant and Environmental Sciences (530) 752-1715.

Courses in Biotechnology (BIT) **Lower Division Courses**

1. Introduction to Biotechnology (4)

Lecture—3 hours; discussion—1 hour. Principles and applications of biotechnology. Topics include microbial biotechnology, agricultural biotechnology, biofuels, cloning, bioremediation, medical biotechnology, DNA fingerprinting and forensics. GE credit: SciEng | SE.—III. (III.) Dandekar, Yode

92. Internship in Biotechnology (1-12)

Internship - 3-36 hours. Prerequisite: consent of instructor. Work experience on or off campus in subject area pertaining to biotechnology or in a business, industry or agency associated with biotechnology. Internship supervised by faculty member in the animal or plant sciences. (P/NP grading

99. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading

Upper Division Courses 150. Applied Bioinformatics (4)

Lecture - 2 hours; laboratory/discussion - 2 hours. Prerequisite: Computer Science Engineering 10 or 15 or Plant Sciences 21; Biological Sciences 101 and 104; Plant Sciences 120 or Statistics 13 or Statistics 100. Concepts and programs needed to apply bioinformatics in biotechnology research. Sequence analysis and annotation and use of plant and animal databases for students in biological and agricultural sciences. Limited enrollment. Two units of credit for students who have completed Computer Science Engineering 124. GE credit: SE, VL.

160. Principles of Plant Biotechnology (3)

Lecture — 3 hours. Prerequisite: Biological Sciences 1A or 2A; Biological Sciences 101 or Plant Sciences 152. Principles and concepts of plant biotechnology including recombinant DNA technology, molecular biology, genomics, cell and tissue culture, gene transfer and crop improvement strategies using transgenic crops. Not open for credit to students who have completed Plant Biology 160. (Former course Plant Biology 160.) GE credit: SE.—II. (II.) Dandekar

161A. Genetics and Biotechnology Laboratory (6)

Lecture — 3 hours; laboratory — 9 hours. Prerequisite: Plant Sciences 152 or Biological Sciences 101; consent of instructor. Techniques of genetic analysis at the molecular level including recombinant DNA, gene mapping and basic computational biology. Not open for credit to students who have completed Plant Biology 161A. GE credit: SE.—II. (II.) Beckles

161B. Plant Genetics and Biotechnology Laboratory (4)

Lecture - 1 hours; laboratory - 8 hours. Prerequisite: Plant Sciences 152 or Biological Sciences 101; consent of instructor. Advanced techniques of genetic analysis at the molecular and cellular levels, including transformation, gene expression and analysis of transgenic plants. Not open for credit to students who have taken Plant Biology 161B. (Former course Plant Biology 161B.) GE credit: SE, SL.-III. (III.) Bennett, Blumwald

171. Professionalism and Ethics in Genomics and Biotechnology (3)

lecture—1 hour; discussion—2 hours. Prerequisite: upper division standing in a natural science major. Real and hypothetical case studies to illustrate ethical issues in genomics and biotechnology. Training and practice in difficult ethical situations and evaluating personal and social consequences. GE credit: SE, SL, WE.-I, II, III. (I, II, III.) Bennett, Bradford,

188. Undergraduate Research Proposal (3)

Lecture/discussion-3 hours. Prerequisite: upper division standing. Preparation and review of a scientific proposal. Problem definition, identification of objectives, literature survey, hypothesis generation, design of experiments, data analysis planning, proposal outline and preparation. (Same course as Plant Sciences 188.) GE credit: Wrt | OL, SE, WE.—III. (III.) Kliebenstein

189L. Laboratory Research in Genomics and Biotechnology (2-5)

Laboratory-3-12 hours; discussion-1 hour. Prerequisite: course 188 and consent of instructor. Formulating experimental approaches to current questions in biotechnology; performance of proposed experiments. May be repeated for credit up to 12 units. (P/NP grading only.)

192. Internship in Biotechnology (1-12)

Internship - 3-36 hours. Prerequisite: consent of instructor. Work experience on or off campus in a subject area pertaining to biotechnology or in a business, industry or agency associated with biotechnology. Internship supervised by faculty member in the animal or plant sciences. (P/NP grading only.)

194H. Honors Thesis in Biotechnology (1-5)

Independent Study—3-15 hours. Prerequisite: senior standing in Biotechnology with 3.250 GPA or higher and completion of courses 188 and 189L. Independent study of selected topics under the direction of a

member or members of the staff. Completion will involve the writing of a senior thesis. (Deferred grading only, pending completion of sequence.) (P/NF grading only.) GE credit: SE, WE.

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading

Bodega Marine Laboratory Program

http://bml.ucdavis.edu/

See also Biological Sciences, Bodega Marine Laboratory Program, on page 178.

Spring Quarter Program

A full quarter of undergraduate course work in marine biology is available each spring quarter at the Bodega Marine Laboratory, located in Bodega Bay, California. Course offerings include lecture and laboratory instruction in the developmental biology and physiological adaptation of marine organisms, and population biology and ecology; a weekly colloquium; and an intensive individual research experience under the direction of laboratory faculty (Biological Sciences courses 120, 120P, 122, 122P, 123; Neurobiology, Physiology, and Behavior 141, 141P). This is a 15 unit program and course offerings and instructors may vary from year to year. Applications are due January 31.

For more course detail, see full description under appropriate academic department listing or http:// bml.ucdavis.edu/

Summer Special Session Courses

This integrated program offers students a multidisciplinary understanding of coastal ecosystems through intensive, hands on courses taught at Bodega Marine Laboratory. The program offers students three sequences of instruction with up to 10 units in each. Two sequences occur during the first Summer Session dates and one sequence in the second Summer Session dates. Applications are due April 15.

For more course detail, see full description under appropriate academic department listing or http:// bml.ucdavis.edu/

Sequences are:

Marine Organisms and Ecology of the California Coast. Evolution and Ecology 106, 114, 111, 110; Biological Sciences 124 Effects of Coastal Pollution on Marine Organisms. Environmental Toxicology/ Nutrition 127

Oceanography. Environmental Science and Policy 152; Geology/Environmental Science and Policy 150C; Biological Sciences 124

Course offerings, sequence structure and instructors may vary from year to year.

Bodega Marine Laboratory spring and summer programs are residential, with students housed on the laboratory grounds. Participants are assessed a room and board fee in addition to standard campus registration fees. Applications and consent of instructors are required.

Additional information is available from the Biological Sciences Undergraduate Programs office in 202 Life Sciences Addition, or directly from: Bodega Marine Laboratory P.O. Box 247 Bodega Bay, CA 94923 (707) 875-2211; http://bml.ucdavis.edu/

Botany

See Plant Biology, on page 462; and Plant Biology (A Graduate Group), on page 464.

Business Management

See Managerial Economics, on page 382, for undergraduate study; and Management, Graduate School of, on page 378.

Cantonese

See Asian American Studies, on page 168.

Cell Biology

See Molecular and Cellular Biology, on page 423.

Cell and **Developmental Biology** (A Graduate Group)

The Cell and Developmental Biology program has merged with the Biochemistry and Molecular Biology program to form Biochemistry, Molecular, Cellular, and Developmental Biology (BMCDB); see Biochemistry, Molecular, Cellular and Developmental Biology, on page 175.

Group Office. 306 Life Sciences (530) 752-9091: http://biosci3.ucdavis.edu/GradGroups/BMCDB/

Cell Biology and **Human Anatomy**

See Medicine, School of, on page 390.

Chemistry

(College of Letters and Science)

Jacquelyn Gervay-Hague, Ph.D., Chairperson of the Department

Neil E. Schore, Ph.D., Vice-Chairperson of the Department

Mark Kurth, Ph.D. Vice-Chairperson of the Depart-

Department Office. 108 Chemistry Building (530) 752-8900; Fax (530) 752-8995; http://www.chem.ucdavis.edu

Faculty

Toby Allen, Ph.D, Associate Professor James Ames, Ph.D., Professor Shota Atsumi, Ph.D., Assistant Professor Matthew P. Augustine, Ph.D., Professor Alan L. Balch, Ph.D., Professor Enoch Baldwin, Ph.D. Associate Professor Peter Beal, Ph.D., Professor Louise A. Berben, Ph.D., Assistant Professor R. David Britt, Ph.D., Professor William Casey, Ph.D., Professor Xi Chen, Ph.D., Professor Stephen Cramer, Ph.D., Professor Sheila David, Ph.D., Professor Andraw J. Fisher, Ph.D., Professor
Annalese K. Franz, Ph.D., Assistant Professor Giulia Galli, Ph.D., Professor
Jacquelyn Gervay Hague, Ph.D., Professor
David Goodin, Ph.D., Professor
Ting Guo, Ph.D., Professor Susan M. Kauzlarich, Ph.D., Professor

Distinguished Graduate Mentoring Award Peter B. Kelly, Ph.D., Professor Kirill Kovnir, Ph.D., Assistant Professor Mark J. Kurth, Ph.D., Professor Donald P. Land, Ph.D., Professor Delmar Larsen, Ph.D., Associate Professor Carlito B. Lebrilla, Ph.D., Professor Gang-Yu Liu, Ph.D., Professor C. William McCurdy, Ph.D., Professor Mark Mascal, Ph.D., Professor Krishnan P. Nambiar, Ph.D., Associate Professor

Distinguished Graduate Mentoring Award Alexandra Navrotsky, Ph.D., Professor Cheuk-Yiu Ng, Ph.D., Professor Marilyn Olmstead, Ph.D., Professor Frank Osterloh, Ph.D., Associate Professor Philip P. Power, FRS, Ph.D., Professor Neil E. Schore, Ph.D., Professor

Academic Senate Distinguished Teaching Award Jared T. Shaw, Ph.D., Assistant Professor Alexei P. Stuchebrukhov, Ph.D., Professor Dean Tantillo, Ph.D., Professor

Academic Senate Distinguished Teaching Award Michael Toney, Ph.D., Professor Nancy S. True, Ph.D., Professor Fred E. Wood, Ph.D., Senior Lecturer

Emeriti Faculty

Thomas L. Allen, Ph.D., Professor Emeritus W. Ronald Fawcett, Ph.D., Professor Emeritus William H. Fink, Ph.D., Professor, Emeritus Edwin Friedrich, Ph.D., Professor Emeritus Hakon Hope, Cand. Real., Professor Emeritus William M. Jackson, Ph.D., Professor Emeritus Gerd N. LaMar, Ph.D., Professor Emeritus Claude F. Meares, Ph.D., Professor Emeritus W. Kenneth Musker, Ph.D., Professor Emeritus Carl W. Schmid, Ph.D., Professor, Emeritus James H. Swinehart, Ph.D., Professor Emeritus Dino S. Tinti, Ph.D., Professor, Emeritus George S. Zweifel, Sc.D., Professor Emeritus

Affiliated Faculty

Timothy E. Patten, Ph.D., Adjunct Professor

The Major Programs

Chemistry studies the composition of matter, its structure, and the means by which it is converted from one form to another.

The Program. The Department of Chemistry offers several degree programs leading to the Bachelor of Arts and the Bachelor of Science. The curriculum leading to the A.B. degree offers a substantive program in chemistry while allowing students the freedom to take more courses in other disciplines and pursue a broad liberal arts education. Students who have a deeper interest in chemistry normally elect one of the several programs leading to the B.S. degree. The standard B.S. program, the only chemistry program accredited by the American Chemical Society, is appropriate for students who are interested in chemistry as a profession. The B.S. in Chemical Physics, the B.S. in Pharmaceutical Chemistry, and the two B.S. Applied Chemistry emphases

are slightly less intense in chemistry, and draw on significant course materials from areas relevant to their particular focus but outside of a classical chemistry degree. Students following the A.B or one of the B.S. programs may consider taking advantage of the Education Abroad Program. Our major adviser can assist students in planning a curriculum while abroad that assures regular progress in the major. A minor program in chemistry is also available.

Career Alternatives. Chemistry graduates with bachelor's degrees are employed extensively throughout various industries in quality control, research and development, production supervision, technical marketing, and other areas. The types of industries employing these graduates include chemical, energy, pharmaceutical, genetic engineering, biotechnology, food and beverage, petroleum and petrochemical, paper and textile, electronics and computer, and environmental and regulatory agencies. The bachelor's programs also provide chemistry graduates with the rigorous preparation needed for an advanced degree in chemistry and various professional schools in the health sciences.

Chemistry

A.B. Major Requirements:

A.B. Major Requirements:
UNITS Preparatory Subject Matter36-42
Chemistry 2A-2B-2C or
2AH-2BH-2CH
Physics /A-/B-/C or 9A-9B-9C 12-15 Mathematics 16A-16B-16C or
17A-17B-17C or 21A-21B-21C 9-12
Depth Subject Matter43
Chemistry 105, 110A-110B-110C, 124A, 128A-128B-128C-129A-129B32
At least 11 additional upper division units in
chemistry (except Chemistry 107A or 107B)
or related areas, including one course with formal lectures. Courses in related areas must
be approved in advance by the major
adviser 1 1 Total Units for the Major
Chemistry
ACS Accredited Program
B.S. Major Requirements:
UNITS Preparatory Subject Matter53
Chamistry 2A 2B 2C or
Chemistry 2A-2B-2C or 2AH-2BH-2CH15
Physics 9A, 9B, 9C
22A, 22AL, 22B
Depth Subject Matter54
Chemistry 105, 110A, 110B, 110C, 115, 124A, 124B or 124C, 124L, 125, 128A, 128B, 128C, 129A, 129B, 129C47 At least 7 additional upper division units in
124A, 124B or 124C, 124L, 125, 128A, 128B, 128C, 129A, 129B, 129C 47
At least 7 additional upper division units in
chemistry (except Chemistry 107A, 107B), including one course with formal
lectures7
Total Units for the Major107
Recommended
Physics 9D
Chemistry
Applied Chemistry-Environmental Chemistry emphasis
B.S. Major Requirements:
UNITS
Preparatory Subject Matter43-50
Chemistry 2A-2B-2C or 2AH-2BH-2CH15
2AH-2BH-2CH

Mathematics 16A-16B-16C or
17A-17B-17C or 21A-21B-21C9-12
Biological Sciences 2A 4
Statistics 13 or 32 or 1003-4
Depth Subject Matter53-62
Chemistry 100, 105, 115, 124A 14
Chemistry 100, 105, 115, 124A 14 Chemistry 107A-107B or
110A-110B-110C6-12
Chemistry 118A-118B-118C or
128A-128B-128C-129A-129B12-13
Environmental Science and Policy 110 4
Environmental Toxicology 101
Science 160; Environmental Science and
Policy 151; Environmental Toxicology 102A,
102B, 120, 131, 135, 146; Geology 150A;
Soil Science 1119-13
At least 3 additional upper division units in
chemistry (Chemistry 199 or 194H strongly
encouraged)3
Total Units for the Major95-113
Chemistry
,
Applied Chemistry—Forensic
Chemistry Emphasis:
B.S. Major Requirements:
UNITS
Preparatory Subject Matter47-54
Chemistry 2A-2B-2C or
2AH-2BH-2CH 1.5
Physics 7A-7B-7C or 9A-9B-9C 12-15
Mathematics 16A-16B-16C or 17A-17B-17C or 21A-21B-21C9-12
Biological Sciences 2A
Statistics 13, 32, 100 or 1023-4
Depth Subject Matter51-61
Chemistry 104, 105, 11529-36
Chemistry 104, 103, 11329-36 Chemistry 107A-107B or
110A-110B-110C6-12 Chemistry 118A-118B-118C or
110/1100-1100
Chemistry 118A-118B-118C or
Chemistry 118A-118B-118C or 128A-128B-128C-129A-129B12-13
128A-128B-128C-129A-129B12-13
128A-128B-128C-129A-129B12-13 Environmental Toxicology 101, 102A, 102B13
128A-128B-128C-129A-129B12-13 Environmental Toxicology 101, 102A, 102B13 At least two courses from Biological Sciences
128A-128B-128C-129A-129B12-13 Environmental Toxicology 101, 102A, 102B
128A-128B-128C-129A-129B12-13 Environmental Toxicology 101, 102A, 102B
128A-128B-128C-129A-129B12-13 Environmental Toxicology 101, 102A, 102B
128A-128B-128C-129A-129B12-13 Environmental Toxicology 101, 102A, 102B
128A-128B-128C-129A-129B12-13 Environmental Toxicology 101, 102A, 102B
128A-128B-128C-129A-129B12-13 Environmental Toxicology 101, 102A, 102B
128A-128B-128C-129A-129B12-13 Environmental Toxicology 101, 102A, 102B
128A-128B-128C-129A-129B12-13 Environmental Toxicology 101, 102A, 102B
128A-128B-128C-129A-129B12-13 Environmental Toxicology 101, 102A, 102B
128A-128B-128C-129A-129B12-13 Environmental Toxicology 101, 102A, 102B
128A-128B-128C-129A-129B12-13 Environmental Toxicology 101, 102A, 102B
128A-128B-128C-129A-129B12-13 Environmental Toxicology 101, 102A, 102B
128A-128B-128C-129A-129B12-13 Environmental Toxicology 101, 102A, 102B
128A-128B-128C-129A-129B12-13 Environmental Toxicology 101, 102A, 102B
128A-128B-128C-129A-129B
128A-128B-128C-129A-129B 12-13
128A-128B-128C-129A-129B 12-13
128A-128B-128C-129A-129B
128A-128B-128C-129A-129B
128A-128B-128C-129A-129B

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Physics 7A, 7B, 7C or 9A-9B-9C 12-15 Mathematics 16A-16B-16C or 17A-17B-17C or 21A-21B-21C9-12 Biological Sciences 2A, and 2B or 2C9 Statistics 13, 32 or 100
Depth Subject Matter48-64
Chemistry 124A, 130A-130B-135,
15015
Chemistry 107A-107B or
Chemistry 107A-107B or 110A-110B-110C6-12
Chemistry 118A-118B-118C or 128A-
128B-128C-129A-129B-129C 12-15
Biological Sciences 102 or Chemistry
1313
At least four courses (not used to satisfy the
above requirements) from Biological Sciences
102, 103, Biotechnology 171 or Veterinary
Medicine 170, Chemistry 131, 199
(minimum 3 units) or 194H, Environmental
Toxicology 103A, Microbiology 104,
Neurobiology, Physiology, and Behavior
100, 101, Plant Biology 126, 130 12-19
Total Units for the Major96-119
Major Adviser. See Department office.
Minor Program Requirements:
UNITS
· · · · ·
Chemistry20-21
Chemistry 105, 107A, 107B, 118A,
124A17
At least one additional course from Chemistry
118B, 124B and 124C3-Á
Note: The minor program has prerequisites of Chem
istry 2A-2B-2C, Mathematics 16A-16B-16C, and
Physics 7A-7B-7C or their equivalents. Students wish
ing to earn a Chemistry minor should consult with a
ing to earn a Chemistry minor should consult with a

Chemistry major adviser. Honors and Honors Program. The student must take courses 194HA, 194HB, and 194HC.

Graduate Study. The Department of Chemistry offers programs of study and research leading to the M.S. and Ph.D. degrees in Chemistry. Detailed information regarding graduate study may be obtained by contacting the Graduate Adviser, Department of Chemistry. See also Graduate Studies, on page

Courses in Chemistry (CHE)

Chemistry Placement Examination. Students who enroll in Chemistry 2A, 2AH or Workload Chemistry 41C must achieve the appropriate score on the Chemistry Placement Exam. In addition to the Chemistry Placement Exam, students are also required to pass the Mathematics Placement Exam with a satisfactory score appropriate to the Chemistry course they have placed into. See the Department of Chemistry website well in advance of enrolling for details. Students who do not meet the examination requirements of both exams will be administratively dropped from these Chemistry courses.

The Student Academic Success Center (SASC) provides review materials, workshops, drop-in and group tutoring, and additional resources. Chemistry Graduate Students Tutors are also listed on the Department of Chemistry website.

Lower Division Courses 2A. General Chemistry (5)

Lecture - 3 hours; laboratory/discussion - 4 hours. Prerequisite: High school chemistry and physics strongly recommended; satisfactory score on diagnostic examinations. Periodic table, stoichiometry, chemical equations, physical properties and kinetic theory of gases, atomic and molecular structure and chemical bonding. Laboratory experiments in stoichiometric relations, properties and collection of gases, atomic spectroscopy, and introductory quantitative analysis. Only 3 units of credit allowed to students who have completed course 9. GE credit: SciEng | QL, SE. - I, II. (I, II.)

2AH. Honors General Chemistry (5)

Lecture - 3 hours; laboratory/discussion - 4 hours. Prerequisite: High school chemistry and physics; satisfactory score on diagnostic examinations; Mathematics 21A (may be taken concurrently) or consent of instructor. Limited enrollment course with a more rigorous treatment of material covered in course 2A. Students completing course 2AH can continue with course 2BH or 2B. -I. (I.)

2B. General Chemistry (5)

Lecture - 3 hours; laboratory/discussion - 4 hours. Prerequisite: course 2A or 2AH. Continuation of course 2A. Condensed phases and intermolecular forces, chemical thermodynamics, chemical equilibria, acids and bases, solubility. Laboratory experiments in thermochemistry, equilibria, and quantitative analysis using volumetric methods. GE credit: SciEng | QL, SE.—II, III. (II, III.)

2BH. Honors General Chemistry (5)

Lecture - 3 hours; laboratory/discussion - 4 hours. Prerequisite: course 2A with consent of instructor or course 2AH with a grade of C or better; and Mathematics 21B (maybe taken concurrently) or consent of instructor. Limited enrollment course with a more rigorous treatment of material covered in course 2B. Students completing course 2BH can continue with course 2CH or 2C.—II. (II.)

2C. General Chemistry (5)

Lecture-3 hours; laboratory/discussion-4 hours. Prerequisite: course 2B or 2BH. Continuation of course 2B. Kinetics, electrochemistry, spectroscopy, structure and bonding in transition metal com pounds, application of principles to chemical reactions. Laboratory experiments in selected analytical methods and syntheses. GE credit: SciEng | QL, SE. — I, III. (I, IIÍ.)

2CH. Honors General Chemistry (5)

Lecture - 3 hours; laboratory - 6 hours. Prerequisite: course 2B with consent of instructor or course 2BH with a grade of C or better; and Mathematics 21C (maybe taken concurrently) or consent of instructor. Limited enrollment course with a more rigorous treatment of material covered in course 2C.—III. (III.)

8A. Organic Chemistry: Brief Course (2)

Lecture - 2 hours. Prerequisite: course 2B with a grade of C- or higher. With course 8B, an introduction to the nomenclature, structure, chemistry, and reaction mechanisms of organic compounds. Intended for students majoring in areas other than organic chemistry.—I, III. (I, III.)

8B. Organic Chemistry: Brief Course (4)

Lecture - 3 hours; laboratory - 3 hours. Prerequisite: course 8A or 118A. Continuation of course 8A. Laboratory concerned primarily with organic laboratory techniques and the chemistry of the common classes of organic compounds. — I, ÍI. (I, II.)

10. Concepts of Chemistry (4)

Lecture-4 hours. A survey of basic concepts and contemporary applications of chemistry. Designed for non-science majors and not as preparation for Chemistry 2A. Course Not open for credit to students who have had Chemistry 2A; but students with credit for course 10 may take Chemistry 2A for full credit. GE credit: SciEng, Wrt | SE, SL.—I. (I.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading

Upper Division Courses 100. Environmental Water Chemistry (3)

Lecture - 3 hours. Prerequisite: course 2C. Practical aspects of water chemistry in the environment, including thermodynamic relations, coordination chemistry, solubility calculations, redox reactions and rate laws. Computer modeling of the evolution in water chemistry from contact with minerals and gases.—II. (II.) Casey

104. Forensic Applications of Analytical Chemistry (3)

Lecture - 2 hours; laboratory - 3 hours. Prerequisite: course 2C. Theory and application of standard methods of chemical analysis to evidentiary sam-ples. Use and evaluation of results from screening tests, FTIR, GC and GCMS to various sample types encountered in forensics. - I. (I.) Land

105. Analytical and Physical Chemical Methods (4)

Lecture - 2 hours; laboratory - 6 hours. Prerequisite: course 110A (may be taken concurrently) or courses 107A-107B. Fundamental theory and laboratory techniques in analytical and physical chemistry. Errors and data analysis methods. Basic electrical circuits in instruments. Advanced solution equilibria. Potentiometric analysis. Chromatographic separations. UV-visible spectroscopy. Lasers. GE credit: QL, SE. — I, III. (I, III.)

107A. Physical Chemistry for the Life Sciences (3)

Lecture - 3 hours. Prerequisite: course 2C, Mathematics 16C or 21C, one year of college level phys ics. Physical chemistry intended for majors in the life science area. Introductory development of classical and statistical thermodynamics including equilibrium processes and solutions of both non-electrolytes and electrolytes. The thermodynamic basis of electrochemistry and membrane potentials. - I. (I.)

107B. Physical Chemistry for the Life Sciences (3)

Lecture — 3 hours. Prerequisite: course 107A. Continuation of course 107A. Kinetic theory of gases and transport processes in liquids. Chemical kinetics, enzyme kinetics and theories of reaction rates. Introduction to quantum theory, atomic and molecular structure, and spectroscopy. Application to problems in the biological sciences. —II. (II.)

108. Physical Chemistry of Macromolecules (3)

Lecture - 3 hours. Prerequisite: course 107B or 110C. Physical properties and characterization of macromolecules with emphasis upon those of biological interest. Structural thermodynamic, optical and transport properties of polymers in bulk and in solution. Physical characterization methods. Special topics on the properties of polyelectrolyte systems. - III.

110A. Physical Chemistry: Introduction to Quantum Mechanics (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 2C, Mathematics 16C or 21C; one year of college physics. Introduction to the postulates and general principles of quantum mechanics. Approximations based on variational method and time independent perturbation theory. Application to harmonic oscillator, rigid rotor, one-electron and many-electron atoms, and homo-and hetero-nuclear diatomic molecules. GE credit: QL, SE.-I, III. (I, III.)

110B. Physical Chemistry: Properties of Atoms and Molecules (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 110A. Group theory. Application of quantum mechanics to polyatomic molecules and molecular spectroscopy. Intermolecular forces and the gas, liquid and solid states. Distributions, ensembles and partition functions. Transport properties. - I, II. (I, II.)

110C. Physical Chemistry: Thermodynamics, Equilibria and Kinetics

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 110B. Development and application of the general principles of thermodynamics and statistical thermodynamics. Chemical kinetics, rate laws for chemical reactions and reaction mechanisms.—II, III.

115. Instrumental Analysis (4)

Lecture - 2 hours; laboratory - 6 hours. Prerequisite: courses 105 and 110B (may be taken concurrently) or 107A-107B. Intermediate theory and laboratory techniques in analytical and physical chemistry. Advanced data analysis methods and goodness-of-fit criteria. Fouriertransform spectroscopic methods and instrumentation. Mass spectrometry. Electrochemistry. Liquid chromatography. GE credit: Wrt | QL, SÉ, WE.-I, II. (I, II.)

118A. Organic Chemistry for Health and Life Sciences (4)

Lecture - 3 hours; laboratory/discussion - 1.5 hours. Prerequisite: course 2C with a grade of C- or higher. The 118A, 118B, 118C series is for students planning professional school studies in health and life sciences. A rigorous, in-depth presentation of basic principles with emphasis on stereochemistry and spectroscopy and preparations and reactions of nonaromatic hydrocarbons, haloalkanes, alcohols and ethers.—I, II, III. (I, II, III.)

118B. Organic Chemistry for Health and Life Sciences (4)

Lecture — 3 hours; laboratory — 3 hours. Prerequisite: course 118A. Continuation of course 118A, with emphasis on spectroscopy and the preparation and reactions of aromatic hydrocarbons, organometallic compounds, aldehydes and ketones. - I, II, III. (I, II,

118C. Organic Chemistry for Health and Life Sciences (4)

Lecture - 3 hours; laboratory - 3 hours. Prerequisite: course 118B. Continuation of course 118B, with emphasis on the preparation, reactions and identification of carboxylic acids and their derivatives, alkyl and acyl amines, B-dicarbonyl compounds, and various classes of naturally occurring, biologically important compounds. — I, II, III. (I, II, III.)

121. Introduction to Molecular Structure and Spectra (4)

Lecture - 4 hours. Prerequisite: course 110B. Modern theoretical and experimental methods used to study problems of molecular structure and bonding; emphasis on spectroscopic techniques. - III. (III.)

122. Chemistry of Nanoparticles (3)

Lecture—3 hours. Prerequisite: course 110C (may be taken concurrently). Chemical and physical aspects of inorganic nanoparticles. Topics include synthesis, structure, colloidal behavior, catalytic activity, size and shape dependency of physical properties, analytical methods and applications. -III. (III.) Osterloh

124A. Inorganic Chemistry: Fundamentals

Lecture - 3 hours. Prerequisite: course 2C. Symmetry, molecular geometry and structure, molecular orbital theory of bonding (polyatomic molecules and transition metals), solid state chemistry, energetics and spectroscopy of inorganic compounds.—I. (I.)

124B. Inorganic Chemistry: Main Group Elements (3)

Lecture - 3 hours. Prerequisite: course 124A. Synthesis, structure and reactivity of inorganic and heteroorganic molecules containing the main group elements. — II. (II.)

124C. Inorganic Chemistry: d and f Block Elements (3)

Lecture - 3 hours. Prerequisite: course 124A. Synthesis, structure and reactivity of transition metal complexes, organometallic and bioinorganic chemistry, the lanthanides and actinides.—III. (III.)

124L. Laboratory Methods in Inorganic Chemistry (2)

Laboratory—6 hours. Prerequisite: course 124B or 124C (may be taken concurrently). The preparation, purification and characterization of main group and transition metal inorganic and organometallic compounds. - III. (III.)

125. Advanced Methods in Physical Chemistry (4)

Lecture — 2 hours; laboratory — 6 hours. Prerequisite: course 110C (may be taken concurrently) and 115. Advanced theory and laboratory techniques in analytical and physical chemistry. Advanced spectroscopic methods. Thermodynamics. Kinetics. Chemical literature. Digital electronics and computer interfacing. Laboratory measurements and vacuum techniques. GE credit: Wrt | QL, SE, WE.—II, III. (II,

128A. Organic Chemistry (3)

Lecture - 3 hours. Prerequisite: course 2C with a grade of C or higher; chemistry majors should enroll in course 129A concurrently. Introduction to the basic concepts of organic chemistry with emphasis on stereochemistry and the chemistry of hydrocarbons. Designed primarily for majors in chemistry. -1, II. (I, II.)

128B. Organic Chemistry (3)

Lecture—3 hours. Prerequisite: course 128A or consent of instructor, course 129A strongly recommended; chemistry majors should enroll in course 129B concurrently. Continuation of course 128A with emphasis on aromatic and aliphatic substitution reactions, elimination reactions, and the chemistry of carbonyl compounds. Introduction to the application of spectroscopic methods to organic chemistry. -II,

128C. Organic Chemistry (3)

Lecture - 3 hours. Prerequisite: course 128B, chemistry majors should enroll in course 129C concurrently. Continuation of course 128B with emphasis on enolate condensations and the chemistry of amines, phenols, and sugars; selected biologically important compounds.—I, III. (I, III.)

129A. Organic Chemistry Laboratory (2)

Lecture—1 hour; laboratory—3 hours. Prerequisite: course 2C with a grade of C or higher; course 128A (may be taken concurrently). Introduction to laboratory techniques of organic chemistry. Emphasis is on methods used for separation and purification of organic compounds.—I, II. (I, II.)

129B. Organic Chemistry Laboratory (2)

Laboratory-6 hours. Prerequisite: courses 128B (may be taken concurrently) and 129A. Continuation of course 129A. Emphasis is on methods used for synthesis and isolation of organic compounds.-II, III. (II, III.)

129C. Organic Chemistry Laboratory (2)

Laboratory-6 hours. Prerequisite: courses 128C (may be taken concurrently) and 129B. Continuation of course 129B.—I, III. (I, III.)

130A. Pharmaceutical Chemistry (3)

Lecture-3 hours. Prerequisite: course 118C or 128C. Examination of the design principles and experimental methods used in pharmaceutical and medicinal chemistry.—II. (II.)

130B. Pharmaceutical Chemistry (3)

Lecture - 2 hours; lecture/laboratory - 1 hours. Prerequisite: course 130A. Continuation of course 130A with emphasis on case studies of various drugs and the use of computational methods in drug design. - III. (III.)

131. Modern Methods of Organic Synthesis (3)

Lecture - 3 hours. Prerequisite: course 128C. Introduction to modern synthetic methodology in organic chemistry with emphasis on stereoselective reactions and application to multistep syntheses of organic molecules containing multifunctionality. —I. (I.)

135. Advanced Bio-organic Chemistry Laboratory (3)

Lecture—1 hour; laboratory—6 hours. Prerequisite: course 118C or 129C. Separation, purification, identification and biological evaluation of organic compounds using modern methods of synthesis, computational chemistry and instrumentation. Emphasis on pharmaceutical and medicinal substances.—III. AH İ

150. Chemistry of Natural Products (3)

Lecture - 3 hours. Prerequisite; course 128C. Chemistry of terpenes, steroids, acetogenins, and alkaloids: isolation, structure determination, biosynthesis, chemical transformations, and total synthesis. GE credit: SciEng, Wrt | SE, WE.—III. (III.)

192. Internship in Chemistry (1-6)

Internship - 3-18 hours. Prerequisite: upper division standing; project approval by faculty sponsor prior to enrollment. Supervised internship in chemistry; requires a final written report. May be repeated for credit for a total of 6 units. (P/NP grading only.)

194HA-194HB-194HC. Undergraduate Honors Research (2-2-2)

Independent study - 2 hours. Prerequisite: open only to chemistry majors who have completed 135 units' and who qualify for the honors program. Original research under the guidance of a faculty adviser, culminating in the writing of an extensive report. (Deferred grading only, pending completion of sequence.)

195. Careers in Chemistry (1)

Seminar — 2 hours. Prerequisite: junior or senior standing in Chemistry. Designed to give Chemistry undergraduate students an in-depth appreciation of career opportunities with a bachelors degree in chemistry. Professional chemists (and allied professionals) describe research and provide career insights. (P/NP grading only.)—I.

197. Projects in Chemical Education (1-4)

Discussion and/or laboratory. Prerequisite: consent of instructor. Participation may include development of laboratory experiments, lecture demonstrations, autotutorial modules or assistance with laboratory sessions. May be repeated for credit for a total of 12 units. (P/NP grading only.)—I, II, III. (I, II, III.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor based upon adequate preparation in chemistry, mathematics and physics. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor based upon adequate preparation in chemistry, mathematics, and physics. (P/NP grading only.)

Graduate Courses

201. Chemical Uses of Symmetry and **Group Theory (3)**

Lecture - 3 hours. Prerequisite: course 124A and 110B, or consent of instructor. Symmetry elements and operations, point groups, representations of groups. Applications to molecular orbital theory, ligand field theory, molecular vibrations, and angular momentum. Crystallographic symmetry. - I. (I.)

204. Mathematical Methods in Chemistry (3)

Lecture - 3 hours. Prerequisite: course 110C; graduate standing in Chemistry. Introduction to mathematical and numerical methods in chemistry. Real and complex functions. Methods of integration. Differential equations. Linear algebra and matrices. Special functions. Integral transforms. Statistics.—I. (I.)

205. Symmetry, Spectroscopy, and Structure (3)

Lecture - 3 hours. Prerequisite: course 201 or the equivalent. Vibrational and rotational spectra; electronic spectra and photoelectron spectroscopy; magnetism; electron spin and nuclear quadrapole resonance spectroscopy; nuclear magnetic resonance spectroscopy; other spectroscopic methods.— II. (II.)

209. Special Topics in Physical Chemistry (3)

Lecture—3 hours. Prerequisite: courses 210A and 211A; graduate standing in Chemistry. Advanced topics in physical chemistry, biophysical chemistry or chemical physics chosen from areas of current research interest. May be repeated for credit.

210A. Quantum Chemistry: Introduction and Stationary-State Properties (3)

Lecture—3 hours. Prerequisite: course 110B and 110C or consent of instructor. Stationary-state quantum chemistry: postulates of quantum mechanics, simple solutions, central field problems and angular momenta, hydrogen atom, perturbation theory, variational theory, atoms and molecules.—II. (II.)

210B. Quantum Chemistry: Time-**Dependent Systems (3)**

Lecture - 3 hours. Prerequisite: course 210A. Matrix mechanics and time-dependent quantum chemistry: matrix formulation of quantum mechanics, Heisenberg representation, time-dependent perturbation theory, selection rules, density matrices, and miscellaneous molecular properties. - III. (III.)

210C. Quantum Chemistry: Molecular Spectroscopy (3)

Lecture - 3 hours. Prerequisite: course 210B. Molecular spectroscopy: Born-Oppenheimer approxima-tion, rotational, vibrational and electronic spectroscopy, spin systems, and molecular photophysics. — I. (I.)

211A. Advanced Physical Chemistry: Statistical Thermodynamics (3)

Lecture — 3 hours. Prerequisite: consent of instructor. Principles and applications of statistical mechanics; ensemble theory; statistical thermodynamics of gases, solids, liquids, electrolyte solutions and polymers; chemical equilibrium.—I. (I.)

211B. Statistical Mechanics (3)

Lecture - 3 hours. Prerequisite: course 211A. Statistical mechanics of nonequilibrium systems, including the rigorous kinetic theory of gases, continuum mechanics transport in dense fluids, stochastic processes, brownian motion and linear response theory. Offered in alternate years. - II.

212. Chemical Dynamics (3)

Lecture - 3 hours. Prerequisite: consent of instructor. Introduction to modern concepts in chemical reaction dynamics for graduate students in chemistry. Emphasis will be placed on experimental techniques as well as emerging physical models for characterizing chemical reactivity at a microscopic level. Offered in alternate years.—II.

215. Theoretical and Computational Chemistry (3)

Lecture - 3 hours. Prerequisite: courses 211A and 210B or consent of instructor. Mathematics of wide utility in chemistry, computational methods for guidance or alternative to experiment, and modern formulations of chemical theory. Emphasis will vary in successive years. May be repeated for credit when topic differs. Offered in alternate years. - (III.)

216. Magnetic Resonance Spectroscopy (3)

Lecture-3 hours. Prerequisite: courses 210A, 210B (may be taken concurrently). Quantum mechanics of spin and orbital angular momentum, nuclear magnetic resonance, theory of chemical shift and multiplet structures, electron spin resonance, theory of gtensor in organic and transition ions, spin Hamiltonians, nuclear quadrupolar resonance, spin relaxation processes. Offered in alternate years. — (III.)

217. X-Ray Structure Determination (3)

Lecture — 3 hours. Prerequisite: consent of instructor. Introduction to x-ray structure determination; crystals, symmetry, diffraction geometry, sample preparation and handling, diffraction apparatus and data collection, methods of structure solution and refinement, presentation of results, text, tables and graphics, crystallographic literature. - III. (III.)

218. Macromolecules: Physical Principles (3)

Lecture - 3 hours. Prerequisite: courses 110A, 110B, 110C or the equivalent. Relationship of higher order macromolecular structure to subunit composition; equilibrium properties and macromolecular dynamics; physical chemical determination of macromolecular structure. Offered in alternate years. - I

219. Spectroscopy of Organic Compounds

Lecture-3 hours; laboratory-2.5 hours. Prerequisite: course 128C or the equivalent. Identification of organic compounds and investigation of stereochemical and reaction mechanism phenomena using spectroscopic methods-principally NMR, IR and MS.—II. (II.)

219L. Laboratory in Spectroscopy of Organic Compounds (1)

Laboratory - 2.5 hours. Prerequisite: course 219 (may be taken concurrently). Restricted to Chemistry graduate students only (or consent of instructor).
Practical application of NMR, IR and MS techniques for organic molecules. — III. (III.)

221A-H. Special Topics in Organic Chemistry (3)

Lecture - 3 hours. Selected topics of current interest in organic chemistry. Topics will vary each time the course is offered, and in general will emphasize the research interests of the staff member giving the course. - I. (I.)

222. Chemistry of Nanoparticles (3)

Lecture/discussion-3 hours. Prerequisite: course 110C or equivalent. Chemical and physical aspects of inorganic nanoparticles, including synthesis, purification, reactivity, characterization, and applications for technology. Emphasis is on problems from the current literature. Not open for credit to students who have taken course 122.—III. (III.) Osterloh

226. Principles of Transition Metal Chemistry (3)

Lecture - 3 hours. Prerequisite: course 124A or the equivalent. Electronic structures, bonding, and reactivity of transition metal compounds.—I. (I.) Balch

228A. Bio-inorganic Chemistry (3)

Lecture - 3 hours. Prerequisite: course 226 or consent of instructor. Defines role of inorganic chemistry in the functioning of biological systems by identifying the functions of metal ions and main group compounds in biological systems and discussing the chemistry of model and isolated biological compounds. Offered every third year. - II.

228B. Main Group Chemistry (3)

Lecture - 3 hours. Prerequisite: course 226 or consent of instructor. Synthesis, physical properties, reactions and bonding of main group compounds. Discussions of concepts of electron deficiency, hypervalency, and non-classical bonding. Chemistry of the main group elements will be treated systematically. Offered every third year. - II.

228C. Solid-State Chemistry (3)

Lecture - 3 hours. Prerequisite: courses 124A, 110B, 226, or the equivalent. Design and synthesis, structure and bonding of solid-state compounds; physical properties and characterization of solids; topics of current interest such as low-dimensional materials, inorganic polymers, materials for catalysis. Offered every third year. - II.

228D. Homogeneous Catalysis (3)

Lecture-3 hours. Prerequisite: course 226. Overview of homogeneous catalysis and related methods, with emphasis on kinetics, mechanisms, and applications for organic synthesis. The related methods may include cluster, colloid, phase transfer, enzymatic, heterogeneous and polymer-supported catalysis. Offered every third year. - II.

231A. Organic Synthesis: Methods and Strategies (4)

Lecture - 3 hours; lecture/discussion - 3 hours. Prerequisite: course 128C or equivalent. Current strategies and methods in synthetic organic chemistry. Focus on construction of carbon frameworks, control of relative and absolute stereochemistry and retrosynthetic strategies. Use of databases and molecular modeling software in multistep strategies. Only one unit of credit for students who have completed course 131. Not open for credit to students who have taken course 231.—II. (II.)

231B. Advanced Organic Synthesis (3)

Lecture-3 hours. Prerequisite: course 231A. Current strategies and methods in synthetic organic chemistry. Continuation of course 231A. Organic synthesis of complex target molecules. Stereochemical considerations and asymmetric synthesis. Organometallics for selective transformations. Carbocyclic and heterocyclic ring formation. Not open for credit to students who have taken course 231.—III. (III.)

233. Physical-Organic Chemistry (3)

Lecture—3 hours. Prerequisite: courses 128A-128B-128C and 110A-110B-110C or the equivalent. Introduction to elementary concepts in physicalorganic chemistry including the application of simple numerical techniques in characterizing and modeling organic reactions.—I. (I.)

235. Organometallic Chemistry in Organic Synthesis (3)

Lecture-3 hours. Prerequisite: course 128C. Current trends in use of organometallics for organic synthesis; preparations, properties, applications, and limitations of organometallic reagents derived from transition and/or main group metals. Offered in alternate years. — (III.)

236. Chemistry of Natural Products (3)

Lecture — 3 hours. Prerequisite: course 128C or the equivalent. Advanced treatment of chemistry of naturally occurring compounds isolated from a variety of sources. Topics will include isolation, structure determination, chemical transformations, total synthesis, biological activity, and biosynthesis. Biosynthetic origin will be used as a unifying theme. —II. (II.)

237. Bio-organic Chemistry (3)

Lecture - 3 hours. Prerequisite: course 128C or the equivalent. Structure and function of biomolecules; molecular recognition; enzyme reaction mechanisms; design of suicide substrates for enzymes; enzyme engineering; design of artificial enzymes and application of enzymes in organic synthesis. Offered in alternate years. — (I.)

238. Introduction to Chemical Biology (3)

Lecture - 3 hours. Prerequisite: course 118C or 128C, or the equivalent; course 130A & B and Biological Sciences 102, 103, & 104, or the equivalents recommended. Synthesis of complex molecules in nature. Use of biosynthetic pathways in synthesis of new chemical entities. Applications of small molecules in chemical genetics and structural biology. Solving biological problems using synthetic biomolecules. - II. (II.) Beal

240. Advanced Analytical Chemistry (3)

Lecture - 3 hours. Prerequisite: courses 110A and 115 or the equivalent. Numerical treatment of experimental data; thermodynamics of electrolyte and non-electrolyte solutions; complex equilibria in aque ous and non-aqueous solutions; potentiometry and specific ion electrodes; mass transfer in liquid solutions; fundamentals of separation science, including column, gas and liquid chromatography.—I. (I.)

241A. Surface Analytical Chemistry (3)

Lecture - 3 hours. Prerequisite: course 110C or the equivalent. Concepts of surfaces and interfaces: physical properties, unique chemistry and electronic effects. Focus on gas-solid interfaces, with some discussion of liquid-solid interfaces. Offered in alternate years.-I.

241B. Laser and X-ray Spectroscopy (3)

Lecture — 3 hours. Prerequisite: course 110B or the equivalent. Concepts and mechanisms of light-matter interactions. Chemical applications of modern spectroscopic methods, including multiphoton spectroscopy, time-resolved laser and x-ray photolysis, and phase-contrast x-ray imaging. Offered in alternate

241C. Mass Spectrometry (3)

Lecture - 3 hours. Prerequisite: course 110C and 115 or the equivalent. Mass spectrometry and related methods with emphasis on ionization methods, mass analyzers, and detectors. Related methods may include ion-molecule reactions, unimolecular dissociation of organic and bioorganic compounds, and applications in biological and environmental analysis. Offered in alternate

241D. Electroanalytical Chemistry (3)

Lecture—3 hours. Prerequisite: course 110C and 115 or the equivalent. Electroanalytical chemistry with consideration of mass transfer and electrode kinetics for polarizable electrodes. Current-potential curves for a variety of conditions, including both potentiostatic and galvanostatic control, and their application in chemical analysis. Offered in alternate years.—II.

241E. Microscopy and Imaging Techniques (3)

Lecture-3 hours. Prerequisite: course 110C and 115 or the equivalent. Introduction to modern microscopy and imaging techniques: scanning tunneling, atomic force, far-field optical, fluorescence, scanning near-field optical, and scanning electron microscopy. Application to nanoscience and analytical and bioanalytical chemistry. Some laboratory demonstrations. Offered in alternate years. - II.

261. Current Topics in Chemical Research

Lecture – 2 hours. Prerequisite: graduate standing in Chemistry or consent of instructor. Designed to help chemistry graduate students develop and maintain familiarity with the current and past literature in their immediate field of research and related areas. May be repeated for credit when topics differ.—I, II, III. (Í, 11. 111.)

263. Introduction to Chemical Research Methodology (3)

Laboratory/discussion-9 hours. Prerequisite: course 293 and graduate student standing in Chemistry; consent of instructor. Introduction to identification, formulation, and solution of meaningful scientific problems including experimental design and/or theoretical analyses of new and prevailing techniques, theories and hypotheses. May be repeated for credit when topic differs. (S/U grading only.)—I, II, III. (I, II, III.)

264. Advanced Chemical Research Methodology (6)

Laboratory/discussion-18 hours. Prerequisite: course 263 or consent of instructor. Applications of the methodology developed in Chemistry 263 to experimental and theoretical studies. Advanced methods of interpretation of results are developed. Includes the preparation of manuscripts for publication. May be repeated for credit when topic differs. (S/U grading only.)—I, II, III. (I, II, III.)

280. Seminar in Ethics for Scientists (2)

Seminar-2 hours. Prerequisite: graduate standing in any department of Science or Engineering. Studies of topical and historical issues in the ethics of science, possibly including issues such as proper authorship, peer review, fraud, plagiarism, responsible collaboration, and conflict of interest. Limited enrollment. (Same course as Engineering Chemical and Materials Science 280 and Physics 280.) (S/U grading only.)-III. (III.)

290. Seminar (2)

Seminar — 2 hours. Prerequisite: consent of instructor. (S/U grading only.)—I, II, III. (I, II, III.)

293. Introduction to Chemistry Research (1)

Discussion-2 hours. Designed for incoming graduate students preparing for higher degrees in chemistry. Group and individual discussion of research activities in the Department and research topic selection. (S/U grading only.)—I. (I.)

294. Presentation of Chemistry Research (1)

Seminar-2 hours. Prerequisite: graduate standing; restricted to graduate students in Chemistry who have not yet given their departmental presentation. Introduces first- and second-year Chemistry graduate students to the process of giving an effective research presentation. Advanced Ph.D. students give formal seminars describing the design and execution of their research projects. May be repeated three times for credit. (S/U grading only.)—II, III. (II, III.)

295. Careers in Chemistry (1)

Seminar — 2 hours. Prerequisite: graduate standing in Chemistry. Designed to give Chemistry graduate students an in-depth appreciation of career opportunities with a M.S. or Ph.D. degree in chemistry. Professional chemists (and allied professionals) give seminars describing both research and career insights. May be repeated for credit 3 times. (S/U grading only.)—I.

296. Research in Pharmaceutical Chemistry

Laboratory—18 hours. Prerequisite: courses 130A and 130B, 135, and 233 (may be taken concurrently). Restricted to students in the Integrated B.S., M.S. Program in Chemistry. The laboratory provides qualified graduate students with the opportunity to pursue original investigation in Pharmaceutical

Chemistry and allied fields in order to fulfill the lettergraded research requirement of the Integrated B.S./ M.S. Program in Chemistry (Pharmaceutical Chemistry Emphasis). May be repeated three times for credit. - I, II, III. (I, II, III.)

298. Group Study (1-5) 299. Research (1-12)

The laboratory is open to qualified graduate students who wish to pursue original investigation. Students wishing to enroll should communicate with the department well in advance of the quarter in which the work is to be undertaken. (S/U grading only.)

Professional Courses

390. Methods of Teaching Chemistry (2)

Lecture - 1 hour; discussion - 1 hour. Prerequisite: graduate student standing in Chemistry and consent of instructor. Practical experience in methods and problems of teaching chemistry. Includes analyses of texts and supporting material, discussion of teaching techniques, preparing for and conducting of discussion sessions and student laboratories. Participation in the teaching program required for Ph.D. in chemistry. May be repeated for credit. (S/U grading only.)—I, II, III. (İ, II, III.)

392. Advanced Methods of Teaching Chemistry (2)

Lecture - 2 hours. Prerequisite: course 390. Advanced topics in teaching chemistry. Analysis and discussion of curricular design, curricula materials, teaching methods and evaluation. For students who are planning a career in teaching chemistry. (P/NP grading only.)—III. (III.)

Chicana/Chicano Studies

(College of Letters and Science)

Miroslava Chávez-García, Ph.D., Chairperson of the Department

Department Office. 2102 Hart Hall (530) 752-2421; Fax (530) 752-8814; http://chi.ucdavis.edu

Faculty

Angie Chabram, Ph.D., Professor Miroslava Chávez-García, Ph.D., Associate

Sergio de la Mora, Ph.D., Associate Professor Adela de la Torre, Ph.D., Professor Yvette Flores, Ph.D., Professor Carlos F. Jackson, M.F.A., Assistant Professor Kevin R. Johnson, J.D., Professor (School of Law) Maceo Montoya, M.F.A., Assistant Professor Natalia Deeb-Sossa, Ph.D., Assistant Professor

Emeriti Faculty

Malaquias Montoya, B.F.A., Professor Emeritus Beatriz Pesquera, Ph.D., Associate Professor Emerita Refugio Rochin, Ph.D., Professor Emeritus Adaljiza Sosa-Riddell, Ph.D., Senior Lecturer Emerita

The Major Program

The Department of Chicana/Chicano Studies offers an interdisciplinary curriculum focusing on the Chicana/Chicano experience through an analysis of class, race, ethnicity, gender and sexuality, and cultural expression. The department offers a major leading to the Bachelor of Arts degree and a minor that can satisfy breadth requirements for the College of Letters and Science. Both the major and minor frame an analysis within the historical and contemporary experiences of Chicanas/os in the Americas. The major gives students an opportunity to specialize in one of two emphases: Cultural Studies or Social/Policy Studies. Students in the major are expected to read, write, and speak Spanish at a level suitable for future study and work in Chicana/o and Latina/o settings. There are no language requirements for the

minor, and all Chicana/Chicano Studies courses are open to students in any major.

The Program. At the lower division level, the major curriculum provides an interdisciplinary overview of various topics. Students are advised to take courses that serve as prerequisites for certain upper division courses. At the upper division level, majors pursue advanced interdisciplinary course work in both the humanities/arts and the social sciences. At this level, students will find courses in Chicana/Chicano history, theory, health and several courses taught from a variety of disciplinary perspectives. Majors may specialize in one of two emphases for the A.B. degree. The Cultural Studies emphasis integrates literature, culture, and artistic expression. Social/Policy Studies emphasizes social theory, research methods, area studies in community/political economy, family, societal and health issues.

Career Alternatives. The Cultural Studies emphasis prepares students for professional work in crosscultural education, cultural/art centers, artistic expression and communications. The Social/Policy Studies emphasis orients students towards professional work in human service delivery, community development, legal services assistance, health services, social welfare and education. Both emphases in the major prepare students for advanced graduate and/or professional studies in related fields.

A.B. Major Requirements:

UNITS

Cultural Studies Emphasis: Preparatory Subject Matter.....16-31 Chicana/o Studies 10, 50...... 8

Chicana/o Studies 21 or 40 4 One of Chicana/o Studies 60, 65, 70, or Spanish 1, 2, 3, or 28, 31, 32 or the equivalent0-15

Depth Subject Matter40 One course from Chicana/o Studies 150,

181 History 165, 166B, 169A, 169B... Two courses from Chicana/o Studies 100, 110, 111, 112, 130, 131, 132, 181 8 Comparative ethnicity/gender: two upper division courses selected from two of the following areas: African American and African Studies, Asian American Studies, Native American Studies, or Women's Studies Two courses from Chicana/o Studies 110, 112, 120, 121, 122, 123 8 Three courses from Chicana/o Studies 154,

Total Units for the Major56-71 **Social/Policy Studies Emphasis:** Preparatory Subject Matter.....20-35

Chicana/o Studies 10, 50...... 8 Chicana/o Studies 21 or 40......4 One from Chicana/o Studies 60, 65, 70, or 73 One from Chicana/o Studies 23, 140A Sociology 46A or Psychology 41......4 Spanish 1, 2, 3, or 28, 31, 32 or the

equivalent0-15 Depth Subject Matter40

One from Chicana/o Studies 150, 181, History 165, 166B, 169A or 169B....... Two courses from Chicana/o Studies 154, 155, 156, 160, 165, 171, or 172 8 Comparative ethnicity/gender: two upper division courses selected from two of the following areas: African American and African Študies, Asian American Studies, Native American Studies, or Women's 110, 111, 112, 130, 131, 132 or 181 Two courses from Chicana/o Studies 110, 112, 120, 121, 122 or 123 8 Total Units for the Major60-75 Major Advisers. M. Chávez-García

Minor Program Requirements:

This minor provides a broad overview of the historical, social, political, economic, ideological and cultural forces that shape the Chicana/o and Latina/o experience. The minor is open to all students with or without course work in Spanish. Students should contact the master adviser for a plan approval and verification of the minor.

Chicana/o Studies......24 Chicana/o Studies 10 or 50......4 Chicana/o Studies 150 or 181 or History 111, 112, 120, 121, 122, 123, 130, 131, 132, 154, 155, 156, 160, 165, 171, 17216

Minor Adviser. See Department office.

Courses in Chicana/Chicano Studies (CHI)

Lower Division Courses

10. Introduction to Chicana/o Studies (4)

Lecture - 3 hours; discussion - 1 hour. Analysis of the situation of the Chicana/o (Mexican-American) people, emphasizing their history, literature, political movements, education and related areas. GÉ credit: Div, Wrt | ACGH, AH or SS, DD, OL, WE.-I, II.

21. Chicana/o and Latina/o Health Care Issues (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 10. Overview of health issues of Chicanas/ os and Latinas/os in the State of California; role of poverty/lack of education in limited access to health care. GE credit: Div | OL, WE.—Flores, de la Torre

215. Chicana/o and Latina/o Health Care Issues (4)

Lecture-4 hours. Prerequisite: Spanish 3 or the equivalent. Overview of health issues of Chicanas/ os and Latinas/os in the State of California; role of poverty/lack of education and limited access to health care. All course instruction for this course will be in Spanish. Course is taught abroad. Not open for credit to students who have completed course 21. GE credit: Div | OL, WC, WE.—Flores, de la Torre

23. Qualitative Research Methods (4)

Lecture/discussion-3 hours; discussion-1 hour. Dominant models of qualitative inquiry in educational and social science research as well as mestizo approaches to research with latinos. Emphasis given to choosing and designing culturally appropriate strategies to investigate latino health, education, social context, and policy issues. GE credit: SocSci | AH, OL, SS, WE.—Chávez-García, Flores

30. United States Political Institutions and Chicanas/os (4)

Lecture/discussion-3 hours; term paper. Overview of the major political institutions and ideologies of the United States and the Chicana/o people's historical and contemporary role in, effects from, and responses to them. Theory, method and critical analysis. GE credit: Div | ACGH, DD, OL, SS, WE.

40. Comparative Health: Top Leading Causes of Death (4)

Lecture/discussion-3 hours; discussion-1 hour. Prerequisite: Statistics 13 or consent by instructor. Introduction to the epidemiology of the leading causes of death for ethnic/racial minorities. Assessment of disproportionate rates at which ethnic/racial minorities suffer and die from chronic and infectious diseases and injuries and statistical methods used to calculate these rates. Not open for credit to students who have completed course 40S. GE credit: SciEng, Div, Wrt | QL, SE, WE.-III.

40S. Comparative Health: Leading Causes of Death (4)

Lecture-4 hours. Prerequisite: Statistics 13 or consent by instructor. Introduction to epidemiology of leading causes of death for ethnic/racial minorities. Assessment of disproportionate rates at which ethnic/racial minorities suffer & die from chronic and infectious diseases & injuries & statistical methods used to calculate these rates. Offered abroad. Not open for credit to students who have completed course 40. GE credit: SciEng, Div, Wrt | QL, SE, WC, WE.

50. Chicana and Chicano Culture (4)

Lecture - 3 hours; discussion - 1 hour. Interdisciplinary survey of Chicana/o cultural representation in the 20th century. Examines Chicana/o culture within a national and transnational context. Explores how Chicano cultural forms and practices intersect with social/material forces, intellectual formations and cultural discourses. (Former course 20.) GE credit: Div | ACGH, AH, DD, WC, WE.-I, III. Chabram, de la Mora, M. Montoya

60. Chicana and Chicano Representation in Cinema (4)

Lecture-3 hours; discussion-1 hour; film viewing -2 hours. Introductory-level study of Chicana and Chicano representation in cinema. Depiction of Chicana and Chicano experience by Chicana/o filmmakers, as well as by non-Chicanos, including independent filmmakers and the commercial industry. GE credit: ArtHum, Div | ACGH, AH, DD, VL, WE.—I. de la Mora

65. New Latin American Cinema (4)

Lecture/discussion-2 hours; discussion-1 hour; film viewing - 3 hour. Historical, critical, and theoretical survey of the cinemas of Latin America and their relationship to the emergence of U.S. Latino cinema. Emphasis on representation and social identity including gender, sexuality, class, race and ethnicity. GE credit: ArtHum, Div | AH, VL, WC, WE.—de la Mora

70. Survey of Chicana/o Art (4)

Lecture - 4 hours. Survey of contemporary Chicana/o art in context of the social turmoil from which it springs. Includes political use of the poster and the mural, the influence of the Mexican mural and graphic movement, and social responsibility of the artist. GE credit: Div | ACGH, AH, DD, VL, WC, WE.—I. Jackson, M. Montoya

73. Chicana/o Art Expression Through Silk Screen (4)

Studio-8 hours; laboratory-4 hours. Introductory level studio course using silk screen and basic printing techniques to explore and develop images of Chicana/o cultural themes and expressions. Students will experiment with images and symbols from their immediate environment/culture. Integrated approach to Chicana/o philosophy of art.m GE credit: ACGH, AH, DD, OL, VL, WC.—I. Jackson

92. Internship (1-12)

Internship - 3-36 hours. Prerequisite: course 10 or consent of instructor. Academic guidance combined with internship in community agencies serving Mexican/Latina/Latino/Chicana/Chicano clients. Use of bilingual skills and knowledge of history, culture, economics, politics and social issues. May be repeated for credit up to 12 units. (P/NP grading only.)

98. Directed Group Study (1-5) (P/NP grading only.)

99. Special Study for Undergraduates (1-5) (P/NP grading only.)

Upper Division Courses 100. Chicana/Chicano Theoretical Perspective (4)

Lecture/discussion -3 hours; term paper. Prerequisite: courses 10 and 50. Critical examination of emerging Chicana/o Studies theoretical perspectives in light of contemporary intellectual frameworks in the social sciences, arts, and humanities. Includes analysis of practices of self-representation, and socio-cultural developments in the Chicana/o community. GE credit: ACGH, DD, SS, WC, WE.-III. Chabram, Deeb-Sossa

110. Sociology of the Chicana/o Experience

Lecture/discussion-4 hours. Prerequisite: course 10 or Sociology 1. The Chicana/o experience in the American society and economy viewed from theoretical perspectives. Immigration, history of integration of Chicana/o labor into American class structure, education inequality, ethnicity, the family and Chicana/o politics. (Former course Sociology 110.) GE credit: SocSci, Div, Wrt | ACGH, DD, OL, SS, WE.—I. Deeb-Sossa

111. Chicanas/Mexicanas in Contemporary Society (4)

Lecture/discussion-4 hours. Prerequisite: course 10 or 50, Women's Studies 50 or History 169B. Analysis of the role and status of Chicanas/Mexicanas in contemporary society. Special emphasis on their historical role, the political, economic and social institutions that have affected their status, and their contributions to society and their community. (Former course 102.) GE credit: ArtHum | ACGH, DD, SS, WE. - Deeb-Sossa

112. Globalization, Transnational Migration, and Chicana/o and Latina/o Communities (4)

Lecture-4 hours. Prerequisite: course 10. Chicana/ o and Latina/o migration experiences within a global context. Topics include national and/or transnational migration in Mexico, Central America, and the United States. GE credit: SocSci, Div, Wrt | ACGH, DD, OL, SS, WE.

120. Chicana/o Psychology (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 21; introductory psychology course recom mended. Introduction to the field of Chicana/o psychology. Analysis of socio-cultural context of Chicanas/os and Latinas/os. Special attention to issues of ethnic identity development, bilingualism, and development of self esteem. Impact of minority experience, migration, acculturation are examined. GÉ credit: SocSci, Div | ACGH, DD, OL, SS, WE. -

121. Chicana/o Community Mental Health (4)

Lecture-3 hours; term paper. Prerequisite: course 10 or 20. Mental health needs, problems, and service utilization patterns of Chicanas/os and Latinas/ os will be analyzed. An analysis of social service policy, and the economic context of mental health programs. Offered Alternate Years. GE credit: Soc-Sci, Div, Wrt | ACGH, DD, OL, SS, WE.—II. (II.) Flores

122. Psychology Perspectives Chicana/o and Latina/o Family (4)

Lecture — 4 hours. Prerequisite: course 10; introductory psychology course highly recommended, and/ or consent of instructor. Role of migration and acculturation on family structure and functioning. From a psychological and Chicana/o Studies perspective, contemporary gender roles and variations in family structures are examined. Special topics include family violence, addiction, family resilience and coping strategies. GE credit: SS, WE.—I. Flores

1225. Psychology Perspectives Chicana/o and Latina/o Family (4)

Lecture-4 hours. Role of migration and acculturation on family structure and functioning. From a psychological and Chicana/o Studies perspective, contemporary gender roles and variations in family structures are examined. Special topics include family violence, addiction, family resilience and coping strategies. This course is taught abroad. Not open for credit to students who have completed course 122. GE credit: OL, SS, WC, WE.—IV.) Flores

123. Psychological Perspectives on Chicana/o and Latina/o Children and Adolescents (4)

Lecture—3 hours; term paper. Prerequisite: course 10 or 21, and upper division standing. Psychological and educational development of Chicano/Latino children and adolescents, with particular attention to the formation of ethnic, gender, class, race, and sexual identities. GE credit: SocSci, Div, Wrt | ACGH, DD, OL, SS, WE.-II. Flores

125S. Latino Families in the Age of Globalization: Migration and Transculturation (4)

Lecture/discussion—4 hours. Prerequisite: Spanish 3 or equivalent highly recommended. Impact of globalization on Latino families in the American continent. Relationships of political structure, economics and family. Intimate partner violence, child maltreatment and alcohol/drug abuse in contemporary Latino families. Offered in a Spanish speaking country. 125S GE credit: OL, SS, WC, WE.—Flores

130. United States-Mexican Border Relations (4)

Lecture—3 hours; term paper. Prerequisite: upper division standing. Theories of U.S.-Mexican border relations, with an overview of the political, economic, and social relationships and an in-depth analysis of immigration issues, border industrialization, women's organizations, economic crises, and legal issues. GE credit: Div | ACGH, DD, SS, WE.-I. Chabram, Chávez-García, de la Torre

131. Chicanas in Politics and Public Policy

Lecture/discussion - 4 hours. Prerequisite: course 30 or Political Science 1. Historical and political analysis of Chicana/Latina political involvement and activities in the general political system, women's movement, Chicano movement, and Chicana movement. Course also examines the public policy process and the relationship of Chicanas/Latinas to public policy formation. Offered in alternate years. GE credit: SocSci, Div | ACGH, DD, OL, SS, WE.—

1315. Chicanas in Politics and Public Policy (4)

Lecture/discussion-4 hours. Historical and political analysis of Chican/Latina political involvement and activities in the general political system, women's movement, Chicano/a movement. Course also examines the public policy process and the relationship of Chicanas/Latinas to public policy formation. Offered abroad. Not open for credit to students who have completed course 131. GE credit: SocSci, Div | OL, SS, WC, WE.-II.

132. Political Economy of Chicana/o Communities (4)

Lecture - 3 hours; term paper. Prerequisite: upper division standing; lower division Chicana/o Studies course recommended. Historical and contemporary study of political and economic forces which define and influence the development of Chicana/o communities. Includes critiques of traditional and Marxian theories and concepts applicable to Chicana/o communities, case studies of Chicana/o communities, especially in California and Texas. GE credit: ACGH, DD, OL, WE.—III.

135S. Transnational Latina/o Political Economy (4)

Lecture—3 hours; term paper. Prerequisite: Spanish 3 or equivalent, or consent of instructor; Economics 1A and 1B recommended. Intensive reading, discussion and research on selected topics from Latin America and the US with regard to immigrant and native communities. Topics include comparative immigration and macroeconomic policies in the US and Latin America. Offered in a Spanish speaking country. GE credit: OL, WC, WE.

140A. Quantitative Methods: Chicano/ Latino Health Research (4)

Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: two years of high school algebra or the equivalent in college. Focuses on measuring Latino/ Chicano health outcomes using a quantitative approach. Assesses main types of study designs and addresses measurement of disease frequency and health effects. GE credit: SciEng | ACGH, DD, QL,

145S. Bi-National Health (5)

Lecture - 5 hours. Prerequisite: Biological Sciences 1A-1B-1C, Spanish 21 or 31 or consent of instructor; upper division standing only. Examination of health status and intervention strategies presented in public health care settings, private clinics and by indigenous healers in Mexico. Analysis of impact of high risk diseases. Offered in a Spanish speaking country under supervision of UC Davis faculty/lecturer. GE credit: OL, WC, WE.—I. Flores, de la Torre

146S. Public Health in Latin America (5)

Lecture/discussion-4 hours; term paper. Critical examination of emerging Public Health issues in Latin America in light of economic, political and social conditions. Contemporary behavioral frameworks used in public health. Includes analysis of clinical medicine and health care systems. —I. (I.) de la

147S. Indigenous Healing and Biodiversity in Latin America (5)

Lecture-4 hours; term paper. Contrast between western and traditional healing practices in Latin America and the role of the natural environment in creating sustainable health delivery systems. Questions of health status attributable to public health and environmental risk factors. GE credit: OL, WC, WE.-I. (I.) de la Torre

150. The Chicana and Chicano Movement (4)

Lecture—3 hours; term paper. Development of the Chicano Movement within the context of the sociopolitical movements of the 1960's in a national and global perspective. Ideological/political perspectives and the implications for political strategies. GE credit: ArtHum, Div, Wrt | ACGH, AH or SS, DD, WC, WE.-III. Chávez-García

154. The Chicana/o Novel (4)

Lecture - 4 hours. Prerequisite: intermediate Spanish or consent of instructor. Introduction to the forms and themes of the Chicana/o novel with special attention to the construction of gender, nationality, sexuality, social class, and the family by contemporary Chicana/o novelists. Bilingual readings, lectures, discussions, and writing in Spanish. (Former course Spanish 126A.) GE credit: ArtHum, Div | ACGH, AH, DD, OL, WC, WE.—Chabram, M. Montoya

155. Chicana/o Theater (4)

Lecture — 4 hours. Prerequisite: intermediate Spanish or consent of instructor. Examination of the formal and thematic dimensions of Chicana/o theater in the contemporary period with special emphasis on El Teatro Campesino and Chicana Feminist Theater. Bilingual readings, lectures, discussions, and writing in Spanish. (Former course Spanish 126B.) GE credit: ACGH, AH, DD, OL, VL, WC, WE.—II. (I.)

156. Chicana/o Poetry (4)

Lecture-4 hours. Prerequisite: intermediate Spanish or consent of instructor. Survey of Chicana/o poetry with special emphasis on its thematic and formal dimensions. Bilingual readings, lectures, discussions, and writing in Spanish. (Former course Spanish 126C.) GĔ credit: ACGH, AH, DD, OL, WC, WE.-

160. Mexican Film and Greater Mexican Identity (4)

Lecture/discussion-4 hours; film viewing-1 hour. Prerequisite: intermediate Spanish. Survey of the role Mexican cinema plays in consolidation and contestation of post-revolutionary Mexican state and in the formation of a greater Mexican cultural identity including Chicana/o identity. Showcases genres, periods, auteurs, movements, and emphasis on gendered and sexualized narratives. GE credit: ArtHum, Div | AH, VL, WC, WE.-II. de la Mora

165. Chicanas, Latinas and Mexicanas in Commercial Media (4)

Lecture/discussion-4 hours; laboratory-2 hours. Prerequisite: course 60 or other film or feminist theory course; conversational fluency in Spanish. The portrayal of Chicanas, Latinas and Mexicanas in commercial media. The relation between the representation of Chicana, Latina, and Mexicana women in commercial television and cinema and the role of women in Mexican and U.S. societies. Offered in alternate years. GE credit: AH, VL, WC, WE.-de la

170. Contemporary Issues in Chicano Art (4)

Lecture-4 hours. Issues and conflicts in the dismantling of the Contemporary Chicano Art Movement. Response and challenge to the dominant culture. GE credit: ACGH, AH, DD, VL, WC, WE.-Jackson

171. Mexican and Chicano Mural Workshop (4)

Studio-8 hours; independent study-1 hour. Prerequisite: course 70 and/or written consent of instructor. The Mural: a collective art process that empowers students and people through design and execution of mural paintings in the tradition of the Mexican Mural Movement; introduces materials and techniques. May be repeated one time for credit. (Same course as Art Studio 171.) GE credit: AH, . VL.−III. Jackson, M. Montoya

172. Chicana/o Voice/Poster Silk Screen Workshop (4)

Studio-8 hours; independent study-1 hour. Prerequisite: course 70 and/or 73 and/or written consent of instructor. The poster as a voice art form used by Chicanas/os and other people of color to point to the defects of social and political existence and the possibility for change, from the Chicana/o artists' perspective. May be repeated one time for credit. GE credit: AH, OL, VL, WC.—II. Jackson

180. Grant Writing in the Chicana/o/ Latina/o Community (4)

Lecture — 4 hours. Prerequisite: course 10, 23 or consent of instructor. Upper division standing. Overview of key elements for grant writing. Topics include community needs assessments, development of human subjects protocols, data collection, methods, evaluation designs and community based methodologies for grant development applications in the Latino community.—de la Torre

181. Chicanas and Latinas in the U.S.: Historical Perspectives (4)

Lecture/discussion-4 hours. Prerequisite: course 10 or Women's Studies 50. Historical issues in the lives of Chicanas, Puertorriquenas, and Cubans in the U.S. and their countries of origin. GE credit: ArtHum, Div, Wrt | ACGH, AH or SS, DD, WE.-II. Chávez-García

182. Race and Juvenile Justice (4)

Lecture - 4 hours. Prerequisite: course 10, Women's Studies 10, or Sociology 10, or equivalent. Individual and institutional responses to "troublesome" youth of color through history and in contemporary society. Emphasis on how race, as well as ethnicity, class, and gender have informed the treatment of "delinquent" youth. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, DD, OL, SS, WE. - Chávez-García, de la Torre

192. Internship in the Chicana/Chicano/ Latina/Latino Community (1-12)

Internship - 3-36 hours. Prerequisite: course 10, 21, or 50, Spanish 3 or the equivalent. Academic guidance combined with internship in community agencies serving Mexican/Latina/Latino/Chicana/ Chicano clients. Use of bilingual skills and knowledge of history, culture, economics, politics and social issues. Internship project required. May be repeated for credit up to 12 units. (P/NP grading only.)

192. Internship in the Chicana/Chicano/ Latina/Latino Community (1-12)

Internship—3-36 hours. Prerequisite: course 10, 21, or 50, Spanish 3 or the equivalent. Academic guidance combined with internship in community agencies serving Mexican/Latina/Latino/Chicana/ Chicano clients. Use of bilingual skills and knowledge of history, culture, economics, politics and social issues. Internship project required. May be repeated for credit up to 12 units. (P/NP grading only.) GE credit: OL.

194HA-194HB-194HC. Senior Honors Research Project (2-5)

Independent study-6-15 hours. Prerequisite: senior standing in Chicana/o Studies major. Student is required to read, research, and write Honors Thesis on Chicana/o Studies topics. (Deferred grading only, pending completion of sequence.) GE credit: OL, WE.

198. Directed Group Study (1-5)

Prerequisite: upper division standing and consent of Program Chairperson. (P/NP grading only.)

1985. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: upper division standing and consent of Program Chairperson. (P/NP grading only.)

1995. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

230. Chicano/Latino Hispanic Politics (4)

Seminar—3 hours; term paper. Prerequisite: two undergraduate courses in Chicana/o Studies or consent of instructor. Examination of Chicano/Latino political experiences. Evaluate theories, ideology and practice of Chicano politics. Brief history of Chicano/Latino/Hispanic political activity, comparisons among political modes, gendered politics, and understanding relationships among Chicano, Mexican, American and world politics.—de la Torre

298. Group Study for Graduate Students (1-5)

Prerequisite: graduate standing, consent of instructor. May be repeated for credit when topic differs. (S/U grading only.)

299. Special Study for Graduate Students (1-12)

Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)

Child Development (A Graduate Group)

Katherine J. Conger, Ph.D., Group Chairperson Group Office. 1315 Hart Hall

(530) 754-4109; http://humandevelopment.ucdavis.edu/

Faculty. See Human Development (A Graduate Group), on page 344.

Graduate Study. The Graduate Group in Child Development offers a multidisciplinary program leading to an M.S. degree. The program provides students with an opportunity to pursue a coordinated course of postgraduate study in the field of child development which cuts across departmental boundaries. Students may work with children and families in the community, as well as the University's Center for Child and Family Studies. Recipients of the degree gain sufficient background to engage in professions that directly (e.g., preschool, 4-H) or indirectly (e.g., social policy) involve children and families, obtain positions in teaching or research set-tings, or pursue further study leading to a doctorate in child development, human development, clinical psychology, or related fields.

Applicants seeking admissions and fellowships consideration must submit all materials by our priority December 15 deadline. Note that a separate fellow-

ship application is required for university fellowships. The final admissions deadline is March 1. See our website for more details.

Graduate Adviser. Contact Group office.

Chinese

See Asian American Studies, on page 168; East Asian Languages and Cultures, on page 218; and East Asian Studies, on page 222.

Cinema and **Technocultural** Studies

(College of Letters and Science) Jaimey Fisher, Ph.D., Program Director

Program Office. 209 Sproul Hall (530) 752-4999; http://filmstudies.ucdavis.edu

Committee in Charge

Sarah Pia Anderson, B.A. (Cinema and Technocultural Studies) Jesse Drew, Ph.D. (Cinema and Technocultural Studies)

Jaimey Fisher, Ph.D. (German and Russian, Cinema and Technocultural Studies)

Caren Kaplen, Ph.D. (American Studies) Colin M. Milburn, Ph.D. (English)

Michael Neff, Ph.D. (Computer Science, Cinema and Technocultural Studies) Bob Ostertag, Ph.D. (Cinema and Technocultural

Studies) Kriss Ravetto-Biagioli, Ph.D. (Cinema and

Technocultural Studies) Scott Simmon, Ph.D. (English) Eric Smoodin, Ph.D. (American Studies)

Blake Stimson, Ph.D. (Cinema and Technocultural

Julie Wyman, Ph.D. (Cinema and Technocultural Studies)

Faculty

Sarah Pia Anderson, B.A. Jesse Drew, Ph.D. Jaimey Fisher, Ph.D. Michael Neff, Ph.D. Bob Ostertag, Ph.D. Kriss Ravetto-Biagioli, Ph.D. Blake Stimson, Ph.D. Julie Wyman, Ph.D.

Emeriti Faculty

Frances Dyson, Ph.D., Professor Emerita Lynn Hershman, M.A., Professor Emerita

The Film Studies Major Program

The interdisciplinary major in Film Studies takes one of the most influential art forms of the twentieth century and today-film-as its object of study. The field of Film Studies addresses the history, theory, and culture of this art form and asks questions about film texts themselves: modes of production (including everything from filmmakers' aesthetic choices to the role of the global economy); historical, national, and cultural contexts; and spectators and audiences. Questions of gender, race, sexuality, and nationality, in all of these areas, have been central to Film Studies almost since its inception and continue to shape much of the work in the field. While the program emphasizes film history, criticism, and theory, students also have opportunities to explore film/video production.

The Program. Students majoring in Film Studies take upper-division courses in film history and film theory, as well as in at least three of five general areas of study. Students also develop a thematic emphasis, in consultation with an advisor, that draws on courses from at least two different departments/ programs and that allows them to pursue their particular interests within the field of Film Studies. Students have the option of completing a senior thesis (either a written paper or an original film/video) within this emphasis.

Career Alternatives. The A.B. degree in Film Studies prepares students for a variety of careers in media industries: for example, local and national film and television production companies, local television newsrooms, community television stations, computer graphic companies, advertising and marketing companies, public relations departments, and film distribution companies. Students wishing to pursue graduate work will be prepared to go on in film studies, as well as a variety of other fields that draw on interdisciplinary study: for example, American studies, English, literatures and languages, drama, communication, computer science, cultural studies, women and gender studies, and ethnic studies programs. Many film students also choose to go on to law school, and the analytical skills, writing abilities, and familiarity with theoretical thought developed through the film major prepare them well for the study and practice of law.

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 20-40

Film Studies 1 A four-course sequence in a single language or equivalent 0-20 One course from African American and African Studies 15, 50; American Studies 1A, 21, 30; Art History 5; Art Studio 30; Chicana/o Studies 50, 60; Design 1; French 50; Humanities 60; Italian 50; Japanese 25; Native American Studies 32; Textiles and Clothing 7; Women's Studies 20, 25...... 4 One course from African American and African Studies 10, 15, 50; Asian American Studies 1, 2; Chicana/o Studies 10, 50, 60; Native American Studies 1, 10, 32, 33; Women's Studies 20, 25, 50, 70, 80 Two courses from Art History 1A, 1B, 1C, 1D; Asian American Studies 2; Chinese 10, 11; Classics 10; Comparative Literature 3, 4, 5, 6, 7; Dramatic Art 1, 20; English 43, 44; German 48; History 4C, 10C, 17B, 72B; Humanities 5, 6; Japanese 10; Music 10, 28; Native American Studies 33; Russian 41, 42..... Note: One of these two courses may be from Design 15, 16 or Dramatic Art 10, 21A,

Depth Subject Matter 36-40

One course from English 161A, 161 B or Film Studies 124..... One course from English 162; Film Studies 127; Philosophy 127; Women and Gender Studies 162..... One course each from three of the following topic areas: Cinematic Traditions and Movements, Visual and Popular Culture, Gender/Sexuality/Class, Race/Ethnicity/ Class, Production and Performance 12 A current list of approved classes is available from the Program office and from the faculty adviser. 16-20 units in one of the two breadth areas

not used to satisfy the breadth requirement, or development of a thematic area in consultation with a faculty adviser 16-20 Qualified students who complete 20 units and have an overall GPA of 3.500 may choose the senior thesis option (194H-196H) for 8 of those 20 units.

No course may be counted for more than one requirement for the major.

Total Units for the Major 56-80 Major Adviser. See Program office.

Minor Program Requirements:

LINITS

Film Studies 24 Upper division courses selected from the following list, with no more than two courses

from any one category 20 (a) Problems and Themes in Cinema: Anthropology 136, Classics 102, Dramatic Art 115, English 160, 161A, 161B, 162, Film Studies 124, 125, Women's Studies

(b) Cinema, Nation and Nationality: German 119, 142, Film Studies 176A, 176B, Italian 150, Japanese 106, Russian 129, Spanish 148

(c) Film and Social Identities: African American and African Studies 170, 171, Film Studies 120, Jewish Studies 120, Women's Studies 160, 164 (d) Film/Video Production: Art Studio 116,

117, 150 (e) Popular and Visual Culture: American Studies 130, 132, 133, 139, Art Studio 150, Communication 140, Political Science 165, Textiles and Clothing 107, Women's

Studies 139

Minor Adviser. See Program office.

The Technocultural Studies Major **Program**

The Technocultural Studies major is an interdisciplinary integration of current research in cultural history and theory with innovative hands-on production in digital media and "low-tech." It focuses on the fine and performing arts, media arts, community media, literature and cultural studies as they relate to technology and science. Backed by critical perspectives and the latest forms of research and production skills, students enjoy the mobility to explore individual research and expression, project-based collaboration and community engagement.

The Program

Preparatory course work involves a solid introduction to the history, ideas and current activities of technocultural studies, along with technical skill courses enabling individuals to get up to speed on digital imaging, sound, digital video and Web production, among other skills. For depth subject matter, students in the major select to concentrate on either critical studies or creative production emphases, and work toward a final project. All majors are required to take at least one course from another department or program relevant to their area of study, upon approval from Technocultural Studies, and may take more courses with approval. The final project for the critical studies emphasis consists of a substantial research paper. The final project for the creative production emphasis will be a major individual or collaborative work. Plans for final projects must be approved in advance.

Career Paths. Technocultural Studies is designed to prepare graduates to be highly adaptable, collaborative, multi-skilled and current with the latest developments. Perhaps most importantly is self-motivation: students do best when fueled by their own passions and plot their own directions, while held to very high standards. We feel this is the best education for living and working in a complex, rapidly changing world. Final research papers and creative production portfolios will provide graduate school admissions committees, employers or clients with tangible evidence of Technocultural Studies graduates' track records and talents.

A.B. Major Requirements:

UNITS

Preparatory Subject Matter......28 Technocultural Studies 1, 2, 4, 5, 6,

7A-E24
American Studies 1A or 54
Depth Subject Matter
Technocultural Studies 190, 191
Total Units for the Major

Major Adviser. See Program office.

Courses in Film Studies (FMS)

Lower Division Courses

1. Introduction to Film Studies (4)

Lecture - 2 hours; discussion - 1 hour; film viewing-3 hours. Analysis of film form and narrative, including cinematography, editing, and sound. Issues in film studies, including authorship, stardom, race, gender, class, and cultural identity. Includes introduction to selected cinematic movements and national film traditions. GE credit: ArtHum Wrt | AH, OL, VL, WC, WE.-I, II, III. (I, II, III.)-Fisher, Lu, Ravetto-Biagioloi, Smoodin

45. Vampires and Other Horrors in Film and Media (4)

Lecture - 2 hours; discussion - 1 hour; film viewing — 3 hours. History of representations of vampires and horror generally from the 19th through 21st centuries. Emphasis on transnational history of the horror genre; psychologies of horror effects; issues of race, gender, and class; intersections with prejudice, medicine, modernity. (Same course as German 45.) Offered in alternate years. GE credit: ArtHum | ACGH, AH, DD, OL, VL, WC, WE.—II, III. Fisher

90X. Lower Division Seminar (4)

Seminar-4 hours. Prerequisite: lower division standing and consent of instructor. Study of a special topic in film studies in a small class setting. May be repeated for credit if topic differs. (P/NP grading only.)—I, II, III. (I, II, III.)

92. Internship (1-12)

Internship—3-36 hours. Supervised internship off and on campus in areas of Film Studies. May be repeated for credit. (P/NP grading only.)

98. Directed Group Study (1-5) (P/NP grading only.)

99. Special Study for Undergraduates (1-5) (P/NP grading only.)

Upper Division Courses

120. Italian-American Cinema (4)

Lecture/discussion-3 hours; film viewing-3 hours. Prerequisite: course 1. Exploration of representations of Italian-American identity in American (U.S.) cinema. Analysis of both Hollywood and independently produced films, especially as they represent ethnicity, gender, and social class of Italian Americans. Not open for credit to students who have completed Humanities 120. GE credit: ArtHum, Div, Wrt | ACGH, AH, DD, OL, VL, WC, WE.—III. (III.) Heyer-Caput, Schiesari

121. New Italian Cinema (4)

44

72

Lecture/discussion-3 hours; film viewing-3 hours. Prerequisite: course 1 and upper-division standing, or consent of instructor. Italian cinema of the 21st century in the context of profound cultural and social changes in Italy since World War II. Productions by representative directors such as Amelio, Giordana, Moretti, Muccino are included. Knowledge of Italian not required. Offered in alternate years. (Same course as Italian 121.) GE credit: ArtHum, Div, Wrt | AH, OL, VL, WC, WE.-III. Heyer-Caput

1215. New Italian Cinema (4)

Lecture/discussion-3 hours; film viewing-3 hours. Prerequisite: course 1 and upper-division standing, or consent of instructor. Italian cinema of the 21st century in the context of profound cultural and social changes in Italy since World War II. Productions by representative directors such as Amelio, Giordana, Moretti, Muccino are included. Knowledge of Italian not required. (Same course as Italian 121S.) GE credit: ArtHum, Div, Wrt | AH, OL, VL, WC, WE.-I, III. (I, III.) Heyer-Caput

124. Topics in U.S. Film History (4)

Lecture—3 hours; film viewing—3 hours. Prerequisite: course 1. Study of an aspect of American film history (such as the silent era; the studio system; U.S. avant-garde cinema), including the influences of technological, economic, regulatory, cultural, and artistic forces. Not open for credit to students who have completed Humanities 124 unless topic differs. May be repeated two times for credit if topic differs. GE credit: ArtHum, Wrt | ACGH, AH, DD, OL, VL, WE.—III. (III.) Clover, Fisher, Simmon, Smoodin

125. Topics in Film Genres (4)

Lecture - 3 hours; film viewing - 3 hours. Prerequisite: course 1. A study of one or more of the film genres (such as the documentary, the musical, film noir, screwball comedy, or the western), including genre theory and the relationship of the genre(s) to culture, history, and film industry practices. Not open for credit to students who have completed Humanities 125 unless topic differs. May be repeated two times for credit if topic differs. GE credit: ArtHum, Wrt | AH, OL, VL, WE.-II. (II.) Clover, Constable, Fisher, Ravetto-Biagioli Simmon, Smoodin

127. Film Theory (4)

Lecture/discussion-3 hours; film viewing-3 hours. Prerequisite: course 1 or consent of instructor. Survey of the conceptual frameworks used to study film (including semiotics, psychoanalysis, spectatorship, auteur, genre and narrative theories). Historical survey of major film theorists. GE credit: ArtHum, Wrt | AH, OL, VL, WC, WE.—III. (III.) Fisher, Ravetto-Biagioloi

129. Russian Film (4)

Lecture/discussion-3 hours; film viewing-3 hours. Prerequisite: completion of Subject A requirement. History of Russian film; film and social revolution, the cult of Stalin, dissident visions; film and the collapse of the Soviet empire; gender and the nation in Russian film. Course taught in English; films are in Russian with English subtitles. Offered in alternate years. (Same course as Russian 129.) GE credit: ArtHum, Div, Wrt.-II.

142. New German Cinema (4)

Lecture/discussion-3 hours; extensive writing. German filmmakers of the 1960s-1980s such as Fass binder, Herzog, Syberberg, Brückner, Schlöndorf, Kluge, Wenders. Knowledge of German not required. May be repeated for credit with consent of instructor. (Same course as German 142) GE credit: ArtHum, Wrt | AH, OL, VL, WC, WE.—I. (I.) Fisher

176A. Classic Weimar Cinema (4)

Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: Humanities 1. German Weimar (1919-1933) cinema. Fritz Lang, F.W. Murnau, and G.W. Pabst among others. Influence on world-wide (esp. Hollywood) film genres such as film noir, horror, science fiction, and melodrama. Not open for credit to students who have completed Humanities 176. Offered in alternate years. (Same Course as Ger man 176A.) GE credit: ArtHum, Wrt | AH, OL, VL, WC, WE.-I. Fisher

176B. Postwar German Cinema (4)

Lecture/discussion-3 hours; film viewing-3 hours. Prerequisite: course 1. Exploration of German cinema from 1945 to 1980, when the Nazi past was a central theme. Includes study of postwar "rubble films," escapist "homeland films," and New German Cinema of the 1970s (including films by Fassbinder, Kluge, Syberberg, and Herzog). Not open for credit to students who have completed Humanities 177. Offered in alternate years. GE credit: ArtHum, Wrt | AH, OL, VL, WC, WE.—II.

189. Special Topics in Film Studies (4)

Lecture/discussion - 3 hours; film viewing - 3 hours. Prerequisite: course 1, upper division standing, or consent of instructor. Group study of a special topic in film, focusing on a national tradition, a major filmmaker, or a specific era. May be repeated three times for credit. GE credit: Wrt | AH, OL, VL, WE. I, III. (I, III.) Clover, Constable, Fisher, Heyer-Caput, Lu, Simmon, Smoodin

190X. Upper Division Seminar (4)

Seminar - 4 hours. Prerequisite: upper division standing or consent of instructor. Study of a special topic in film studies in a small class setting. May be repeated for credit if topic differs. (P/NP grading only.) — I, II, III. (I, II, III.)

192. Internship (1-12)

Supervised internship off and on campus in areas of Film Studies. May be repeated for credit. (P/NP grading only.)

194H. Special Study for Honors Students (1-5)

Variable - 1-5 hours; independent study - 3-15 hours. Prerequisite: senior standing; GPA of at least 3.500; consent of instructor. Guided research on a topic in Film Studies in preparation for the writing of an honors thesis in course 195H or the creation of an honors project in course 196H. May be repeated two times for credit. (P/NP grading only.)—I, II, III. (1, 11, 111.)

195H. Honors Thesis (1-5)

Independent study—3-15 hours. Prerequisite: course 194H and consent of instructor; GPA of at least 3.500; senior standing. Writing of an honors thesis on a topic in Film Studies under the direction of a faculty member. May be repeated two times for credit. (P/NP grading only.) GE credit: AH, VL, WE.—I, II, III. (I, II, III.)

196H. Honors Project (1-5)

Project—3-15 hours. Prerequisite: course 194H and consent of instructor; GPA of at least 3.500; senior standing. Creation of an honors film, video, or mixed-media project under the direction of a faculty member. May be repeated two times for credit. (P/ NP grading only.) GE credit: AH, VL, WE.-I, II, III. (I, II, III.)

197T. Tutoring in Film Studies (1-5)

Tutorial - 3-15 hours. Prerequisite: consent of program director. Leading of small voluntary discussion groups affiliated with one of the Program's regular courses. May be repeated for credit. (P/NP grading only.)

198. Directed Group Study (1-5)

(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Professional Course

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit (S/Ŭ grading only.)

Courses in Technocultural Studies (TCS)

Lower Division Courses

1. Introduction to Technocultural Studies (4)

Lecture - 3 hours; extensive writing. Contemporary developments in the fine and performing arts, media arts, digital arts, and literature as they relate to technological and scientific practices. GE credit: ArtHum | AH, VL, WE. - Ostertag

2. Critiques of Media (4)

Lecture/discussion—3 hours; term paper. Introduction to different forms of critical analysis of media, with focus on creative responses to the media within visual arts, media arts, and net culture. Response of artists to the power of mass media, from early forms of photomontage through contemporary "culture jamming" and alternative media networks. GE credit: ArtHum | AH, VL, WE.—Wyman

4. Parallels in Art and Science (4)

Lecture - 3 hours; term paper. Issues arising from historical and contemporary encounters between the arts and sciences, with emphasis on comparative notions of research, experimentation, and progress. GE credit: ArtHum | AH, VL, WE.

5. Media Archaeology (4)

Lecture/discussion—3 hours; term paper. Evolution of media technologies and practices beginning in the 19th Century as they relate to contemporary digital arts practices. Special focus on the reconstruction of the social and artistic possibilities of lost and obsolete media technologies. GE credit: ArtHum | AH or SE, VL, WE

6. Technoculture and the Popular Imagination (4)

Lecture—3 hours; extensive writing. Issues of technological and scientific developments as conveyed through mass media and popular culture with special attention to public spectacle, exhibitions, broadcasts, performances, demonstrations and literary fictions and journalistic accounts. GE credit: ArtHum | AH, VL, WE.—Kahn

7A-E. Technocultural Workshop (1)

Seminar-1 hour. Workshops in technocultural digital skills: (A) Digital Imaging; (B) Digital Video; (C Digital Sound; (D) Web Design; (E) Topics in Digital Production. GE credit: VL.-I. (I.)

Upper Division Courses

100. Experimental Digital Cinema I (4)

Lecture/discussion-3 hours; laboratory-3 hours. Experimental approaches to the making of film and video in the age of digital technologies. Opportunities for independent producers arising from new media. Instruction in technical, conceptual and creative skills for taking a project from idea to fruition. GE credit: VL. - Wyman

101. Experimental Digital Cinema II (4)

Lecture/discussion-3 hours; laboratory-3 hours. Prerequisite: course 100. Continuation of course 100 with further exploration of digital cinema creation. Additional topics include new modes of distribution, streaming, installation and exhibition. GE credit: VL. - Wyman

103. Interactivity and Animation (4)

Lecture/discussion - 3 hours; laboratory - 3 hours. Fundamentals of creating interactive screen-based work. Theories of interactivity, linear versus non-linear structures, and audience involvement and participation. Use of digital production tools to produce class projects. GE credit: VL. – Drew

104. Documentary Production (4)

Lecture/discussion—3 hours; project. Prerequisite: course 7B or the equivalent, course 155. Traditional and new forms of documentary, with focus on technocultural issues. Skills and strategies for producing work in various media. Progression through all stages of production, from conception through postproduction to critique. GE credit: VL.-Drew, Wyman

110. Object-Oriented Programming for

Lecture/discussion-3 hours; laboratory-3 hours. Prerequisite: course 1. Introduction to object-oriented programming for artists. Focus on understanding the metaphors and potential of object-oriented programming for sound, video, performance, and interactive installations. GE credit: VL.—III. Ostertag

111. Community Media Production (4)

Lecture/discussion-3 hours; laboratory-3 hours. Use of video and new media tools to address social issues among neighborhood and community groups. Students will use basic video, sound, and lighting techniques as they work with local groups in a group video project. GÉ credit: VL.-III. (III.)

112. New Radio Features and Documentary (4)

Lecture/discussion-3 hours; laboratory-3 hours. New feature and documentary production for radio and other audiophonic media, including audio streaming Web sites and installation. Emphasis on new and experimental approaches to audio production for broadcast on community radio and in international arts programming.

113. Community Networks (4)

Lecture/discussion-3 hours; laboratory-3 hours. Impact and implications of computer-based networks in community, civic, and social life. Subjects may include community-access computer sites, neighborhood wireless networks, the digital divide, opensource software, and citizen action.

115. Electronics for Artists (4)

Lecture — 3 hours; laboratory — 3 hours. Prerequisite: course 1. Creative application of electronic technology relevant to media and fine arts involving both electronic principles and hands-on application.—III.

120. History of Sound in the Arts (4)

Lecture—3 hours; term paper. Prerequisite: course 1. A survey of the use of sound, voice, noise, and modes of listening in the modernist, avant-garde, and experimental arts, from the late 19th Century to the present. Focus on audiophonic and audiovisual technologies. — Kahn

121. Introduction to Sonic Arts (4)

Lecture/discussion-3 hours; lecture/laboratory-3 hours. Prerequisite: course 7C. Introduction to the use of sound within the arts. Techniques and aesthetics of experimental contemporary practices. Creation of original sound works. - Ostertag

122. Intermediate Sonic Arts (4)

Lecture/discussion-3 hours; laboratory-3 hours. Prerequisite: course 121, 170C. Techniques of recording, editing, mixing, and synthesis to combine voice, field recordings, and electronic signals. Incorporating live, recorded, and found sounds to create multidimensional stories. Presentation of live performances, audio recordings, and sound installations. — Ostertag

123. Sight and Soundtrack (4)

Lecture/discussion-3 hours; laboratory-3 hours. Prerequisite: courses 7C, 170C. The use of sound to articulate, lend mood or subconsciously underscore visual, environmental or performative situations, combining music, voice, sound effects and other noises to create sound designs that enhance, alter or support action and movement.—Ostertag

125. Advanced Sound: Performance and Improvisation (4)

Workshop-3 hours; practice-3 hours. Prerequisite: courses 121 and 122 or consent of instructor. Culmination of TCS sound courses. Class will focus on performance and improvisation, culminating in a final public performance. Students will be expected to do extensive reading and rehearsal outside of class time. - III. (III.) Ostertag

130. Fundamentals of 3D Computer Graphics (4)

Lecture—3 hours; laboratory—3 hours. A foundation course that teaches students the theory of three dimensional computer graphics, including modeling, rendering and animation. Development of practical skills through the use of professional software to create computer graphics. - I. (I.) Neff

131. Character Animation (4)

Lecture — 3 hours; laboratory — 3 hours. Prerequisite: course 130 or consent of instructor. The art of character animation in three dimensional computer animation. Movement theory, principles of animation, animation timing. Development of technical and practical skills.—III. (III.) Neff

150. Introduction to Theories of the Technoculture (4)

Lecture/discussion—3 hours; extensive writing. Major cultural theories of technology with emphasis on media, communications, and the arts. Changing relationships between technologies, humans, and culture. Focus on the evolution of modern technologies and their reception within popular and applied contexts. GE credit: ArtHum | VL. - Dyson

151. Topics in Virtuality (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 1. Social, political, economic, and aesthetic factors in virtual reality. Artificial environments, telepresence, and simulated experience. Focus on contemporary artists' work and writing. GE credit: VL. — Dyson

152. New Trends in Technocultural Arts (4)

Lecture/discussion - 3 hours; term paper. Current work at the intersection of the arts, culture, science, and technology including biological and medical sciences, computer science and communications, and artificial intelligence and digital media. GE credit: VL. - Dyson

153. Concepts of Innovative Soundtracks

Lecture/discussion—3 hours; term paper. Innovative and unconventional soundtracks in cinema, media arts, and fine arts. Introduction to basic analytical skills for understanding sound-image relationships.

154. Outsider Machines (4)

Lecture/discussion-3 hours; term paper. Invention, adaptation and use of technologies outside the mainstream, commonsense, and the possible. Topics include machines as metaphor and embodied thought, eccentric customizing and fictional technologies. GE credit: VL.

155. Introduction to Documentary Studies (4)

Lecture/discussion—3 hours; term paper. Recent evolution of the documentary. The personal essay film; found-footage/appropriation work; non-linear, multi-media forms; spoken word; storytelling; oral history recordings; and other examples of documentary expression. GE credit: ACGH, AH, DD, VL.-I. (I.) Drew

158. Technology and the Modern American Body (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 1 and either American Studies 1 or 5. The history and analysis of the relationships between human bodies and technologies in modern society. Dominant and eccentric examples of how human bodies and technologies influence one another and reveal underlying cultural assumptions. (Same course as American Studies 158.) GE credit: ArtHum | ACGH, AH, WE. - de la Pena

159. Media Subcultures (4)

Lecture/discussion-3 hours; term paper. Relationships between subcultural groups and media technologies. Media as the cohesive and persuasive force of subcultural activities. List-servs, Web sites, free radio, fan 'zines, and hip-hop culture. GE credit: Div | ACGH, VL.—II. (II.) Drew

170A-E. Advanced Technocultural Workshop (1)

Seminar—1 hour. Prerequisite: course 7A or the equivalent. Workshops in advanced technocultural digital skills: (A) Digital Imaging; (B) Digital Video; (C) Digital Sound; (D) Web Design; (E) Topics in Digital Production. GE credit: VL.

175. Small Scale Film Production (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: consent of instructor. Lecture and intensive workshop teaching small-scale film production. Appointments as a(n) director, director of photography, actor, writer, lighting designer, sound designer and other critical positions are used to produce and submit a short film to a film festival. (Same course as Dramatic Art 175.) May be repeated two times for credit.—III. (III.) Anderson, Drew

190. Research Methods in Technocultural Studies (4)

Lecture/discussion-3 hours; project. Introduction to basic research methods for Technocultural Studies: electronic and archived images, sounds and data, satellite downlinking, radiowave scanning, and oral histories. GE credit: VL, WE.-Drew

191. Writing Across Media (4)

Lecture/discussion-3 hours; extensive writing. Introduction to experimental approaches to writing for different media and artistic practices. How written texts relate to the images, sounds, and performances in digital and media production. GE credit: WE.-Jones

192. Internship (1-4)

Internship—3-12 hours. Supervised internship on or off campus in area relevant to Technocultural Studies. May be repeated two times for credit. (P/NP grading only.)

197T. Tutoring in Technocultural Studies (1-5)

Tutorial-3-15 hours. Prerequisite: consent of instructor. Undergraduates assist the instructor by tutoring students in one of the department's regularly sched uled courses. May be repeated for credit up to eight units. (P/NP grading only.)—I, II, III. (I, II, III.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. Guided study with faculty member in independent scholarly activity.

May be repeated for credit up to eight units. (P/NP grading only.)

Classics

(College of Letters and Science) Emily Albu, Ph.D., Program Director

Department Office. Spanish and Classics; 618 Sproul Hall: (530) 752-0835; http://classics.ucdavis.edu

Faculty

Don Abbott, Ph.D., Professor (English) Carlee Arnett, Ph.D., Associate Professor (German) Emily Albu, Ph.D., Associate Professor Noha Radwan, Ph.D., Assistant Professor (Comparative Literature) Lynn E. Roller, Ph.D., Professor (Art History) Carey Seal, Ph.D., Assistant Professor Seth L. Schein, Ph.D., Professor (Comparative Literature) Jocelyn Sharlet, Ph.D., Assistant Professor (Comparative Literature) Rex Stem, Ph.D., Assistant Professor Akihiko Watanabe, Ph.D., Assistant Professor

Emeriti Faculty

David A. Traill, Ph.D., Professor Emeritus Wesley E. Thompson, Ph.D., Professor Emeritus

Affiliated Faculty

Poonam Chauhan, M.A. Lecturer Galia Franco, M.A. Lecturer Shayma Hassouna, M.A., Lecturer Valentina Popescu, Ph.D., Lecturer John Rundin, Ph.D., Lecturer

The Major Program

Classical Civilization is an interdisciplinary major that examines the ancient Mediterranean cultures of Greece, Rome and the Near East, with courses offered on the languages, history, literature, religions, myths, art and archaeology of these societies, their achievements in rhetoric and philosophy, and their political and social institutions. Minor programs in Classical Civilization, Greek, and Latin, and many General Education courses are offered also.

The Program. The major has two tracks: (1) Classical and Mediterranean Civilizations, and (2) Classical Languages and Literatures. The core of both major tracks consists of two years of Latin, Greek or Hebrew, the introductory sequence on the ancient Mediterranean world (Classics 1, 2, 3), the advanced seminar (Classics 190), and a number of electives. The Classical and Mediterranean Civilization track allows students to choose their electives from a broadly balanced program in history, art and archaeology, literature, philosophy and rhetoric. The Classical Languages and Literatures track focuses more intensively on language and literature, requiring the study of two languages and allowing fewer electives. Students planning to go on to graduate work in Classics should take Track 2 and study as much Latin and Greek as possible. They should make a point of talking to an advisor early in their undergraduate program. They are also advised to acquire a reading knowledge of French or German.

Career Opportunities. A degree in Classical Civilization represents a solid liberal arts education that provides an excellent foundation for a wide variety of careers. In the last twenty-five years, many majors have applied to law or medical schools and nearly all have been accepted. Additional career options include library and museum work, teaching, journalism, and graduate study in Classics, art, archaeology, history, literature, philosophy, and religion.

Classical Civilization

A. B. Major Requirements:

UNITS

Classical and Mediterranean Civilizations track

Preparatory Subject Matter.....26-27

Latin 1-2-3, or Greek 1-2-3, or Hebrew One additional course from: Art History 1A; Classics courses 1 through 50 (except 30 and 31); Comparative Literature 1; Philosophy 21; Religious Studies 21, 40......3-4

Depth Subject Matter40

Upper division courses in Latin, Greek or Six additional courses selected from at least Greek, Hebrew, or Classics, and one course must be selected from group (c).

(a) Literature and Rhetoric: Additional upper division courses in Latin, Greek and Hebrew; Classics 102, 110, 140, 141, 142, 143 (b) History: History 102A, 111A, 111B, 111C; Religious Studies 102, 125 (c) Art and Archaeology

Classics 171, 172A, 172B, 173, 174,

175 (d) Philosophy and Religion: Classics 150; Philosophy 143, 160, 161, 162; Political Science 118A; Religious Studies 141A, 141B, 141C

Total Units for the Major66-67

Classical Languages and Literatures track Preparatory Subject Matter.....34 Two of the following sequences: Latin 1-2-3; Greek 1-2-3; Hebrew 1-2-3......30 Classics 1, 2, or 34

Depth Subject Matter36 Six upper division courses in the two chosen languages, with at least two courses in each language......24 Classics 190......4 Two additional courses selected from any of the following groups8 (a) Literature and Rhetoric: . Additional upper division courses in Latin, Greek and Hebrew; Classics 102, 110, 140, 141, 142, 143 (b) History: History 102A, 111A, 111B, 111C; Religious Studies 102, 125 (c) Art and Archaeology: Classics 171, 172A, 172B, 173, 174, (d) Philosophy and Religion: Classics 150; Philosophy 143, 160, 161, 162; Political Science 118A; Religious Studies 141A, 141B, 141C

Total Units for the Major70 Major Advisers. E.M. Albu, V. Popescu, C. Seal

Minor Program Requirements:

The Department offers minors in Classical Civilization, Greek and Latin for those wishing to follow a shorter but formally recognized program of study in Classics.

Classical Civilization......20 Classics 1, 2, or 34 One upper division course in Latin, Greek or Hebrew Two additional upper division courses in Classics, Latin, Greek or Hebrew.....8 One additional upper division course selected from any of the groups (a) through (d) in the Classical Civilization major.....4

Greek20 Classics 1 or 2 Three upper division courses in Greek 12 One additional upper division course in Classics, Latin, Greek or Hebrew.....4

Latin20 Classics 34 Three upper division courses in Latin12 One additional upper division course in Classics, Latin, Greek or Hebrew......4

Honors Program. Candidates for high or highest honors in Classical Civilization must write a senior honors thesis under the direction of a faculty member in Classics. Potential candidates for the honors program must enroll in Classics 194HA and 194HB, normally during the first two quarters of the senior year. Enrollment is limited to upper division students with a minimum of 135 units, and a 3.500 grade point average in courses in the Classical Civilization major. For further information, students should consult with the major adviser or program director. The requirements for the honors program are in addition to the regular requirements for the major in Classical Civilization.

Graduate Study. The Department offers a master's degree in Classics with emphasis on either Greek or Latin; however, admission into the graduate program has been suspended.

Prerequisite credit. Credit will not normally be given for a lower division course in Latin or Greek if it is the prerequisite of a course already successfully completed. Exceptions can be made by the Program Director only.

Courses in Arabic, Classics, Greek, Hebrew, Hindi-Urdu, and Latin follow in alphabetical order.

Courses in Arabic (ARB)

Lower Division Courses

1. Elementary Arabic 1 (5)

Lecture/discussion-5 hours. Introduction to basic Arabic. Interactive and integrated presentation of listening, speaking, reading, and writing skills, including the alphabet and basic syntax. Focus on standard Arabic with basic skills in spoken Egyptian and/or one other colloquial dialect. GE credit: AH. — Hassouna

1A. Intensive Elem Arabic (15)

Lecture/discussion - 15 hours. Special 12-week accelerated, intensive summer session course that combines the work of courses 1, 2, and 3. Introduction to Modern Standard Arabic through development of all language skills in a cultural context with emphasis on communicative proficiency. Not open for credit to students who have completed course 1, 2, or 3. Not offered every year. GE credit: AH, WC.-IV. (IV.)

2. Elementary Arabic 2 (5)

Lecture/discussion-5 hours. Prerequisite: course 1 or with instructor's consent after student takes all components of the course 1 final exam. Continues introduction to basic Arabic from course 1. Interactive and integrated presentation of listening, speaking, reading, and writing skills, including syntax. Focus on standard Arabic and limited use of spoken Egyptian and/or one other colloquial dialect. GE credit: AH.—II. (II.) Hassouna

3. Elementary Arabic 3 (5)

Lecture/discussion - 5 hours. Prerequisite: course 1 and 2 or with consent of instructor after taking all components of the final exam for course 1 and 2. Continues introduction to basic Arabic from courses and 2. Interactive and integrated presentation of listening, speaking, reading, and writing skills, including syntax. Focus on standard Arabic with limited use of spoken Egyptina and/or one other colloquial dialect. GE credit: AH.—III. (III.) Hassouna

21. Intermediate Arabic 21 (5)

Lecture/discussion-5 hours. Prerequisite: course 1, 2, 3 or with consent of instructor after taking all parts of course 3 final exam. Builds on courses 1, 2, and 3. Interactive and integrated presentation of listening, speaking, reading, and writing skills, including idiomatic expression. Focus on standard Arabic with limited use of Egyptian and/or one other colloquial dialect. GE credit: AH. — I. (I.) Hassouna

22. Intermediate Arabic 22 (5)

Lecture/discussion-5 hours. Prerequisite: course 21 or with consent of instructor after taking all parts of course final 21 exam. Continues from course 21. Interactive and integrated presentation of listening, speaking, reading, and writing skills, including idiomatic expression. Focus on standard Arabic with limited use of Egyptian and/or one other colloquial dialect. GE credit: AH.—II. (II.) Hassouna

23. Intermediate Arabic 23 (5)

Lecture/discussion - 5 hours. Prerequisite: course 22 or with consent of instructor after completing all parts of the final exams for courses 21 and 22. Continues from courses 21 and 22. Interactive and integrated presentation of listening, speaking, reading, and writing skills, including idiomatic expression. Focus on standard Arabic with limited use of Egyptian and/or one other colloquial dialect. GE credit: AH. - III. (III.) Hassouna

Upper Division Courses 121. Advanced Arabic (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 23 or consent of instructor. Review, refinement, and development of skills learned in intermediate Arabic through work with texts, video, and audio on cultural and social issues. Integrated approach to reading, writing, listening, speaking

primarily standard Arabic, with limited use of one colloquial dialect. May be repeated two times for credit based on different readings. GE credit: AH, WC.-I. (I.) Sharlet

122. Advanced Arabic (4)

Lecture/discussion-3 hours. Prerequisite: course 121 or permission of instructor. Continuation of course 121. Further development of advanced skills in reading, listening, writing, and speaking standard Arabic through work with texts, video, and audio on cultural and social issues. Limited use of one colloquial dialect. GE credit: AH, WC.-II. (II.) Radwan

123. Advanced Arabic (4)

 $\label{lecture} Lecture/discussion-3 \ hours. \ Prerequisite: course$ 122 or permission of instructor. Continuation of course 122. Further development of advanced skills in reading, listening, writing, and speaking standard Arabic through work with texts, video, and audio on cultural and social issues. Limited use of one colloquial dialect. GE credit: AH, WC.-III. (III.) Radwan

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. Development of reading, writing, speaking, and listening skills in advanced Arabic. Materials may include al-Kitaab Part Two or Three, news articles and broadcasts, short stories, poetry, novels, essays, scripture, prophetic traditions, audio recordings, and television and film. May be repeated four times for credit if content differs. (P/NP grading only.)—I, II, III. (I, II,

Courses in Classics (CLA)

Lower Division Courses

1. The Ancient Near East and Early Greece: 3000-500 B.C.E. (4)

Lecture - 3 hours; term paper. Introduction to the literature, art, and social and political institutions of ancient Mesopotamia, Egypt, Palestine, and early Greece from 3000 to 500 B.C.E. GE credit: ArtHum, Wrt | AH, WC, WE. - (II.) Popescu

2. Ancient Greece and the Near East: 500 to 146 B.C.E. (4)

Lecture—3 hours; term paper. Introduction to the literature, art and thought and the political and social institutions and values of Greece and its eastern Mediterranean neighbors—the Persians, Egyptians, and Judeans. GE credit: ArtHum, Wrt | AH, WC, WE.—II. (II.)

3. Rome and the Mediterranean: 800 B.C.E. to 500 C.E. (4)

Lecture - 3 hours; discussion - 1 hour. Introduction to the history, literature, material culture, political and social institutions and values of Roman Civilization, with an emphasis on the development of the Roman Empire and the interactions of Roman culture with other Mediterranean cultures. GE credit: ArtHum | AH, WC, WE.-III. (III.) Stem

10. Greek, Roman, and Near Eastern Mythology (3)

Lecture - 3 hours. Examination of major myths of Greece, Rome, and the Ancient Near East; their place in the religion, literature and art of the societies that produced them; their subsequent development, influence and interpretation. GE credit: ArtHum | AH, VL, WC.—I, II, III. (I, II, III.) Rundin,

15. Women in Classical Antiquity (4)

Lecture/discussion-3 hours; term paper. Lives and roles of women and men in ancient Greece and Rome. Readings from history, philosophy, medical and legal documents, literature and myth. Offered irregularly. GE credit: AH, VL, WC, WE.—Seal

20. Pompeii AD 79 (4)

Lecture-3 hours; term paper. Roman life in an urban community at the time of the eruption of Vesuvius. Slide presentations of the archeological evidence will be supplemented by selected readings from Petronius' Satyricon and other ancient authors. Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WC, WE.

25. The Classical Heritage in America (4)

Lecture/discussion-3 hours; term paper. Classical heritage in the New World, with emphasis on the United States from its colonial past to the present day. The reception of Greco-Roman thought and values as expressed in art, architecture, education, law, government, literature, and film. Offered irregularly. GE credit: ArtHum, Wrt | ACGH, AH, WE.—Albu

30. Greek and Latin Elements in English Vocabulary (3)

Lecture - 3 hours. Knowledge of Latin and Greek not required. Elements of Greek and Latin vocabulary for increased understanding of English word formation and improved ability to understand and retain unfamiliar words. Emphasis on Greek and Latin elements but other languages not neglected. GE credit: AH. - III. (III.) Albu, Popescu, Rundin

31. Greek and Latin Elements in Technical Vocabulary (3)

Lecture — 3 hours. Knowledge of Greek and Latin not required. Elements of Greek and Latin vocabulary to increase understanding of English word formation in medical, scientific and technical terminology and improve ability to understand and retain unfamiliar terms. GE credit: AH.

50. The Rise of Science in Ancient Greece (4)

Lecture/discussion—3 hours; term paper. Prerequisite: Mathematics 16A or the equivalent. Study of the emergence of scientific rationality in ancient Greece and its political and social context; concentration on four areas: mathematics, medicine, cosmology, and psychology. Reading from the Presocratics, Hippocrates, Plato, Aristotle, and Hellenistic philosophers. GE credit: ArtHum, Wrt | AH,

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses 101A. Topics in Ancient Mediterranean Civilizations (4)

Lecture/discussion—3 hours; term paper. Prerequisite: one course in Classics, Latin or Greek or consent of instructor. Topics may be ordered by time or place (e.g. Hellenistic Egypt) or by theme or genre (e.g. slavery in the ancient world). May be repeated two times for credit when topic differs. Offered irregularly. GE credit: AH, WC, WE.-Albu

101B. Topics in Greek Civilization (4)

Lecture/discussion-3 hours; term paper. Prerequisite: one course in Classics, Latin, or Greek or consent of instructor. Topics may be ordered by time or place (e.g. the world of Homer) or by theme or genre (e.g. the Greek art of war). May be repeated two times for credit when topic differs. Offered irregularly. GE credit: AH, WC, WE.-Albu

101C. Topics in Roman Civilization (4)

Lecture/discussion-3 hours; term paper. Prerequisite: one course in Classics, Latin or Greek or consent of instructor. Topics may be ordered by time or place (e.g. Julius Caesar and his age) or by theme or genre (e.g. gladiators: blood in the arena). May be repeated two times for credit when topic differs. Offered irregularly. GE credit: AH, WC, WE.—Albu

101D. Topics in Classical Receptions (4)

Lecture/discussion—3 hours; term paper. Prerequisite: one course in Classics or consent of instructor. Topics in classical reception from late antiquity to the present. Topics may be ordered by time or place (e.g. the classical tradition in Washington, D.C.) or by theme or genre (e.g. cinematic representations of the ancient world). May be repeated two times for credit when topic differs. Offered irregularly. GE credit: AH, WC, WE.—III. Albu

102. Film and the Classical World (4)

Lecture - 3 hours; film viewing - 2.5 hours. Prerequisite: any Classics course except 30 or 31. The Classical World as portrayed in films. Viewings and discussions of modern versions of ancient dramas, modern dramas set in the Ancient Mediterranean world, and films imbued with classical themes and

allusions. Supplementary readings in ancient literature and mythology. GE credit: ArtHum, Wrt | AH, WE. - (II.) Albu

110. Origins of Rhetoric (4)

Lecture—3 hours; term paper. Prerequisite: one course in ancient history or consent of instructor. Issues in the development of rhetoric from its origins in ancient Greece to A.D. 430. Special attention to works of Plato, Aristotle, Cicero, and Quintilian. Role of grammar and rhetoric in schools of Roman Empire. The Christian rhetoric of Saint Augustine. Not open for credit to students who have completed Rhetoric and Communication 110 or Communication 110. (Former course Rhetoric and Communication 110.) GE credit: ArtHum, Wrt | AH, WE. - (III.)

120. Greek and Roman Historiography (4)

Lecture/discussion-3 hours; term paper. Survey of Greek and Roman historical writing in English translation. Authors to be read may include Herodotus, Thucydides, Sallust, Livy, and Tacitus. Focus on the development of historical writing as a literary genre. GE credit: AH, WC, WE. Offered in alternate

125. Roman Political Thought (4)

Lecture - 3 hours; term paper. Survey of Roman thinking about politics, as expressed both in formal theorizing and in a variety of other contexts, including oratory, historiography, and epic. Study of Roman political reflection in its historical, cultural, and literary context. GE credit: AH, WC, WE. Offered in alternate years.—Seal

140. Homer and Ancient Epic (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 10 or Comparative Literature 1. Reading of the classical epics of Homer (Iliad, Odyssey) and Virgil (Aeneid) in English. Discussion of techniques of composition, the beliefs and values of their respective societies, and the generic tradition of ancient epic. Offered in alternate years.GE credit: ArtHum, Wrt | AH, WC, WE.-Popescu

141. Greek and Roman Comedy (4)

Lecture-3 hours; conference-1 hour. Readings in Aristophanes, Menander, Plautus, and Terence; lectures on the development of ancient comedy. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WE. - Popescu

142. Greek and Roman Novel (4)

Lecture-3 hours; term paper. Examination of the ancient Greek romances and their development into the grotesque realism of Petronius' Satyricon, and the religious mysticism of Apuleius' The Golden Ass. GE credit: ArtHum, Wrt | AH, WC, WE.—Schein

143. Greek Tragedy (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 10. Reading in English of selected plays of Aeschylus, Sophocles, and Euripides. Discussion of the development and influence of Athenian tragedy. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WE.-Popescu

150. Socrates and Classical Athens (4)

Lecture/discussion-3 hours; term paper. Study of the major sources of our knowledge of Socrates, assessment of his role in the politics and culture of ancient Athens, his method of teaching, and his place in Western thought. Offered in alternate years. . GE credit: AH, WC, WE.—Seal

171. Mediterranean Bronze Age Archaeology (4)

Lecture — 3 hours; extensive writing. Prerequisite: one of course 1, 2, 10, 15, Art History 1A, or Anthropology 3 recommended. Archaeological monuments of the ancient Near East, including Egypt and Mesopotamia, and of Greece and Crete during the Bronze Age. Special emphasis on the problems of state formation and on the co-existence and collapse of Bronze Age societies. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC.—Roller

172A. Early Greek Art and Architecture (4)

Lecture -3 hours; term paper. Examination of the origin and development of the major monuments of Greek art and architecture from the eighth century to

the mid-fifth century B.C. Not open for credit to students who have completed Art History 154A. (Same course as Art History 172A.) Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WE.-

172B. Later Greek Art and Architecture (4)

Lecture—3 hours; term paper. Study of the art and architecture of later Classical and Hellenistic Greece, from the mid-fifth century to the first century B.C. Not open for credit to students who have completed Art History 154B. (Same course as Art History 172B.) Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WE. - (II.) Roller

173. Roman Art and Architecture (4)

Lecture—3 hours; term paper. The art and architecture of Rome and the Roman Empire, from the founding of Rome through the fourth century C.E. Not open for credit to students who have completed Art History 155. (Same course as Art History 173.) Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WE. - II. Roller

174. Greek Religion and Society (4)

Lecture-3 hours; term paper. Prerequisite: a lower division Classics course, except Classics 3, 20, 30, or 31. Cults, festivals, and rituals of Greek religious practice and their relationship to Greek social and political institutions, and to Greek private life. Includes discussion of major sanctuaries at Olympia, Delphi, Athens, and others. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC.-Rundin

175. Architecture and Urbanism in Mediterranean Antiquity (4)

Lecture—3 hours; extensive writing. Prerequisite: a lower division course (except 30, 31); Art History 1A recommended. Architecture and urban development in the ancient Near East, Greece, and Rome. Special emphasis on the social structure of the ancient city as expressed in its architecture, and on the interaction between local traditions and the impact of Greco-Roman urbanism. (Same course as Art History 175.) Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.-(II.)

190. Senior Seminar (4)

Seminar-3 hours; term paper. Prerequisite: completion of one upper division course in Latin, Greek or Hebrew or consent of instructor. Advanced interdisciplinary study of a problem in the ancient Mediterranean world using the techniques of history, archaeology, art history and philology. May be repeated for credit with consent of instructor. GE credit: ArtHum, Wrt | AH, WE.-I.

194HA-194HB. Special Study for Honors Students (3-3)

Discussion - 1 hour; independent study; term paper. Prerequisite: admission to the honors program and consent of faculty member supervising honors thesis. Directed reading, research and writing culminating in the completion of a senior honors thesis under the direction of faculty adviser. (Deferred grading only, pending completion of sequence. P/NP grading only.) GE credit: AH. - I-II, II-III.

197TC. Community Tutoring in Classical Languages (1-5)

Tutoring-1-5 hours. Prerequisite: consent of instructor. Supervised instruction of Greek or Latin in nearby schools by qualified students in department. May be repeated for credit up to 5 units. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: upper division standing. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

Graduate Courses

200A. Approaches to the Classical Past (4)

Seminar-3 hours; term paper. Survey of major areas of classical scholarship, with special emphasis on the continuing impact of Mediterranean antiquity on later literature, history, art, and culture. Offered in alternate years. — (I.) Álbu

200B. Approaches to the Classical Past (4)

Independent study-4 hours. Prerequisite: course 200A; graduate student status. Research project on major area of Classical scholarship, with special emphasis on the continuing impact of Mediterranean antiquity on later literature, history, art, and culture. Limited enrollment. Offered in alternate years. — (III.)

201. Introduction to Classical Philology (4)

Seminar-3 hours; term paper. Survey of major contemporary areas of classical scholarship with special attention devoted to current problems in literary and textual criticism.

202. Homer (4)

Seminar-3 hours; term paper. Readings in the Iliad and Odyssey: the origins and transmission of the

203. Vergil (4)

Seminar—3 hours; term paper. Reading of selected books of the Bucolics, Georgics, and Aeneid. Emphasis will be placed on the study of Vergilean poetic language. — Traill

204. Greek and Roman Comedy (4)

Seminar-3 hours; term paper. Historical and critical problems in Aristophanes or New Comedy. May be repeated for credit.

205. Latin Lyric and Elegy (4)

Seminar-3 hours; term paper. Critical examination of the works of Catullus, Horace, or Propertius. May be repeated for credit.—Traill

206. Greek Historiography (4)

Seminar—3 hours; term paper. Development of historical writing in Greece. May be repeated for credit

207. Greek Drama (4)

Seminar-3 hours; term paper. Literary and philological analysis of the plays of Euripides, Sophocles, or Aeschylus. May be repeated for credit.

299. Research (1-12)

Prerequisite: consent of instructor. (S/U grading

Courses in Greek (GRK)

Lower Division Courses

1. Elementary Greek (5)

Lecture -5 hours. Introduction to the basic grammar and vocabulary of Classical and New Testament Greek. Development of translation skills with emphasis on Greek-English. (Students who have successfully completed Greek 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student's P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed.) GE credit: AH. –I. (I.) Popescu

2. Elementary Greek (5)

Lecture-5 hours. Prerequisite: course 1. Continuation of course 1. GE credit: AH.—II. (II.) Popescu

2NT. Elementary New Testament Greek (1)

Lecture - 1 hour. Prerequisite: course 2 (concurrently). Supplementary study of New Testament Greek. GE credit: AH.—II. (II.) Popescu

3. Intermediate Greek (5)

Lecture - 5 hours. Prerequisite: course 2. Continuation of course 2. Selected readings from Greek authors. GE credit: AH.—III. (III.) Popescu

3NT. Elementary New Testament Greek (1)

Lecture - 1 hour. Prerequisite: course 3 (concurrently). Supplementary study of New Testament Greek. GE credit: AH.—III. (III.) Popescu

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

100. Readings in Greek Prose (5)

Lecture/discussion-4 hours; term paper. Prerequisite: course 3 or equivalent. Review of Greek morphology, syntax, and vocabulary. Readings in Greek prose authors, including Xenophon. GE credit: AH, WC, WE.—I. (I.) Seal

101. Plato (4)

Lecture—3 hours; term paper. Prerequisite: course 3. GE credit: ArtHum, Wrt | AH, WE.—(II.) Seal

102. Euripides (4)

Lecture—3 hours; term paper. Prerequisite: course 101. GE credit: ArtHum, Wrt | AH, WE.—III. Pope-

103A. Homer: Iliad (4)

Recitation - 3 hours; term paper. Prerequisite: course 3. GE credit: ArtHum, Wrt | AH, WE. - (II.) Schein

103B. Homer: Odyssey (4)

Recitation - 3 hours; term paper. Prerequisite: course 3. GE credit: ArtHum, Wrt | AH, WE. - (II.) Schein

104. Menander (4)

Lecture — 3 hours; term paper. Prerequisite: course 3. GE credit: ArtHum, Wrt | AH, WE.

105. Attic Orators (4)

Lecture—3 hours; term paper. Prerequisite: course 100 or equivalent. Selected readings from the orators of 4th and 5th century Athens. May be repeated for credit if topic differs and with consent of instructor. Offered irregularly. GE credit: AH, WC, WE.

110. Readings in the Greek Novel (4)

Lecture - 3 hours; term paper. Prerequisite: course 100N. Selected readings from Greek prose fiction of the late classical, Hellenistic and imperial periods. Offered in alternate years. May be repeated two times for credit with consent of instructor. GE credit: Wrt. — (III.)

111. Sophocles (4)

Lecture-3 hours; term paper. Prerequisite: course 103. GE credit: ArtHum, Wrt | AH, WE. - (III.)

112. Aristophanes (4)

Lecture—3 hours; term paper. Prerequisite: course 103. GE credit: ArtHum, Wrt | AH, WE.

113. Thucydides (4)

Lecture—3 hours; term paper. Prerequisite: course 103. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WE.—Popescu

114. Lyric Poetry (4)

Lecture—3 hours; term paper. Prerequisite: course 103. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WE. - Popescu

115. Aeschylus (4)

Lecture-3 hours; term paper. Prerequisite: course 103. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WE. - Schein

116. Herodotus (4)

Lecture—3 hours; term paper. Prerequisite: course 103. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WE.-Stem

121. Greek Prose Composition (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or equivalent. Intensive grammar and vocabulary review through exercises in Greek prose composition. Offered in alternate years. GE credit: AH.

130. Readings in Later Greek (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 100 or equivalent. Translation and discussion of selected readings from Hellenistic to Byzantine Greek literature. Offered in alternate years. GE credit: AH, WE

198. Directed Group Study (1-5)

(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Courses in Hebrew (HEB)

Lower Division Courses

1. Elementary Hebrew (5)

Lecture/discussion-4 hours; laboratory-1 hour. Speaking, listening, comprehension, reading and writing fundamentals of modern Hebrew. (Students who have successfully completed, with a C- or better, Hebrew 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/ NP grading basis only. Although a passing grade will be charged to the student's P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed.) GE credit: AH.—I. (I.) Franco

1A. Accelerated Intensive Elementary Hebrew (15)

Lecture/discussion-15 hours. Special 12 week accelerated, intensive summer session course that combines the work of courses 1, 2, and 3. Introduction to Hebrew grammar and development of language skills in a cultural context with emphasis on communication. Not open to students who have completed course 1, 2, or 3. GE credit: AH, WC.-

2. Elementary Hebrew (5)

Lecture/discussion-4 hours; laboratory-1 hour. Prerequisite: course 1 or the equivalent. Speaking, listening, comprehension, reading and writing fundamentals of modern Hebrew. GE credit: AH.-II. (II.) Franco

3. Elementary Hebrew (5)

Lecture/discussion-4 hours; laboratory-1 hour. Prerequisite: course 2 or the equivalent. Speaking, listening comprehension, reading and writing fundamentals of modern Hebrew. GE credit: AH.—III. (III.) Franco

21. Intermediate Mod Hebrew I (5)

Lecture/discussion-5 hours. Prerequisite: course 3 or consent of instructor. Development and refinement of grammar, composition, and language skills required for reading literary texts and conversing about contemporary topics at an advanced level History of the Hebrew language. Not open to students who have taken courses 100 or 100A.—I. (I.)

22. Intermediate Modern Hebrew II (5)

Lecture/discussion-5 hours. Prerequisite: course 21 or consent of instructor. Continued development and refinement of grammar, composition, and language skills required for reading literary texts and conversing about contemporary topics at an advanced level. History of the Hebrew language. Not open to students who have taken course 101 or 100B.—II. (II) Franco

23. Intermediate Modern Hebrew III (5)

Lecture/discussion-5 hours. Prerequisite: course 22 or consent of instructor. Continued development and refinement of grammar, composition, and language skills required for reading literary texts and conversing about contemporary topics at an advanced level. History of the Hebrew language. Further development of writing and translating skills. Not open to students who have taken course 100C or 102.—III. (III.) Franco

Upper Division Courses 100AN. Advanced Modern Hebrew I (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 23 or consent of instructor. Students who have taken course 100A as 2nd year Hebrew may take course 100AN. Third year Hebrew. Advanced grammar and composition. Focus on reading of literary texts, oral skills and accuracy in writing. GE credit: AH.-I. (I.)

100BN. Advanced Modern Hebrew II (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 100AN or consent of instructor. Students who have taken course 100B as 2nd year Hebrew

may take course 100BN. Third year Hebrew. Advanced grammar and composition. Focus on reading of literary texts, oral skills and accuracy in writing. GE credit: AH. - II. (II.)

100CN. Advanced Modern Hebrew III (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 100BN. Students who have taken course 100C as 2nd year Hebrew may take course 100CN. Third year Hebrew. Advanced grammar and composition. Focus on reading of literary texts, oral skills and accuracy in writing. GE credit: AH. – III. (III.)

Courses in Hindi (HIN)

Lower Division Courses

1. Elementary Hindi/Urdu I (5)

Lecture/discussion-5 hours. An introduction to Hindi and Urdu in which students will learn vocabulary and grammar in both Devanagari and Urdu scripts, and will practice skills in reading, writing, speaking and listening. GE credit: AH.-I. (I.) Chau-

2. Elementary Hindi/Urdu II (5)

Lecture/discussion - 5 hours. Prerequisite: course 1. An introduction to Hindi and Urdu in which students will learn vocabulary and grammar in both Devanagari and Urdu scripts, and will practice skills in reading, writing, speaking and listening. GE credit: AH.—II. (II.) Chauhan

3. Elementary Hindi/Urdu III (5)

Lecture/discussion-5 hours. Prerequisite: course 2. An introduction to Hindi and Urdu in which students will learn vocabulary and grammar in both Devanagari and Urdu scripts, and will practice skills in reading, writing, speaking and listening. GE credit: AH.—III. (III.) Chauhan

21. Intermediate Hindi/Urdu (5)

Lecture/discussion—5 hours. Prerequisite: course 3. An intermediate level course for students who have completed Elementary Hindi/Urdu or the equivalent. Students will continue to practice their skills in listening, speaking, reading and writing in Hindi and Urdu. GE credit: AH.—I. (I.) Chauhan

22. Intermediate Hindi/Urdu II (5)

Lecture/discussion-5 hours. Prerequisite: course 21. An intermediate level course where students will continue to practice their skills in listening, speaking, reading and writing in Hindi and Urdu. GE credit: AH. — II. (II.) Chauhan

23. Intermediate Hindi/Urdu III (5)

Lecture/discussion - 5 hours. Prerequisite: course 22. An intermediate level course where students will continue to practice their skills in listening, speaking, reading and writing in Hindi and Urdu. GE credit: AH.—III. (III.) Chauhan

Courses in Latin (LAT)

Lower Division Courses

1. Elementary Latin (5)

Lecture - 5 hours. Introduction to basic grammar and vocabulary and development of translation skills with emphasis on Latin to English. (Students who have successfully completed Latin 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student's P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed.) GE credit: AH.-I. (I.) Popescu, Run-

2. Elementary Latin (5)

Lecture — 5 hours. Prerequisite: course 1. Continuation of course 1. GE credit: AH.—II. (II.) Rundin

3. Intermediate Latin (5)

Lecture - 5 hours. Prerequisite: course 2. Continuation of course 2. Selected readings from Latin authors. GE credit: AH.—III. (III.) Rundin

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

100. Readings in Latin Prose (4)

Lecture/discussion-4 hours. Prerequisite: course 3 or the equivalent. Review of Latin morphology, grammar, and vocabulary. Readings in prose authors, including Julius Caesar.—I. (I.) Stem

101. Livy (4)

Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WE. - (III.) Stem

102. Roman Comedy (5)

Lecture — 4 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WE. - (II.) Albu

103. Vergil: Aeneid (4)

Lecture — 3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WE.—II. Albu, Seal

104. Sallust (4)

Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WE.—III. Stem

105. Catullus (4)

Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WE.—(III.) Seal

106. Horace: Odes and Epodes (4)

Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WE. - (III.) Albu, Seal

108. Horace: Satires and Epistles (4)

Lecture — 3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WE.

109. Roman Elegy (4)

Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WE.

110. Ovid (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 100 or equivalent. Translation and discussion of selected readings from the works of Ovid. May be repeated one time for credit when topic differs and with consent of instructor. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC, WE.-Albu

112. Cicero (4)

Recitation — 3 hours; term paper. Prerequisite: course 100 or equivalent. Translation and discussion of selected readings from the works of Cicero. May be repeated one time for credit if readings vary and with consent of instructor. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WE. - Stem

115. Lucretius (4)

Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WE.-(II.)

116. Vergil: Eclogues and Georgics. (4)

Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WE

118. Roman Historians (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 100 or equivalent. Readings in Latin from one or more of the major Roman historians and biographers. Authors may include Sallust, Nepos, Livy, Tacitus, Suetonius, and Ammianus Marcellinus. Offered in alternate years. GE credit: AH, WC,

119. Readings in Republican Latin Literature (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or equivalent. Translation and discussion of selected readings from Republican Latin literature. Offered in alternate years. GE credit: AH, WC, WE.-Stem

120. Readings in Imperial Latin Literature

Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or equivalent. Readings in Imperial Latin literature. Offered in alternate years. GE credit: AH, WC, WE.-Stem

121. Latin Prose Composition (4)

Lecture—3 hours; term paper. Prerequisite: course 100 or equivalent. Prose composition. Offered in alternate years. GE credit: AH.

125. Medieval Latin (4)

Lecture — 3 hours; term paper. Prerequisite: course 3 and two upper division courses in Latin. Selected readings from the Vulgate and various medieval authors provide an introduction to the developments in the Latin Language and literature from the fourth to the fifteenth centuries. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WE. - (I.) Albu

130. Readings in Late Latin (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or equivalent. Translation and discussion of selected readings from late imperial-early medieval Christian and pagan literature. Offered in alternate years. GE credit: AH, WC, WE.

198. Directed Group Study (1-5) (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Clinical Nutrition

(College of Agricultural and Environmental Sciences) Faculty. See the Department of Nutrition, on page

The Major Program

The Clinical Nutrition major provides students with training in normal and therapeutic nutrition, biological and social sciences, food science, communication, business management and food service management. This major fulfills the academic requirements for admission into a dietetics internship or the equivalent, which must be completed before qualifying for registration as a dietitian.

The Program. The Clinical Nutrition major (formerly Dietetics) includes the same basic core of nutrition classes as the Nutrition Science major, but includes additional courses such as food service management, education, sociology, and communi cation skills to prepare for work with the public. Clinical Nutrition students spend the first two years completing preparatory course work in the basic biological sciences, along with several of the social sciences. In the final two years, students take courses in normal and clinical nutrition, food science, biochemistry, and management techniques.

Entering freshman or transfer students are assumed to have basic computer skills and to demonstrate mathematics competency adequate to pass the Precalculus Diagnostic Examination with a minimum score of 27, or have taken calculus at a community college or other four-year institution.

Career Alternatives. The Clinical Nutrition major qualifies students to apply for a dietetic internship accredited by the Commission for Accreditation of Dietetics Education enabling them to become a Registered Dietitian, the professional credential necessary to work in a clinical setting. Once dietitians are registered, they generally seek employment in administrative, therapeutic, teaching, research, or public health/public service positions in clinics, hospitals, schools, or other similar institutions. There is a growing role for dietitians working in settings outside of the traditional hospital (for example, in state and federal nutrition programs, nutrition education, Peace Corps and Cooperative Extension work). Students who complete the undergraduate preparation in clinical nutrition are also qualified to enter graduate programs in dietetics, nutrition science, public health nutrition, and food service management.

B.S. Major Requirements:

	UNITS
Written/Oral Expression	8
English 3 or University Writing Program 1 Communication 1	4
Preparatory Subject Matter	
Biological Sciences 2A & 2B	
Chemistry 2A, 2B, 2C, 8A, 8B	
Economics 1A or 1B	
Psychology 1 Sociology 1 or 3 or Anthropology 24	4 1 ₋ 5
Statistics 13	4-5
Depth Subject Matter	
Agricultural and Resource Economics	
112	1
Animal Biology 102 and 103	10
Biological Sciences 101	
Food Science and Technology 100A,	
100B, 101A, 101B	12
Food Service Management 120, 120L,	
122	8
Microbiology 101	5
Nutrition 111AV, 111B, 112, 116A, 116AL, 116B 116BL, 118, and 190	25
Neurobiology, Physiology, and Behavior	23
101, 101L	8
Additional upper division Nutrition	
electives	4
Total Units for the Major	135
Major Adviser. A.J. Clifford (Nutrition)	
Advising Center for the major is located in Meyer Hall (530) 752-2512.	n 3202
Graduate Study. See Graduate Studies, o	on page

Clinical Nutrition and Metabolism

See Internal Medicine (IMD), on page 400.

Clinical Psychology

See Medicine, School of, on page

Clinical Research (A Graduate Group)

Cameron Carter, M.D., Chairperson of the Group Group Office. CTSC, 2921 Stockton Blvd., Sacramento, CA 95817 (916) 703-9124

111.

Timothy Albertson, M.D., Ph.D. (Internal Medicine: Pulmonary and Critical Care Medicine) Laurel Beckett, Ph.D. (Public Health Sciences) Lars Berglund, M.D., Ph.D.

(Internal Medicine: Endocrinology, Clinical Nutrition, and Vascular Medicine) Richard Bold, M.D. (Surgery: Oncology) Cameron Carter, MMBS

(Psychiatry and Behavioral Sciences) Fitz-Roy Curry, Ph.D.

(Physiology and Membrane Biology) Charles DeCarli, M.D. (Neurology) Ralph deVere White, M.D. (Urology)

Jose Galvez, M.D. (Pathology & Laboratory Medicine)

Randi Hagerman, M, FAAP (Pediatrics) Ladson Hinton, M.D.

(Psychiatry and Behavioral Sciences) Jesse Joad, M.D. (Pediatrics: Pulmonary) Richard Kravitz, M.D., MSPH (Internal Med) Nancy Lane, M.D. (IM: General Medicine) Jerold Last, Ph.D.

(IM: Pulmonary and Critical Care Medicine)
Stephen Mc Curdy, M.D., MPH
(Public Health Sciences)

Fred Meyers, M.D. (Internal Medicine: Hematology and Oncology) David Pleasure, M.D. (Neurology)
Richard Pollard, M.D. (Internal Medicine: Infectious

and Immunologic Diseases)
Claire Pomeroy, M.D., MBA (Internal Medicine:

Infectious and Immunologic Diseases) Peter Yellowlees, MBBS

(Psychiatry and Behavioral Sciences)

Graduate Study. The Mentored Clinical Research Training Program (MCRTP) is an interdisciplinary graduate group in clinical research with a Master of Advanced Study degree in Clinical Research. The MCRTP provides a solid clinical/translational, patient-oriented research foundation for junior faculty, clinical and pre-clinical fellows, and post-doctoral scholars. The program centers around three core elements: didactic instruction, mentored research, and special experiences:

Mandatory course work includes biostatistics, epidemiology, patient-oriented research, health services research, data management/informatics, scientific communication, research management, responsible conduct of research and career development. The instruction includes a 12-week summer curriculum followed by a two-year core curriculum and electives that can be tailored to best meet each scholars career development needs.

Degree Offered. M.A.S. Plan II

Requirements:

Candidates must meet the following minimum requirements:

Completed one of the following degrees: M.D., D.D.S., D.M.D., O.D., N.D., D.O., Pharm.D., D.V.M., Ph.D. or D.N.S. in nursing. High level of interest and potential to pursue innovative pre-clinical/translational or clinical research as a major focus of career plan, and a long-term goal of entering clinical research

Submission of an application: 2-4 page research proposal, Description of training plan with identified mentor, Curriculum vitae. Letters of support from the prospective mentor and Department Chair, and commitment of release time from the candidates' department chair or division chief is also required. Personal Interview.

Communication

(College of Letters and Science) George A. Barnett, Chairperson of the Department Department Office. 175 Kerr Hall; (530) 752-9933

Faculty

George A. Barnett, Ph.D., Professor Robert A. Bell, Ph.D., Professor Jaeho Cho, Ph.D., Associate Professor Bo Feng, Ph.D., Assistant Professor Hyunseo Hwang, Ph.D., Assistant Professor Nicholas A. Palomares, Ph.D., Associate Professor Laramie Taylor, Ph.D., Associate Professor Narine Yegiyan, Ph.D., Assistant Professor

Emeriti Faculty

Rina Alcalay, Ph.D., Professor Emerita Charles R. Berger, Ph.D., Professor Emeritus Michael T. Motley, Ph.D., Professor Emeritus James J. Murphy, Ph.D., Professor Emeritus Academic Senate Distinguished Teaching Award

Ralph S. Pomeroy, Ph.D., Professor Emeritus John L. Vohs, M.A., Senior Lecturer Emeritus

Affiliated Faculty

Virginia O. Hamilton, Ph.D., Lecturer Catherine Puckering, M.A., Lecturer Alisa Shubb, M.A., Lecturer John Theobald, M.A., Lecturer

The Major Program

The major in communication focuses upon human symbolic behavior in interpersonal and mediated contexts

The Program. The program of study in communication examines communication processes at several different levels of analysis. Courses dealing with communication at the individual, interpersonal, organizational and societal levels of analysis are offered. Classes addressing such topics as communication and cognition, message systems, interpersonal communication, nonverbal communication, communication and persuasion, organizational communication, mass media effects and public communication cam-paigns explore communication at these levels of analysis. Related social science courses are also part of the major.

Preparatory Requirements. Before declaring a major in communication, students must complete the following courses with a combined grade point average of at least 2.500 at the University of California (at least 3.000 GPA may be required for similar courses taken at community college). All courses must be taken for a letter grade:

Anthropology 4 or Linguistics 14 uni	
Psychology 14 uni	ts
Sociology 15 uni	ts
Statistics 13	ts

Career Alternatives. Communication graduates have found careers in such fields as broadcast and print journalism, administration, sales, management, politics and government, education, social work, and public relations. A communication degree is also excellent preparation for law school or other graduate programs.

UNITS

A.B. Major Requirements:

U	INII
Preparatory Subject Matter	2
Anthropology 4 or Linguistics 1	
Communication 1 or 34	
Psychology 1 4	
Sociology 15	
Statistics 134	
Depth Subject Matter	. 44
Communication 1014	
Communication 102, 134, 141	
Select one of Communication 103 or	
105 or 1354	
Select one of Communication 140 or	
142 or 143 or 144 or 146 or 152 or	
165 or 1704	
Select five of the following additional	
courses (the five courses must be other than those chosen to fulfill the above	
requirements)20	
Communication 103, 105, 135, 136, 138	
139, 140, 142, 143, 144, 146, 152,	′
165, 170, 172, 180, 189A, 189B, 189C	
189D, Anthropology 117, 120, Linguistics	
160, 163, 171, 173, Political Science	
164, 165, Psychology 132, Sociology	
126, 128, 135, 148	
T . 1	

Total Units for the Major......65

Grading recommendation. Although not required, it is recommended that all courses offered in satisfaction of the major, except variable-unit courses, be taken for a letter grade.

Major Advisers. Faculty; contact department.

Advising Office. 179 Kerr Hall

communication

Minor Program Requirements:

Communication......24 One course from Communication 1, 3..... 4 At least five upper division courses in

Graduate Study. The Department of Communication offers programs of study and research leading to the M.A. degree in Communication. Detailed information may be obtained from the Graduate Adviser, Department of Communication.

Graduate Adviser. N. Palomares

Courses in Communication (CMN)

Students must have satisfied the Entry Level Wrting requirement before taking any course in Communi-

Lower Division Courses

1. Introduction to Public Speaking (4)

Lecture - 1 hour; discussion - 3 hours. Practice in the preparation and delivery of speeches based on contemporary principles and strategies of informing and persuading audiences. GE credit: Wrt | OL.—I, II, III. (I, II, III.) Shubb

3. Interpersonal Communication Competence (4)

Lecture -2 hours; discussion -2 hours. Communication in interpersonal contexts. Sender, receiver, and message variables, and their interaction with communication competence. Participation in simulations and experiential exercises. GE credit: SS.-I, II, III. (I, II, III.) Hamilton

5. Global English and Communication (4)

Lecture - 2 hours; discussion - 2 hours. English as a global language and its uses in intercultural communication. Cultural, historical, and political dimensions of varieties of English spoken around the world. Experiential grounding in strategies for increasing interpretive and verbal communicative competence for a globalized world. (Same course as Linguistics 5.) GE credit: AH or SS, OL. WC.—II. (II.) Farrell, Feng, Ramanathan

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading

Upper Division Courses 101. Communication Theories (4)

Lecture - 3 hours; discussion - 1 hour. Forms, functions, development, and testing of communication theory, with emphasis on social scientific approaches. Survey and comparison of significant micro and macro theories and models of face-to-face and mediated communication. Application of theories to real world problems. GE credit: SocSci | SS.-I, II, III, IV. (I, II, III, IV.) Feng

102. Empirical Methods in Communication

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 101 and Statistics 13 or equivalent. Social scientific research methods commonly employed in Communication. Topics include research design, measurement, sampling, questionnaire construction, survey research, experimental design, evaluation research, content analysis and qualitative field methods. GE credit: SocSci | SS.-I, II, III. (I, II, III.) Bell, Jenkins, Motley, Palomares, Yegiyan

103. Gender Differences in Communication

Lecture-4 hours. Prerequisite: course 101 and course 102 (or an equivalent course in research methods). Pass one open to Communication majors only. Examination of communication differences between men and women as sources of male/ female stereotypes, misunderstandings, dilemmas, and difficulties (real and imagined). Treatment of

genders as cultures. Topics include male/female differences in discursive practices and patterns, language attitudes, and relationship dynamics. GE credit: SocSci | SS.—I, II. Palomares

105. Semantic and Pragmatic Functions of Language (4)

Lecture — 4 hours. Prerequisite: course 101 and 102 (or equivalent course in research methods). Pass One open to Communication majors only. The role of language in shaping attitudes and perceptions of self and others. The use and abuse of verbal symbols in communicative situations. Concepts of meaning in discourse. GE credit: SS.-II, III. (II, III.) Palomares

134. Interpersonal Communication (4)

Lecture—4 hours. Pass one open to Communication majors only. Communication between individuals in social and task settings. One-to-one communication, verbal and nonverbal, in developing relationships. Consideration of theory and research on relevant variables such as shyness, selfdisclosure, reciprocity, games, and conflict. GE credit: SocSci | SS.-I, II, III. (I, II, III.) Feng, Jenkins

135. Nonverbal Communication (4)

Lecture — 4 hours. Examination of the interaction between nonverbal communication and verbal communication channels in influencing outcomes in interpersonal and mass mediated communication contexts. Underlying functions served by nonverbal communication will also be considered. GE credit: SocSci, Div | SS.—I, II, III. Berger

136. Organizational Communication (4)

Lecture — 4 hours. Prerequisite: course 101 and 102 (or equivalent course in research methods). Pass one open to Communication majors only. Organizational communication theory and practice is examined with an emphasis on the use of effective communication strategies for achieving organizational goals. GE credit: SS.-I, II, IV. (I, II, IV.) Barnett

137. Intercultural Communication (4)

Seminar-3 hours; term paper. Prerequisite: course 134. Major concepts and theories of intercultural communication. Topics include cultural similarities and differences in verbal and nonverbal communication; dimensions of cultural variations, barriers to intercultural communication, and intercultural communication competence. GÉ credit: SS.-III. (III.) Feng

138. Communication and Cognition (4)

Lecture/discussion-4 hours. Prerequisite: course 101 and 102 (or equivalent course in research methods). Pass one open to Communication majors only. Relationship between communication and cognition. Models of discourse comprehension and production, the influence of language attitudes on social judgments, and the effects of information processing on decision making are explored. GE credit: SocSci | SS.—II. (II.) Berger, Yegiyan

139. Advanced Organizational Communication (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 136. Pass one open to Communication majors only. Communication processes within and among social organizations. Examines formal organizations as information processing systems. Topics include general systems theory, input-output analysis, structural-functionalism, cybernetics, organizational network analysis, organization environments, organizations as cultures, organizational learning, information technologies, and communication diagnostic/auditing strategies. GE credit: SS, WE.-III. (III.) Barnett

140. Introduction to Mass Communication

Lecture/discussion-4 hours. History of mass media and media research traditions. Organization and economics of the media industry. Media policy, law, regulation and ethics. Impact of the media on individuals and society. Traditional, new and emerging communication technologies. GE credit: SocSci | ACGH, SS. —I, II, III, IV. (I, II, III, IV.) Cho, Hwang, Taylor, Yegiyan

141. Media Effects: Theory and Research (4)

Lecture/discussion-4 hours. Prerequisite: course 101, 102 (or equivalent course in research methods), and 140. Pass one open to Communication majors only. Social scientific studies of the effects of mass media messages on audience members' actions, attitudes, beliefs, and emotions. Topics include the cognitive processing of media messages, television violence, political socialization, cultivation of beliefs, agenda-setting, and the impact of new technologies. GE credit: SocSci | SS.-II, III. (II, III.) Hwang, Taylor

142. News Policies, Practices and Effects (4)

Lecture-4 hours. Prerequisite: course 101, 102 (or equivalent course in research methods), 140. Pass one open to Communication majors only. Exploration of processes and constraints in the gathering, editing, and reporting of news. Examination of studies on the effects of news, contemporary challenges to news reporting presented by new technologies, and the relationship of news to other social institutions. GE credit: SocSci | ACGH, SS.-I, II, III. Theobald

143. Analysis of Media Messages (4)

Lecture/discussion - 3 hours; term paper. Prerequisite: course 101, 102 (or equivalent course in research methods), 140. Pass one open to Communication majors only. Examination of alternative approaches to the analysis, interpretation, and evaluation of media messages, including those disseminated through broadcasting, print, and new technologies. GE credit: SocSci, Wrt | ACGH, SS, Wrt.—I, ĬI, III. (I, II, III.)

144. Media Entertainment (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 101, 102 (or equivalent course in research methods), 140. Pass one open to Communication majors only. Effects and appeal of media entertainment, emphasizing emotional reactions. Topics include key concepts of entertainment research such as mood management, and the respective features and emotional/social-psychological effects of genres such as comedy, mystery, thriller, sports, music, horror, and erotica. GÉ credit: SS, WE.-III. (III.) Taylor

146. Communication Campaigns (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 101, 102 (or equivalent course quantitative research methods), 140, 141, 152. Pass one open to Communication majors only. Strategic uses of media and interpersonal communication channels in health, environmental advocacy, and political campaigns. Emphasis is on general principles relevant to most campaign types, including public information, socialmarketing, and media advocac campaigns. Not open for credit to students who have completed course 160. GE credit: SocSci | ACGH, SS, WE.-III. (III.) Barnett

152. Theories of Persuasion (4)

Lecture - 4 hours. Prerequisite: course 101 and 102. Theories and models of persuasion that account for the effects of source, channel and audience factors on message recipients. Examination of message strategies for altering attitudes and gaining compliance. Contexts of application include product advertising, politics, and health promotion. GE credit: SocSci | SS. - I, II. (I, II.) Bell, Jenkins

161. Health Communication (4)

Lecture/discussion-4 hours. Prerequisite: course 101 and 102. Health communication theories and research, including a review of research on health literacy, social support and coping, doctor-patient interaction, health communication campaigns, and media influences on health. Application of new communication technologies in health promotion. GE credit: SocSci | SS.-III. (III.) Bell

165. Media and Health (4)

Lecture/discussion-4 hours. Prerequisite: course 101, 102 (or equivalent course in research methods), and 140. Content and effects of health messages in news, entertainment, and advertising Topics include health news reporting; portrayals of disease, disability, death and health-related behaviors; representations of health professionals; promotion of drugs and other health products; tobacco and alcohol advertising. GE credit: SocSci | SS.-III. (III.) Bell, Taylor

170. Communication, Technology, and Society (4)

Lecture/discussion-4 hours. Prerequisite: course 101, 102 (or equivalent course in research methods), 140. Survey of how communication technologies transform our lives at the individual and society levels. Topics include human-computer interaction; social media; the effects of communication technologies in education, health and business; and social and political implications of technological development. GE credit: SocSci | ACGH, VL, SS.—III. (III.)

172. Computer-Mediated Communication (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 101 and 102 (or equivalent course in research methods). Pass one open to Communication majors only. Uses and impacts of computer mediated communication. Theories and research findings pertaining to how computer-mediation affects various aspects of human interaction including impression formation, development of personal relationships, group decision making, collaborative work, and community building. GE credit: SocSci | SS.-III. (III.)

180. Current Topics in Communication (4)

Lecture/discussion-4 hours. Prerequisite: course 101 and 102 (or equivalent research methods course). Pass one open to Communication majors only. Group study of a special topic in communication. May be repeated one time for credit when topic differs. Offered irregularly. GE credit: SS.—III. (III.)

189A. Proseminar in Social Interaction (4)

Seminar — 3 hours; term paper. Prerequisite: course 101, 102, 136; consent of instructor. Open to Communication majors only. Reading, discussion research, and writing on a selected topic in the specialty of social interaction. Potential topics include relationship initiation, maintenance, and deterioration; communication failure; nonverbal communication; conversational management; semantics and pragmatics of languages; and family/marital communication. May be repeated for credit when topic differs. Offered in alternate years. GE credit: SocSci, Wrt | SS, WE.—III. Berger, Feng, Jenkins, Palo-

189B. Proseminar in Mass Communication

Seminar—3 hours; term paper. Prerequisite: course 101, 102, 140; consent of instructor. Reading, discussion, research, and writing on a selected topic in the specialty of mass communication. Potential topics include, agenda-setting, the cultivation of beliefs, television violence, media portrayals of underprivileged groups, mediated political discourse, interactive technologies, and international/global communications. May be repeated for credit when topic differs. Offered in alternate years. GE credit: SocSci, Wrt | SS, WE.—III. Berger, Hwang, Taylor, Yegiyan

189C. Proseminar in Health Communication (4)

Seminar-3 hours; term paper. Prerequisite: course 101; 102; 161 or 165; consent of instructor. Open to Communication majors only. Reading, discussion, research, and writing on a selected topic in health communication. Potential topics include health communication design and evaluation, media advocacy, physician-patient interaction, uses of communication technologies in health settings, and health-related advertising. May be repeated for credit when topic differs. Offered in alternate years. GE credit: SocSci, Wrt | SS, WE.—III. Barnett, Bell, Feng, Taylor

189D. Proseminar in Organizational Communication (4)

Seminar—3 hours; term paper. Prerequisite: course 101, 102, 136; consent of instructor. Open to Communication majors only. Reading, discussion,

research, and writing on a selected topic in the specialty of organizational communication. Potential topics include organizational networks, organizational conflict and its resolution, mediation, bargaining and negotiation, superior-subordinate interaction, leadership styles, and inter-organizational communication. May be repeated for credit when topic differs. Offered in alternate years. GE credit: SocSci, Wrt | SS, WE.—III. Barnet

192. Internship in Communication (1-6)

Internship - 3-18 hours. Prerequisite: communication majors who have completed 20 units of upper division communication courses. Open to Communication majors only. Supervised work experience requiring the application of communication principles and strategies or the evaluation of communication practices in a professional setting. Relevant experiences include public relations, advertising, sales, human resources, health promotion, political campaigns, journalism, and broadcasting. May be repeated up to 6 units of credit. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.)

194H. Senior Honors Thesis (4)

Seminar-1 hour; individual tutoring on research project-3 hours. Prerequisite: senior standing and approval by Honors Committee. Directed reading, research, and writing culminating in the preparation of honors thesis under direction of faculty adviser. GE credit: SS, WE.

197T. Tutoring in Communication (2-4)

Seminar - 1-2 hours; laboratory - 1-2 hours. Prerequisite: upper division standing with major in Communication and consent of Department Chairperson. Tutoring in undergraduate Communication courses, including leadership of discussion groups affiliated with departmental courses. May be repeated for credit up to a total of six units. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

201. Theoretical Perspectives on Strategic Communication (4)

Seminar—4 hours. Prerequisite: graduate standing; consent of instructor. Explores the intentional use of discourse and nonverbal behavior to reach goals. Explores theories and models that elucidate the processes that enable the realization of intentions in message plans and discourse. — I. (I.) Berger

202. Communication Theory Construction

Seminar-4 hours. Prerequisite: consent of instructor; graduate standing. Alternative meta-theoretical perspectives for theory generation in communication inquiry. Processes of construct explication, operationalization and theory construction. Emphasis on the critique of extant communication theories and the development of theory construction skills. Not offered every year.—III.

210. Experimental Methods and Analysis in Communication (4)

Lecture - 4 hours. Prerequisite: graduate standing; one course in inferential statistics; consent of instruc-tor. Experimental designs in communication. Topics include: causation; threats to validity; conceptualization, operationalization, and measurement; hypothesis testing; ethics; data analysis software focusing on the analysis of variance and planned contrasts; and the practical and effective implementation and writing of experiments. —I. (I.) Palomares

211. Survey Research Methods in Communication (4)

Seminar-4 hours. Prerequisite: graduate standing; one course in inferential statistics; consent of instructor. Methods for designing personal interview, phone, mail, and web-based surveys in communication. Topics include: sampling stratégies, sources of

error and bias in survey designs, questionnaire construction, cognitive interviewing, interviewer behavior, and analysis of complex survey data using standard software packages. - II. (II.) Bell

220. Persuasion Theories and Message Design (4)

Seminar-4 hours. Prerequisite: graduate standing; consent of instructor. Major social scientific theories and perspectives on attitude change and persuasion. Application of persuasion theories and principles to persuasive message design in applied contexts. – III. (III.) Hughes

221. Communication and Cognition (4)

Seminar-4 hours. Prerequisite: graduate standing; consent of instructor. Explores the cognitive structures and processes that enable the production, comprehension and interpretation of messages in face-toface and mediated communication contexts. Explores the communication outcomes associated with these processes. Offered in alternate years. -

222. Risk Communication (4)

Seminar-4 hours. Prerequisite: graduate standing; consent of instructor. Theories and models of individual risk information processing. Media depictions of threats and risk-related information and their potential effects on audiences. Implications for the design and implementation of messages concerning threat and risk. Not offered every year.

230. Social Interaction Theory and Research (4)

Seminar-4 hours. Prerequisite: graduate standing; consent of instructor. Survey of theories and research on social interaction and interpersonal communication. Covers communication codes, individual differences in communication, communication and relationship development, family communication, conflict, cognitive and emotional processes underlying social interaction, social influence, intercultural communication, and nonverbal behavior.—II. (II.)

231. Tactics of Interpersonal Influence (4)

Seminar-4 hours. Prerequisite: graduate standing; consent of instructor. Achievement of interpersonal goals in social interaction. Topics include message production; tactics, strategies and planning; anticipating potential obstacles; resisting and thwarting goals; plan recognition; and goal detection. Exam ined goals include compliance gaining, attitude change, ingratiation, information seeking, comforting, and deception. Offered in alternate years. — (III.)

232. Health Communication (4)

Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Health communication theories and research traditions. Topics include consumer health information seeking; physician-patient interaction; information, social marketing, "edutainment," and media advocacy campaigns; social networks and coping; media influences on health; and new communication technologies in health promotion and healthcare deliver (Same course as Pubic Health Science 232.) Offered in alternate years.—(II.) Bell

233. Communication in Medicine (4)

Seminar-3 hours; term paper. Restricted to graduate standing. Survey of research on communication between patients and health care providers. Topics include verbal and nonverbal behavior, power and influence, empathy and support, and conflict management. Cultural, social, organizational, and technological influences on communication are examined. Offered in alternate years. - II. Bell

243. Media and Health (4)

Seminar - 3 hours; term paper. Restricted to graduate standing. Survey of research on media and health. Topics include health news coverage; depictions of health, illness and disability in entertainment; health campaigns; advertising of health products and services; and the influence of gaming and other new media on health behaviors. Offered irregu-larly.—II. (II.) Bell, Taylor

244. Organizational Communication (4)

Seminar-4 hours. Prerequisite: graduate standing and consent of instructor. Theory and research on communication processes in organizations

250. Mediated Communication Theory and Research (4)

Seminar-4 hours. Prerequisite: graduate standing; consent of instructor. Survey of major theories on the intended and unintended effects of mediated communication. Topics include media's effects on learning, political behavior, interpersonal violence, sexual socialization, consumer behavior, race relations, gender socialization, and cultural processes.—II. (II.) Taylor

251. Communication, Technology, and Society (4)

Seminar-4 hours. Prerequisite: graduate standing; consent of instructor. Transformation of life at the individual and societal levels by communication technologies. Topics include the digital divide, media convergence in news and entertainment, human-computer interaction, distance learning, electronic commerce, distributed work and e-democracy. Offered in alternate years. — (II.) Taylor

252. Computer-Mediated Communication (4)

Seminar-4 hours. Prerequisite: graduate standing; consent of instructor. The effects of computer-mediated communication on the ways in which people express themselves, form impressions about strangers, develop and maintain relationships, collaborate on group work, and expand social network, especially in comparison to face-to-face communication. Offered in alternate years. — (III.)

253. Negotiation (4)

Seminar-4 hours. Prerequisite: graduate standing and consent of instructor. Theory and research on negotiating.

254. Communication Campaigns (4)

Seminar-4 hours. Prerequisite: graduate standing; consent of instructor. Strategic uses of media and interpersonal channels to promote social change through social marketing, information, and media advocacy campaigns. Focus on theory-based interventions in a variety of applied contexts. Offered in alternate years.—(II.)

260. Communication Applications (2-4)

Discussion-1 hour; supervised field work-3-9 hours. Prerequisite: course 220. Fieldwork in communication. Organization and implementation of a research project for a specific application of a communication program. May be repeated one time for credit. (S/U grading only.)

280. Special Topics in Social Interaction (4)

Seminar-4 hours. Prerequisite: graduate standing; consent of instructor. Reading, discussion, research, and writing on a selected topic in the specialty of social interaction. May be repeated for credit when topic differs. Not offered every year.

281. Special Topics in Mediated Communication (4)

Seminar—4 hours. Prerequisite: graduate standing; consent of instructor. Reading, discussion, research, and writing on a selected topic in the speciality of mediated communication. May be repeated for credit when topic differs. Not offered every year. – Yegiyan

282. Special Topics in Health Communication (4)

Seminar-4 hours. Prerequisite: graduate standing; consent of instructor. Reading, discussion, research and writing on a focused topic in health communication. May be repeated for credit when topic differs. (Same course as Epidemiology and Preventive Medicine 282). Not offered every year.—III.

283. Special Topics in Organizational Communication (4)

Seminar-4 hours. Prerequisite: graduate standing; consent of instructor. Reading, discussion, research, and writing on a selected topic in the specialty of

organizational communication. May be repeated for credit when topic differs. Not offered every year. -

298. Group Study (1-5)

Lecture — 3 hours. (S/U grading only.)

299. Individual Study (1-12)

(S/U grading only.)

299R. Thesis Research (1-12)

Independent study—3-36 hours. Prerequisite: graduate standing in Communication. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)

Community and **Regional Development**

(College of Agricultural and Environmental Sciences)

Faculty. See the Department of Human and Community Development, on page 341.

The Major Program

The Community and Regional Development major (formerly Applied Behavioral Sciences) aims to provide a broad comparative understanding of theories, methodologies, and issues relevant to the study of communities and the people in them. The program focuses on the ways that economic, political and socio-cultural forces are transforming regions and local communities, and it considers how knowledge can be used to improve the quality of community life.

The Program. Principal subjects of study within the major are community and organizational develop-ment, social change processes, the role of culture and ethnicity in shaping community life, community research methodologies, the impacts of innovation and technology on community development, and the effects of social, economic and political systems on communities. The major is organized to allow students to develop fields of concentration that meet their career goals.

Internships and Career Alternatives. Community and Regional Development students are required to complete an internship in their field before graduation. Internships have been arranged with local, county, and state planning units, health departments, schools, housing offices, and community education programs. Community and Regional Development graduates are prepared for occupations in community development, social research, program evaluation, organizational and educational consulting, city and regional planning, and for-profit organizations. The major also provides effective preparation for graduate or professional study in the social and behavioral sciences, or for professional degrees.

B.S. Major Requirements:

P

	UNITS
reparatory Subject Matter	. 22-25
Community and Regional Development 1, 2	8
Plant Sciences 21 or Computer Science Engineering 15	3-4
Economics 1A or 1B Anthropology 2 or Sociology 1	
Statistics 13 or 32 or Sociology 46B	3-4
epth Subject Matter	. 39-40
Core Issues in Community Development:	

Three courses from Community and Regional Development 118, 140, 141, 162, or International Agricultural Development 103......8

Political Processes and Community Change: Two courses from Community and Regional Development 147, 149, 154, 157, 158, or Methods for Community Research: Two courses, including at least one *'d course Community and Regional Development 151, *156, *Education 114, *Landscape and **Note on substitutions: supplementary list of pre-approved substitutions available in Advising Office. Internship: Community and Regional Development 192

Areas of Specialization

Take 20 units from each of two options or 40 units from one option. The Areas of Specialization must include two Community and Regional Development courses. Up to 4 units of variable-unit course work may be counted toward this requirement (e.g., Community and Regional Development 192).

Global Communities Option40

Students must consult with a faculty adviser to identify an emphasis within the option and to select suit-

Development Policy: Anthropology 122B, 126A, 135, Agricultural and Recourse Economics 115A, 115B, Community and Regional Development 140, 152, 153A, 153B, 153C, 164, 180, Economics 115A, 115B, 160A, 160B, 162, International Agricultural Development 170, Sociology 138, 139, 141, 145A, 159
Gender and Development: Sociology 132, 145, Anthropology 126B, Women and Gender Studies 102, 182 Globalization and Politics: Political Science 124, 130, 131, 178, 175 Experiential Learning, Area Studies, and Language: Total number of units of credit in Experiential learning, Area Studies, and Language courses cannot exceed 32. Up to 12 credits transferred from any accredited foreign program or foreign internship, including UCD EAP and Summer Abroad programs. Up to 12 credits in regional area studies classes (e.g., Middle East, China, Latin

Organization and Management

Up to 12 credits for foreign Language.

Students must consult with a faculty adviser to identify an emphasis within the option and to select suitable courses.

Administration: Community and Regional Development 157, 158, 194HA and 194HB, Agricultural Economics 100A, 171A Economics 115A, Political Science 100, 105, 142, 155, 183 Communication: Communication 134, 136, 140, 152, Community and Regional Development 147, 176, Education 120, 163
Human Resources: Community and Regional
Development 151, 172, 176, Economics
151B, Sociology 120, 128, 129)
Management: Community and Regional
Development 118, 140, 141, 154, 162, 164, 168, Agricultural Economics 112, 113, History 174A, Sociology 138, 139, 158, 159, 180A, 180B

Policy, Planning, and Social Services

Students must consult with a faculty adviser to identify an emphasis within the option and to select suitable courses.

General: Community and Regional Development 118, 142, 151, 153, 154, 156, 162, 176, 180, 194HA and 194HB, Environmental Science and Policy 165,

Political Science 100, 105, 108, 109, 142, 154, 155, 183, Sociology 120, 140, 154, 155, 185 Community Health and Counseling: Communication 134, 135, 165, Community and Regional Development 164, Education 160, 163, Public Health Sciences 101, Environmental Science and Policy 126, Human Development 120, 121, 130, Psychology 123, 126, 151, 154, 162, 168, Sociology 154
Education and Community: Agricultural Education 100, 160, Communication 146, Education 100, 110, 120, 151, 152, 153, Psychology 100, 132, Sociology 124
Environmental Policy and Regional Planning: Community and Regional Development 140, 141, 149, 152, 158, 171, Economics 115A, Environmental Recourse Sciences 121, Environmental Science and Policy 110, 160, 161, 164, 166, 168A, 168B, 171, 172, 173, 179, Geography 155, Political Science 102, 107, 175, Sociology 102, 118, 138, 141, 143A, 143B, 170 Family and Community: American Studies 152, Community and Regional Development 147, Human Development 100A, 100B, 100C, 101, 102, 103, 110, 130, 140, 140L, 141, 142, 143, 160, 161, 162,

Psychology 140, Sociology 122, 131, 134, English Composition Requirement4

In addition to the College English Composition requirements, choose one from the University Writing Program 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 102H, 104A, 104B, 104C, 104D, 104E, 104F......4

Total Units for Major105-109

Major Adviser. M. Kenney

Advising Center for the major is located in 1303 Hart Hall (530) 752-2244.

Honors Program. An Honors Program available to Human and Community Development majors who have demonstrated excellence in their field of study. Entrance into the honors program requires that a student have completed at least 135 units with a minimum grade point average of 3.500 in upper division courses counted toward the major. The program consists of a project whose specific nature is determined by consultation with the student's Honors Adviser. It may involve completion of a research project, a scholarly paper, a senior thesis, or some comparable assignment. The project will have a minimum duration of two quarters and will be noted on the student's record by a variable unit course number or special honors course designation. Successful completion of the honors program requires that a minimum of eight (8) units of credit be earned in course work for the project. It is expected that a stu-dent participating in the Honors Program of the Community Studies and Development will participate in the Undergraduate Research, Scholarship and Creative Activities Conference. Additionally, students participating in the Honors Program will be required to give a public presentation of their work in a departmental seminar program

Honors Program Advisor. Frank Hirtz, fwhirtz@ucdavis.edu

Minor Program Requirements:

The Community and Regional Development faculty offers the following minor program:

Community Development24 Community and Regional

Development 14 Five courses selected from Community and Regional Development 140, 141, 142, 147, 149, 151, 152, 153A/B/C, 154, 156, 157, 158, 162, 164, 171, 172, 176, 18020

Minor Adviser. M. Kenney

Graduate Study. See Graduate Studies, on page

Related Courses. See Environmental Science and Policy 10, 101, 133.

Courses in Community and Regional Development (CRD)

Lower Division Courses

1. The Community (4)

Lecture - 3 hours; discussion - 1 hour. Basic concepts of community analysis and planned social change. The dynamics of community change through case studies of communities including peasant, urban ghetto, suburban mainline, and California farm workers. GE credit: SocSci, Div, Wrt | ACGH, DD, OL, SS, VL, WE. - I, II. (I, II.) Tarallo

2. Ethnicity and American Communities (4)

Lecture - 3 hours; discussion - 1 hour. Historical and cultural survey of the role of various ethnic groups in the development of American communities. Examines ethnicity as a cultural factor, ethnicity as power and issues related to selected American ethnic groups. GE credit: SocSci, Div, Wrt | ACGH, DD, ŠS, WE. — I, II. (I, II.) Lippin

20. Food Systems (4)

Lecture—3 hours; laboratory—3 hours. Social aspects of agri-food systems. Social science perspectives applied to food and agricultural sustainability in relation to ecology, knowledge, technology, power, governance, labor, social difference, and social movements. Social and environmental effects of commodity chains in comparative global context. GE credit: SocSci, Wrt | OL, VL, SS, WE.-I. (I.)

92. Internship (1-12)

Internship - 3-36 hours. Prerequisite: consent of instructor. Supervised internship, off and on campus, in community and institutional settings. (P/NP grading only.).

98. Directed Group Study for Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) (P/NP grading only.)

Upper Division Courses 118. Technology and Society (4)

Lecture - 3 hours; discussion - 1 hour; extensive writing; term paper. Prerequisite: upper division standing. Impact of technology on labor relations, employment, industrial development and international relations. Internal relations of technology development and deployment. GE credit: SocSci | SS, WC.-I. (I.) Kenney

140. Dynamics of Regional Development

Lecture-4 hours; extensive writing; term paper; project. Prerequisite: one undergraduate social science course or consent of instructor. Industrial cluster formation and institutions. Technology, labor relations and interfirm linkages in global value chains. California and other regions are used as case studies. GE credit: SocSci | SS.-II. (II.) Kenney

141. Organization of Economic Space (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 1. Globalization and technological restructuring of economic activity focusing on new spatial pat-terns of production and circulation and their implications for workers, communities and societies, both in the U.S. and around the globe. GE credit: SocSci | SS, WC, WE.—I. (I.) Benner

142. Rural Change in the Industrialized World (4)

Lecture - 3 hours; discussion - 1 hour; extensive writing; term paper. Prerequisite: course 1. Geography of rural environment with emphasis on rural restructuring. Demographics, community, economy, governance, agriculture, and environmental conservation in rural areas of industrialized world. Case studies

from and comparisons drawn between North America, Europe, Australia, New Zealand, and Japan. GE credit: SocSci | SS, WE.-II. (II.) Galt

147. Community Youth Development (4)

Lecture/discussion-4 hours; project; extensive writing or discussion; term paper. Prerequisite: social science research methods course. Community influences on youth well-being, youth as agents of community change, and policies to support healthy communities for young people. Special emphasis on disparities in youth well-being related to race, class, immigration status, gender, sexual-orientation Offered in alternate years. GE credit: SocSci, Div, Wrt | DD, OL, SS, VL, WE.—III. London

149. Community Development Perspectives on Environmental Justice (4)

Lecture/discussion-4 hours; extensive writing or discussion; project; term paper. Prerequisite: social science research methods course. Environmental justice social movements; inequitable distribution of pollution on low-income communities of color; histories, policies, and innovations associated environmental justice movements in the United States and around the world. Offered in alternate years. GE credit: Soc-Sci, Div, Wrt | DD, OL, SS, VL, WE.-III. London

151. Community Field Research: Theory and Analysis (4)

Lecture — 4 hours; extensive writing; project; term paper. Prerequisite: course 1 or 151, Sociology 2, Anthropology 2, Asian American Studies 100, Chicano Studies 132, Geography 5 or African American & African Studies 101 or consent of instructor. Introduction to principles and strategies of community organizing and development. Examination of non-profit organizations, citizen participation, poverty reduction, community needs assessment, and regional development strategies. Comparison of community development approaches of the U.S.A./ California with other western and non-western societies. GE credit: SocSci, Div, Wrt | ACGH, DD, OL, SS, VL, WE.-III. (III.) Tarallo

152. Community Development (4)

Lecture-4 hours. Prerequisite: course 1 or 151, Sociology 2, Anthropology 2, Asian American Studies 100, Chicana/o Studies 132, Geography 5, or African American and African Studies 101 or consent of instructor. Introduction to principles and strategies of community organizing and development. Examination of non-profit organizations, citizen participation, approaches to reducing poverty, community needs assessment, and regional development strategies. GE credit: SocSci, Wrt | ACGH, DD, SS, WC, WE.—I. Hirtz

153A. International Community Development: Asia (4)

Lecture - 4 hours. Prerequisite: course 1, Anthropology 2, International Agricultural Development 10. Examination and analysis of community development efforts in Japan and the impact of global forces in different settings. Alternative strategies with emphasis on self-reliance and locally controlled development. Course is based in Kyoto, Japan, and includes field trips. GE credit: SocSci, Div | OL, SS, VL, WC, WE. - Fujimoto

153B. International Community **Development: Europe (4)**

Lecture-4 hours. Prerequisite: course 1 or 2, Anthropology 2, International Agricultural Development 10; course 164 or the equivalent recommended. Examination and analysis of community development efforts in Europe and the impact of global forces in different settings. Alternative strategies with emphasis on self-reliance and locally controlled development. Course is based in Freiburg, Germany, and includes field trips to France and Switzerland. GE credit: SocSci, Div | SS, WC.—

153C. International Community Development: Africa (4)

Lecture - 2 hours; fieldwork - 2 hours. Prerequisite: course 1 or 2; Anthropology 2 or International Agricultural Development 10; course 141 or equivalent recommended. Examination and analysis of community development efforts in Africa and the impact of global forces in urban and rural settings. Focus on strategies that promote self-reliance and locally controlled development. Course based in South Africa, includes field trips. GE credit: SocSci, Div | SS,

154. Social Theory and Community Change

Lecture/discussion-4 hours; extensive writing; project; term paper. Prerequisite: course 1, Sociology 1, or Anthropology 2. Comparative overview of the dominant social science paradigms for the study of community development and change. Among the paradigms discussed are functionalism, conflict theory/Marxism, structuralism, methodological individualism, reflexive modernity. GE credit: SocSci, Div, Wrt | ACGH, DD, OL, SS, VL, WC, WE.—I. (I.) Hirtz

156. Community Economic Development (5)

Lecture — 4 hours; laboratory — 2 hours. Prerequisite: Plant Sciences 21 or Engineering Computer Sciences 15 and course 152 or consent of instructor. How low income communities work together to improve their economic well-being, increase their control over their economic lives, and build community power and decision-making. Includes techniques to analyze community economic potential and identification of appropriate intervention tools. Group project. GE credit: QL, SS, WE.-II. (II.) Benner

157. Politics and Community Development

Lecture-4 hours. Prerequisite: prior course work in sociology or political science recommended. Analyzes political, economic and sociocultural forces shaping the form and function of local communities in the U.S. Considers theories of the state, the community and social change and case studies of actual community development in comparative historical perspective. GE credit: SocSci, Div, Wrt | ACGH, DD. SS. WE.-II.

158. Small Community Governance (4)

Lecture/discussion—3 hours; fieldwork—3 hours. Prerequisite: course 151 or 160 or Political Science 100. Governing institutions and political processes in rural and small urban places. Local government organization, community autonomy, leadership, political change, policy development, and select policy issues including public finance. Field research on political processes or policy issues in select communities. Offered in alternate years.—III. Hirtz

162. People, Work and Technology (4)

Lecture-4 hours. Prerequisite: upper division standing and completion of eight units of coursework in Sociology, Anthropology, or Community and Regional Development. Restricted to upper division standing. Analysis of the relationship between work, technology, and human experience. Theories of the causes and consequences of labor process change; impacts of race/ethnicity, class, gender, and citizen-ship status on work; responses of workers, communities, and policy-makers to workplace changes. — I.

164. Theories of Organizations and Their Roles in Community Change (5)

Lecture — 4 hours; laboratory — 2 hours. Prerequisite: course 1 or 2 or other equivalent social science course and Statistics 13 or equivalent. Planned change within and through community organizations. Private voluntary organizations, local community associations, and local government. Relationship between community organizations and social capital. Collaborative original data gathering and professional report writing. GE credit: ACGH, DD, OL, SS, VL, WE.-II. (II.) Hirtz

171. Housing and Social Policy (4)

Lecture - 4 hours; term paper. Prerequisite: upper division standing. Social impact, economics, and politics of housing in the United States. Special attention given to federal, state, and local policy and program strategies to produce and preserve affordable housing and inclusive neighborhoods.—III. (III.) Wiener

172. Social Inequality: Issues and Innovations (4)

Lecture/discussion-4 hours; extensive writing; term paper; project. Prerequisite: upper division standing and completion of eight units of course work in Anthropology, Sociology, or Community and Regional Development. Focus on the dimensions, causes, and means of alleviating social inequality in the U.S. Examination and analysis of major theories and forms (class, race/ethnicity, gender, and citizenship status) of inequality. Policy-based and grassroots approaches to change. - III. (III.)

176. Comparative Ethnicity (4)

Lecture-4 hours; term paper. Prerequisite: upper division standing; eight units of Sociology, Anthropology, or combination. Role of ethnicity in shaping social systems and interaction. Analytical approaches to and issues arising from the study of ethnicity, through utilization of data from a range of different societies. GE credit: SocSci, Div, Wrt | ACGH, DD, SS, WC, WE.—II. Guarnizo

180. Transnational Community Development (4)

Lecture/discussion—4 hours; extensive writing; project; term paper. Prerequisite: course 1, or Anthropol ogy 2, or Sociology 1. The effects of grassroots, non-state, non-corporate actors from abroad on local, national and international development. Socioeconomic, political, and cultural implications of transnational actions undertaken by international nongovernmental organizations, individual migrants, and migrant grassroots civic organizations. GE credit: SocSci | SS, WC, WE.—III. (III.) Guarnizo

192. Internship (1-12)

Internship - 3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Supervised internship, off and on campus, in community and institutional settings. (P/NP grading only.)

194HA-194HB. Special Study for Honors Students (4-4)

Independent study-3 hours; seminar-1 hour; project; term paper. Prerequisite: completion of 135 units at the time of enrollment; GPA 3.500 in the major; GPA 3.300 in overall standing; completion of at least four upper division courses; agreement of a faculty member to serve as thesis adviser; consent of instructor. Community and Regional Development Honors is a program of direct reading, research and writing culminating in the preparation of a Senior Honors Thesis under the direction of a faculty adviser. (Deferred grading only, pending completion of sequence.)—I, II. (I, II.) Hirtz

198. Directed Group Study (1-5)

(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

240. Community Development Theory (4)

Lecture/discussion-4 hours. Introduction to theories of community development and different concepts of community, poverty, and development. Emphasis on building theory, linking applied development techniques to theory, evaluating development policy, and examining case studies of community development organizations and projects.—I. (I.) Hirtz

241. The Economics of Community Development (4)

Seminar—4 hours. Prerequisite: graduate standing. Economic theories and methods of planning for communities. Human resources, community services and infrastructure, industrialization and technological change, and regional growth. The community's role in the greater economy. - I. Kenney

242. Community Development Organizations (4)

Seminar-4 hours. Prerequisite: course 240. Theory and praxis of organizations with social change agendas at the community level. Emphasis on nonprofit organizations and philanthropic foundations. — III. (III.) Hirtz

2425. Community Development Organizations (International) (4)

Fieldwork - 10 hours; lecture - 5 hours; workshop -5 hours. Prerequisite: course 240. Theory and praxis of organizations with social change agendas at the community level. Emphasis on local governance, non-profit organizations and philanthropic foundations at an international level. Limited enrollment. IV. (IV.) Hirtz

244. Political Ecology of Community Development (4)

Lecture — 4 hours. Prerequisite: graduate standing. Community development from the perspective of geographical political ecology. Social and environmental outcomes of the dynamic relationship between communities and land-based resources, and between social groups. Cases of community conservation and development in developing and industrialized countries. - II. (II.) Galt

245. The Political Economy of Urban and Regional Development (4)

Lecture - 4 hours. Prerequisite: course 157, 244, or the equivalent. How global, political and economic restructuring and national and state policies are mediated by community politics; social production of urban form; role of the state in uneven development; dynamics of urban growth and decline; regional development in California.—III. (III.)

246. The Political Economy of Transnational Migration (4)

Lecture — 4 hours. Prerequisite: graduate standing. Theoretical perspectives and empirical research on social, cultural, political, and economic processes of transnational migration to the U.S. Discussion of conventional theories will precede contemporary comparative perspectives on class, race, ethnicity, citizenship, and the ethnic economy.—II. (II.)

247. Transformation of Work (4)

Lecture/discussion-4 hours. Prerequisite: graduate standing in history or social science degree program or consent of instructor. Exploration of the ways that the experience, organization, and systems of work are being reconfigured in the late twentieth century. The impacts of economic restructuring on local communities and workers.—III. (III.)

248. Social Policy, Welfare Theories and Communities (4)

Seminar-4 hours. Prerequisite: graduate standing. Theories and comparative histories of modern welfare states and social policy in relation to legal/normative, organizational, and administrative aspects. Analysis of specific social issues within the U.S./California context. Not open for credit to students having completed course 248A and 248B. Offered in alternate years. — (III.) Hirtz

248A. Social Policy, Welfare Theories and Communities I (2)

Seminar-2 hours. Prerequisite: graduate standing. Theories and comparative histories of modern welfare states. Theories of welfare and social policy in relation to normative, organizational, and administrative aspects of welfare and social policy. Offered in alternate years. - Hirtz

248B. Social Policy, Welfare Theories and Communities II (2)

Seminar-2 hours. Prerequisite: graduate standing, course 248A concurrently. Analysis of a specific set of social issues within the U.S./California context. Issues may include poverty, hunger, housing, health, family, disability, economic opportunity, affirmative action orientations, gender, old age, or special social groups. Offered in alternate years—Hirtz

250. Professional Skills for Community Development (4)

Lecture/discussion - 2 hours; project - 2 hours; fieldwork; extensive writing or discussion. Prerequisite: course 240. Priority enrollment for Masters and Ph.D. students in Community and Regional Development. Help students develop the practical skills needed to work professionally in organizations that are involved in community development. Provides an

overview of community development planning, project management, and consultation skills. -II. (II.) Benner, Hirtz, London

290. Seminar (1)

Seminar-1 hour. Analysis of research in applied behavioral sciences. (S/U grading only.)—I, II, III.

292. Graduate Internship (1-12)

Internship - 3-36 hours. Individually designed supervised internship, off campus, in community or institutional setting. Developed with advice of faculty mentor. (S/U grading only.)

293. Community Development Graduate Proseminar (1)

Lecture/discussion-1 hour. Prerequisite: enrolled in Community Development graduate group; restricted to first year Community Development graduate students only. Introduction to graduate training in Community Development. Seminar designed to introduce students entering graduate work in the Community Development Graduate Group to its ongoing activities. (S/U grading only.)—I. (İ.)

298. Group Study (1-5)

299. Research (1-12)

(S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Professional Course 440. Professional Skills for Community Development (4)

Seminar—4 hours. Prerequisite: course 240. The intersection of theory and case studies to develop practical skills needed to work as a professional community developer, program administrator, and/or policy consultant.—II. (II.) Bradshaw

Community Development (A Graduate Group)

Michael Rios, Ph.D., Chairperson of the Group Group Office. 1332 Hart Hall (Human and Com-

munity Development); (530) 752-1926; http://hcd.ucdavis.edu

Faculty

Chris Benner, Ph.D., Associate Professor (Human and Community Development) Adela De La Torre, Ph.D., Professor (Chicana/o Studies)

Jesse Drew, Ph.D., Associate Professor (Techno-Cultural Studies)
Deborah Elliott-Fisk, Ph.D., Sr. Lecturer SOE

(Wildlife, Fish, and Conservation Biology)

Patsy Eubanks-Owens, M.L.A., Professor (Landscape Architecture)

Yvette Flores-Ortiz, Ph.D., Professor (Chicana/o Studies)

Ryan E. Galt, Ph.D., Assistant Professor (Human and Community Development) Luis Guarnizo, Ph.D., Professor

(Human and Community Development) Susan Handy, Ph.D., Professor

(Environmental Science and Policy) Paul Heckman, Ph.D., Professor

(School of Education) Robin Hill, Ph.D., Associate Professor

(Art, Art History)
Frank Hirtz, Ph.D., Sr. Lecturer SOE
(Human and Community Development)

Carlos Jackson, M.F.A., Assistant Professor (Chicana/o Studies)

Susan B. Kaiser, Ph.D., Professor (Women's Studies)

Martin Kenney, Ph.D., Professor (Human and Community Development) David Kyle, Ph.D., Associate Professor (Sociology) William Lacy, Ph.D., Professor, Vice Provost (Human and Community Development, Outreach and International Programs) Jonathan London, Ph.D., Director, Assistant Professor (Center for the Study of Regional Change) Mark Lubell, Ph.D., Professor (Environmental Sciences and Policy) Michael, McQuarrie, Ph.D., Assistant Professor

(Sociology) Elizabeth Miller, M.D., Ph.D., Assistant Professor (UCDHS: Pediatrics)

Deb Niemeier, Ph.D. Professor (Civil and Environmental Engineering) Richard Pan, Ph.D., Associate Professor (General Pediatrics)

Dennis Pendleton, Ph.D., Dean (UC Davis Extension)

Michael Rios, Ph.D., Associate Professor (Environmental Design)

Julie Sze, Ph.D., Associate Professor (American Studies)

Tom Tomich, Ph.D., Professor (Human and Community Development) Karen Watson-Gegeo, Ph.D., Professor (School of Education) Distinguished Graduate

Mentoring Award Steve Wheeler, Ph.D., Associate Professor (Environmental Design) Diane Wolf, Ph.D., Professor (Sociology)

Affiliated Faculty

David Campbell, Ph.D., Specialist in Cooperative Extension (Human and Community Development) Gail Feenstra, Ph.D., Academic Coordinator

Joyce Gutstein, Ph.D., Director (Public Service Research Program)

Michael Lawler, Ph.D., Chair, Human Services (UC Davis Extension)

Jeff Loux, Ph.D., Director (Land Use and Natural

Resources, UC Davis Extension)
Deborah Paterniti, Ph.D., Associate Adjunct Professor (UCDHS: Center for Healthcare Policy and Research

Carolyn Penny, Ph.D., Director (Common Ground/UC Davis Extension) Bernadette Tarallo, Ph.D., Continuing Appointment Lecturer (Human and Community Development) Mark Van Horn, Director (PSTC/SF)

Stephen Brush, Ph.D., Professor Emeritus

(Human and Community Development)

Emeriti Faculty

Mark Francis, M.L.A., Professor Emeritus (Environmental Design) Isao Fujimoto, M.A., Lecturer SOE Emeritus James I. Grieshop, Ph.D., Specialist in Cooperative Extension Emeritus (Human and Community Development) Janet D. Momsen, Ph.D., Professor Emerita (Human and Community Development) Ben Orlove, Ph.D., Professor Emeritus (Environmental Sciences and Policy) Michael P. Smith, Ph.D., Distinguished Professor Emeritus (Human and Community Development) Alvin D. Sokolow, Ph.D., Extension Specialist

Emeritus (Human and Community Development) Geoffrey A. Wandesforde-Smith, Ph.D., Associate Professor Emeritus (Political Science, Environmental Science and Policy)

Miriam J. Wells, Ph.D., Professor Emerita (Human and Community Development)

Graduate Study. The Graduate Group in Community Development offers a multidisciplinary program of study which leads to the M.S. degree. The program helps students link conceptual knowledge with cutting edge practical experience so they can influence the social, economic, cultural and political forces that affect the well-being of people living in community settings whether small towns or large cities, whether in the Unites States or elsewhere in the world. Graduate study in community development

also prepares individuals to work within government or non-profit organizations in the realm of social and economic change, or to prepare them for further doctoral studies in related programs. Particular strengths of the program include: urban political development and change; sustainable agriculture and food systems; community organizing and organizations in under-served communities; community economic development; environmental conservation and planning; local impacts of globalization and trans-nationalism.

Preparation. Applicants to this program can prepare themselves by enrolling for upper division courses in the social or behavioral sciences, e.g., anthropology, economics, sociology, psychology, geography, urban studies or political science, and courses in community studies.

Graduate Advisers. Contact the Group office.

Community Nutrition

See Nutrition Science, on page 449.

Comparative Literature

(College of Letters and Science)

Juliana Schiesari, Chairperson of the Department

Department Office. 213 Sproul Hall; (530) 752-1219; http://complit.ucdavis.edu

Faculty

Gail Finney, Ph.D., Professor

(Comparative Literature, German and Russian) Academic Senate Distinguished Teaching Award Ralph Hexter, Ph.D., Professor

(Classics, and Comparative Literature) Neil Larsen, Ph.D., Professor Kari Lokke, Ph.D., Professor Sheldon Lu, Ph.D., Professor Noha Radwan, Ph.D. Assistant Professor Juliana Schiesari, Ph.D., Professor (Comparative Literature, French and Italian)

Brenda Schildgen, Ph.D., Professor UC Davis Prize for Teaching and Scholarly Achievement

Jocelyn Sharlet, Ph.D., Associate Professor Archana Venkatesan, Ph.D., Assistant Professor (Comparative Literature, Religious Studies)

Emeriti Faculty

Manfred Kusch, Ph.D., Senior Lecturer Emeritus 'Comparative Literature, French and Italian) Seth L. Schein, Ph.D., Professor Emeritus Robert M. Torrance, Ph.D., Professor Emeritus

Affiliated Faculty

Scott McLean, Ph.D., Lecturer

The Major Program

Comparative Literature is a dynamic major whose own self-definition is constantly shifting. Once mostly limited to the study of western European literature and its Greco-Roman classical past, today Comparative Literature has become a global interdisciplinary study of literature in original languages and other media (including cinema, television, fine arts, and opera, for example). Thus, we can define Compara-tive Literature as the study of literature and culture across national boundaries and throughout historical

The Program. Both the major and the minor programs in Comparative Literature allow students to combine courses in one or more national literature departments with courses in Comparative Literature. The introductory course sequence (COM 1 through

4) provides both an overview of ancient to contemporary literature and film and offers intensive practice in analytical thought. In addition, any one of the courses in the sequence satisfies the university composition requirement. All readings in undergraduate Comparative Literature courses are in English, but majors take upper division courses in at least one foreign literature in the original language.

Students majoring in Comparative Literature choose a first and second literature of concentration, one of which may be English. After the introductory sequence, each student's major course work is divided between courses in the two literatures of concentration and Comparative Literature courses. These Comparative Literature courses encourage students to take a broad view of a historical period, a theme, a genre, or a literary movement. The wide variety of options in the program permits great flexibility and encourages interdisciplinary connections among literature and philosophy, psychology, history, and the arts. Each student's plan of study must be approved by the major adviser at the beginning and end of each calendar year.

Career Alternatives. A Comparative Literature major offers an excellent enhancement to pre-professional training, preparing students for graduate study in medicine, dentistry, veterinary medicine, and other science fields as well as law and business, besides of course journalism and publishing, teaching, or graduate study in literature.

A.B. Major Requirements:

UNITS

Preparatory Subject Matter..... 16-46

Comparative Literature 1 or 2; 3 or 4...... 8 Two other lower division courses in Comparative Literature (selected from 1-53C excluding the 10 series. Cannot include the two required courses in the 1-4 series). It is recommended that students who do not use a European language toward the major take one of the remaining required lower division courses in the 53 series, preferably the 53 course that relates to the region of the language the student is using to satisfy the upper division language requirement in the ensure satisfactory performance at the uppe division level0-30

Depth Subject Matter 40

Five upper division Comparative Literature courses including at least one course in a major period (such as 164A-164B-164C-164D), movement (such as 168A-168B, 169) or genre (such as 160A-160B, 161A-161B, 163, 166A-166B) and including the following required courses Comparative Literature 141 (recommended for the junior year); Comparative Literature 195 (to be taken in the spring quarter before graduation) 20 Three upper division literature courses in a language other than English 12 Two additional upper division literature courses in Comparative Literature or in any other program including English or literature

in translation 8 Total Units for the Major56-86

Major Adviser. Consult the Department office.

Minor Program Requirements:

The minor in Comparative Literature allows students to combine courses in Comparative Literature with courses in a national literature, including English or foreign literature in translation. There is no foreign language requirement for the minor.

Comparative Literature 24

Comparative Literature 1, 2, 3, or 4...... 4 At least five upper division literature courses, at least four of which are in Comparative Literature (Comparative Literature 141 and 195 recommended)......20 Courses should be chosen in consultation with, and with the approval of, the adviser.

Minor Adviser. Consult the Department office.

Advising. All Comparative Literature majors and minors must consult with their adviser, individually, at least once at the beginning and once at the end of each academic year.

Honors and Honors Program. Students, who meet the grade point requirement for graduation with honors and complete the requirements established by the College of Letters and Science, may be recommended by the department for graduation with high honors or highest honors on the basis of an evaluation of their academic achievements in the major and in the honors project in particular. Entrance into the honors program requires that a student have completed at least 135 units with a minimum grade point average of 3.500 in courses counted toward the major.

Candidates must write a senior thesis under the direction of a faculty member approved by the major adviser. For this purpose, in addition to fulfilling all other major requirements, honors candidates must enroll in 6 units of Comparative Literature 194H during the first two quarters of the senior year.

Teaching Credential Subject Representative. See the Teaching Credential/M.A. Program on

Education Abroad Options. The department of Comparative Literature encourages students to study abroad, in the Summer Abroad program, the Quarter Abroad Program, or the Education Abroad Program. With the approval of a major adviser, applicable courses taken abroad may be accepted in the major or minor programs.

Graduate Study. The Comparative Literature Program offers the Ph.D. degree with a strong emphasis on individual research under the supervision of a faculty member. Candidates for the Ph.D., in addition to research of a comparative nature, study three literatures (one of which may be English and/or American) in the original languages, acquiring an extensive knowledge of the overall development of one. Students may choose to focus on a special topic instead of on a third literary tradition.

Within this framework, each student's program will be tailored to individual interests, and may center on a major historical period, such as the Renaissance or the modern age; a genre, such as lyric poetry, epic, drama, or the novel; or any other special emphasis approved by the Graduate Adviser.

Preparation. For admission to the Ph.D. Program candidates should have an undergraduate major in literature and reading ability in three foreign languages. The Group requires three letters of recommendation and a sample of recent written work, and it is recommended that students submit their GRE

Graduate Adviser. S. Lu

Courses in Comparative Literature

Note. Many courses in Comparative Literature require that students have met the Entry Level Writing Requirement (ELWR) for the University of California.

Lower Division Courses

1. Major Books of Western Culture: The Ancient World (4)

Lecture/discussion-4 hours. Prerequisite: completion of Entry Level Writing Requirement. Introduction, through class discussion and frequent written assignments, to some of the major books of western civilization such as The Odyssey, Aeneid, Bible, and Augustine's Confessions. GE credit: ArtHum, Wrt | AH, WC, WE.-I, II, III. (I, II, III.)

2. Major Books of Western Culture: From the Middle Ages to the Enlightenment (4)

Lecture/discussion-4 hours. Prerequisite: completion of Entry Level Writing Requirement. Introduction to the methods of inquiry applied to critical reading and the practice of writing. Focus on texts from the European Middle Ages to the eighteenth century; critical analysis of the historical-cultural develop ments in this period. GE credit: ArtHum, Wrt | AH, WC, WE.-I, II, III. (I, II, III.)

3. Major Books of Western Culture: The Modern Crisis (4)

Lecture/discussion-4 hours. Prerequisite: completion of Entry Level Writing Requirement. Introduction, through class discussion and frequent written assignments, to the major literature and thought of the late eighteenth to the mid-twentieth century. GE credit: ArtHum, Wrt | AH, WC, WE.-I, II, III. (I, II, III.)

4. Major Books of the Contemporary World

Lecture/discussion—4 hours. Prerequisite: completion of Subject A requirement. Comparative study of selected major Western and non-Western texts composed in the period from 1945 to the present. Intensive focus on writing about these texts, with frequent papers written about these works. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.—I, II, III. (I, II,

5. Fairy Tales, Fables, and Parables (4)

Lecture - 3 hours; discussion - 1 hour. An introduction to fairy tales, fables, and parables as recurrent forms in literature, with such readings as tales from Aesop and Grimm, Chaucer and Shakespeare, Kafka and Borges, Buddhist and Taoist parables, the Arabian Nights, and African American folklore. GE credit: ArtHum, Div, Wrt | AH, WC, WE.-I, II, III. (I, II, III.) Schildgen, Sharlet

6. Myths and Legends (4)

Lecture - 3 hours; discussion - 1 hour. Introduction to the comparative study of myths and legends, excluding those of Greece and Rome, with readings from Near Eastern, Teutonic, Celtic, Indian, Japanese, Chinese, African and Central American literary sources. GE credit: ArtHum, Div, Wrt | AH, WC, WE.-I, II. (I, II.) McLean, Venkatesan

7. Literature of Fantasy and the Supernatural (4)

Lecture - 3 hours; discussion - 1 hour. The role of fantasy and the supernatural in literature: tales of magic, hallucination, ghosts, and metamorphosis, including diverse authors such as Shakespeare, P'u Sung-Ling, Kafka, Kawabata, Fuentes, and Morrison. GE credit: ArtHum, Div, Wrt | AH, WC, WE.-II, III. (II, III.) Finney, Larsen

8. Utopias and their Transformations (4)

Lecture/discussion-3 hours; term paper. Prerequisite: satisfaction of the Subject A requirement. A consideration, in literary works from different ages, of visionary and rational perceptions of a lost paradise, Golden Age, or Atlantis - and of the inhuman nightmares that can result from perversions of the utopian dream of perfection. GE credit: ArtHum, Wrt | AH, WC, WE.-(I.)

9. The Short Story and Novella (4)

Lecture/discussion-3 hours; term paper. An introduction to shorter forms of prose fiction by major authors of different countries, with special emphasis on the modern period. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—(III.)

10A-N. Master Authors in World Literature (2)

Lecture/discussion — 1 two-hour session. Designed primarily to acquaint the non-literature major with a cross-section of writings by the world's most important authors; readings in English translation. Content alternates among the following segments: (A) Gilgamesh, Ramayana, Beowulf, Nibelungenlied; (B) Metamorphoses, Decameron, Arabian Nights, Canterbury Tales; (C) Chanson de Roland, El Čid, Igor's Campaign, Morte D'Arthur; (D) Sakuntala, Tristan and Isolde, Aucassin and Nicolette, Gawain and the Green Knight; (E) Swift, Rabelais, La Celestina, Simplicissimus; (F) Cervantes, Saikaku, Fielding, Vol-

taire; (G) Machiavelli, Shakespeare, Lope de Vega/ Calderón, Molière/Racine, Lessing/Schiller; (H) Goethe, Byron, Stendhal, Pushkin, Lermontov; (I) Hoffmann, Gogol, Poe, Hawthorne, Maupassant, Chekhov, Melville; (J) Flaubert, Twain, Turgenev, Galdós, Ibsen; (K) Balzac, Dostoevski/Tolstoi, Hardy, Shaw, Strindberg; (L) Unamuno, Svevo, Conrad, Gide, Kafka, Faulkner; (M) Rilke/Yeats, Joyce/ Woolf, Mann/Céline, Bulgakov/Tanizaki, O'Neill/ Brecht, Lorca/Pirandello; (N) Camus/Sartre, García Márquez/Grass, Borges/Sarraute, Bellow/ Nabokov, Beckett/Pinter, Genet/Dürrenmatt. May be repeated for credit in different subject area. Limited enrollment. (P/NP grading only.)—I, II, III. (I, II,

12. Introduction to Women Writers (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: completion of subject A requirement. Survey of fiction, drama, and poetry by women writers from all continents. Concerns of women compared in light of their varied social and cultural traditions. Literary analysis of voice, imagery, narrative strategies and diction. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—III. Lokke

13. Dramatic Literature (3)

Lecture - 3 hours. Prerequisite: completion of Subject A requirement or the equivalent. Introduction, through careful reading of selected plays, to some of the major forms of Western drama, from the earliest tragedies of ancient Greece to the contemporary American theater. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC, WE.-II.

14. Introduction to Poetry (3)

Lecture/discussion-3 hours. Prerequisite: completion of Subject A requirement. Comparative study of poetry in a variety of lyric and other poetic forms from different historical periods and different linguis-tic, national, and cultural traditions. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC, WE.—(I.)

20. Humans and the Natural World (4)

Lecture/discussion-3 hours; term paper. Changing relationship between humans and the natural environment in ancient and modern authors as Virgil, Li Po, Basho, Darwin, and Thoreau. GE credit: ArtHum, Wrt | AH, WC, WE.—II. (II.) McLean

24. Animals in Literature (4)

Lecture - 3 hours; term paper or discussion. Prerequisite: completion of Entry Level Writing Requirement. Study of literary texts from various periods and cultures whose theme is the representation of animals. GE credit: ArtHum | AH, WC, WE.-II. (II.) Schiesari

25. Ethnic Minority Writers in World Literature (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: ELWR (Entry Level Writing Requirement). Consideration of a broad range of writers who speak from an ethnic perspective different from the nominally or politically dominant culture of their respective countries and who explore the challenges faced by characters significantly affected by their ethnic minority status. GE credit: ArtHum, Div, Wrt | AH, WC, WE.-II. (II.) Radwan

53A. Literature of China and Japan (3)

Lecture - 2 hours; discussion - 1 hour. Introduction to representative masterpieces of East Asia with readings from such works as The Story of the Stone, The Peach Blossom Fan, T'ang and Sung poetry, classical Japanese poetry, drama, and travel diaries, and The Tale of Genji. GE credit: ArtHum, Div, Wrt | AH, WC, WE.

53B. Literature of India and Southeast Asia

Lecture - 2 hours; discussion - 1 hour. Introduction to representative masterpieces of South Asia with readings from such works as the Mahabharata and Ramayana, The Cloud Messenger, Shakuntala, The Little Clay Cart, and the stories and poems of both ancient and modern India and Southeast Asia. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—(III.) Venkatesan

53C. Literatures of the Islamic World (3)

Lecture - 2 hours; discussion - 1 hour. Introduction to classical Islamic culture through translations of literature primarily from Arabic and Persian, as well as other languages. Topics include the concept of the self, society and power, spirituality, the natural world, the cosmos, and the supernatural. GE credit: AH, WC, WE.—I. Sharlet

90X. Lower Division Seminar (1-2)

Seminar — 1-4 hours. Prerequisite: consent of instructor. Examination of a special topic in a small group

98. Directed Group Study (1-5) I, II, III. The Staff (Director in charge)

Restricted to lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) (P/NP grading only.)

Upper Division Courses 100. World Cinema (4)

Lecture/discussion-3 hours; film viewing-3 hours. Prerequisite: upper-division standing, or consent of instructor. A comparative, cross-cultural study of a topic, theme, or movement in world cinema beyond the boundary of a single national tradition. Topics may include "postsocialist cinemas in East Europe and Asia," "cinema and globalization," and "popular Asian cinemas." May be repeated three times for credit when topic differs. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.-I, III. (I, III.) Lu

110. Hong Kong Cinema (4)

Lecture/discussion — 3 hours; film viewing — 3 hours. Prerequisite: upper-division standing, or consent of instructor. Hong Kong cinema, its history, industry, styles, genres, directors, and stars. Special attention to its polyglot, multicultural, transnational, colonial, and postcolonial environment. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.—II. (II.) Lu

120. Writing Nature: 1750 to the Present (4)

Lecture/discussion-3 hours; term paper. Prerequisite: completion of Subject A requirement and at least one course in literature. Study of representations, descriptions, and discussions of humankind's problematical relationship with the non-human world in texts written in a variety of European and American traditions between 1750 and the present. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC, WE. — (III.) McLean

135. Women Writers (4)

Lecture/discussion-3 hours; term paper. An exploration of women's differing views of self and society as revealed in major works by female authors of various times and cultures. Readings, principally of fiction, will include such writers as Lady Murasaki, Mme de Lafayette, and Charlotte Bronte. GE credit: ArtHum, Div, Wrt AH, WC, WE.-I, III. (I, II.) Lokke, Schiesari

138. Gender and Interpretation in the Renaissance (4)

Lecture/discussion—3 hours; term paper. Prerequisite: completion of Subject A requirement, at least one course in literature, or consent of instructor. Critical analysis of Renaissance texts with primary focus on issues such as human dignity, education and gender politics; "high" and "low" culture and its relation to literary practices. (Same course as Italian 141.) GE credit: ArtHum, Div, Wrt | AH, WC, WE.-II. (II.) Schiesari

139. Shakespeare and the Classical World

Lecture/discussion-3 hours; term paper. Prerequisite: at least one course in literature. Shakespeare's representations of the classical world in the light of selected ancient texts and Renaissance conceptions of Antiquity, with special attention to the depiction of politics and history. Offered in alternate years. GE credit: AH, WC, WE.—(II.)

140. Thematic and Structural Study of Literature (4)

Lecture/discussion — 3 hours; term paper. Interpretation of selected works illustrating the historical evolution of themes, as well as of formal and structural elements. May be repeated for credit when substance of course varies. GE credit: ArtHum, Wrt | AH, WE.-(II.)

141. Introduction to Comparative Critical Theory (4)

Lecture/discussion-3 hours; term paper. Prerequisite: one upper division literature course or consent of instructor. Introduction to comparative critical theory and its use for interpreting literary texts, film, and media forms in global culture. (Same course as Critical Theory 101.) GE credit: ArtHum, Wrt | AH, WC, WE.—IIÍ. (III.) Larsen

142. Critical Reading and Analysis (4)

Lecture/discussion-3 hours; term paper. Prerequisite: consent of instructor. Close reading of selected texts; scrutiny of very limited amount of material, with attention to the problems of texts in translation. GE credit: AH, WE.

144. The Grotesque (4)

Lecture/discussion—3 hours; term paper. Prerequisite: completion of Subject A requirement and at least one course in literature. Study of the "grotesque" in selected texts from the Renaissance to the 20th century, with attention to the "grotesque" as a means of social, cultural, and political commentary, as well as of aesthetic innovation. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC, WE. - (I.)

145. Representations of the City (4)

Lecture — 2 hours; discussion — 1 hour; writing. Exploration of the representation of the city in major translated literary texts from a variety of literary traditions and periods. Emphasis on the diversity of urban experience in literature. Topics includé public and private space, memory, and gender. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC, WE. - I. Radwan, Sharlet

146. Myth in Literature (4)

Lecture—3 hours; term paper. Prerequisite: course 6 recommended. Comparative study of different versions of one or more central myths, with attention to their cultural settings, artistic and literary forms of representation, as well as to their psychological dimensions. GE credit: ArtHum, Wrt | AH, WC, WE. - (II.)

147. Modern Jewish Writers (4)

Lecture/discussion-3 hours; term paper. Prerequisite: completion of the Subject A requirement and one lower division literature course. Problems of the modern Jewish experience from the perspective of the writer's construction of the self in relation to the future and to the non-Jew. Draws upon Russian, German, Yiddish, and American traditions. GE credit: ArtHum, Div, Wrt | AH, WC, WE.-II. (III.)

148. Mystical Literatures of South Asia and the Middle East (4)

Lecture/discussion-3 hours; term paper. Exploration of the comparative mystical literatures of major religious traditions, with a focus on those produced in South Asia and the Middle East, although including other traditions. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC, WE.-I. Ven-

151. Colonial and Postcolonial Experience in Literature (4)

Lecture — 3 hours; term paper. Prerequisite: completion of Subject A requirement and at least one course in literature. A literary introduction to the cultural issues of colonialism and postcolonialism through reading, discussing and writing on narratives which articulate diverse points of view. GE credit: ArtHum, Div, Wrt | AH, WC, WE.-II. (III.) Larsen, Radwan

152. Literature of the Americas (4)

Lecture/discussion-3 hours; term paper. Prerequisite: completion of Subject A requirement and at least one course in literature. Study of the various stylistic, historical, social and cultural factors that contribute to a hemispheric vision of American literature, encompassing works by Canadian, United States, Caribbean, Brazilian, and Spanish-American writers. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—I. (I.) Larsen

1525. Literature of the Americas (Taught in Latin America) (4)

Lecture/discussion-6 hours; term paper; fieldwork—6 hours. Prerequisite: completion of Entry Level Writing Requirement and at least one course in literature, or consent of instructor. Various stylistic, historical, social, and cultural factors that contribute to a hemispheric vision of American literature, encompassing works by Canadian, United States, Caribbean, Brazilian, and Spanish-American writers. Course taught abroad. May be repeated one time for credit. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.—III, IV. (III, IV.) Larsen

153. The Forms of Asian Literature (4)

Lecture/discussion-3 hours; term paper. Prerequisite: upper division standing. Introduction to distinctive Asian literary forms, such as haiku, noh, the Chinese novel and tale, through reading of major works. Comparison with Western genres and study of native and Western critical traditions. GE credit: ArtHum, Div, Wrt | AH, WC, WE.-Lu

154. African Literature (4)

Lecture - 3 hours; term paper. Prerequisite: completion of Entry Level Writing Requirement (ELWR).

Colonial and post-colonial sub-Saharan African literature and the African oral traditions from which it emerged. Genres and themes of African literature from the nineteenth century to the present. Offered in alternate years. (Same course as African American Studies 153.) GE credit: ArtHum, Div, Wrt | AH, WC, WE.—İII. (III.) Adejunmobi

155. Classical Literatures of the Islamic World 600-1800 (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: Subject A or consent of instructor. Major classical texts of the Islamic world with attention to intermingling of diverse cultural influences and historical context. Includes epic, romance, lyric, mystical narrative, fairy tales, essays. Texts from Arabic, Persian, Ottoman Turkish, and Urdu literature. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—(II.) Sharlet

156. The Ramayana (4)

Lecture — 3 hours; term paper. Exploration of the Indian epic, Ramayana, through the lens of literature, performance, and visual art. Emphasis on the text's diversity and its contemporary global relevance. Topics include Ramayanas in Southeast Asia, and in various South Asian diaspora communities. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—(II.) Venkatesan

157. War and Peace in Literature (4)

Lecture/discussion—3 hours; term papers. Prerequisite: course 1, 2, or 3, or consent of instructor. Through study of a few major works from Western and non-Western literature the course seeks to illuminate the way in which literature from antiquity to the present has dealt with the antinomy peace/war through the ages. GE credit: ArtHum, Wrt | AH, WC, WE.—Radwan

158. The Detective Story as Literature (4)

Lecture - 3 hours; term paper. Study of the origins, literary and social background, development and implications of the literature of detection in a comparative context. GE credit: ArtHum, Wrt | AH, WC, WE.-I.

159. Women in Literature (4)

Lecture — 3 hours; term paper. Prerequisite: course 1, 2, 3, or 4 or the equivalent recommended. Portrayals of women in literature, comparing selected heroines who represent a particular theme, period, or genre. Texts range around the globe and from ancient to modern works, such as Lysistrata, Emma, Hedda Gabler, The Makioka Sisters, and Top Girls. GE credit: ArtHum, Div, Wrt | AH, WC, WE.

160A. The Modern Novel (4)

Lecture/discussion—3 hours; term paper. The changing image of man and his world as seen in novels by such writers as Joyce, Proust, and Mann. GE credit: ArtHum, Wrt | AH, WC, WE.—III. (III.)

160B. The Modern Drama (4)

 ${\tt Lecture/discussion-3\ hours;\ term\ paper.\ Readings}$ in representative authors such as Ibsen, Strindberg, Chekhov, Pirandello and Brecht. GE credit: ArtHum, Wrt | AH, WC, WE.-I. (II.) Finney

161A. Tragedy (4)

Lecture/discussion—3 hours; term paper. Persistent and changing aspects of the tragic vision in literature from ancient times to the present. GE credit: ArtHum, Wrt | AH, WC, WE.

161B. Comedy (4)

Lecture/discussion—3 hours; term paper. Comic attitudes towards life in literary works of different ages. GE credit: ArtHum, Wrt | AH, WC, WE

163. Biography and Autobiography (4)

Lecture/discussion—3 hours; term paper. Portrayals of a human life in biographies and/or autobiographies of different countries and ages. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC, WE. - II. (I.)

164A. The European Middle Ages (4)

Lecture/discussion-3 hours; term paper. Prerequisite: Subject A. Medieval literary genres as the foundation for modern literary forms. Topics and themes as love, God, vision, nature, history and politics, and sign theory. GE credit: ArtHum, Wrt | AH, WC, WE.-I. (I.) Schildgen

164B. The Renaissance (4)

Lecture/discussion-3 hours; term paper. Prerequisite: Subject A. Literature, new science, gender, politics, and exploration in European Renaissance. Readings in Petrarch, Machiavelli, Montaigne, Tasso, Ariosto, Stampa, Shakespeare, Labé and Aphra Behn. GE credit: ArtHum, Wrt | AH, WC, WE.—II. (II.) Schiesari

164C. Baroque and Neoclassicism (4)

Lecture/discussion—3 hours; term paper. Readings in major authors such as Calderón, Corneille, Pascal, Racine, Milton, and Grimmelshausen, with consideration of the tension between the expansive energies of the "baroque" and the restraints of dogma and reason. GE credit: ArtHum, Wrt | AH, WČ, WE.

164D. The Enlightenment (4)

Lecture/discussion-3 hours; term paper. Prerequisite: Subject A. Enlightenment writers such as Swift, Voltaire, Sterne, Rousseau, Wollstonecraft, and Kant. Emphasis on the revolutionary impact of eighteenthcentury philosophical ideas and literary forms on modern political, social, and aesthetic culture. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC, WE.

165. Caribbean Literatures (4)

Lecture/discussion-4 hours. Prerequisite: upper division standing. Comparative approach to the multi-lingual, multi-cultural literatures of the Caribbean. Works from English, French, and Spanish speaking regions with special attention to problems of identity, diaspora and resistance, class, gender, race. Not open for credit to students who have completed course 165S. GE credit: ArtHum, Div, Wrt | AH, WC, WE.-II. (II.)

165S. Caribbean Literatures (4)

Lecture/discussion-4 hours. Prerequisite: upper division standing. Comparative approach to the multi-lingual, multi-cultural literatures of the Caribbean. Works from English, French, and Spanish speaking regions with special attention to problems of identity, diaspora and resistance, class, gender, race. Taught at the University of Havana, Cuba. Not open for credit to students who have completed course 165. GE credit: ArtHum, Div, Wrt | AH, WC, WE.-II. (II.)

166. Literatures of the Modern Middle East

Lecture/discussion—3 hours; term paper. Major translated works in modern Middle Eastern and North African Literature, including Arabic, Hebrew, Persian, and Turkish. Social and historical formation, with topics such as conflict and coexistence, journeys, and displaced people, gender and family. GE credit: ArtHum, Wrt | AH, WC, WE.—I. (I.) Rad-

166A. The Epic (4)

Lecture/discussion-3 hours; term paper. Study of various forms of epic poetry in both the oral and literary traditions. May be repeated for credit in different subject area. GÉ credit: ArtHum, Wrt | AH, WC, WE.-(I.)

166B. The Novel (4)

Lecture/discussion-3 hours; term paper. Prerequisite: Subject A. The novel as global genre: picaresque, epistolary, Bildungsroman, historical novel, contemporary forms. May be repeated one time for credit. GE credit: ArtHum, Wrt | AH, WC, WE.-II.

167. Comparative Study of Major Authors (4)

Lecture/discussion—3 hours; term paper. Prerequisite: consent of instructor. Pivotal works of artists in the Western mainstream, such as Dante, Shakespeare, Cervantes, Goethe, Tolstoi, Proust, and Joyce. GE credit: ArtHum, Wrt | AH, WC, WE.

168A. Romanticism (4)

Discussion - 3 hours; term paper. Prerequisite: any introductory course in literature. Introduction to the Romantic movement with emphasis upon Romantic concepts of the self, irony, love, the imagination and artistic creativity, and the relationship of the individual to nature and society. GE credit: ArtHum, Wrt | AH, WC, WE.-I. McLean, Lokke

168B. Realism and Naturalism (4)

Discussion - 3 hours; term paper. Prerequisite: consent of instructor. Novels and plays by Dickens, Zola, Flaubert, Dreiser, Ibsen, and Strindberg investigate marriage and adultery, the city and its perils, the hardships of industrialization, the war between the sexes, the New Woman, and other 19th-century themes. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC, WÉ.-II. Finney

169. The Avant-Garde (4)

Lecture/discussion—3 hours; term paper. Studies in movements such as surrealism, expressionism and the absurd. GE credit: ArtHum, Wrt | AH, WE.

170. The Contemporary Novel (4)

Lecture-3 hours; term paper. Study of important novels from different parts of the world, including Asia, Africa, Latin America, Europe, and the United States, in the period from the Second World War to the present. GE credit: ArtHum, Wrt | AH, WC,

180. Selected Topics in Comparative

Lecture/discussion—3 hours; term paper. Prerequisite: completion of Subject A requirement and at least one course in literature. Study of a selected topic or topics appropriate to student and faculty interests and areas of specialization of the instructor. May be repeated one time for credit when the topic differs. GE credit: ArtHum, Wrt | AH, WC, WE.

180S. Selected Topics in Comparative Literature (Taught Abroad) (4)

Lecture/discussion-6 hours; extensive writing; fieldwork-6 hours. Prerequisite: Subject A; at least one course in literature, or consent of instructor. Study of selected topics appropriate to student and faculty interests and areas of specialization of the instructor May be repeated one time for credit when topic differs. GE credit: ArtHum, Wrt | AH, WC, WE.-IV.

194H. Special Study for Honors Students

Independent study—1-5 hours. Prerequisite: open only to majors of senior standing who qualify for honors program. Guided research, under the direction of a faculty member approved by the Program Director, leading to a senior honors thesis on a comparative topic. May be repeated for credit. (P/NP grading only.) GE credit: AH, WE.

195. Seminar in Comparative Literature (4)

Seminar-3 hours; term paper. Prerequisite: senior standing as a Comparative Literature major or minor or consent of instructor. Open only to Comparative Literature majors or minors in or consent of instructor. Advanced study of selected topics and texts in Comparative Literature, with explicit emphasis on the theoretical and interpretive approaches that define Comparative Literature as a discipline and distinguish it from other literary disciplines. Required for the major. GE credit: AH, WE.—III. (III.)

197T. Tutoring in Comparative Literature (1-5)

Discussion — 2-4 hours. Prerequisite: upper division standing with declared major in Comparative Literature. Tutoring in undergraduate courses including leadership in small voluntary discussion groups affiliated with current courses offered by Comparative Literature. May be repeated for credit for a total of 6 units. (P/NP grading only.)

198. Directed Group Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

210. Topics and Themes in Comparative Literature (4)

Discussion — 3 hours; term paper. Prerequisite: graduate standing in Comparative Literature, English, or a foreign-language literature, or consent of instructor. Comparative, interpretive study of the treatment of specific topics and themes in literary works from various periods, societies, and cultures, in light of these works' historical and sociocultural contexts. May be repeated for credit when topic differs.—III.

214. Approaches to Lyric Poetry (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Analysis and interpretation of poetic texts in different historical periods and national literatures, with consideration of major theoretical developments in the understanding of poetic discourse. Offered in alternate years. -(III.) Schiesari

215. Forms of the Spiritual Quest (4)

Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor; knowledge of at least one foreign language. An exploration, culminating in a research paper, of changing forms of the quest for transcendence in different cultures, mainly in major works of Western literature, but also in other traditions and from the perspectives of other disciplines

220. Literary Genres (4)

Discussion—3 hours; term paper. Prerequisite: graduate standing in Comparative Literature, English, or a foreign-language literature, or consent of instructor. Comparative literature of major works in a particular genre from various linguistic, national, and cultural traditions, with particular attention to historical developments within the genre and to genre theory. May be repeated for credit when topic differs. - 1

238. Gender and Interpretation (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of how lit-erary texts from different periods, societies, and cultures represent gender roles and gender hierarchy, building on recent work on gender in anthropology, literature, psychology, and women's studies.

250A. Research in Primary Literature (4)

Project. Individually guided research in the primary literature of concentration, under the supervision of a faculty member culminating in a conference paper. Required of M.A. and Ph.D. candidates.—I, II, III. (I,

250B. Research in Second Literature (4)

Project. Individually guided research in the secondary literature of concentration, under the supervision of a faculty member, culminating in a pap Required of Ph.D. candidates.—I, II, III. (İ, II, III.)

250C. Research in Third Literature or Special Topic (4)

Project. Individually guided research, under the supervision of a faculty member, in the third literature of concentration or on a special topic culminating in a paper. Required of Ph.D. candidates. — I, II, III. (I, II, İII.)

250D. Dissertation Prospectus (4)

Independent study. Individually guided writing of the dissertation prospectus under supervision of a faculty member. Must be taken prior to completion of the qualifying exam. Required of Ph.D. candidates. (S/U grading only.)—I, II, III. (I, II, III)

255. Colloquium (2)

Lecture/discussion - 2 hours. Prerequisite: graduate standing. Oral presentation and critique of research papers; discussion of current problems in teaching and research in Comparative Literature. May be repeated for credit. (\$/U grading only.)-(II.)

260. Contexts of the 19th-Century Novel

Seminar-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Development in 19th-century history, culture, and society in relation to major trends in the 19th-century novel. Offered in alternate years. — (III.)

298. Directed Group Study (1-5)

Prerequisite: graduate standing. (S/U grading only.)

299. Individual Study (1-12)

(S/U grading only.)

299D. Special Study for the Doctoral Dissertation (1-12)

(S/U grading only.)

Professional Courses

390. Teaching Comparative Literature in College (3)

Lecture-1 hour; discussion-2 hours. Methods of teaching Comparative Literature with specific application to the introductory courses 1, 2, and 3, in relation to major cultural and social developments. Discussion also of ways to teach analytical writing. (S/U grading only.)—I. (I.)

392. Teaching Internship in Comparative Literature (1)

Discussion—1 hour. Regular consultations between the student instructor teaching Comparative Literature courses and a supervisor. In-class evaluation of teaching. May be repeated for credit after consultation with supervisor. (S/U grading only.)-I, II, III. (I,

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Comparative Literature (A Graduate Group)

The Comparative Literature Graduate Group is based in the department of Comparative Literature. See Comparative Literature, on page 206.

Comparative **Pathology** (A Graduate Group)

Dori Borjesson, Ph.D., Chairperson of the Group Group Office. 5215, Vet Med 3A (530) 752-2657:

http://www.vetmed.ucdavis.edu/pmi/comppath/ homecp.htm

Faculty

Robert Atwill, D.V.M., M.P.V.M., Ph.D., Professor (Population Health and Reproduction)

Barry A. Ball, D.V.M., Ph.D., Professor

(Population Health and Reproduction)
Danika Bannasch, D.V.M., Ph.D., Associate Professor (Population Health and Reproduction)

Alexander Borowsky, M.D., Associate Professor (Department of Pathology and Laboratory Medicine)

Peter A. Barry, Ph.D., Associate Professor (Pathology and Oncology)

Stephen W. Barthold, D.V.M., Ph.D., Professor (Pathology, Microbiology, and Immunology) Nicole Baumgarth, D.V.M., Ph.D., Associate

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(Pathology Microbiology and Immunology) Hilary A. Brodie, M.D., Ph.D., Professor

(Otolaryngology)
Robert J. Brosnan, D.V.M., Ph.D., Assistant Professor
(Surgical and Radiological Sciences)
Barbara A. Byrne, D.V.M., Ph.D., Assistant Professor

(Pathology, Microbiology, and Immunology)
Robert D. Cardiff, M.D., Ph.D., Professor (Pathology)

Hongwu Chen, Ph.D., Associate Professor

(Cancer Center, Basic Sciences)
Tsung-Yu Chen, M.D., Ph.D., Associate Professor

(Cancer Center, Basic Science) Xinbin Chen, B.V.M., Ph.D., Professor (Surgical and Radiological Sciences

Anthony T.W. Cheung, Ph.D., Professor (Pathology) Bruno B. Chomel, D.V.M., Ph.D., Professor

(Population Health and Reproduction) Mary M. Christopher, D.V.M., Ph.D., Professor

(Pathology, Microbiology, and Immunology) Alan J. Conley, D.V.M., Ph.D., Professor (Population Health and Reproduction)

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Beate Crossley, D.V.M., Ph.D., M.P.V.M., Assistant Professor (Department of Medicine and Epidemiology)

James S. Cullor, D.V.M., Ph.D., Professor (Population Health and Reproduction)

Ftiz-Roy E. Curry, B.E., Ph.D., Professor (Biomedical Engineering)

Satya Dandekar, Ph.D., Professor

(Microbiology and Immunology)
Wenbin Deng, B.M., M.S., Ph.D., Assistant Professor (Cell Biology and Human Anatomy)
Peter Dickinson, D.V.M., Ph.D., Assoc. Professor

(Neurology/Neurosurgery)

Kent L. Erickson, Ph.D., Professor (Human Anatomy) Thomas B. Farver, Ph.D., Professor

(Population Health and Reproduction) Janet Foley, MS, D.V.M., Ph.D., Assistant Professor (Medicine and Epidemiology) Laurel J. Gershwin, D.V.M., Ph.D., Professor

(Pathology, Microbiology, and Immunology) M. Eric Gershwin, M.D., Professor (Rheumatology) Ralph Green, M.D., Ph.D., Professor

(Medical Pathology and Laboratory Medicine)

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(Anatomy, Physiology and Cell Biology)
Lynelle Johnson, D.V.M. Ph.D., Assistant Professor

(Medicine and Epidemiology) James H. Jones, D.V.M., Ph.D., Professor

(Surgical and Radiological Sciences) Gerald J. Kost, M.D., Professor

(Pathology and Oncology) Kit S. Lam, M.D., Ph.D., Professor

(Hematology/Oncology)
Gregory C. Lanzaro, M.S., Ph.D., Professor (Pathology, Microbiology and Immunology) Kent Leach, Ph.D., Associate Professor

(Biomedical Engineering)
Rance B. LeFebvre, Ph.D., Professor

(Pathology, Microbiology, and Immunology) Nicholas, W. Lerche, D.V.M., M.P.V.M., Professor

(Medicine and Epidemiology) Irwin K. Liu, D.V.M., Ph.D., Professor (Population Health and Reproduction)

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(Pathology, Microbiology, and Immunology)
Paul A. Luciw, Ph.D., Professor
(Pathology and Oncology)

Bruce G. Lyeth, M.S., Ph.D., Professor (Neurological Surgery)
Leslie A. Lyons, Ph.D, Associate Professor

(Population Health and Reproduction) N. James MacLachlan, B.V.Sc., Ph.D., Professor

N. James MacLachlan, B.V.Sc., Ph.D., Professor (Pathology, Microbiology, and Immunology)
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(Pathology, Microbiology, and Immunology)

(Pathology, Microbiology, and Immunology)
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Anatomic Pathology (Pathology, Microbiology, and Immunology)
Peter F. Moore, B.V.S.C., Ph.D., Professor

(Pathology, Microbiology, and Immunology) Brian Murphy, D.V.M., Assistant Professor

(Pathology, Microbiology & Immunology) William Murphy, M.D., Professor (Dermatology) Jan Nolta, Ph.D., Professor (School of Medicine,

Internal Medicine) Sean Owens, Ph.D., Assistant Professor (Pathology, Microbiology, and Immunology) Niels C. Pedersen, D.V.M., Ph.D., Professor

(Medicine and Epidemiology)
Patricia Pesavento, D.V.M., Ph.D., Assistant

Professor (Pathology, Microbiology & Immunology)

Kent E. Pinkerton, Ph.D., Professor (Anatomy, Physiology and Cell Biology) Distinguished Teaching Award-Graduate/Professional David E. Pleasure, M.D. Professor

(Neurology and Pediatrics)
Rachel E. Pollard, D.V.M., Ph.D., Assistant Professor (Surgical and Radiological Sciences)
Jerry S. Powell, M.D., Professor

(Anatomy, Physiology and Cell Biology) Thomas P. Prindiville, M.D., Professor

(Internal Medicine)

Robert Rebhun, D.V.M., Ph.D., Assistant Professor (Surgical and Radiological Sciences) Alexander Revzin, Ph.D., Associate Professor

(Biomedical Engineering)
Janet F. Roser, Ph.D., Professor (Animal Science)

Benjamin Sacks, Ph.D., Assistant Professor (Population Health & Reproduction) Michael F. Seldin, M.D., Ph.D., Professor (Biological Chemistry and Molecular Medicine) Jared Shaw, Assistant Professor (Chemistry) Jay V. Solnick, M.D., Ph.D., Associate Professor (Internal Medicine) Eugene P. Steffey, V.M.D., Ph.D., Professor (Surgical and Radiological Sciences) Jeffrey L. Stott, Ph.D., Professor (Pathology, Microbiology, and Immunology) Susan M. Stover, D.V.M., Ph.D., Professor (Anatomy, Physiology and Cell Biology)
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Scott Weber, D.V.M., Ph.D. (Associate Professor) Robert H. Weiss, M.D., Professor (Internal Medicine, Division of Nephrology) Jonathan Widdicombe, Ph.D., Professor (Human Physiology)
Dennis W. Wilson, D.V.M., Ph.D., Professor (Pathology, Microbiology, and Immunology)
Erik R. Wisner, D.V.M., Professor (Surgical and Radiological Science)
Jian Wu, M.D., Ph.D., Assistant Adjunct Professor (Internal Medicine) Reen W. Wu, Ph.D, Professor (Internal Medicine) Ebenezer Yamoah, M.Sc., Ph.D., Professor (Center for Neuroscience) (Center for INEUROSCIENCE)
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(Anatomy, Physiology and Cell Biology)
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Affiliated Faculty

Kristina Abel, M.Sc., Ph.D., Assistant Adjunct Professor (Internal Medicine) Mary Chang, MS, Ph.D. Assistant Researcher (Internal Medicine) Marta L. Marthas, Ph.D., Adjunct Professor

Microbiology and Immunology)

Professor of Clinical Wildlife Health (Pathology,

(Pathology, Microbiology, and Immunology)
Michael B. McChesney, Ph.D., Associate Adjunct
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Microbiology and Immunology)
William K. Reisen, Ph.D., Adjunct Professor and
Research Entomologist (Pathology, Microbiology

and Immunology
Ellen E. Sparger, D.V.M., Ph.D., Associate Adjunct
Professor (Medicine and Epidemiology)
Coleen Sweeney, Ph.D., Assistant Adjunct Professor

(Biochemistry and Molecular Medicine)
Laura Van Winkle, Associate Adjunct Professor
(Anatomy, Physiology and Cell Biology)
Joseph G. Zinkl, D.V.M., Ph.D., Professor Emeritus
(Pathology, Microbiology and Immunology)

Graduate Study. The Graduate Group in Comparative Pathology offers the M.S. and Ph.D. degrees for graduate study in disciplines concerned with disease processes. The group's focus is the study of the causes and nature of disease processes in animals and humans, with major emphasis on the mechanisms responsible for the development of diseases at the level of organ systems, the cell, or subcellular mechanisms. The group brings a wide array of scientific knowledge to this study, so that students with divergent interests can be accommodated in programs designed for individual needs. Beyond core courses selected from disciplines such as anatomy, bacteriology, genetics, immunology, parasitology, pathology, physiology, and virology, course programs are intentionally flexible.

Preparation. This program is primarily for students who have a professional medical degree, e.g., D.V.M., M.D., D.D.S. Students without a professional degree will be considered if they have an especially strong background in basic biomedical sciences.

Graduate Adviser. F.C. Mohr (Pathology, Microbiology, and Immunology)

Computer Science

See Computer Science, on page 211; Computer Science (A Graduate Group), on page 211; Engineering: Computer Science, on page 266; and Engineering: Electrical and Computer Engineering, on page 272.

Computer Science

(College of Letters and Science)
Prasant Mohapatra, Ph.D., Chairperson of the

Department Office. 2063 Kemper Hall (530) 752-7004; http://www.cs.ucdavis.edu

Faculty. For complete faculty listing, please see Engineering: Computer Science, on page 266.

The Major Program

Department

The computer science major prepares students for careers involving the design of computer systems and their application to science, industry, and management

The Program. Students taking this major receive solid grounding in fundamentals of computer languages, operating systems, computer architecture, and the mathematical abstraction required to use the computer in solving complex tasks. For students interested in the engineering aspects of computer science, see Engineering: Computer Science, on page 266.

Career Alternatives. The computer science program prepares students for advanced work in computer science or in other disciplines requiring advanced knowledge of the use of computers.

B.S. Major Requirements:

One series from the following four 14-19 (a) Chemistry 2A-2B-2C (b) Chemistry 2A-2B and Biological Sciences 2A (c) Chemistry 2AH-2BH-2CH (d) Physics 9A-9B-9C and Mathematics 21D Depth Subject Matter46-50 Computer Science Engineering 120 or 122B (completion of only 120 or 122B will satisfy the core requirement, but not a computer science elective simultaneously); 122A, 140A; 150, 154A......20 Computer Science/Mathematics electives Minimum of 7 courses including at least one mathematics or statistics course from: Computer Science Engineering 120, 122B (completion of only 120 or 122B will satisfy the core requirement, but not a computer science elective simultaneously), 124, 129, 130, 140B, 142, 145, 152A, 152B, 152C, 153, 154B, 156, 158, 160, 163, 165A, 165B, 170, 175, 177, 178, 188, 189, 193A & B (minimum of 3 units) from approved 192 or 199, Electrical and Computer Engineering 180A, 180B, Statistics 131A, Mathematics 25, 108, 115A, 115B, 135A, 141, 145, 147, 148, 150A, 150B, 150C, 160. Total Units for the Major98-108

Major Advisers. N. Matloff, M. Farrens, M.

Franklin, N. Amenta, R. Olsson, P. Rogaway, D. Ghosal

Minor Program Requirements:

Graduate Study. See Graduate Studies, on page 111

Computer Science (A Graduate Group)

Kwan-Liu Ma, Ph.D., Chairperson of the Group **Group Office.** 2063 Engineering II (Department of Computer Science) (530) 752-7004; gradinfocs@ucdavis.edu; http://www.cs.ucdavis.edu

Faculty

UNITS

Venkatesh Akella, Ph.D., Professor
(Electrical and Computer Engineering)
Nina Amenta, Ph.D., Professor
(Computer Science)
Zhaojun Bai, Ph.D., Professor (Computer Science)
Matthew Bishop, Ph.D., Associate Professor
(Computer Science)
Hemant Bhargava, Ph.D., Professor
(Computer Science)
Hao Chen, Ph.D., Assistant Professor
(Computer Science)
Harry Cheng, Ph.D., Professor
(Mechanical and Aerospace Engineering)
R. Holland Cheng, Ph.D., Professor
(Molecular and Cellular Biology)
Chen-Nee Chuah, Ph.D., Assistant Professor
(Electrical and Computer Engineering)

James P. Crutchfield, Ph.D., Professor (Physics) lan Davidson, Ph.D., Associate Professor (Computer Science) Jesus M. D'Souza, Ph.D., Assistant Professor (Mechanical and Aerospace Engineering) Riassa D'Souza, Ph.D., Assistant Professor (Mechanical and Aerospace Engineering)

Jesus DeLoera, Ph.D., Professor (Mathematics)

Prem Devanbu, Ph.D., Associate Professor (Computer Science)

Matthew Farrens, Ph.D., Professor (Computer Science)

Robert Faris, Ph.D., Assistant Professor (Sociology) Vladimir Filkov, Ph.D., Assistant Professor (Computer Science)

Matthew Franklin, Ph.D., Professor (Computer Science)

Dipak Ghosal, Ph.D., Professor (Computer Science)

Tood J. Green, Ph.D., Assistant Professor (Computer Science)

Daniel Gusfield, Ph.D., Professor (Computer Science) Francois Gygi, Ph.D., Professor (Computer Science) Bernd Hamann, Ph.D., Professor (Computer Science) Michael Hogarth, Ph.D., Associate Professor

(School of Medicine) Mont Hubbard, Ph.D., Professor

(Mechanical and Aerospace Engineering) Greta Hsu, Ph.D., Assistant Professor (Graduate School of Management)

Sanjay Joshi, Ph.D., Assistant Professor (Mechanical and Aerospace Engineering)

Kenneth Joy, Ph.D., Professor (Computer Science) Louise Kellogg, Ph.D., Professor (Geology) Patrice Koehl, Ph.D., Professor (Computer Science) Mathias Koeppe, Ph.D., Assistant Professor (Mathematics)

Karl Levitt, Ph.D., Professor (Computer Science) Xin Liu, Ph.D., Associate Professor

(Computer Science) Kwan-Liu Ma, Ph.D., Professor

(Computer Science) Bertram Ludaescher, Ph.D., Professor

(Computer Science)
Charles Martel, Ph.D., Professor (Computer Science)
Norman Matloff, Ph.D., Professor

(Computer Science)

Nelson Max, Ph.D., Professor (Computer Science) E.O. Milton, Ph.D., Professor (Mathematics) Deb Niemeier, Ph.D., Professor

(Civil and Environmental Engineering)
Prasant Mohapatra, Ph.D., Professor, Chair (Computer Science)

Biswanath Mukherjee, Ph.D., Professor (Computer Science) Distinguished Graduate Mentoring Award

Michael Neff, Ph.D., Assistant Professor

(Computer Science)
Ronald Olsson, Ph.D., Professor (Computer Science)
John Owens, Ph.D., Assistant Professor

(Electrical and Computer Engineering) Raju Pandey, Ph.D., Associate Professor

(Computer Science) Sean Peisert, Ph.D., Assistant Adjuct Professor (Computer Science)

Bahram Ravani, Ph.D., Professor (Mechanical and Aerospace Engineering)

Robert Redinbo, Ph.D., Professor (Electrical and Computer Engineering)

David Rocke, Ph.D., Professor (Applied Science) Garry Rodrique, Ph.D., Professor (Applied Science)

Phillip Rogaway, Ph.D., Professor (Computer Science)

Kenneth Shackel, Ph.D., Professor (Plant Sciences) David Slaughter, Ph.D., Professor

(Biological and Agricultural Engineering)
Oliver Staadt, Ph.D., Assistant Professor

(Computer Science)
Henning Stahlberg, Ph.D., Assistant Professor
(Molecular and Cellular Biology)

Zhendong Su, Ph.D., Associate Professor (Computer Science)

Ilias Tagkopoulos, Ph.D., Assistant Professor (Computer Science)

Susan Ustin, Ph.D., Professor (Land, Air and Water Resources) V. Rao Vemuri, Ph.D., Professor (Applied Science)

S. Felix Wu, Ph.D., Professor (Computer Science)
Rao Vemuri, Ph.D., Professor (Applied Science) Kent Wilken, Ph.D., Associate Professor (Electrical and Computer Engineering)

David Woodruff, Ph.D., Professor (Graduate School of Management)

Catherine Yang, Ph.D., Assistant Professor Graduate School of Management) Peter Yellowlees, Ph.D., Professor

School of Medicinel Ben Yoo, Ph.D., Professor (Electrical and Computer Engineering)

Emeriti Faculty

Ralph Algazzi, Ph.D., Professor Emeritus Meera Blattner, Ph.D., Professor Emeritus S.L. Hakimi, Ph.D., Professor Emeritus Peter Linz, Ph.D., Professor Emeritus Manfred Ruschitzka, Ph.D., Professor Emeritus Michael Soderstrand, Ph.D., Professor Emeritus Donald Topkis, Ph.D., Professor Eremitus Richard Walters, Ph.D., Professor Emeritus

Affiliated Faculty

Owen Carmichael, Ph.D., Assistant Professor (Med: Neurology)

Graduate Study. The Graduate Group in Computer Science offers programs of study leading to the M.S. and Ph.D. degrees in Computer Science. The varied nature of the faculty brings a wide variety of research interests to the program. Research strengths lie in algorithms, computational biology, computer architecture, computer graphics and visualization, database systems, computer security and cryptography, computer networks, program specifications and verification, programming languages and compilers, parallel and distributed systems, scientific computation, and software engineering. Interdisciplinary research in computer science is encouraged

Preparation. Normal preparation for the program is a bachelor's degree in either computer science or in a closely related field (such as electrical engineering or mathematics, with substantial course work in computer science). Applications are also considered from students with outstanding records in other disciplines. M.S. students may either complete a thesis or pass a comprehensive examination. Ph.D. students must pass a qualifying oral examination and complete a dissertation demonstrating original research in an area approved by the Graduate Group.

Graduate Advisers. H. Chen, P. Devanbu, M. Farrens, D. Ghosal, V. Filkov P. Rogaway

Conservation Biology

See Ecology (A Graduate Group), on page 224; Environmental Biology and Management, on page 293; and Wildlife, Fish, and Conservation Biology, on page 530.

Consumer Science

(College of Agricultural and Environmental Sciences)

Faculty. See under the Division of Textiles and Clothing, on page 513.

Major Programs. The Consumer Food Science option under the Food Science major is a related program. See also Food Science and Technology, on page 311, Nutrition, on page 445, and Textiles and Clothing, on page 513.

Graduate Study. For graduate study, see Graduate Studies, on page 111

Courses in Consumer Science (CNS)

Questions pertaining to the following courses should be directed to the Division of Textiles and Clothing Advising office in 129 Everson Hall.

Lower Division Course

92. Internship in Consumer Science (1-12)

Internship - 3-36 hours. Prerequisite: consent of instructor. Internship on and off campus in a consumer science related area. (P/NP grading only.)

Upper Division Courses 100. Consumer Behavior (3)

Lecture—3 hours. Prerequisite: preparation in areas of psychology or sociology and economics recommended. Provides a set of behavioral concepts and theories useful in understanding consumer behavior on the part of the individual, business, and social organizations. Conceptual models to help guide and understand consumer research will be presented. GE credit: SocSci, Div, Wrt | SS, WE.

192. Internship in Consumer Science (1-12) Internship - 3-36 hours. Prerequisite: completion of a minimum of 84 units; consent of instructor. Internship on and off campus in a consumer science related area. (P/NP grading only.)

198. Directed Group Study (1-5)

(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Course

299. Research (1-12)

(S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, III.)

Contemporary Leadership

(College of Agricultural and Environmental Sciences)

The Science and Society Program offers a minor in Contemporary Leadership, open to all undergraduate students regardless of major. The minor provides a broad overview of leadership theory and practice, and engages students in critical thinking, self-reflection, problem solving and multicultural education. Students should contact the minor adviser for course selection and plan approval.

Consult advisors often to insure timely enrollment in Science and Society 192 and 190X as courses with fewer than ten students will not be taught.

Minor Program Requirements:

UNITS

Contemporary Leadership24 **Core Leadership Courses**

Science and Society 130 Science and Society 192 (must be taken concurrently with an approved

Preparatory Subject Matter

Students are required to complete 4 units from each of the following four categories. All courses are 4 units unless specified in parentheses:

Ethics and Values

Animal Science 170, Computer Science 188 (3), English 107, Environmental Science and Policy 164 (3), Nature and Culture 120, Philosophy 115, 116, 117, Psychology 175 4

Communication, Interpersonal Relationships and Human Dynamics

Anthropology 139AN, Communication 134, 135, 136, Community and Regional Development 172, 174, Linguistics 163, Psychology 151, Sociology 126, 132, University Writing Program 104 (A-F) 4

Organization Structure and Cultures

American Studies 125, Anthropology 105,

American Studies 133, 153, 156, Community and Regional Development 176, English 179, History 173, 178A, 178B, Native American Studies 134, Political Science 124, 125, 130, Textiles and Clothing 174 ...

Minor Adviser. The list of appropriate courses changes over time. Consult Elvira Galvan Hack Science and Society (Plant Pathology) to request an advising appointment at eghack@ucdavis.edu.

Critical Theory

David Simpson, Ph.D., Chairperson of the Program

Program Office. 216 Sproul Hall (530) 752-5799; http://crittheory.ucdavis.edu

Committee in Charge

Jeff Fort, Ph.D. (French and Italian) Elizabeth Freeman, Ph.D. (English) Neil Larson, Ph.D. (Comparative Literature) Kriss Ravetto-Biagioli, Ph.D.

(Cinema and Technocultural Studies) Scott Shershow, Ph.D. (English) David Simpson, Ph.D. (English) Blake Stimson, Ph.D. (Art History)

Graduate Study. The program in Critical Theory offers study and research leading to the Ph.D. with a designated emphasis in Critical Theory. The program provides theoretical emphasis and interdisciplinary perspective to students already preparing for the Ph.D. in one of 13 participating departments (Anthropology, Comparative Literature, Culture Studies, Education, English, French, German, History, Music, Native American Studies, Sociology, Spanish, and Theatre and Dance). Students complete all requirements for the Ph.D., including the dissertation, in one of the participating departments. Minimum coursework for the Critical Theory Designated Emphasis consists of four courses. The first three of these, Critical Theory 200A, 200B, and 200C form a coherent sequence and are normally taken in consecutive order. For the fourth course, students have the option of taking another section of Critical Theory 200B or an approved course from any affiliated

Graduate Adviser. Consult Critical Theory Pro-

Courses in Critical Theory (CRI) Upper Division Courses

101. Introduction to Critical Theoretical Approaches to Literature and Culture (4)

Lecture/discussion-3 hours; term paper. Prerequisite: one upper division literature course or consent of instructor. Introduction to critical theory and its use for interpreting literary texts, film, and media forms in our present global culture. (Same course as Comparative Literature 141.) GE credit: ArtHum, Wrt. -

Graduate Courses

200A. Approaches to Critical Theory (4)

Seminar - 3 hours; term paper. Prerequisite: graduate standing in a participating program. The prob-lem of interpretation in 20th-century thought with a critical overview of various theoretical approaches (e.g., semiotics, hermeneutics, deconstruction, social and cultural critique, feminist theory, psychoanalysis).—I, II, III. (I, II, III.)

200B. Problems in Critical Theory (4)

Seminar—3 hours; term paper. Focused study of a particular critical theoretical approach, school or perspective. Topics may include but are not limited to: critical approaches to the study of culture, film, historiography, visual culture, the body, and aesthetics. May be repeated for credit with consent of instructor if topic differs. - I, II, III. (I, II, III.)

200C. History of Critical Theory (4)

Seminar-3 hours; term paper. Critical analysis and discussion of pre-twentieth century theories of literary and cultural criticism. Topics may include but are no limited to: ancient and early modern philosophy; nature and culture in the Renaissance; theories of Mimesis from antiquity to the Renaissance. May be repeated for credit with consent of instructor if topic differs. — I, II, III. (I, II, III.)

201. Critical Theory Special Topics (4)

Seminar-3 hours; term paper. Prerequisite: course 200A. Application of theoretical principles to one specific research topic. May be repeated for credit with consent of instructor when topic differs. —I, II, III. (I, II, III.)

202. Visual Culture (4)

Lecture/discussion-4 hours. Prerequisite: course 200A strongly recommended. Analysis of image production in the contemporary world (photography, film, television, advertising, etc.) and their effects on individual subjectivities and collective social identities. - II. (II.)

298. Directed Group Study (1-5) 299. Individual Study (1-12)

(S/U grading only.)

Crop Science and Management

(College of Agricultural and Environmental Sciences) This major was discontinued as of Fall 2008; see Plant Sciences, on page 467.

Cultural Studies (A Graduate Group)

Robert Irwin, Ph.D., Director of the Group

Group Office. 2201 Hart Hall (530) 754-7683; http://culturalstudies.ucdavis.edu

Committee in Charge

Miroslava Chavez-Garcia, Ph.D. (Chicano/a Studies) Marisol de la Cadena, Ph.D. (Anthropology) Kathleen Frederickson, Ph.D. (English) Laura Grindstaff, Ph.D. (Sociology)
Robert Irwin, Ph.D. (Spanish and Portuguese) Caren Kaplan, Ph.D.

(American Studies, Science and Technology Studies)

Sunaina Maira, Ph.D. (Asian American Studies) Amina Mama, Ph.D. (Women and Gender Studies) Sarah Perrault, Ph.D. (University Writing Program) Kriss Ravetto, Ph.D. (Technocultural Studies)

Affiliated Faculty

Christine Acham, Ph.D., Associate Professor (African American and African Studies)

Moradewun Adejunmobi, Ph.D., Professor (African American and African Studies) Mario Biagioli, Ph.D., Professor

(School of Law; Science and Technology Studies) David Biale, Ph.D., Professor

(History, Jewish Studies) Charlotte Biltekoff, Ph.D., Assistant Professor (American Studies, Food Science and , Technology)

Lawrence Bogad, Ph.D., Associate Professor (Theatre and Dance)

Angie Chabram-Dernersesian, Ph.D., Professor (Chicana/o Studies)

Miroslava Chavez-Garcia, Ph.D., Associate

Professor (Chicana/o Studies)
Christina Cogdell, Ph.D., Associate Professor (Design, Art History)

Elizabeth Constable, Ph.D., Associate Professor (Women and Gender Studies)

Allison Coudert, Ph.D., Professor (Religious Studies)
Xiaomei Chen, Ph.D., Professor

(East Asian Languages and Cultures)
Maxine Craig, Ph.D., Associate Professor

(Women and Gender Studies) Marisol de la Cadeña, Ph.D., Associate Professor (Anthropology, Science and Technology Studies)

Sergio de la Mora, Ph.D., Associate Professor (Chicana/o Studies)

Carolyn de la Peña, Ph.D., Professor (American Studies)

Gregory Dobbins, Ph.D., Associate Professor (Ĕnglish)

Donald Donham, Ph.D., Professor (Anthropology) Joseph Dumit, Ph.D., Associate Professor (Anthropology, Science and Technology Studies)

Omnia El Shakry, Ph.D., Associate Professor (History)

Gail Finney, Ph.D., Professor

(Comparative Literature, German and Russian) Jaimey Fisher, Ph.D., Associate Professor

(Cinema and Technocultural Studies, German and . Russian)

Kathleen Frederickson, Ph.D., Assistant Professor (English)

Elizabeth Freeman, Ph.D., Professor (English)

Laura Grindstaff, Ph.D., Professor (Sociology)

Angela Harris, J.D., Professor (School of Law)

Wendy Ho, Ph.D., Associate Professor (Asian American Studies, Women and Gender Studies)

Hsuan Hsu, Ph.D., Associate Professor (English) Lynette Hunter, Ph.D., Professor

(Theatre and Dance) Robert Irwin, Ph.D., Professor (Spanish and Portuguese)

Carlos Jackson, Ph.D., Assistant Professor (Chicano/a Studies)

Mark Jerng, Ph.D., Associate Professor (English)

Suad Joseph, Ph.D., Professor (Anthropology, Women and Gender Studies) Susan Kaiser, Ph.D., Professor (Textiles and Clothing,

Women and Gender Studies) Caren Kaplan, Ph.D., Professor

(American Studies, Science and Technology Studies)

Richard Kim, Ph.D., Associate Professor (Asian American Studies) Elisabeth Krimmer, Ph.D., Professor (German and Russian)

Anna K. Kuhn, Ph.D., Professor (Women and Gender Studies)

Neil Larsen, Ph.D., Professor

(Comparative Literature, Critical Theory)
Michael Lazzara, Ph.D., Associate Professor (Spanish and Portuguese) Sunaina Maira, Ph.D., Professor

(Asian American Studies) Amina Mama, Ph.D., Professor (Women and Gender Studies)

214 Dermatology

Desirée Martín, Ph.D., Assistant Professor (English) Luz Mena, Ph.D., Assistant Professor (Women and Gender Studies) Colin Milburn, Ph.D., Associate Professor (English) Susette Min, Ph.D., Associate Professor (Asian American Studies) Bettina Ng'weno, Ph.D., Associate Professor (African American and African Studies) Robert Ostertag, Ph.D., Professor (Cinema and Technocultural Studies) Halifu Osumare, Ph.D., Associate Professor (African American and African Studies) Ana Peluffo, Ph.D., Associate Professor (Spanish and Portuguese) Sarah Perrault, Ph.D., Assistant Professor (University Writing Program) Vaidehi Ramanathan, Ph.D., Professor (Linguistics) Kriss Ravetto-Biagioli, Ph.D., Associate Professor (Cinema and Technocultural Studies) Michael Rios, Ph.D., Associate Professor (Environmental Design) Robyn Rodriguez, Ph.D., Associate Professor (Asian American Studies) Jon Rossini, Ph.D., Associate Professor (Theatre and Dance) Parama Roy, Ph.D., Associate Professor (English) Margaret Rucker, Ph.D., Professor (Textiles and Clothing) Simon Sadler, Ph.D., Professor Suzana Sawyer, Ph.D., Associate Professor (Anthropology) Juliana Schiesari, Ph.D., Professor (Comparative Literature, French and Italian) Sarita See, Ph.D., Associate Professor (Asian American Studies) Sudipta Sen, Ph.D., Professor (History) Scott Simmon, Ph.D., Professor (English)
Julia Simon, Ph.D., Professor (French and Italian) Michael P. Smith, Ph.D., Professor (Human and Community Development) Eric Smoodin, Ph. D., Professor (American Studies) Blake Stimson, Ph.D., Professor (Art History, Cinema and Technocultural Studies)
Madhavi Sunder, J.D., Professor (School of Law, Science and Technology Studies) Julie Sze, Ph.D., Associate Professor (American Studies) Patricia Turner, Ph.D., Professor (African American and African Studies) Clarence Walker, Ph.D., Professor (History) Grace Wang, Ph.D., Assistant Professor (American Studies) Heghnar Watenpaugh, Ph.D., Associate Professor (Art History) Keith Watenpaugh, Ph.D., Associate Professor (Religious Studies) Evan Watkins, Ph.D., Professor (English) Karen Watson-Gegeo, Ph.D., Professor (Education) Carl Whithaus, Ph.D., Associate Professor (University Writing Program)

Li Zhang, Ph.D., Professor (Anthropology)

Graduate Study. The Graduate Group in Cultural Studies at UC Davis offers an interdisciplinary approach to the study of culture and society that highlights how sexuality, race, ability, citizenship, gender, nationality, class and language organize embodied identities, social relations and cultural objects. With the close guidance and supervision of a faculty committee, students in the program pursue interdisciplinary research in areas including studies of comparative and critical race, ecocriticism, fashion, queer theory, media and popular cultural representation, science and technology, Marxist theory, travel and tourism, food, physical and cognitive abilities, cultural geography, transnational culture and politics, globalization, religion, rhetoric, perfor-

Diane Wolf, Ph.D., Professor

(Sociology, Jewish Studies)

Julie Wyman, Ph.D., Assistant Professor

(Cinema and Technocultural Studies)

mance, and critical theory. Although both the Ph.D. and M.A. are offered, the majority of students are admitted to the Ph.D. program.

Preparation. Normal preparation for the program is a bachelor's degree in a related field. M.A. students must pass an examination. Ph.D. students must pass a qualifying examination, a comprehensive examination, and complete a dissertation demonstrating original research in an area approved by the Graduate Group. In addition to the standard UC Davis graduate application (which requires a statement of purpose), we also require three letters of recommendation, transcripts, GRE scores, writing sample (ten-page minimum, not exceeding twenty pages), and a fellowship application.

Graduate Advisers. Marisol de la Cadena (Anthropology), Elizabeth Freeman (English), Robert Irwin (Spanish and Portuguese), Sunaina Maira (Asian American Studies), Kriss Ravetto (Cinema and Technocultural Studies)

Courses in Cultural Studies (CST) Graduate Courses

200A. Histories of Cultural Studies (4)

Lecture/discussion—4 hours. Prerequisite: graduate standing or consent of instructor. Undergraduate coursework in the humanities or social sciences recommended. Histories and traditions of cultural studies internationally; multiple legacies of cultural studies as a field of inquiry in various geographical contexts; foregrounds important critical perspectives resulting from social and intellectual movements worldwide.—I. [I.]

200B. Theories of Cultural Studies (4)

Lecture/discussion—4 hours. Prerequisite: course 200A or consent of instructor. Definitions of "critical" scholarship and examination of various contexts in which cultural studies theory has emerged worldwide. Both mainstream and alternative theoretical traditions, such as those developed by people of color and by other minoritized groups.—II. (II.)

200C. Practices of Cultural Studies (4)

Lecture/discussion—4 hours. Prerequisite: courses 200A and 200B or consent of instructor. Methodological and practical applications of cultural studies research. Critical analyses of ethnography, textual analysis, social change, community development, and identity formation. Emphasis given to students' unique versions of cultural studies practices.—III. (III.)

204. History and Theory of Sexualities (4)

Lecture/discussion—4 hours. Prerequisite: course 200A (may be taken concurrently) or consent of instructor. Studies of sexualities in feminist, literary, historical, and cultural studies research, specifically examining the emergence of "sexuality" as a field of research and the relationship of sexuality studies to cultural forms, subjectivity, and social relations generally. Not offered every year.—I. (I.)

206. Studies in Race Theory (4)

Lecture/discussion—4 hours. Prerequisite: course 200A (may be taken concurrently) or consent of instructor. Theoretical framework for the critical study of race, drawing on contemporary cultural studies and postcolonial scholarship in order to understand the social production of "race" as a category for organizing social groups and determining group processes. Not offered every year.—II. (II.)

208. Studies in Nationalism, Transnationalism, and Late Capitalism (4)

Lecture/discussion—4 hours. Prerequisite: course 200A (may be taken concurrently) or consent of instructor. Contemporary theories of nation, nationalism, postcolonialism, and transnationalism. Specific attention to the relationship between cultural production and the formation of ideas about nation and nationalism, including examination of both "legitimizing" and resistant discourses. Not offered every year.—III. [III.]

212. Studies in the Rhetorics of Culture (4)

Lecture/discussion—4 hours. Prerequisite: course 200A (may be taken concurrently) or consent of instructor. Survey of critical and analytical approaches to the study of texts. Examination of multi-mediated objects to understand their cultural import by focusing on discursive production, dispersal, and reception processes, and related shifts in power relations. Not offered every year.—I. (I.)

214. Studies in Political and Cultural Representations (4)

Lecture/discussion—4 hours. Prerequisite: course 200A (may be taken concurrently) and consent of graduate adviser. Framework for the analysis of political and popular cultural representations. Emphasis on concepts, theories, and methodologies illuminating dominant and vernacular cultural representation, appropriation, and innovation in transnational contexts. May be repeated for credit up to 4 times when topic differs. Not offered every year.—II. (II.)

250. Research Seminar (4)

Seminar—4 hours. Prerequisite: courses 200A, 200B, 200C or consent of instructor. Designed to facilitate student interaction and promote student research by guiding students through the production of a publishable essay. Essays submitted, distributed, and discussed by seminar participants. May be repeated up to 12 units of credit.—II. (II.)

270A-270B-270C. Individually Guided Research in Cultural Studies (4-4-4)

Discussion—1 hour; independent study—2 hours; extensive writing. Prerequisite: course 200C, 250, consent of instructor. Individually guided research, under the supervision of a faculty member, on a Cultural Studies topic related to the student's proposed dissertation project to produce a dissertation prospectus.—1, II, III. (I, II, III.)

290. Colloquium (1)

Lecture—1 hour. Prerequisite: graduate standing or consent of instructor. Designed to provide cohort identity and faculty student exchange. Opportunity to present papers, hear guest lecturers, and see faculty presentations, gather for organizational and administrative news, exchange information, and make announcements. May be repeated up to 12 units of credit. (S/U grading only.)—1, II, III. (I, II, III.)

295. Special Topics (4)

Lecture/discussion—4 hours. Prerequisite: graduate standing or consent of instructor. Special topics courses offered according to faculty and student interests and demands. May be repeated for credit with consent of adviser.—I, II, III. (I, II, III.)

298. Group Research (1-5)

(S/U grading only.)—I, II, III. (I, II, III.)

299. Directed Research (1-5)

(S/U grading only.)—I, II, III. (I, II, III.)

299D. Dissertation Research (1-12)

Independent study—3-36 hours. Prerequisite: advancement to doctoral candidacy. (S/U grading only.)—I, II, III. (I, II, III.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, III.)

Dermatology

See Medicine, School of, on page 390.

Design

(College of Letters and Science)
Timothy McNeil, M.A., Chairperson of the Department

Department Office. 107 Art Building (530) 752-6244; http://design.ucdavis.edu

Faculty

Susan Avila, M.F.A., Professor Christina Cogdell, Ph.D., Associate Professor Glenda Drew, M.A., Associate Professor James Housefield, Ph.D., Assistant Professor Mark Kessler, M.Arch., Assistant Professor Timothy McNeil, M.A., Associate Professor Konstantinos Papamichael, Ph.D., Professor Simon Sadler, Ph.D., Professor Ann Savageau, M.F.A., Associate Professor Michael Siminovitch, Ph.D., Professor Susan Verba, M.F.A., Assistant Professor

Emeriti Faculty

Richard Berteaux, B.Arch., M.S., Professor Emeritus Frances Butler, M.A., Professor Emerita Dolph Gotelli, M.A., Professor Emeritus Patricia Harrison, M.Arch., Professor Emerita Gyongy Laky, M.A., Professor Emerita Helge B. Olsen, Senior Lecturer Emeritus Victoria Z. Rivers, M.A.C.T., S.C.T., Professor Emerita

Katherine W. Rossbach, M.A., Professor Emerita Barbara Shawcroft, M.F.A., Professor Emerita JoAnn C. Stabb, M.A., Senior Lecturer Emerita Kathryn Sylva, M.F.A., Professor Emerita

Affiliated Faculty

John Driscoll, M.F.A., Lecturer Barbara Molloy, M.F.A., Lecturer Bob Morgan, B.S., Lecturer Gale Okumura, B.A., Lecturer D.R. Wagner, M.F.A., Lecturer Adele Zhang, M.F.A., Design Collection Curator

The Major Program

The Department of Design offers a creative, challenging, and flexible approach to the study of design with emphasis on socially responsible, human centered, and sustainable practice.

The Program. Foundation courses: Design and Visual Culture; Design Drawing, Form and Color, and Graphic Design and Computer Technology; are required of all design majors. One additional course in the student's area of interest is required for Preparatory Subject Matter. Depth Subject Matter courses provide: (1) further exploration of design principles and conceptual, formal and technical issues; (2) conceptual and critical development through a series of history and theory classes; (3) in-depth studio experience with projects that demonstrate a research-based, iterative design process. Optional capstone class. A more detailed explanation is available through the Design Advising office in 107 Art Building (530) 752-6244.

Preparatory Requirements. Before declaring a major in Design, students must complete the following courses with a combined grade point average of at least 2.600 at the University of California. All courses must be taken for a letter grade:

Design 1	. 4
Design 15	. 4
Design 40A or 40B	. 4
Design 50	. 4
University Writing Program 18 or 19	

Portfolios. Portfolios are not required for admission to the major. However, it is highly recommended that design students maintain an updated portfolio of visual work for faculty and professional evaluation and consideration for enrollment in specialized courses, including independent study, group study and internship.

Internships, Careers, and Study Abroad.

Design students are encouraged to supplement their coursework with internships in design firms, museums, and design related businesses. Design graduates go directly from this program into further graduate study, or professional work including exhibition, fashion, information, Interior architecture and product (lighting and furniture), textiles, visual communications (digital, environmental and print) and sustainable design. In addition, students have become entrepreneurs through freelance and commissioned work in many related areas. The Department of Design encourages students to experience design abroad through a variety of sponsored programs. For more information, contact the Education Abroad Center.

A.B. Major Requirements:

Preparatory Subject Matter
Design 1
Three courses from the following:
Art 2 or Design 14; Design 15, 16 12 University Writing Program 18 or 19 4
Design 40A or 40B
One course from the following: Art 9;
Design 13, 21, 50, 60, 70, 77
Depth Subject Matter44
Two courses, at least one of which must be a
Design course, from the following: Art 110A,
110B; Design 107, 113, 115, 127B, 150A;
Dramatic Art 128; Technocultural Studies
100 8
Three courses, at least two of which must be
Design courses, from the following: Art
History 168, 184, 187, 188A, 188B, 189;
Design 127A, 138, 142A, 142B, 143, 144,
145; Dramatic Art 114, 150, 155;
Technocultural Studies 150, 152, 153, 155, 159
159
or five courses from List A and one course
from List B
List A. Electives: Design 116, 117, 131,
132A, 132B, 134A, 134B, 135A, 135B,
136A, 136B, 137A, 137B, 150B, 151,
155A, 157, 160, 161, 170, 171, 177,
180A, 185, 186, 191 One course from the
following approved list may count for List A:

Note. Substitutions for the listed courses may be allowed under certain circumstances with prior departmental approval.

ART 113, Chicano Studies 172, Dramatic

List B. Capstone Course Option: Design

Art 124A, 124B, 124C, 124E, 170

154, 179, 180B, 187

Total Units for the Major.....72

Major Adviser. Information on the current Academic Advisers can be obtained by contacting the Undergraduate Adviser at (530) 752-6244.

Graduate Study. The graduate program in Design leading to the Master of Fine Arts degree offers students opportunities for independent, creative, innovative interdisciplinary study combining design with anthropology, critical theory, consumer issues, art, engineering, the sciences and theater. Faculty work closely with students to build individual programs based upon a student's specialized goals and interests in design. Study in new technologies and experimental approaches are encouraged. Areas of emphasis include exhibition, fashion, information, Interior architecture and product (lighting and furniture), textiles, visual communications (digital, environmental and print) and sustainable design. For more information, see the program website at http://mfa-design.ucdavis.edu.

Graduate Adviser. Please contact the Program at (530) 752-8710.

Courses in Design (DES)

Questions pertaining to the following courses should be directed to the instructor or to the Design Advising office in 107 Art (530) 752-6244. Scheduling of classes is subject to change; please contact the Advising office to confirm when a course is offered.

Lower Division Courses

1. Introduction to Design (4)

Lecture—3 hours; discussion—1 hour. Priority given to Design majors. Introduction to design discipline through readings, writing, visual problem solving, and critical analysis. Topics: design principles and elements, vocabulary, color theory, Gestalt principles, conceptualization strategies. Role of designer and products in contemporary culture including social responsibility and sustainability. GE credit: AH, VL, WE.—I. (I.) Housefield

13. Photography for Designers (4)

Lecture—5 hours; lecture/discussion—2 hours. Prerequisite: course 1. Priority given to Design majors. Photography for designers with emphasis on 35mm camera photography, black and white processes, and darkroom techniques. Digital photography, critical analysis of photographs, and the role of photography in society. GE credit: AH, VL.

14. Design Drawing (4)

UNITS

28

Studio—5 hours; lecture/discussion—2 hours. Prerequisite: course 1; students with a background in drawing or Advanced Placement Art Studio units are encouraged to submit a portfolio for review to waive this course. Priority given to Design majors. Drawing as a tool for design. Basic skills in objective observation and representation, including line, shape, tone, and space. Drawing as a tool for formulating and working through design problems. GE credit: AH, VL.—I, II, III. (I, II, III.)

15. Form and Color (4)

Studio—5 hours; lecture/discussion—2 hours. Prerequisite: course 1. Priority given to Design majors. Understanding color, form and composition as ways of communicating design concepts and content. Color theory, color mixing, interaction of color. Explores a variety of materials, media and presentation techniques. GE credit: AH, VL.—III. (III.)

Graphic Design and Computer Technology (4)

Studio – 5 hours; lecture/discussion – 2 hours. Prerequisite: course 1. Priority given to Design students. Introduction to computers in design with emphasis on development of a general understanding of graphic design, including theory, practice, and technology. Includes principles of color, visual organization, visual hierarchy, typography, image enhancement. Projects created on Macintosh computers. GE credit: ArtHum | VL.—I, II, III, IV. (I, III, III, IV.)

21. Drafting and Perspective (4)

Studio – 5 hours; lecture/discussion – 2 hours. Prerequisite: course 1, 14, 15, 16 or consent of instructor. Priority given to Design majors. Introduction to mechanical drafting, including scaled drawing, orthogonal projection, isometric, axonometric and perspective. Includes basic rendering techniques. GE credit: AH, VL.—I, IV. (I.) Kessler

40A. History of Design: Ancient through Industrial Revolution (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Priority given to Design majors. Social and stylistic history of design (crafts and industrial products, costume, architecture, landscape, graphics) up to the 19th century. Emphasis on changing methods of design and production in the 19th century. Field trip required. Not open for credit to students who have taken course 40 or 140. GE credit: AH, VL, WE.—I, IV. (I, IV.) Housefield

40B. History of Modern Design (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 1; course 40A or art history (ancient through 19th century) recommended or consent of instructor. Priority given to Design majors. Social and stylistic history of design (crafts and industrial products, costume, architecture, landscape, visual communica-

tion) from the mid-nineteenth century to the present. Emphasis on design reform and the growth of modernism in Europe and America. Field trip required. GE credit: ArtHum | AH, VL, WE.-II. (II.) House-

50. Model Making (4)

Studio – 5 hours; lecture/discussion – 2 hours. Pre-requisite: course 1, 14, 15, 16 or consent of instructor. Priority given to Design majors. Introduction to concepts, methods and materials for model making in design. Use of models for idea generation, as well as specifics for study models, semidetailed and presentation models. GE credit: ArtHum | VL.—I. (I, II.)

60. Introduction to Surface Design (4)

Lecture - 2 hours; studio - 5 hours. Prerequisite: courses 1, 14, 15. Priority to Design majors. Introduction to diverse methods for creating imagery, patterns, and textures on cloth. Explorations and experimentation with dyes and pigments, mechanical resists, color removing, and physical and chemical alterations of textile surfaces and structures.

70. Introduction to Textile Design Structures (4)

Lecture - 2 hours; studio - 5 hours. Prerequisite: course 1. Priority given to Design majors. Introduction to diverse methods for creating textile structures. Exploration of the creative potential of hand-constructed textiles, manipulation of fabric to create dimensional surfaces, and the basics of building and joining fabric structures. Only two units of credit to students who have completed courses 23 or 24. Not open for credit for students who have completed both 23 and 24.—I. (I.) Savageau

77. Introduction to Structural Design for Fashion (4)

Studio-5 hours; lecture/discussion-2 hours. Prerequisite: course 1, 14, 15, 16 or consent of instructor. Priority given to Design majors. Study and practice of designing clothing for the human body. Emphasis on flat pattern development, structural joining sequences and the development of three-dimensional garments from two-dimensional drawings Not open for credit to students who have completed course 77A. GE credit: AH, VL.-II. (II.)

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading

Upper Division Courses 107. Advanced Structural Design for Fashion (4)

Lecture - 2 hours; studio - 5 hours. Prerequisite: courses 1, 14, 15, 70, 77 (77A also acceptable) or consent of instructor. Priority to Design majors Advanced study and practice of designing clothing for the human body through pattern development and structural joining. Emphasis on draping techniques and advanced conceptualization for fashion design. Not open for credit to students who have taken course 77B. GE credit: AH, VL.—III. (III.)

113. Visual Communication: Digital Imaging (4)

Studio-5 hours; lecture/discussion-2 hours. Prerequisite: course 1, 14, 15, 16; course 13 or Art Studio 9 recommended or consent of instructor. Priority given to Design majors. Digital imaging for designers, combining theoretical perspectives with practical applications. Expansion of use and meaning of the single photographic image through collage techniques, grids, triptychs and image sequencing. Alteration of image maning through the addition of text. GE credit: AH, VL.

115. Letterforms and Typography (4)

Studio—5 hours; lecture/discussion—2 hours. Prerequisite: course 1, 14, 15, 16 or consent of instructor. Priority given to Design majors. Fundamentals of letterforms and typography. Characteristics of typefaces; formatting and composition of type. Principles of legibility, visual hierarchy, rules and blocks, grids, and images as they relate to typography. Not available for credit to students who have completed course 22. GE credit: AH, VL.-I, II, III, IV. (II, III.)

116. Visual Communication: Graphic Design Studio (4)

Studio-5 hours; lecture/discussion-2 hours. Prerequisite: course 113, 115 or consent of instructor. Priority given to Design majors. Through multiple, conceptually-linked assignments, focus on the fundamental choices designers make in translating concepts into graphic form, taking projects from initial concept and research, to design strategies, to project resolution and audience reception. Not open for credit to students who have completed course 152 or 152A. GE credit: AH, VL.—I, II, IV. (I, II.) Verba

117. Visual Communication: Internet and Interactive Design (5)

Studio-5 hours; lecture/discussion-2 hours. Prerequisite: course 1, 14, 15, 16 or consent of instructor. Priority given to Design majors. Technical and conceptual aspects of creating interactive visual media for screen-based delivery, concentrating on websites. Attention to conceptual framework, visual design, information architecture and interactivity. Researched and written pre-production materials required. Not open for credit to students who have completed course 153. GE credit: AH, VL.-II, IV. (II.) Drew

127A. Sustainable Design (4)

Lecture - 4 hours. Prerequisite: course 1; 14, 15, and 16 recommended. Principles, practice and materials of contemporary sustainable design in the context of environmental crisis. History of sustainable design in relation to the fields of textiles, visual communication, interior architecture, exhibition design and lighting. Only two units of credit for students who have completed course 127.—II. (II.) Savageau

127B. Studio Practice in Sustainable Design (4)

—2 hours; studio—5 hours. Prerequisite: Lecture courses 1, 14, 15, 16 and 127A. Analysis and practice of sustainable design within studio context. Design project that incorporate the reuse of post consumer waste; standard materials vs. sustainable materials; Cradle to Cradle philosophy and prac tice; biomimicry; Life Cycle Analysis. Required field trips. Not open for credit for students who have completed course 127.—III. (III.) Savageau

131. Global Fashion and Product Design (4)

Studio - 5 hours; lecture/discussion - 2 hours. Prerequisite: course 1, 14, 15, 16; course 77 recommended or consent of instructor. Priority given to Design majors. Exploration of materials, embellishments, and structural techniques derived from historic and contemporary world cultures. Emphasis on unique qualities of individual expression applied to hand made textiles, fashion and textile products. Offered irregularly. GE credit: AH, VL.—Avila

132A. Textile Design: Woven Structures (4)

Studio-5 hours; lecture/discussion-2 hours. Prerequisite: course 1, 14, 15, 16; course 60 recommended or consent of instructor. Priority given to Design majors. Foundation course in handwoven textile structure and design, emphasizing yarn identification, basic drafting, basic weaves and their derivatives explored in context of original color effects and yarn combinations. May be repeated one time for credit with consent of instructor. Offered irregularly. GE credit: AH, VL. - Avila

132B. Loom-Constructed Textile Design (4)

Studio-8 hours. Prerequisite: course 132A. Intermediate level study of complex fabric structure with emphasis on pattern in relation to surface, dimension, and material

134A. Introduction to Interior Design-Residential (4)

Lecture/discussion—2 hours; studio—5 hours. Prerequisite: course 1, 14, 15, 16, and 21. Introduction to the theory and practice of interior design with focus on residential spaces. Basic methods of design conceptualization, development, and presentation. For Design majors only.—Kessler

134B. Introduction to Interior Design-Commercial and Technical Spaces (4)

Studio - 5 hours; lecture/discussion - 2 hours. Prerequisite: course 1, 14, 15, 16; course 21 recommended or consent of instructor. Priority given to Design majors. Introduction to the theory and practice of interior design with focus on small commercial and technical spaces. Archetypal spaces, non-residential building systems, ADA accessibility, design programming and research methods. GE credit: AH, VL. — II. (I, II.) Kessler

135A. Furniture Design (4)

Studio-5 hours; lecture/discussion-2 hours. Prerequisite: course 1, 14, 15, 16; course 21 recommended or consent of instructor. Priority given to Design majors. Development of designs for contemporary furniture. Consideration of behavioral and physical requirements, cultural and historic expression, and structural and aesthetic qualities. Process includes research, drawings, and construction of scale models. Required field trip. GE credit: AH, VL.-II. (II.)

135B. Furniture Design (4)

Studio-5 hours; lecture/discussion-2 hours. Prerequisite: course 1, 14, 15, 16; course 21 recommended or consent of instructor. Priority given to Design majors. Design and construction of full size prototype furniture based on preliminary work completed in course 135A. Material technology, construction methods, and finishes discussed. Development of shop drawings and furniture construction. Required field trip. GE credit: AH, VL.

136A. Lighting Technology and Interior Design (4)

Lecture/discussion-3 hours; laboratory-3 hours. Prerequisite: courses 1, 14, 16, 21; courses 134A and 134B recommended; consent of instructor. Priority given to Design majors. Introduction to lighting design and technology. Understanding the role of lighting in the development of functional and aesthetically pleasing environments. Energy efficiency in lighting. Limited enrollment. - I. (I.) Siminovitch

136B. Designing with Light (4)

Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: courses 1, 14, 16, 21, 136A; courses 134A and 134B recommended; consent of instructor. Priority given to Design majors. Design and manipulation of light sources, luminaires, and lighting controls to enhance the functional and aesthetic impact of interior and exterior spaces. Design projects explore lighting effects, light distribution characteristics, and lunminaire design. Limited enrollment. - II. (II.) Siminovitch

137A. Principles of Daylighting (4)

Lecture/discussion—3 hours; studio—4 hours. Prerequisite: courses 1, 14, 15, 16, 21, 134A and 134B or consent of instructor; course 50 recommended. Priority given to Design and Engineering majors. The impact of natural light on the built environment and methods to control glare and maximize energy savings.—I. (I.) Papamichael

137B. Daylighting Design Studio (4)

Lecture/discussion-3 hours; studio-4 hours. Prerequisite: course 137A; courses 136A and 136B recommended. Daylighting design issues; ambient and task lighting; lighting requirements in residential, commercial, and industrial applications; daylight analysis and design; side and top lighting; glazing selection; shading systems; integration with electric lighting; daylighting and energy efficiency; photo-sensor lighting controls. Limited enrollment. GE credit: ArtHum or SciEng.—III. (III.) Papamichael

138. Materials and Methods in Interior Design (4)

Lecture/discussion—3 hours; project—1 hour. Prerequisite: course 1, 14, 15, and 21. Introduction to the finish materials used for interior design with special emphasis on sustainable and recycled products. Performance factors, relative costs and energy impacts, installation conditions and construction details, and design potential for a full range of interior materials. Two field trips required. Offered irreg-

142A. World Textiles: Eastern Hemisphere

Lecture - 4 hours. Prerequisite: course 1; Art History 1A, 1B, 1C, or 1D recommended. Social contexts, meanings, aesthetics, stylistic developments, and methods significant in eastern hemisphere textiles. Emphasis on Japan, China, Indonesia, Oceania, Southern and Central Asia, Africa. GE credit: ArtHum, Div.—I. Savageau

142B. World Textiles: Western Hemisphere (4)

Lecture - 4 hours. Prerequisite: course 1, Art History 1A, 1B, or 1C recommended. Social context, aesthetics, stylistic developments and methods significant in western hemisphere textiles. Emphasis on the Middle East, Europe, and the Americas up to contemporary times. Two required field trips. GE credit: ArtHum, Div. - Savageau

143. History of Fashion (4)

Lecture - 4 hours. Prerequisite: course 1; course 40A or 40B recommended. Priority to upper division Design majors. History of fashion from the earliest times to the present with emphasis on both aesthetic and functional aspects. GE credit: ArtHum.—II. (II.)

144. History of Interior Design (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Priority to Design majors. Interior design in Europe and America from the classical period to modern times. Emphasis on the dwelling in its cultural setting and the development of the theory of modern interior design. One all-day field trip required. GE credit: AH, VL, WE. -III. (III.) Housefield

145. History of Visual Communication (4)

Lecture-4 hours. Prerequisite: Art History 1A, 1B, or 1C; course 1; course 40 recommended. Priority to Design majors. Historical developments of visual communication, concentrating on the technological and aesthetic development of graphic design; origins and manifestations of current issues in visual communication; provide framework for analysis of current and future trends in visual communication. — Drew

150A. Computer-Assisted Drawing for Designers (4)

Studio-5 hours; lecture/discussion-2 hours. Prerequisite: courses 1, 14, 15, 16 or consent of instructor. Priority given to Design majors. Computer assisted drawing and modeling using a mid-level, multiuse CAD program. Basic architectural drawing and modeling technique in both two-dimensional and three-dimensional CAD environments. Not open for credit to students who have taken course 150. GE credit: AH, VL.-I, II. (I, II.)

150B. Computer-Assisted Presentations for Interior Architecture (4)

Studio-5 hours; lecture/discussion-2 hours. Prerequisite: courses 1, 14, 15, 16; course 21 recommended or consent of instructor. Priority given to Design majors. Computer-assisted architectural presentation including the development of complex 3D models, techniques of photo-realistic rendering and computer simulation of movement through architectural and interior space. Offered irregularly. GE credit: AH, VL.

151. Visual Communication: Type in Motion (4)

Studio-5 hours; lecture/discussion-2 hours. Prerequisite: courses 1, 14, 15, 16; course 115 recommended or consent of instructor. Priority given to Design majors. Fundamentals of creating motionbased, screen-based typography. Consideration of narrative structures, movement assemblage, and other visual languages, synthesized within a nuanced understanding of typography within digital space. GE credit: AH, VL.—III. (III.)

154. Visual Communication: Message Campaign Design (4)

Studio-5 hours; lecture/discussion-2 hours. Prerequisite: course 116 or consent of instructor. Priority given to Design majors. Principles and application of visual design strategies for advertising. Emphasis on promotion of design for social change. Creation of public visual-media campaign. Not open for credit to students who have completed 152B. GE credit: AH, VL.—III. (III.) Sylva

155A. Topics Studio: Pattern, Form and Surface (4)

Studio-5 hours; lecture/discussion-2 hours. Prerequisite: course 113, 115 or consent of instructor. Priority given to Design majors. Design approaches in visual communications arising from a critical examination of the history of form, pattern, and surface in design disciplines. Through experimentation and exploration, develop non-traditional working methods to arrive at innovative solutions to tradi tional graphic media. GE credit: VL.-II, III. (II.) Verba

157. Visual Communications: Intermediate Internet and Interactive Design (4)

Studio-5 hours; lecture/discussion-2 hours. Prerequisite: course 1, 14, 15, 16; course 115, 117 recommended or consent of instructor. Priority to Design majors. Technical and conceptual aspects of creating web sites that address current trends, such as CSS for type and position and interactivity with ActionScript. Attention to conceptual framework, visual design and user interaction design. Research and written pre-production materials required. GE credit: AH, VL. -I, III. (III.) Drew

159. Design for Understanding (4)

Studio-5 hours; lecture-2 hours. Prerequisite: course 1, 14, 15, 16, 115, 116 or consent of instructor. Pass one open to Design majors. Principles of effective information display including aspects of language, structure, legibility, sequenc-ing, and context. Analysis of historical examples of typographic, diagrammatic, and cartographic excellence. User-centered research. Development and presentation of iterative design prototypes. Design that informs, connects, and inspires. Offered irregularly. GE credit: AH, VL.—III. (III.) Verba

160. Textile Surface Design: Patterns and Resists (4)

Lecture — 2 hours; studio — 5 hours. Prerequisite: course 1, 14, 15, 16; course 60 or 70 recommended or consent of instructor. Priority to Design majors. Use of traditional and contemporary processes to create images and patterns on fabric using a variety of dyes, including direct applications, bound and mechanical resists. Emphasis on individual exploration and interpretation of processes and techniques. May be repeated for credit one time with consent of instructor GE credit: AH, VL.-I. (I.) Avila

161. Textile Surface Design: Screen and Digital Printing (4)

Studio - 5 hours; lecture - 2 hours. Prerequisite: courses 1, 13, 14, 15, 16, 160 or consent of instructor. Priority given to Design majors. Design of textiles and screen printing on fabrics; soft-product development; integration of hand-produced and digitally generated imagery on cloth. Not open for credit to students who have completed course 160B.—III. (III.) Avila

170. Experimental Fashion Design (4)

Lecture — 2 hours; studio — 5 hours. Prerequisite: courses 1, 14, 15, 16, 70, 77, 107. Priority given to Design majors. Fashion design as a vehicle for contemporary self expression. Emphasis on developing two-dimensional conceptualization of ideas and translating them into one-of-a-kind garments utilizing new fabric technologies and archetypal forms. Field trip required. Not open for credit to students who have completed course 170A.-III. Avila

171. Fashion Drawing: Technical and Illustration (4)

Lecture - 2 hours; studio - 5 hours. Prerequisite: courses 1, 14, 15, 16, 77. Priority to Design majors. Exploration of fashion design processes for industry within the social and physical context. Emphasis on two-dimensional conceptualization of ideas, garment construction, and ideation processes utilizing commercial textiles. Field Trip required. Not open for credit to students who have completed course 170B. — IV. (IV.)

177. Computer-Assisted Fashion Design (4)

Studio-5 hours; lecture/discussion-2 hours. Prerequisite: course 77 or consent of instructor. Priority given to Design majors. Advanced exploration of apparel design processes for industry and personal expression with emphasis on computer-assisted design applications. Field trip required. GE credit: AH, VL. — İV. (IV.) Avila

179. Fashion Design: Signature Collection

Lecture/discussion - 3.5 hours; studio - 3.5 hours. Prerequisite: courses 1, 14, 15, 16, 70, 77, 107, 170; consent of instructor. Priority to Senior Design majors. Advanced exploration of fashion design with an emphasis on professional portfolio development and presentation. Emphasis on conceptualizing, designing, and fabricating a cohesive line of wearable garments suitable for presenting in a public fashion show. May be repeated one time for credit. Not open for credit to students who have taken more than eight units of course 191A.—II. (II.)

180A. Advanced Interior Design: Institutional Spaces (4)

Studio - 5 hours; lecture/discussion - 2 hours. Prerequisite: courses 1, 14, 15, 16; course 21 recommended or consent of instructor. Priority to Design majors. Advanced interior design problems focused on complex institutional spaces. Introduction to building codes related to interior design. Integration of building systems with interior design solutions. GE credit: AH, VL.—II. (II.) Kessler

180B. Advanced Interior Architecture (4)

Studio-5 hours; lecture/discussion-2 hours. Prerequisite: course 180A or consent of instructor. Priority to Design majors. Advanced problems in interior architectural design emphasizing space planning for corporate and institutional environments. Field trips required. GE credit: AH, VL.—III. (III.) Kessler

185. Exhibition Design (4)

Studio-5 hours; lecture/discussion-2 hours. Prerequisite: course 1, 14, 15, 16; course 115, 150A recommended or consent of instructor. Priority to Design majors. Design of museum and commercial exhibition environments. Exhibition research, concept development and object selection, spatial planning, display furniture, object placement and staging, interpretive strategies and architectural finishes. GE credit: AH, VL.—I. (I.) McNeil

186. Environmental Graphic Design (4)

Studio-5 hours; lecture/discussion-2 hours. Prerequisite: course 1, 14, 15, 16; course 115 recommended or consent of instructor. Priority given to Design majors. Design of informational and directional graphics for the built environment. Application and integration of typography, imagery and symbols into the architectural landscape. Development of universal wayfinding and graphic navigational systems to help people find their way. GE credit: AH, VL.-II. (II.) McNeil

187. Narrative Environments (4)

Studio-5 hours; lecture/discussion-2 hours. Prerequisite: course 185 or 186 or consent of instructor. Priority given to Design majors. Design of narrative environments and multi-sensory experiences for cultural, commercial, entertainment and public spaces. Interpretive planning and design for specific exhibit audiences. Manipulation of objects and the communication of complex ideas in the exhibition environment. GE credit: AH, VL.-III, IV. (III, IV.) McNeil

190. Proseminar (1)

Seminar - 1 hour. Prerequisite: design major or consent of instructor. Philosophies of design explored through discussion and presentation of research results. May be repeated three times for credit. (P/ NP grading only.)

191A-D. Workshops in Design (4-12)

Seminar-1 hour; studio or field experience-3 hours per unit (units determined by instructor and student); field trip. Prerequisite: course 14, 15; upper division standing and consent of instructor. Faculty initiated workshops featuring advanced studies and applications of original work in Design: (A) Costume; (B) Environment; (C) Graphics; (D) Textiles. Credit limited to 12 units in one section or a combination of sections. Letter grading by contract. Field trips included.

192. Internship (1-6)

Internship - 3-18 hours. Prerequisite: completion of 84 units and consent of instructor. Supervised internship, off and on campus, in areas of design including environmental, costume, textile, museum, display and interior design. Enrollment limited to 3 units per quarter or 6 units per IV session. (P/NP grading only.)

197T. Tutoring in Design (1-5)

Discussion — 3-15 hours. Prerequisite: upper division standing and consent of instructor. Leading of small discussion groups or studio meetings affiliated with one of the department's regular courses. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

199. Special Study of Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

221. Theory and Issues in Design (4)

Seminar - 3 hours; independent study. Prerequisite: graduate standing in Design or consent of instructor. Perspectives on theoretical and aesthetic issues related to the design professions such as methodology in historical and contemporary contexts, implications of technology on design theory and practice, and design relationships to environmental sustainability, recycling, and other social issues. May be repeated one time for credit. -1. (1.)

222. Research Methods and Critical Writing for Design (4)

Seminar—3 hours; independent study. Prerequisite: course 221; graduate standing in Design or consent of instructor. Focused on research methods and critical writing related to design topics including case studies, original and secondary sources, critical reviews. Expectation of a paper meeting professional standards suitable for publication from each student at end of course. May be repeated one time for credit. - II. (II.)

223. Professional Practice and Ethics in Design (4)

Seminar-3 hours; independent study. Prerequisite: courses 221, 222; graduate standing in Design or consent of instructor. Introduce students to issues of professional design practice: business ethics, contracts and business practices, social responsibility through case studies, guest lectures and field trips, and readings. Short written assignments and presentations will be required.—III. (III.)

224. Seminar in Design Research and Teaching (4)

Independent study—6 hours; extensive writing—4 hours; discussion—2 hours. Prerequisite: courses 221, 222, 223; concurrent academic appointment (TA) in courses 142A, 142B, 143, 144, 145; graduate standing in Design; consent of instructor. Student will work closely with instructor on a research and writing project related to subject matter of undergraduate history courses noted above with the goal of introducing student to advanced historical research processes and development of writing skills. May be repeated two times for credit. - I, II, III.

290. Seminar in Design (4)

Seminar-4 hours. Prerequisite: graduate standing or consent of instructor. Selected topics in design methodology, research, communication, and education. May be repeated for credit. - III. (III.)

292. Practicum in Textile Arts/Costume

Prerequisite: graduate standing in Textile Arts and Costume Design or consent of instructor. Interaction with a working professional in the student's field of interest to apply theories and concepts to working practice. (S/U grading only.)

298. Directed Group Study for Graduate Students (1-5)

Studio. Prerequisite: consent of instructor. (S/U grading only.)

299. Individual Focused Study (1-12)

Prerequisite: graduate standing in Textile Arts and Costume Design or consent of instructor. Advanced study in studio practice on independent projects with faculty consultation. May be repeated for credit.

299D. Project Concentration (1-12)

Prerequisite: graduate standing in Textile Arts and Costume Design or consent of instructor. A minimum of 22 units must be taken in Project Concentration and Individual Focused Study. Student creates a body of original work at a professional level, with written and visual documentation of process and concepts underlying the project, culminating in public presentation. (S/U grading only.)—III. (III.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, Iİ, III.)

Dietetics

See Clinical Nutrition, on page 199.

Dramatic Art

See Theatre and Dance, on page

Earth Sciences

See Environmental and Resource Sciences, on page 295; Geology, on page 321: Hydrologic Sciences (A Graduate Group), on page 346; Hydrology, on page 347; Soil and Water Science, on page 501; and Soil Science, on page 500.

East Asian Languages and Cultures

(College of Letters and Science)

Xiaomei Chen, Ph. D., Chairperson of the Department

Department Office. 209 Sproul Hall (530) 752-4999;

http://chinese.ucdavis.edu; http://japanese.ucdavis.edu

Faculty

Chia-ning Chang, Ph.D., Professor (Japanese) Xiaomei Chen, Ph.D., Professor (Chinese) Chengzhi Chu, Ph.D., Associate Professor (Chinese) David Gundry, Ph.D., Assistant Professor (Japanese) Mark Halperin, Ph.D., Associate Professor (Chinese) Yuming He, Ph.D., Assistant Professor (Chinese)

Joseph Sorensen, Ph.D., Assistant Professor (Japanese)

Michelle Yeh, Ph.D., Professor (Chinese)

Emeriti Faculty

Robert Borgen, Ph.D, Professor Emeritus Donald A. Gibbs, Ph.D., Professor Emeritus Key H. Kim, Ph.D., Professor Emeritus

Affiliated Faculty

Kazue Chavez, Lecturer (Japanese) Junko Ito, Lecturer (Japanese) Ling-Yu Lu, Lecturer (Chinese) Mayumi Saito, Lecturer (Japanese) Haruko Sakakibara, Lecturer (Japanese) Ritsuko Shigeyama, Lecturer (Japanese) Miyo Uchida, Lecturer (Japanese) Chunxia Wang, Lecturer (Chinese) Ju-Yin Wang, Lecturer (Chinese) Shan Xiang, Lecturer (Chinese) Moeko Watanabe, Lecturer (Japanese) Yang Xiao, Lecturer (Chinese) Binbin Yang, Lecturer (Chinese)

The Major Program

The department offers a core language program in both Chinese and Japanese and courses in literature and culture. The core language program in Chinese has two tracks: one for students who have no background whatsoever and one for students with prior language background.

The Program. A student elects to major in either Japanese or Chinese. Practical language skills are taught using the most modern methods so that upon entering the upper division a student will have attained substantial fluency in the spoken language (hearing and speaking) and the written language (reading and writing). Upper division courses balance the need to further language skills with the need to understand and appreciate the cultural richness of either Chinese or Japanese civilization. All students are encouraged to combine their study of Japan's or China's language and literature with courses in related fields, and to study abroad through the Education Abroad Program, the UC International Summer Session programs, or through

Career Opportunities. UC Davis graduates have learned that a major in Chinese or Japanese is a genuine, earned distinction that facilitates entrance to graduate programs and professional schools. In addition, job opportunities abound in virtually all career paths, especially for those who have completed study abroad.

Chinese

A.B. Major Requirements:

UNITS

Preparatory Subject Matter.....0-30 Chinese 1, 2, 3, 4, 5, 6; or 1BL, 2BL, 3BL; or 1CN, 2CN, 3CN.

Recommended:

Chinese 10, 11, 50, Comparative Literature 14, Japanese 10, Linguistics 1, History 9A

Depth Subject Matter 44

Chinese 106, 107, 111, 112, 113, 114, 160 28 Note: With prior approval of an undergraduate adviser, students already proficient in Chinese at the third-year level (courses 111-112-113) should take three other upper division Chinese courses instead. Four courses selected from Chinese 100A, 101, 102, 103, 104, 105, 108, 109A-I, 110, 115, 116, 120, 130, 131, 132, 140; one of the four courses must be from 101, 102, 103, 104, 109G...... 16

Japanese 101, 102, 103, 104, 105, 106; Anthropology 148A-148B; Art History 163A-163B; East Asian Studies 113; History 191A-F; Religious Studies 172; or

other advanced literature and culture courses selected in consultation with the undergraduate adviser

Total Units for the Chinese Major 56-74 Japanese

A.B. Major Requirements:

UNITS

Preparatory Subject Matter.....0-30 Japanese 1, 2, 3, 4, 5, 6 Recommended: Japanese 10, 15, 25, Chinese 10, 11, 50, Linguistics 1, History 9B.

Depth Subject Matter 40

Japanese 101, 102, 103, 111, 112, Eight units selected from Japanese 104, 105, 106, 107, 108, 109, 115, 131, 132, 133, 134, 135, 136, 141......8 Eight units selected from Chinese 104, 105, 106, 107, 108, 109A-I, 110; Anthropology 149A-149B; Art History 164; Comparative Literature 153; History 194A-194B-194C; Religious Studies 170, 172; or other advanced literature and culture courses selected in consultation with the undergraduate adviser......8

Total Units for the Japanese Major... 40-70

Major Advisers. C. Chang, D. Gundry, and J. Sorensen (Japanese); C. Chu, M. Halperin and M. Yeh (Chinese)

Minor Program Requirements:

Minors are offered in Chinese and in Japanese for students wishing to follow a formally recognized program of study in those languages and their litera

Chinese 20 Japanese..... 20

All upper division courses, including both language courses and literature in translation courses, may be used to meet this requirement. One approved lower division course (Chinese 10, 11, 50; Japanese 10, 25, 50) may also be used. In addition, students must demonstrate their language proficiency, normally through completion of Chinese 111 or Japanese 111. Only four units from 192, 197T, 198, and 199 may be applied to the minor. For details, consult the undergraduate advisers.

Honors Program. Candidates for high or highest honors in Chinese or Japanese must enroll in CHN 199 or JPN 199 and complete a research project or a scholarly paper under the direction of a faculty member. The project will have a minimum duration of two quarters and carry a minimum of 6 units of credit. Additionally, entrance into the honors program requires completion of at least 135 units with a minimum GPA of 3.500 in courses counted toward the major. Interested students should consult with faculty in their field of interest in their junior year and undertake their project during the first two quarters of their senior year. Other arrangements must be authorized in advance by the department chair.

Students who complete the honors thesis receive departmental citation, and if their overall GPA qualifies them, may be recommended by the faculty for honors, high honors or highest honors at graduation.

Education Abroad Program. The university maintains study abroad programs in China, Japan, Hong Kong, and Taiwan. They offer excellent opportunities for students to polish their language skills and experience Asian cultures firsthand. Students are encouraged to participate. Appropriate courses taken abroad can be applied toward the major or the minor. For details, see the department's undergraduate adviser and the Education Abroad Program office.

Related Courses. See East Asian Studies course

Prerequisite Credit. No student may repeat a course if that course is a prerequisite for a course that has already been completed with a grade of C- or better

Placement. Chinese 1 and Japanese 1 are intended for beginning students with no prior knowledge of those languages. Students who do have some knowledge but wish to improve their skills should meet with one of the advisers to discuss appropriate placement. Students must follow departmental guidelines for placement in all language courses and instructor approval is required for enroll-

Backtracking. Satisfactory completion of a language course is evidence that a student's language skills are beyond the level of those expected in its prerequisite courses. Accordingly, students who have completed a language course cannot go back and take its prerequisites. If the prerequisite courses are required for the major, students may substitute other courses. Students who are not sure how this requirement applies to them should speak to the undergraduate adviser.

Waived Language Courses. Students with exceptional language ability may waive required language course. If lower division courses have been waived, students will not have to take courses in their place. If upper division courses have been waived, students can use other appropriate courses to earn the units they need to complete the major. Consult the undergraduate adviser regarding selection of appropriate courses.

Courses in Chinese (CHN) **Lower Division Courses**

1. Elementary Chinese (5)

Lecture/discussion - 5 hours. Introduction to Chinese grammar and development of all language skills in a cultural context with special emphasis on communication. (Students who have successfully completed Chinese 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/ NP grading basis only. Although a passing grade will be charged to the student's P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed.)—I. (I.)

1A. Accelerated Intensive Elementary Chinese (15)

Lecture/discussion-15 hours. Prerequisite: placement exam required. Special nine week accelerated, intensive summer session course that combines the work of courses 1, 2, and 3. Introduction to Chinese grammar and development of all language skills in a cultural context with emphasis on communication. Not open for credit to students who have completed course 1, 2, or 3.—IV. (IV.)

1BL. Accelerated Written Chinese I (5)

Lecture - 5 hours. Prerequisite: ability to speak and understand oral Chinese (Mandarin or dialect). Designed for students who already have some degree of fluency in spoken Chinese, but who cannot read Chinese characters. Concentrates on developing reading ability and accelerates progress to upper division. Not open for credit to students who have completed course 8. (Former course 8.)—I. (I.)

1CN. Mandarin for Cantonese Speakers I (5)

Lecture - 5 hours. Prerequisite: ability to read and write Chinese characters at the elementary school level. Accelerated training in spoken Mandarin, particularly in the phonetic transcription system known as pinyin, for students who already can read and write Chinese. Course assumes no knowledge of spoken Mandarin Chinese. Not open for credit to students who have completed course 7. (Former course 7.)—I. (I.)

2. Elementary Chinese (5)

Lecture/discussion-5 hours. Prerequisite: course 1. Continuation of course 1 in the areas of grammar and basic language skills.—II. (II.)

2BL. Accelerated Written Chinese II (5)

Lecture - 5 hours. Prerequisite: course 1BL. Continuation of course 1BL. Designed to accelerate the progress of students who already know spoken Mandarin or a dialect but cannot read or write Chinese characters. Not open for credit to students who have completed course 18. (Former course 18.)—II. (II.)

2CN. Mandarin for Cantonese Speakers II (5)

Lecture - 5 hours. Prerequisite: course 1CN. Continuation of course 1CN. Training in spoken Mandarin for students who already can read and write Chinese. Not open for credit to students who have completed course 17. (Former course 17.)—II. (II.)

3. Elementary Chinese (5)

Lecture/discussion-5 hours. Prerequisite: course 2. Continuation of course 2. Completion of grammar sequence and continuing practice of all language skills. — III. (III.)

3BL. Accelerated Written Chinese III (5)

Lecture - 5 hours. Prerequisite: course 2BL Advanced written styles and syntax in Chinese. Students completing this course proceed to course 111, which starts the third-year Chinese, or to some other appropriate upper-division course. Not open for credit to students who have completed course 28. (Former course 28.)—III. (III.)

3CN. Mandarin for Cantonese Speakers III (5)

Lecture - 5 hours. Prerequisite: course 2CN. Continuation of course 2CN. Prepares students for entering upper division courses in Chinese. Not open for credit to students who have completed course 27. (Former course 27.)—III. (III.)

4. Intermediate Chinese (5)

Lecture/discussion - 5 hours. Prerequisite: course 3 or the equivalent. Intermediate-level training in spoken and written Chinese in cultural contexts, based on language skills developed in course 3. GE credit: WC.-I. (I.)

4A. Accelerated Intensive Intermediate Chinese (15)

Lecture/discussion - 15 hours. Prerequisite: course 3 or 1A or placement exam. Special nine week accelerated, intensive summer session course that combines the work of courses 4, 5, and 6. Intermediatelevel training in spoken and written Chinese in cultural and communicative contexts, based on language skills developed in course 3 or 1A. Not open to students who have completed course 4, 5, or 6.— IV. (IV.)

5. Intermediate Chinese (5)

Lecture/discussion-5 hours. Prerequisite: course 4 or the equivalent. Intermediate-level training in spoken and written Chinese in cultural contexts, based on language skills developed in course 4.—II. (II.)

6. Intermediate Chinese (5)

Lecture/discussion-5 hours. Prerequisite: course 5 or the equivalent. Intermediate-level training in spoken and written Chinese in cultural contexts, based on language skills developed in course 5.—III. (III.)

10. Modern Chinese Literature (In English) (4)

Lecture — 3 hours; term paper or discussion — 1 hour. Introductory course requiring no knowledge of Chinese language or history. Reading and discussion of short stories and novels and viewing of two films. Designed to convey a feeling for what China has experienced in the twentieth century. Not open for credits to students who have already taken, or are taking concurrently, course 104. GÉ credit: ArtHum, Div, Wrt | AH, WC.—II. (I.) Chen

11. Great Books of China (in English) (4)

Lecture - 3 hours; discussion - 1 hour. Selected readings in English translation are supplemented with background information on periods, authors and the interrelationships of culture, literature and social change. Methods of analysis are introduced and applied in class discussions. GE credit: ArtHum, Div, Vrt | AH, WC.−I. (I.) Halperin

50. Introduction to the Literature of China and Japan (4)

Lecture/discussion-4 hours Methods of literary analysis and their application to major works from the various genres of Chinese and Japanese literature (in translation), including film. East Asian cultural traditions will also be introduced. (Same course as Japanese 50.) GE credit: ArtHum, Div, Wrt | AH, WC.-II. (II.) Gundry

98. Directed Group Study (1-5) (P/NP grading only.)

99. Special Study for Undergraduates (1-5) (P/NP grading only.)

Upper Division Courses 100A. Chinese Intellectual Traditions: **Daoist Traditions (4)**

Lecture/discussion-4 hours. Prerequisite: course 11 or a course in Chinese history recommended. English-language survey of key Daoist texts and scholarship. Topics include Daoist concepts of the cosmos, the natural world, scripture, the body, and immortality; Daoist divinities; Daoism and the state. Offered in alternate years. (Same course as Religious Studies 175A) GE credit: ArtHum, Div, Wrt | AH, WC.-(II.) Halperin

101. Chinese Film (4)

Lecture/discussion-3 hours; film viewing-3 hours. Prerequisite: History 9A or any course on traditional China, upper division standing. English language survey of Chinese film, from its inception to the end of the twentieth century. Chinese films as important texts for understanding national, transnational, racial, gender, and class politics of modern China. GE credit: ArtHum, Div | AH, VL, WC.-III. (III.)

102. Chinese American Literature (in English) (4)

Lecture—3 hours, term paper or discussion—1 hour. Prerequisite: a course in Chinese history recommended; upper division standing. English language survey of Chinese American literature which reflects cultural roots in China before immigration and the diaspora experience in the United States after immigration. Memory, nostalgia, national identities, cross-cultural communication, globalization, and trans-national politics. GE credit: ArtHum, Div, Wrt | AH, WC.—II, III. (II, III.) Chen

103. Modern Chinese Drama (4)

Lecture - 3 hours; term paper or discussion - 1 hour. Prerequisite: a course in Chinese history recommended; upper-division standing. English language survey of modern Chinese spoken drama in the twentieth century and its major playwrights, in the context of Chinese history and the interaction of Chinese culture with other cultures. GE credit: ArtHum, Div, Wrt | AH, VL, WC.-II, III. (II, III.) Chen

104. Modern Chinese Fiction (in English) (4)

Lecture-3 hours; term paper or discussion-1 hour. Prerequisite: course 10 or a course in Chinese history recommended. English language survey of Chinese fiction as it evolved amidst the great historical, social and cultural changes of the twentieth century. Thorough study of the most influential writers and genres. GE credit: ArtHum, Div, Wrt | AH, WC.— III. (II.) Chen

105. Western Influences on Twentieth-Century Chinese Literature (in English) (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 10 or History 9A recommended. Introduction of Western literary thought into modern China, the experimentation with Western literary forms and techniques, and the development of Marxism in contemporary literary writing. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC.—III.

106. Chinese Poetry (in English) (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: History 9A or any course on traditional China recommended. Organized topically and chronologically, the lyric tradition is explored from the dawn of folk songs down to modern expressions of social protest. Topics include friendship, love, oppression,

war, parting, death, ecstasy and beauty. All readings are in English. GE credit: ArtHum, Div, Wrt | AH, WC.—I. (I.) Yeh

107. Traditional Chinese Fiction (in English)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 10 or a course in Chinese history. English-language course studying the dawn of Chinese fiction and its development down to modern times. Combines survey history with close reading of represen-tative works such as The Story of the Stone and famous Ming-Qing short stories. GE credit: GE credit: ArtHum, Div, Wrt | AH, WC.—II. (II.) Halp-

108. Poetry of China and Japan (in English) (4)

Lecture - 3 hours; discussion - 1 hour. A comparative approach to Chinese and Japanese poetry, examining poetic practice in the two cultures; includes a general outline of the two traditions, plus study of poetic forms, techniques, and distinct treatments of universal themes: love, nature, war, etc. Offered in alternate years. (Same course as Japanese 108.) GE credit: ArtHum, Div, Wrt | AH, WC.-II. (II.) Yeh

109A, C-E, G-I. Topics in Chinese Literature (in English) (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: depending on topic, course 10, 11, 104, 106, 107, or a course in Chinese history. Topics in Chinese literature may include: (A) crime and punishment; (C) women writers; (D) the knight-errant; (E) the city in fiction; (G) the literature of twentieth-century Taiwan; (H) popular literature; (I) the scholar and the courtesan. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC.—(III.) Chen, Halperin, Yeh

110. Great Writers of China: Texts and Context (in English) (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: any course from the General Education Literature Préparation List, or consent of instructor. Examination of major theoretical concepts and interpretive methods in the study of literature by using examples from the Chinese tradition; discussions of classical and modern works with an emphasis on the relations between literature, author, society, and culture. GE credit: ArtHum, Div, Wrt | AH, WC.—I, II. (I, II.) Yeh

111. Modern Chinese: Reading and Discussion (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 6 or the equivalent. Readings in modern Chinese newspaper articles, essays, and short stories, based on language skills developed in courses 1 through 6. GE credit: AH, WC.—I. (I.)

111A. Intensive Third-Year Chinese (12)

Lecture/discussion - 13.3 hours. Prerequisite: course 6 or 3BL or 4A; or successful completion of Chinese Placement Exam and with placement at the thirdyear level. Not open to students who have completed course 111, 112, or 113. Nine-week intensive summer course combines courses 111, 112, and 113. Training at intermediate-high and advanced-low level in spoken and written Chinese in cultural and communicative contexts based on language skills developed in course 6. GE credit: AH, OL, WC.—IV. (IV.)

112. Modern Chinese: Reading and Discussion (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 111. Readings in modern Chinese newspaper articles, essays, and short stories, based on language skills developed in course 111. GE credit: ĂH, WC.-II. (II.)

113. Modern Chinese: Reading and Discussion (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 112. Readings in modern Chinese newspaper articles, essays, and short stories, based on language skills developed in course 112. GE credit: AH, WC.—III. (III.)

114. Introduction to Classical Chinese: Confucius (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 6 or consent of instructor. Texts from the Confucian canon are read with the assistance of prepared word glossaries so that while learning to read classical Chinese, the students also experience the most influential books in the history of China in their original texts. GE credit: AH.—I. (Í.) Halperin

115. Introduction to Classical Chinese: Mencius (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 114. Continues course 114 by reading selections from the text of the Mencius. GÉ credit: AH.-

116. Introduction to Classical Chinese: Narrative Styles (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 115. Continues course 115 by reading selections from the Records of the Grand Historian and other early, influential works. GE credit: AH.-III. (III.) Halperin

120. Advanced Chinese (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 113 or consent of instructor. Selected readings from all genres to develop advanced skills in reading, writing, aural comprehension, and translation. May be repeated one time for credit. GE credit: AH.—I, İI, III. (I, II, III.)

130. Readings in Traditional Chinese Fiction

Lecture - 1 hour; discussion - 3 hours. Prerequisite: course 112 or the equivalent; course 114 recom mended. Close reading in Chinese of representative works from the Tang Dynasty (618-907) to modern times. May be repeated one time for credit when content varies. GE credit: AH.-II. (II.)

131. Readings in Traditional Chinese Poetry (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 6 or consent of instructor. Traditional Chinese poetry from its beginnings to the golden ages of Tang and Song, surveying forms and poets that best reveal the Chinese poetic sensibility and the genius of the language of Chinese poetry. GE credit: AH.— I. (I.) Yeh

132. Readings in Modern Chinese Poetry

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 6 or consent of instructor. Chinese poetry from the Literary Revolution of 1917 to the present, surveying works that embody exciting innovations and reflect the modernity of twentieth-century Chinese society and culture. GE credit: AH, WC.-II.

140. Readings in Classical Chinese (4)

Lecture/discussion-3 hours; term paper. Prerequisite: consent of instructor. Study and philological analysis of selected texts from the first millennium of Imperial China. May be repeated two times for credit. GE credit: AH.-I, II, III. (I, II, III.)

150. Fifth-Year Chinese: Selected Topics in Chinese Language, Literature, and Culture (4)

Lecture/discussion-4 hours. Prerequisite: successful completion of course 120, or course 123 after Spring 2012, or fifth-year level Chinese placement exam. Literary works and scholarly essays on selected topics of Chinese culture and society. Development of a deep understanding of Chinese culture and society through sophisticated Chinese speaking and writing exercises. May be repeated three times for credit when topic differs. Offered irregularly. GE credit: ArtHum, Div, Wrt | AH, OL, WC, WE.-I, II, III, IV. (I, II, III, IV.)

160. The Chinese Language (4)

Lecture/discussion-4 hours. Prerequisite: course 6 (may be taken concurrently); Linguistics 1 recommended. The Chinese language viewed in its linguistic context, synchronically and diachronically. Historical phonology, classical and literary language, rise of written vernacular, descriptive grammar of modern standard Chinese, dialectal variation, and sociolinguistic factors. GE credit: AH.—II, İII. (II, III.)

192. Chinese Internship (1-12)

Internship - 3-36 hours to be arranged. Prerequisite: upper division standing and consent of instructor. Work experience in the Chinese language, with analytical term paper on a topic approved by instructor. (P/NP grading only.)

197T. Tutoring in Chinese (1-5)

Tutoring — 1-5 hours. Prerequisite: consent of Department chairperson. Leading of small voluntary discussion groups affiliated with one of the Department's regular courses. May be repeated for credit, but only 2 units may be applied to the minor. (P/NP grading only.) - Chu

198. Directed Group Study (1-5)

(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Course 299. Research (1-12)

(S/U grading only.)

Courses in Japanese (JPN)

Lower Division Courses

1. Elementary Japanese (5)

Lecture/discussion-5 hours. Introduction to spoken and written Japanese in cultural contexts, with emphasis on communication. (Students who have successfully completed Japanese 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student's P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed.)—I. (I.)

1A. Accelerated Intensive Elementary Japanese (15)

Lecture/discussion-15 hours. Special 12 week accelerated, intensive summer session course that combines the work of courses 1, 2 and 3. Introduction to Japanese grammar and development of all language skills in a cultural context with emphasis on communication. Not open for credit to students who have completed course 1, 2, or 3.

1AS. Intensive Elementary Japanese (15)

Lecture/discussion - 15 hours. Intensive course taught combining the work of courses 1, 2, and 3. Introduction to Japanese grammar and development of all language skills in a cultural context with emphasis on communication. Offered in Japan. Not open for credit to students who have taken course 1, 2, or 3.—IV. (IV.)

2. Elementary Japanese (5)

Lecture/discussion-5 hours. Prerequisite: course 1 or the equivalent. Continuation of training in basic spoken and written skills.—II. (II.)

3. Elementary Japanese (5)

Lecture/discussion-5 hours. Prerequisite: course 2 or the equivalent. Continuation of training in basic spoken and written skills. - III. (III.)

4. Intermediate Japanese (5)

Lecture/discussion-5 hours. Prerequisite: course 3 or the equivalent. Intermediate-level training in spoken and written Japanese in cultural context, based on language skills developed in course 3.—I. (I.)

5. Intermediate Japanese (5)

Lecture/discussion - 5 hours. Prerequisite: course 4 or the equivalent. Intermediate-level training in spoken and written Japanese in cultural context, based on language skills developed in course 4.—II. (II.)

6. Intermediate Japanese (5)

Lecture/discussion-5 hours. Prerequisite: successful completion (C- or better) of course 5 or the equivalent. Intermediate-level training in spoken and written Japanese in cultural context, based on language skills developed in course 5.—III. (III.)

75. Intensive Intermediate Japanese (20)

Lecture/discussion - 20 hours. Prerequisite: course 2. Special intensive course that combines the work of courses 3, 4, 5, and 6. Introduction to Japanese grammar and development of all language skills in a cultural context with emphasis on communication. Taught in Japan. Not open for students who have taken course 3, 4, 5, or 6.—III.

10. Masterworks of Japanese Literature (in English) (4)

Lecture - 3 hours; discussion - 1 hour. Introduction to Japanese literature: readings and discussion in English of important works from earliest times to the present. GE credit: ArtHum, Div, Wrt | AH, WC, WE.-III. (III.) Sorensen

15S. Introduction to Japanese Culture (2)

Lecture/discussion-2 hours; fieldwork-1 hour. Restricted to students enrolled in units for the Kyoto Quarter Abroad program. Aspects of Japanese culture: literature, history, religion, art, language, and society. Conducted in English; taught in Japan. GE credit: AH, WC.—III. (III.) Sorensen

25. Japanese Language and Culture (in English) (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 1 or Linguistics 1 or Anthropology 4 recommended. Classification and communication of experience in Japanese culture; principles of language use in Japanese society. Speech levels and honorific language, language and gender, minority languages, literacy. Role of Japanese in artificial intelligence and computer science. Offered in alternate

50. Introduction to the Literature of China and Japan (4)

Lecture/discussion-4 hours. Methods of literary analysis and their application to major works from the various genres of Chinese and Japanese literature (in translation), including film. East Asian cultural traditions will also be introduced. (Same course as Chinese 50.) GE credit: ArtHum, Div, Wrt | AH, WC.-II. (II.) Gundry

98. Directed Group Study (1-5) (P/NP grading only.) GE credit: AH.

99. Special Study for Undergraduates (1-5) (P/NP grading only.)

Upper Division Courses

101. Japanese Literature in Translation: The Early Period (4)

Lecture - 3 hours; discussion - 1 hour. Study of early Japanese literature from the Nara to the end of the Heian period through a broad survey of the major literary genres such as lyric poetry, court diaries, prose narratives, poem-tales, and classical Chinese writings. GE credit: ArtHum, Div, Wrt | AH, WC, WE. -I. (I.) Sorensen

102. Japanese Literature in Translation: The Middle Period (4)

Lecture - 3 hours; discussion - 1 hour. Study of the major literary genres from the twelfth century to the second half of the nineteenth century including poetry, linked-verse, military chronicles, no drama, Buddhist literature, haiku, haibun, kabuki, bunraku, plays and Edo prose narratives. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—II. (II.) Sorensen

103. Japanese Literature in Translation: The Modern Period (4)

Lecture - 3 hours; discussion - 1 hour. Modern Japanese literature from the 1870s to the 1970s. Surveys representative literary works and ideas against the social and intellectual background of the Meiji, Taisho, and Showa periods. GE credit: ArtHum, Div, Wrt | AH, WC.-III. (III.) Chang

104. Modern Japanese Literature: War and Revolution (3)

Lecture/discussion-3 hours. Perspectives and sensibilities with which major modern Japanese writers have interpreted the traumatic and often poignant experiences of war and socio-political upheavals from the late nineteenth century to the 1970s. Lectures, discussions, and readings in English. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC.—I. Chang

105. Modern Japanese Literature: Hero and Anti-hero (4)

Lecture/discussion-4 hours. The ways in which representative hero and anti-hero protagonists in modern Japanese literature perceive, confront, challenge, and resolve a wide array of social, political, and moral problems of their times. Course taught in English. GE credit: ArtHum, Div, Wrt | AH, WC.—I. (I.) Chang

106. Japanese Culture Through Film (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing. Aspects of Japanese culture such as love, the family, position of women, growing up, death, and the supernatural as portrayed in films by Kurosawa, Mizoguchi, Ichikawa, Ozu, and Itami. Lectures, discussion, and readings in English. Films with English subtitles. GE credit: ArtHum, Div, Wrt | AH, VL, WC.-II. (II.) Chang, Gundry,

107. Modern Japanese Autobiographies (in English) (4)

Lecture—3 hours; term paper/discussion—1 hour. Prerequisite: upper division standing. Exploring the modern and contemporary Japanese social and cultural landscape through critical analysis of modern Japanese autobiographies by prominent and other authors in the 19th and 20th centuries. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC.-I. Chang

108. Poetry of China and Japan (in English)

Lecture-3 hours; discussion-1 hour. A comparative approach to Chinese and Japanese poetry, examining poetic practice in the two cultures; includes a general outline of the two traditions, plus study of poetic forms, techniques, and distinct treatments of universal themes: love, nature, war, etc. Offered in alternate years. (Same course as Chinese 108.) GE credit: ArtHum, Div, Wrt | AH, WC.-I, II.

109. Japanese Popular Culture (5)

Lecture - 3 hours; discussion - 1 hour; film viewing-3 hours. Japanese popular culture, from its medieval/early modern precedents to contemporary incarnations. Émphasis on the major forms of twentieth-century popular culture, including genre films, popular theater, TV manga (cartoons), animation and science fiction. GE credit: ArtHum, Div | AH, VL, WC.-III. Sorensen

111. Modern Japanese: Reading and Discussion (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 6. Readings in modern Japanese short stories, newspaper articles, and essays; conversation practice based on these readings. GE credit: OL.-I.

112. Modern Japanese: Reading and Discussion (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 111. Continuation of course 111. GE credit: OL.-II. (II.)

113. Modern Japanese: Reading and Discussion (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 112. Continuation of course 112. GE credit: OL.-III. (III.)

114A. Spoken Japanese (2)

Discussion - 2 hours. Prerequisite: course 6 or the equivalent. Training in spoken Japanese for students with a basic working knowledge of the language. (P/NP grading only.) GE credit: OL.—I. (I.)

114B. Spoken Japanese (2)

Discussion-2 hours. Prerequisite: course 114A or consent of instructor. Continuation of course 114A. Training in spoken Japanese for students with a basic working knowledge of the language. (P/NP grading only.) GE credit: OL-II. (II.)

114C. Spoken Japanese (2)

Discussion-2 hours. Prerequisite: course 114B or consent of instructor. Continuation of course, 114B. Training in spoken Japanese for students with a basic working knowledge of the language. (P/NP grading only.) GE credit: OL.—III. (III.)

115. Japanese Composition (2)

Lecture — 2 hours. Prerequisite: course 6 or consent of instructor. Development of skills in the techniques of writing Japanese. Practice in short essay writing with an aim toward mastery of the vocabulary and syntax of written style Japanese. - I. (I.)

1175. Intensive Modern Japanese: Reading and Discussion (17)

Lecture/discussion - 17 hours. Prerequisite: course 5. Intensive course taught combining the work of courses 1, 2 and 3. Intensive course combining the work of courses 6, 111, 112, and 113. Completes introduction to basic Japanese grammar. Develops more advanced reading, writing, and conversation skills in a cultural context. Taught in Japan. Not open to students who have taken courses 6, 111, 112, or 113.—III. (III.)

131. Readings in Modern Japanese Literature: 1920-1945 (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 113 or the equivalent. Fourth-year level reading of representative works of modern Japanese literature including short stories, novellas, diaries, memoirs, poetry and excerpts from novels and plays from 1920 through the militaristic era, to the end of the war years in 1945. GE credit: AH.—III. (III.)

132. Readings in Modern Japanese Literature: 1945-1970 (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 113 or the equivalent. Continuation of course 131, but may be taken independently. Covers selected texts from the immediate post-war years beginning in 1945 down to 1970 and the post-war recovery. GE credit: AH.—III. (III.) Chang

133. Readings in Modern Japanese Literature: 1970 to Present (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 113 or the equivalent. Continuation of course 132, but may be taken independently. Covers selected texts from 1970 to the present. Offered in alternate years. GE credit: AH, WC.—II. Chang

134. Readings in the Humanities: Traditional Culture (4)

Lecture—3 hours; discussion—1 hour or term paper. Prerequisite: course 113. Fourth-year level reading of modern works by major specialists on traditional Japanese culture: history, religion, thought, art, international relations, and literary history and criticism. Focus is equally on developing reading skills and learning about Japanese culture. GE credit: AH, WC.—II. (II.) Gundry, Sorensen

135. Readings in the Humanities: The Modern Period (4)

Lecture—3 hours; term paper. Prerequisite: course 113. Fourth-year level reading of authentic modern writings on Japanese culture, history, philosophy, society, religion, law, politics, international relations, aesthetics, and comparative culture by prominent critics, commentators, and scholars. GE credit: AH, WC.-III. (III.) Chang

136. Readings in Newspapers and Magazines (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 113 or the equivalent. Fourth-year level reading of newspaper and magazine reports, articles, and editorials on domestic and international affairs relating to contemporary Japan. Offered in alternate years. GE credit: AH, WC.-(I.) Chang

141. Introduction to Classical Japanese (4)

Lecture/discussion-4 hours. Prerequisite: one advanced Japanese reading course such as Japanese 131, 132, or the equivalent reading knowledge of Japanese. The basic features of classical

Japanese grammar through careful reading of selected literary texts such as Hojoki or Tsurezuregusa. Offered in alternate years. - III.

151. Japanese Linguistics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: courses 1, 2, and 3 or equivalent. Introduction to Japanese linguistics, featuring key aspects of the Japanese language. Analysis of Japanese from the perspectives of phonology, syntax, discourse analysis, sociolinguistics and psycholinguistics. GE credit: ArtHum, Div, Wrt | SS.—I. (I.)

152. Traditional Japanese Drama (4)

Lecture — 3 hours; discussion — 1 hour. Survey in English of Japanese drama, focusing on traditional forms: noh, kyôgen, bunraku puppet theater, and kabuki, with some attention to modern theater. Texts of plays and secondary works on performance techniques and the composition of plays. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.—(III.) Sorensen

156. Japanese Literature on Film (4)

Lecture/discussion-3 hours; film viewing-2 hours. Survey of films based on works of Japanese literature, emphasis on pre-modern and early modern texts. Introduction to major directors of Japan, with a focus on cinematic adaptation. Lectures and readings in English. Films in Japanese with English subtitles. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.—(III.) Sorensen

192. Japanese Internship (1-12)

Internship - 3-36 hours to be arranged. Prerequisite: upper division standing and consent of instructor. Work experience in Japanese language, with analytical term paper on a topic approved by instructor. (P/NP grading only.)

197T. Tutoring in Japanese (1-5)

Tutoring - 1-5 hours. Prerequisite: consent of Department chairperson. Leading of small voluntary discussion groups affiliated with one of the Program's regular courses. May be repeated for credit, but only 2 units may be applied to the minor. (P/NP grading only.)

198. Directed Group Study (1-5) (P/NP grading only.) GE credit: AH, WC.

199. Special Study for Advanced Undergraduates (1-5) (P/NP grading only.) GE credit: AH, WC.

Graduate Courses

291. Seminar in Modern Japanese Literature: Major Writers (4)

Seminar-4 hours. Prerequisite: any one of courses 131, 132, 133, 134, 135, or the equivalent. Indepth reading and critical analyses of major works by and critical literature on one or two prominent modern or contemporary writers such as Natsume Soseki, Mori Ogai, Shimazaki Toson, Akutagawa Ryunosuke, Tanizaki Junichiro, Abe Kobo and Oe Kenzaburo. Offered in alternate years.—III. Chang

299. Research (1-12)

(S/U grading only.)

East Asian Studies

(College of Letters and Science) Chia-ning Chang, Ph.D., Program Director

Program Office. 1277 Social Science and Humanities Building; (530) 752-3406; http://eastasian.ucdavis.edu

Committee in Charge

Katharine Burnett, Ph.D., Associate Professor (Art History) Chia-ning Chang, Ph.D., Professor (East Asian Languages and Cultures) Chengzhi Chu, Ph.D., Associate Professor (East Asian Languages and Cultures) David Gundry, Ph.D., Assistant Professor

Sheldon Lu, Ph.D., Professor (Comparative Literature) Ethan Scheiner, Ph.D., Associate Professor (Political Science) Eddy U, Ph.D., Associate Professor (Sociology) Li Zhang, Ph.D., Professor (Anthropology)

The Major Program

The East Asian Studies major gives the student an understanding of East Asia (especially China and Japan) through interdisciplinary studies that combine sustained work in an East Asian language with courses on East Asian countries.

The Program. The program offers core courses in East Asian history, humanities, social sciences, and languages. After taking the core courses in conjunction with two years or more of either Chinese or Japanese language study, the student chooses additional courses focusing on a special field of interest, such as anthropology or history. Since six quarters of language work are required, students normally should apply to the East Asian studies program no later than their sophomore year.

Programs, Internships, and Career Alternatives. One program of interest to East Asian Studies majors is the education abroad program, which gives students the opportunity to live and experience the culture of their focus country. At UC Davis, the Internship and Career Center helps students obtain legislative, legal, and business internships. Additionally, the UC Davis Washington Center arranges internships and runs a full-credit academic program in Washington D.C. with a full range of opportunities for East Asian Studies majors. East Asian Studies graduates are prepared for employment in govern ment agencies (such as Foreign Service), state agencies, international or non-governmental (such as United Nations), foundations, journalism, teaching, counseling and companies having an interest in international business, trade, finance. The stringent language requirement of the major program enhances career prospects in jobs that demand knowledge of language and culture of the focus

A.B. Major Requirements:

UNITS

Preparatory Subject Matter.....41-42 History 9A and 9B.....

One course from Art History 1D, Chinese 10, 11, Comparative Literature 53A, Japanese 10, 25, Religious Studies 70, 75......3-4 Two years (or the equivalent) of Chinese or

Depth Subject Matter36

Must include at least 8 units of core courses from each of the following three categories.

History 191A, 191B, 191C, 191D, 191E, 191F; 194A-194B or 194B-194C

Social Science:

Anthropology 148A, 148B, 149A, 149B; Economics 171; Geography 127; Political Science 148A, 148B; Sociology 147 Humanities:

Art History 163A, 163B, 163C, 164; Chinese 104, 106, 107, 109, 131, 132; Japanese 101, 102, 103; Religious Studies

At least 12 additional units must be selected from the above courses, or from the following: Anthropology 110, 112, 117, 119, 120, 122, 123, 124, 128; Chinese (any upper division course); Economics 115A, 115B, 116, 160A, 160B, 162; Geography 143; History 102G, 102H, 102N; Japanese (any upper division course); Linguistics 100; Political Science 127, 133, 138, 145, 148C; Sociology 118, 141, 170, 183 (or other appropriate courses, including individual and group study

courses (198, 199), as approved by the Committee in charge).

Total Units for the Major.....77-78 Recommended

Students are strongly urged to take a substantial number of courses in Euro-American civilization as a basis for comparison for a deeper understanding of America's relations with East Asia.

Major Adviser. Chia-ning Chang (East Asian Studies), Mark Halperin (East Asian Languages and Cul-

Minor Program Requirements:

Courses taken for the minor are expected to reflect a predominant interest in either China or Japan, but also to provide some exposure to the other of the two countries. All courses counting towards the East Asian Studies major, including individual and group study courses (198, 199), may be used to fulfill the requirements for the minor program, as long as they deal predominantly with China, Japan, or both.

East Asian Studies22

History 9B and 18 upper division units, of which at least 12 must be in courses focusing on China; OR History 9A and 18 upper division units, of which at least 12 must be in courses focusing on Japan......22

Courses in East Asian Studies. The following courses count toward the major and are open to stu-dents throughout the campus. See departmental listings for course descriptions.

Anthropology

Culture and Political Economy in 148A

Contemporary China

149B Contemporary Japanese Society

Art History

Asian Art 163A. Chinese Art Chinese Painting 163B.

163C. Painting in the People's Republic of

164. The Arts of Japan

Chinese

All courses

Comparative Literature

Literature of China and Japan 53A 153. The Forms of Asian Literature

Economics

171. Economy of East Asia

History

9A.	History of East Asian Civilization
9B.	(China) History of East Asian Civilization
102G.	(Japan) Undergraduate Proseminar: China to 1800
102H.	Undergraduate Proseminar: China

since 1800

102N Undergraduate Proseminar: Japan 191A. Classical China 191B. High Imperial China 191C. Late Imperial China Nineteenth-Century China 191D. 191E. The Chinese Revolution 191F. History of the People's Republic of

China, 1949 to the Present 194A. Aristocratic and Feudal Japan

through 16th Centuries 194B. Early Modern Japan, 17th-19th

Centuries Modern Japan 20th Centuries 194C

194D. Business and Labor in Modern Japan 194E. Education and Technology in

Modern Japan

History of Modern Korea 195B.

Japanese

All courses.

Political Science

148A. Government and Politics in East Asia: China

148B. Government and Politics in East Asia: Pacific Rim

Government and Politics in East 148C. Asia: Southeast Asia

Religious Studies

Chinese Philosophy: An Introduction Introduction to Buddhism 170.

172. Ch'an (Zen) Buddhism

Sociology

147. Sociological Perspectives on East 188. Social Stratification in China

Courses in East Asian Studies (EAS) Lower Division Course

88. Korean Society: Late 19th Century to the Present (4)

Lecture/discussion-4 hours. Modern Korean society (late 19th Century to contemporary period), emphasizing the perseverance and transformations of traditional social and cultural patterns. GE credit: ArtHum, Div, Wrt.-II. Kim

Upper Division Courses

113. Cinema and Society in China (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: one course from History 190C, 193, or consent of instructor. Knowledge of Chinese not required. Viewing and analysis of one Chinese film with English subtitles each week, followed by discussion and short essays. Cinematic technique, social values and film topics from 1930s to today. Not open for credit to students who have completed Chinese 113. GE credit: ArtHum, Div, Wrt. - III. (III.)

190. East Asian Studies Seminar (4)

Seminar-3 hours; term paper. Prerequisite: upper division standing or consent of instructor. Political, social, cultural, and economic issues in East Asia Topic varies each year. May be repeated for credit if topic differs. Not offered every year.

192. East Asian Studies Internship (1-12)

Internship - 3-36 hours; term paper. Prerequisite: upper division standing and consent of instructor. Work experience in the East Asian Studies field, with analytical term paper on a topic approved by the instructor. (P/NP grading only.)

194H. Special Study for Honors Students

Independent study-1-5 hours. Prerequisite: open only to majors of senior standing who qualify for honors program. Guided research, under the direction of a faculty member, leading to a senior honors thesis on a topic in East Asian Studies culture, society, or language. (P/NP grading only.)

196A-196B. Honors Seminar (4-4)

Seminar - 2 hours; conference - 2 hours. Prerequisite: a GPA of 3.500 in the major, senior standing, and consent of instructor. A two-quarter research project culminating in an Honors thesis. A grade of B or higher must be earned to qualify the student for honors distinction at graduation. (Deferred grading only, pending completion of sequence.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading

Ecological Management and Restoration

(College of Agricultural and Environmental Sciences) Faculty. See Plant Sciences, on page 467.

The Major Program

This major is designed for students who are interested in understanding how to manage and restore wildland and rangeland plant communities. Courses are selected to provide an interdisciplinary background that encompasses ecology, applied plant biology, and the social sciences. Students will acquire a core understanding of natural and managed ecosystems and how they function, interact with the natural environment, are connected with human society and social change, and are restored and managed.

The Program. The curriculum provides depth in the ecological and botanical sciences directed toward an integrated understanding of how communities and ecosystems function and how this knowledge can assist in their management and restoration. Courses in environmental policy and law expose the students to the social drivers and constraints of ecosystem management. All students gain practical experience through practical field courses and a required internship. Students may also pursue an Honors thesis in their senior year.

Career Alternatives. Graduates from this program are prepared to pursue a wide range of careers, including positions in ecological restoration and ecosystem management; rangeland and reserve management; environmental consulting; public, private, or non-profit agencies concerned with restoration and natural resource management; Cooperative Extension; teaching; information and communication services. Graduates are qualified to pursue advanced studies in fields such as ecology, agroecology, environmental studies, geography or weed

B.S. Major Requirements:

UNITS	
Preparatory Subject Matter51-61	
Biological Sciences 1A, 1B, 1C or 2A, 2B, 2C	
Depth Subject Matter60-80	
Environmental Horticulture 160, 160L4 Plant Sciences 146 or Soil Science 105 or 111 or 112 or 118	

100, Geology 35, Hydrology 143, 147,

or 151

Plant Sciences 171 or Environmental Horticulture 120
Environmental Science and Management
1414
Plant Sciences 135 or 141 or 162 or
Entomology 107 or Soil Science 112 or
other course chosen in consultation with
an advisor
Landscape Architecture 180F or Plant
Sciences 163
Environmental Horticulture 102 or Plant
Biology 111 or Plant Sciences 157 or
1584
Environmental Science and Policy 160
or 161 or 171 or 172 or 179 and
179L 3-5
Internship; Plant Sciences 1922
Fatul III

Total Units for the Major...... 111-141 Major Adviser. T. P. Young

Advising Center for the major, including peer advising, is located in 1220 Plant and Environmental Sciences (530) 752-1715.

Ecology (A Graduate Group)

S.P. Lawler, Ph.D., Chairperson of the Group

Group Office. 1005 Wickson Hall (530) 752-6752; http://ecology.ucdavis.edu

Faculty

Marissa L. Baskett, Ph.D., Assistant Professor (Environmental Science and Policy) Alison M. Berry, Ph.D., Professor (Plant Sciences) Robert L. Bettinger, Ph.D., Professor (Anthropology) Monique Borgerhoff Mulder, Ph.D., Professor (Anthropology) Louis W. Botsford, Ph.D., Professor (Wildlife, Fish, and Conservation Biology)
Walter M. Boyce, Ph.D., Professor

(Pathology, Microbiology, and Immunology)
Patrick H. Brown, Ph.D. Professor (Plant Sciences) Mary Cadenasso, Ph.D., Assistant Professor (Plant Sciences)

James Carey, Ph.D., Professor (Entomology)
Tim Caro, Ph.D., Professor
(Wildlife, Fish, and Conservation Biology)

Edward P. Caswell-Chen, Ph.D., Professor

(Nematology) Ernest S. Chang, Ph.D., Professor (Bodega Marine Laboratory)

Thomas Čoombs-Hahn, Ph.D., Assosciate Professor (Neurobiology, Physiology, and Behavior) Howard V. Cornell, Ph.D., Professor

(Environmental Science and Policy Randy A. Dahlgren, Ph.D., Professor

(Land, Air and Water Resources) Academic Senate Distinguished Teaching Award Christyann M. Darwent, Ph.D., Associate Professor

(Anthropology)

Serge I. Doroshov, Ph.D., Professor (Animal Science) John M. Eadie, Ph.D., Professor

(Wildlife, Fish, and Conservation Biology) Deborah L. Elliott-Fisk, Ph.D., Professor (Wildlife, Fish, and Conservation Biology)

Holly Ernest, D.V.M., Ph.D. Associate Professor (VM: Population Health and Reproduction) Valerie. T. Éviner, Ph.D., Assistant Professor

(Plant Sciences) lan C. Faloona, Ph.D., Assistant Professor

(Land, Air, and Water Resources) Nann A. Fangue, Ph.D., Assistant Professor (Wildlife, Fish Conservation Biology) Y. Hossein Farzin, Ph.D., Professor

(Agricultural and Resource Economics)

Howard Ferris, Ph.D., Professor (Nematology)

Albert Fischer, Ph.D., Associate Professor (Plant Sciences)

Janet E. Foley, Ph.D., Professor (VM: Epidemiology) Brian Gaylord, Ph.D., Associate Professor

(Evolution and Ecology) Shu Geng, Ph.D., Professor (Plant Sciences)

Paul Gepts, Ph.D., Professor (Plant Sciences) Steven E. Greco, Ph.D., Associate Professor (Environmental Design)

Richard Grosberg, Ph.D., Professor (Evolution and Ecology) Susan L. Handy, Ph.D., Professor (Environmental Science and Policy) Alexander H. Harcourt, Ph.D., Professor Emeritus

(Anthropology) Susan Harrison, Ph.D., Professor

(Environmental Science and Policy)
Alan Hastings, Ph.D., Professor

(Environmental Science and Policy)

Robert Hijmans, Ph.D., Associate Professor (Environmental Science and Policy)

Tessa Hill, Ph.D., Assistant Professor (Geology) Marcel Holyoak, Ph.D., Professor

(Environmental Science and Policy)

William Horwath, Ph.D., Professor (Land, Air and Water Resources)

Benjamin Z. Houlton, Ph.D., Assistant Professor (Land, Air and Water Resources)

Silas S. O. Hung, Ph.D., Professor (Animal Science) Louise E. Jackson, Ph.D., Professor

(Land, Air and Water Resources) Marie A. Jasieniuk, Ph.D., Assistant Professor

(Plant Sciences) Richard Karban, Ph.D., Professor (Entomology) Ermias Kebreab, Ph.D., Professor (Animal Science)

Douglas A. Kelt, Ph.D., Professor (Wildlife, Fish, and Conservation Biology) Christine Krueder Johnson, Ph.D., Associate Professor (VM: Wildlife Health Center)

Dietmar Kueltz, Ph.D., Associate Professor (Animal Science)

Emilio A. Laca, Ph.D., Professor (Plant Sciences)

John Largier, Ph.D., Professor (Environmental Science and Policy)

Andrew M. Latimer, Ph.D., Assistant Professor (Plant Sciences)

Sharon P. Lawler, Ph.D., Associate Professor

(Entomology)
Edwin E. Lewis, Ph.D., Professor (Nematology)
C.-Y. Cynthia Lin, Ph.D. Assistant Professor (Agricultural and Resource Economics, Environmental Science and Policy)

Mark Lubell, Ph.D., Professor (Environmental Science and Policy)

Andrew Marshall, Ph.D., Assistant Professor (Anthropology)

Richard L. McElreath, Ph.D. Associate Professor (Anthropology)

Frank M. Mitloehner, Ph.D., Associate Professor (Animal Science) Steven G. Morgan, Ph.D., Professor

(Environmental Science and Policy, Bodega Marine Laboratory)

Peter B. Moyle, Ph.D., Professor (Wildlife, Fish, and Conservation Biology)

Steven A. Nadler, Ph.D., Professor (Nematology) Gabrielle Nevitt, Ph.D., Professor

(Neurobiology, Physiology, Behavior) Debbie A. Niemeier, Ph.D., Professor (Civil and Environmental Engineering)

Benjamin S. Orlove, Ph.D., Professor Ermeritus (Environmental Science and Policy)

Gregory Pasternack, Ph.D., Professor (Land, Air and Water Resources)

Gail L. Patricelli, Ph.D., Assistant Professor (Evolution and Ecology) Kyaw Tha Paw U, Ph.D., Professor

(Land, Air and Water Resources) Dan Potter, Ph.D., Professor (Plant Sciences)

James F. Quinn, Ph.D., Professor (Environmental Science and Policy)
Marcel Reimanek, Ph.D., Professor
(Evolution and Ecology)
Eliska Reimankova, Ph.D., Professor

(Environmental Science and Policy)

Kevin J. Rice, Ph.D., Professor (Plant Sciences) James H. Richards, Ph.D., Professor

(Land, Air and Water Resources)

David Rizzo, Ph.D., Professor (Plant Pathology)

Jay Rosenheim (Entomology) Academic Senate Distinguished Teaching Award

James N. Sanchirico, Ph.D., Associate Professor (Environmental Science and Policy)

Eric D. Sanford, Ph.D., Associate Professor (Evolution and Ecology)
Thomas W. Schoener, Ph.D., Professor

(Evolution and Ecology)
Sebastian Schreiber, Ph.D. Professor

(Evolution and Ecology) Mark W. Schwartz, Ph.D., Professor (Environmental Science and Policy) Academic Senate Distinguished Teaching Award

S.G. Schladow, Ph.D., Professor (Civil and Environmental Engineering)

Kate M. Scow, Ph.D., Professor

(Land, Air and Water Resources) Arthur M. Shapiro, Ph.D., Distinguished Professor (Evolution and Ecology)

Andrew Sih, Ph.D., Professor

(Environmental Science and Policy) Johan Six, Ph.D., Associate Professor (Plant Sciences)

David R. Smart, Ph.D., Associate Professor (Viticulture and Enology)

Michael R. Springborn, Ph.D., Assistant Professor (Environmental Science and Policy)

Jay Stachowicz, Ph.D., Professor (Evolution and Ecology) Academic Senate

Distinguished Teaching Award Maureen Stanton, Ph.D. Professor

(Evolution and Ecology) Sharon Y. Strauss, Ph.D., Professor (Evolution and Ecology)

Donald Strong, Ph.D., Professor (Evolution and Ecology)

Ron Tjeerdema, Ph.D., Professor (Environmental Toxicology) Brian Todd, Ph.D. Assistant Professor

(Wildlife, Fish Conservation Biology)

Thomas P. Tomich, Ph.D., Professor (Environmental Science and Policy, Human and Community Development)
Susan L. Ustin, Ph.D., Professor
(Land, Air and Water Resources)
Chris Van Kessel, Ph.D., Professor (Plant Sciences)

Dirk Van Vuren, Ph.D., Professor (Wildlife, Fish, and Conservation Biology)

Peter C. Wainwright, Ph.D., Professor

(Evolution and Ecology) Academic Senate Distinguished Teaching Award
Neal M. Williams, Ph.D., Assistant Professor

(Entomology) Susan L. Williams, Ph.D., Professor (Evolution and Ecology)

John C. Wingfield, Ph.D., Professor (Neurobiology, Physiology and Behavior Bruce Winterhalder, Ph.D. Professor (Anthropology) Louie H. Yang, Ph.D., Assistant Professor (Entomology)

Truman P. Young, Ph.D., Professor (Plant Sciences)

Affiliated Faculty

William Bennett, Ph.D., Associate Researcher Ecologist (John Muir Institute of the Environment)

Richard Y. Evans, Ph.D., Extension Specialist (Plant Sciences)

Edwin DeHaven Grosholz, Ph.D., Professor, Cooperative Extension Specialist (Environmental Science and Policy)

Joshua M. Hull, Ph.D., Assistant Adjunct Professor (Animal Science)

Michael L. Johnson, Ph.D., Associate Director

(Center for Watershed Sciences)
Peter Klimley, Ph.D., Adjunct Professor, Associate Research Biologist (Bodega Marine Laboratory)
Bernie May, Ph.D., Adjunct Professor

(Animal Science)

A. Keith Miles, Ph.D., Adjunct Professor (Wildlife, Fish, and Conservation Biology) Malcolm North, Ph.D., Research Associate (Plant Sciences)

Ben Sacks, Ph.D., Adjunct Associate Professor (VM: Population Health and Reproduction) Kenneth W. Tate, Ph.D., Cooperative Extension Specialist (Plant Sciences)

Swee Teh, Ph.D., Associate Research Toxicologist/ Pathologist (Anatomy, Physiology and Cell Biology)

Lisa C. Thompson, Ph.D., Associate Specialist in Cooperative Extension (Wildlife, Fish, and Conservation Biology)

Inge Werner, Ph.D., Associate Adjunct Professor (Anatomy, Physiology and Cell Biology) Minghua Zhang, Ph.D., Associate Adjunct Professor (Land, Air and Water Resources)

Graduate Study. The Graduate Group in Ecology offers the M.S. and Ph.D. degrees. Ecology is a science that integrates numerous fields of study to attain deep understanding of natural and societal influences on the distribution, abundances, behaviors, traits, and ecosystem functions of organisms. In order to accommodate varied student interests, the Group has developed several 'areas of emphasis' with specialized programs of study: agricultural ecology, conservation ecology, ecosystems and landscape ecology, ecotoxicology, environmental policy and human ecology, integrative ecology, marine ecology, physiological ecology and restoration ecology. For further details, contact the Group office.

Preparation. Appropriate preparation is undergraduate work in any of the biological, social or behavioral, and physical sciences, mathematics or engineering. Applicants will normally be expected to have completed the following courses during the undergraduate years or shortly after matriculating: two courses each in introductory biology, general chemistry and physical science; one course each in calculus, an upper division introduction to ecology course and introductory statistics. Students that choose the environmental policy and human ecology area of emphasis are only required to complete one course in general chemistry. They may also substitute one quantitative course in social science such as micro- or macro-economics for one chemistry or physics requirement.

Graduate Advisers. S. Lawler, E. Grosholz. K. Scow (Agricultural Ecology); J. Eadie, P. Moyle, E. Rejmankova, A. Shapiro (Conservation Ecology); E. Lewis (Ecosystems and Landscape Ecology); R. Tjeerdema (Ecotoxicology); M. Lubell, M. Springborn, J. Sanchirico (Environmental Policy & Human Ecology); J. Richards (Integrative Ecology); E. Sanford (Marine Ecology); J. Richards (Physiological Ecology); K. Rice (Restoration Ecology)

Courses in Ecology (ECL)

Graduate Courses

200A. Principles and Applications of Ecology (5)

Lecture - 4 hours; discussion - 1 hour. Prerequisite: first course in Ecology (e.g., Environmental Science and Policy 100), Statistics 102, Mathematics 16A, 16B or consent of instructor; pass 1 open to graduate majors. Provides a broad background in the principles and applications of ecology, and serves as a foundation for advanced ecology courses. Topics include ecophysiology, behavioral ecology, population ecology, genetics and evolution. Emphasis on historical developments, current understanding, and real world applications.—I. (I.) Holyoak, Rice

200B. Principles and Applications of Ecology (5)

Lecture - 4 hours; discussion - 1 hour. Prerequisite: course 200A; pass 1 open to graduate majors. Principles and applications of ecology, continuing topical coverage from ECL200A. The course covers principles of community structure and functioning, species diversity patterns, ecosystem ecology and biogeochemistry, landscape ecology, biogeography and phylogenetics.—II. (II.) Cornell

201. Ecosystems and Landscape Ecology (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: courses 200A and 200B. Integration of concepts to understand and manage ecosystems in a complex and changing world. Emphasis on interactions among biotic, abiotic and human factors and changes over space/time. Local to global controls over water, carbon and nutrients across ecosystems/ landscapes. GE credit: SE.-II. (II.) Cadenasso,

203. Physiological Ecology (3)

Lecture - 3 hours. Prerequisite: Evolution and Ecology 101 or Environmental Studies 100; Neurobiology, Physiology, and Behavior 110 or Plant Biology 111 or Environmental Studies 129; elementary cal culus. A comparative examination of several animal groups addressing fundamental physiological mechanisms that shape the ecology of each animal group. Offered in alternate years-III. Wainwright

204. Population and Community Ecology

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Environmental Studies 100 or Evolution and Ecology 101, Mathematics 21A-21B or consent of instructor; Mathematics 22B recommended. Review of major concepts of population ecology and community ecology, with emphasis on the rationale of theory and use of theory as applied in the ecology of natural and managed systems. Offered in alternate years. -

205. Community Ecology (4)

Lecture — 2 hours; discussion — 2 hours. Prerequisite: Environmental Studies 100, Evolution and Ecology 101, or Plant Biology 117. Introduction to literature and contemporary research into processes structuring ecological communities.—II. Karban, Lawler

206. Concepts and Methods in Plant Community Ecology (4)

Lecture—3 hours; laboratory—4 hours. Prerequisite: introductory courses in statistics and plant ecology; consent of instructor. Principles and techniques of vegetation analysis, including structure, composition, and dynamics. Emphasis given to sampling procedures, association analysis, ordination, processes and mechanisms of succession, and classification. Most techniques are demonstrated or conducted during field trips and laboratories. Offered in alternate years.—I. (I.) Rejmanek

207. Plant Population Biology (3)

 $Lecture-2\ hours;\ laboratory/discussion-1\ hour.$ Prerequisite: advanced undergraduate ecology course (e.g., Environmental Science and Policy 100, Evolution and Ecology 101, Entomology 104 or Plant Biology 117), and advanced undergraduate course in genetics and/or evolution (e.g., Biological Sciences 101 or Evolution and Ecology 100). Introduction to theoretical and empirical research in plant population biology. Emphasis placed on linking ecological and genetic approaches to plant population biology. (Same course as Population Biology 207.) Offered in alternate years. - (II.) Rice

208. Issues in Conservation Biology (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: one of Environmental Studies 100, Zoology 125, Botany 117, or Entomology 106. Graduate-level introduction to current research in conservation biology. Course will emphasize reading and discussing primary literature. Specific topics will reflect the research interests of UC Davis conservation biology faculty. - II. (II.) Harrison

211. Advanced Topics in Cultural Ecology

Lecture/discussion—3 hours; term paper. Prerequisite: Environmental Science and Policy 133/Anthropology 133 and graduate standing in Ecology or Anthropology. Topics of current analytical and methodological importance in cultural ecology. Examination of general issues in cultural ecology through study of human response to and influences on climate. (Same course as Anthropology 211.) Offered in alternate years. - (I.) McElreath

212A. Environmental Policy Process (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course in public policy (e.g., Environmental Studies 160) or environmental law (e.g., Environmental Studies 161); course in bureaucratic theory (e.g., Political Science 187 or Environmental Studies 166); course in statistics (e.g., Sociology 106 or Agricultural and Resource Economics 106). Introduction to selected topics in the policy process, applications to the field of environmental policy. Develops critical reading skills, understanding of frameworks of the policy process and political behavior, and an ability to apply multiple frameworks to the same phenom ena. Offered in alternate years. (Same course as Environmental Science and Policy 212A.)—I. Lubell

212B. Environmental Policy Evaluation (4)

Lecture-1 hour; discussion-1 hour; seminar hours. Prerequisite: intermediate microeconomics (e.g., Economics 100); Statistics 108 or Agricultural and Resource Economics 106; policy analysis (e.g., Environmental Studies 168A or the equivalent); Agricultural and Resource Economics 176. Methods and practices of policy analysis; philosophical and intellectual bases of policy analysis and the political role of policy analysis. (Same course as Environmental Science and Policy 212B.) Offered in alternate years.—(III.) Springborn

213. Population, Environment, and Social Structure (4)

Seminar—3 hours; term paper. Prerequisite: at least one course in population or human ecology, or in environment and resources. Relationships among population dynamics, resource scarcity and environmental problems, and social structure; focus on demographic content of global ecological models and simulations, ecological content of modern demographic theories, and debates about scarcity, inequality, and social conflict and change. Óffered in alternate years. — (III.)

214. Marine Ecology: Concepts and Practice (3)

Lecture - 1 hour; discussion - 1.5 hours; fieldwork -1.5 hours. Prerequisite: graduate standing or one course in ecology, one course in evolution or genetics, and consent of instructor; survey course in marine ecology recommended. Critical review and analysis of concepts and practices in modern marine ecology at the interface of several fields of study including oceanography, evolution, behavior, and physiology. Emphasis on critical thinking, problem solving, and hands-on study. Three field trips required. - III. (III.) Morgan

216. Ecology and Agriculture (4)

Lecture — 3 hours; term paper. Prerequisite: Evolution and Ecology 11 or consent of instructor. Ecological principles as relevant to agriculture. Integration of ecological approaches into agricultural research to increase ecosystem functions and services. Topics include crop autoecology, biotic interactions among crops and pests, ecosystem and landscape ecology. Not open for credit to students who have completed Vegetable Crops 216 (Former course Vegetable Crops 216). Offered in alternate years. —I. (I.) Jack-

217. Conservation and Sustainable **Development in Third World Nations (4)**

Lecture/discussion-3 hours; fieldwork-2 hours. Prerequisite: at least one course from two of these three groups: (a) Environmental Studies 160, 161, 168A, 168B; (b) Environmental Studies 101, 133, International Agricultural Development 103, Geography 142; (c) Anthropology 126, 131, Geography 141, Sociology 144, 145A, 145B. Examination of the patterns of resource ownership, control and management in agricultural lands, extractive zones (fisheries, forests) and wildlands, with emphases on conservation and sustainability. Comparison of industrial democracies and poorer nations. (Same course as International Agricultural Development 217.) Offered in alternate years.—(III.)

219. Ecosystem Biogeochemistry (4)

Lecture - 3 hours; laboratory/discussion - 2 hours. Prerequisite: introductory courses in ecology/biology and soils are recommended; undergraduates accepted with consent of instructor. Multi-disciplinary analysis of energy and nutrient transfers within terrestrial ecosystems. Examination of processes and inter- and intra-system interactions between the atmosphere, biosphere, lithosphere, and hydrosphere. Laboratory section uses biogeochemical simulation models to examine case studies. (Same course as Soil Science 219.) Offered in alternate years. — (III.) Houlton

220. Spatio-Temporal Ecology (2)

Lecture/discussion-2 hours. Prerequisite: Population Biology 200B or course 204 or Evolution and Ecology 104 or Environmental Science and Policy 121 or consent of instructor. Spatio-temporal ecological theory focusing on population persistence and stability, predator-prey and host-parasitoid interactions, species coexistence and diversity maintenance, including effects of environmental variation, spatial and temporal scale, life-history traits and nonlinear dynamics. Topics vary. (Same course as Population Biology 220.) May be repeated one time for credit. (S/U grading only.) — (III.)

222. Human Ecology of Agriculture (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: upper division course work in environmental sciences, cultural anthropology, economics, international agricultural development or sociology, or consent of instructor. Social and cultural factors relating to agricultural adaptation and evolution. Ethnobiological knowledge systems, rules and customs of resource allocation, impact of population growth, technological change, states and markets. Social and cultural contexts of biological diversity and agricultural resource conservation. - I. Brush

225. Terrestrial Field Ecology (4)

Seminar-1 hour; field work-12 hours. Prerequisite: introductory ecology and introductory statistics or consent of instructor. A field course conducted over spring break and four weekends at Bodega Bay, emphasizing student projects. Ecological hypothesis testing, data gathering, analysis, and written and oral presentation of results will be stressed. (Same course as Entomology 225/Population Biology 225.)—III. Karban

231. Mathematical Methods in Population Biology (3)

Lecture-3 hours. Prerequisite: Mathematics 16C or 21C or the equivalent. Mathematical methods used in population biology. Linear and nonlinear difference equation and differential equation models are studied, using stability analysis and qualitative methods. Partial differential equation models are introduced. Applications to population biology models are stressed. (Same course as Population Biology 231.)—I. Hastings

232. Theoretical Ecology (3)

Lecture - 3 hours. Prerequisite: course 204 or the equivalent, and Mathematics 16C or 21C; or one of courses 100 or 121 or Evolution and Ecology 101, and a strong mathematics background (Mathematics 22A-22B-22C or the equivalent). Examination of major conceptual and methodological issues in theoretical ecology. Model formulation and development will be emphasized. Topics will vary from year to year. May be repeated for credit. Offered in alternate years. — (II.) Hastings

242. Ecological Genetics: Applied Genetics for Ecology, Health, and Conservation of Natural Populations (3)

Lecture—2 hours; discussion—0.5 hours; laboratory—0.5 hours. Prerequisite: undergraduate genetics and ecology/conservation biology courses recommended. Introduction to the field of applied ecological genetics to include applications in conservation ecology, population genetics, population biology, wildlife health and disease ecology. Limited enrollment. (Same course as Population Health and Reproduction 242.)—II. (II.) Ernest

280. Current Anthropology Journal Editorial Workshop (4)

Workshop—1 hour; independent study—3 hours. Students must enroll for all three quarters. Reading and offering workshop critiques of manuscripts submitted for publication, and reading and discussion of other relevant work in anthropology and human ecology. Track and edit published comments and authors' replies that accompany major features. Participation in the development of new sections for the electronic edition of the journal, including a "news and views" section and a debate section. (Same course as Anthropology 280.) May be repeated for 12 units of credit with consent of instructor. (S/U grading only.)—I, II, III.

290. Seminar in Ecology (1-4)

Seminar - 1-4 hours. Prerequisite: consent of instructor. Topics in ecology. Students are expected to present an oral seminar on a particular aspect of the general topic under consideration. (S/U grading only.) — I, Iİ, III. (I, II, III.)

296. Topics in Ecology and Evolution (1)

Seminar – 1 hour. Prerequisite: graduate standing. Seminars presented by visiting lecturers, UC Davis faculty, and graduate students. May be repeated for credit. (Same course as Population Biology 292.) (S/U grading only.)—I, II, İII. (I, II, III.)

297T. Tutoring in Ecology (1-4)

Lecture - 1 hour; discussion - 1 hour. Prerequisite: graduate standing in ecology; consent of instructor. Teaching ecology including conducting discussion groups for regular departmental courses under direct guidance of staff. May be repeated for credit. (S/U grading only.)

298. Group Study (1-5)

(S/U grading only.)

299. Research (1-12)

Prerequisite: graduate standing. (S/U grading only.)

Economics

(College of Letters and Science)

Ann Stevens, Ph.D., Chairperson of the Department Deborah Swenson, Ph.D., Vice Chairperson of the

Department Office. 1113 Social Sciences and Humanities Building (530) 752-0741; http://www.econ.ucdavis.edu

Faculty

Paul Bergin, Ph.D., Professor Giacomo Bonanno, Ph.D., Professor James Bushnell, Ph.D., Associate Professor Colin Cameron, Ph.D., Professor Scott E. Carrell, Ph.D., Associate Professor Gregory Clark, Ph.D., Professor Robert C. Feenstra, Ph.D., Professor Athanasios Geromichalos, Ph.D., Assistant Professor Hilary Hoynes, Ph.D., Professor Oscar Jorda, Ph.D., Professor Christopher M. Meissner, Ph.D. Associate Professor Dougla's Miller, Ph.D., Associate Professor Marianne E. Page, Ph.D., Professor Giovanni Peri, Ph.D., Professor Martine Quinzii, Ph.D., Professor Dave Rapson, Ph.D., Assistant Professor Katheryn N. Russ, Ph.D., Assistant Professor Kevin D. Salyer, Ph.D., Professor Burkhard C. Schipper, Ph.D., Associate Professor Shu Shen, Ph.D., Assistant Professor Ina Simonovska, Ph.D., Assistant Professor Joaquim Silvestre, Ph.D., Professor Ann Huff Stevens, Ph.D., Professor Deborah Swenson, Ph.D., Professor Wing T. Woo, Ph.D., Professor

Emeriti Faculty

Andrzej Brzeski, Ph.D., Professor Emeritus W. Eric Gustafson, Ph.D., Senior Lecturer Emeritus Academic Senate Distinguished Teaching Award L. Jay Helms, Ph.D., Professor Emeritus Kevin D. Hoover, D.Phil., Professor Emeritus Hiromitsu Kaneda, Ph.D., Professor Emeritus Peter H. Lindert, Ph.D., Professor Emeritus

Academic Senate Distinguished Teaching Award Louis Makowski, Ph.D., Professor Emeritus Thomas Mayer, Ph.D., Professor Emeritus Klaus Nehring, Ph.D., Professor Emeritus Alan L. Olmstead, Ph.D., Professor Emeritus Steven M. Sheffrin, Ph.D., Professor Emeritus T. Y. Shen, Professor Emeritus Elias H. Tuma, Ph.D., Professor Emeritus Gary M. Walton, Ph.D., Professor Emeritus Leon L. Wegge, Ph.D., Professor Emeritus

Affiliated Faculty

Emanuel A. Frenkel, Ph.D., Lecturer Bagher Modjtahedi, Ph.D., Lecturer Janine Wilson, Ph.D., Lecturer

The Major Program

Economics is the study of how individuals, organizations, and societies choose among alternative uses of resources and how these resources are turned into the things people want.

The Program. Economics majors complete an introductory course sequence in economics, in addition to several courses in quantitative methods. Intermediate theory and economic history are taken on the upper division level and then students are free to concentrate the remainder of their units in various areas of interest, including more courses in economic theory or history, international economics, labor, industry, alternative economic systems, economic development, public finance, econometrics, or mathematical economics.

Internships and Career Alternatives. Internships for economics majors have been arranged at banks, brokerages, other business enterprises, and governmental units. The internships must complement the student's course work. A degree in economics is excellent preparation for students who want to go on to law school, business school, advanced work in economics, or graduate work in international relations. It is also a good background for careers in management and positions with the government.

A.B. Major Requirements:

	UNITS	
Preparatory Subject Matter	1 <i>7</i> -20	
Economics 1A-1B	8	
Statistics 13, 32, or 1023	-4	
Mathematics 16A-16B or 21A-21B6	-8	
Depth Subject Matter	44	
Economics 100, 101	4 4 or , ,	
Total Units for the Major		
Recommended. Students considering graduate		
study in economics are strongly urged to take matics 21A-21B-21C and 22A.		
The Economics Department suggests that Economics 100 and 101 be taken as soon as possible of the due to the state of the s		

Major Advisers. Contact Department office.

Minor Program Requirements:

introductory courses.

Economics.......20 Economics 100, 101...... 8

Select 8 units from Economics 103, 106, 116, 121A, 121B, 122, 125, 130, 131, 132, 134 (or Agricultural and Resource Economics 171A), 135, 136, 137, 140 (or Agricultural and Resource Economics 106), 145, 151A, 151B, 152, 160A, 160B; Agricultural and Resource Economics 139, 156, 175, 176..... Select 4 units from upper division Economics courses 4

Preparation. Economics 1A and 1B; Statistics 13, 32, or 102; Mathematics 16A and 16B or 21A and 21B. Mathematics 16A and 16B or 21A and 21B should be completed before taking Economics 100 and 101. Students need to complete Economics 100 and 101 before taking the advanced courses.

Course Limits. Except under extraordinary circumstances, not more than two economics courses should be taken in any one quarter. In special cases, the department will accept a limited number of related upper division courses from other departments in satisfaction of the economics upper division course requirements. Approval from a departmental adviser is required in all such cases

Graduation with High or Highest Honors. To be eligible for departmental recommendation for High or Highest Honors in Economics at graduation, a student must take all upper division courses in Economics for a letter grade, earn at least a 3.500 grade point average in those courses, and complete at least eight units of course work that result in the submission of an Honors project. Consult the College of Letters and Science section of this catalog and contact the Department for more information.

Study Abroad. The economics department wishes to accommodate students who would like to complement their economics degree with a study abroad experience. Up to 20 units of upper division credit from foreign campuses (excluding Economics 100 and 101) may be used towards the completion of the degree. To ensure that foreign courses will apply towards the economics degree, students need to select courses from the pre-approved list at EAP or seek pre-approval in the economics department for the foreign courses they wish to complete.

Graduate Study. Students who meet the admission requirements of Graduate Studies and the Department of Economics may pursue studies leading to the M.A. and Ph.D. degrees. Fields of empha-sis for graduate study include: Economic Theory, Monetary Economics, Economic Development, Economic History, International Economics, Labor Economics, Industrial Organization, Economic Systems, Public Finance, Mathematical Economics, and Quantitative Methods (Econometrics). For information on admission to graduate study, degree requirements, and financial aid, consult the Graduate Announcement and http://www.econ.ucdavis.edu.

Graduate Advisers. Contact Department office. American History and Institutions. This University requirement can be satisfied by completion of Economics 111A, 111B; see also under University

Courses in Economics (ECN)

Lower Division Courses

1A. Principles of Microeconomics (4)

Lecture-3 hours; discussion-1 hour. Course 1A and 1B may be taken in either order. Analysis of the allocation of resources and the distribution of income through a price system; competition and monopoly; the role of public policy; comparative economic sys tems. GE credit: SocSci | ACGH, QL, SS.-I, II, III. (I, II, III.)

1B. Principles of Macroeconomics (4)

Lecture - 3 hours; discussion - 1 hour. Course 1A and 1B may be taken in either order. Analysis of the economy as a whole; determinants of the level of income, employment and prices; money and banking, economic fluctuations, international trade, economic development; the role of public policy. GE credit: GE credit: SocSci | ACGH, QL, SS. -I, II, III. (1, 11, 111.)

90X. Lower Division Seminar (1-2)

Seminar - 1-2 hours. Prerequisite: lower division standing and consent of instructor. Examination of a special topic in Economics through shared readings, discussions, and written assignments. May not be repeated for credit. Limited enrollment.

92. Internship and Field Work (1-12)

Internship—3-36 hours; term paper. Prerequisite: junior or senior standing; availability of internship position or approved field work project; stock-brokerage interns must have completed Management 11A-11B; consent of instructor. Intensive study of practical application of concepts in economics, stressing research methods and empirical analysis. (P/NP grading only.)

98. Group Study for Undergraduates (1-5)

Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

99. Individual Study for Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses 100. Intermediate Micro Theory (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 1A, 1B; Mathematics 16A-16B or 21A-21B with grade of C- or better in each. Price and distribution theory under conditions of perfect and imperfect competition. General equilibrium and welfare economics. Not open for credit to students who have completed Agricultural and Resource Economics 100A or 10ŎB.—I, II, III. (I, II, III.)

101. Intermediate Macro Theory (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 1A, 1B; Mathematics 16A-16B or 21A-21B with grade of C- or better in each. Theory of income, employment and prices under static and dynamic conditions, and long term growth. - I, II, III. (I, II, III.)

102. Analysis of Economic Data (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 1A, 1B, Statistics 13 or 32, Mathematics 16A-16B or 21A-21B, with grade of C- or better in each, or consent of instructor. Analysis of economic data to investigate key relationships emphasized in introductory microeconomics and macroeconomics. Obtaining, transforming, and displaying data; statistical analysis of economic data; and basic univariate and multivariate regression analysis. Only 2 units of credit allowed to students who have completed course 140 or Agricultural and Resource Economics 106. GE credit: VL. - I, II, III. (I, II, III.)

103. Economics of Uncertainty and Information (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 100, Mathematics 16A and 16B or Mathematics 21A and 21B. Optimal decisions under uncertainty, expected utility theory, economics of insurance, asymmetric information, signalling in the job market, incentives and Principal-Agent theory, optimal search strategies and the reservation price principle. - I. (I.)

106. Decision Making (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 100; Mathematics 16A-16B or 21A-21B; Statistics 13 or 32, with grade of C- or better in each course, or consent of the instructor. Descriptive and normative analysis of individual decision making, with applications to personal, professional, financial, and public policy decisions. Emphasis on decision making under uncertainty and over time. Heuristics and biases in the psychology of decisions; overcoming decision traps.—III. (III.)

110A. World Economic History Before the Industrial Revolution (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 1A and 1B. Development and application of analytical models to explain the nature and functioning of economies before the Industrial Revolution.

Examples will be drawn from a variety of societies, including England, China, Polynesia, and Pre-Columbian America. GE credit: SocSci | SS.-III. (III.)

110B. World Economic History Since the **Industrial Revolution (4)**

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 1A, 1B and 110A. Development and application of analytical models to explain the nature and functioning of economies since the Industrial Revolution. Examples will be drawn from a variety of societies, including England, China, Germany, and India. GE credit: SocSci | SS.—II. (II.)

111A. Economic History (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A-1B or consent of instructor. Survey of economic change in the United States from Colonial times to 1865; reference to other regions in the Western Hemisphere. GE credit: SocSci | SS.-I. (I.)

111B. Economic History (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: courses 1A-1B, or consent of instructor. Survey of economic change in the United States from 1865 to the post World War II era. GE credit: SocSci | SS.— 1, 11, 111. (1, 11, 111.)

115A. Economic Development (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: courses 1A and 1B. Major issues encountered in emerging from international poverty, including prob-lems of growth and structural change, human welfare, population growth and health, labor markets and internal migration. Important issues of policy concerning international trade and industrialization. (Same course as Agricultural and Resource Economics 115A.) GE credit: SocSci, Div.-I, II. (I, II.) Taylor

115B. Economic Development (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: courses 1A and 1B. Major macroeconomic issues of developing countries. Issues include problems in generating capital, conduct of monetary and fiscal policies, foreign aid and investment. Important issues of policy concerning international borrowing and external debt of developing countries. (Same course as Agricultural and Resource Economics 115B.) GE credit: SocSci.-II, III. (II, III.)

116. Comparative Economic Systems (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 100; Mathematics 16B and 21B. Economics analysis of the relative virtues of capitalism and socialism, including welfare economics. Marxian exploitation theory, the socialist calculation debate (Hayek and Lange), alternative capitalist systems (Japan, Germany, U.S.) and contemporary models of market socialism. GE credit: WC

121A. Industrial Organization (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: courses 1A-1B; 100, or consent of instructor. An appraisal of the role of competition and monopoly in the American economy; market structure, conduct, and economic performance of a variety of industries. GE credit: SocSci.—I, II, III. (I, II, III.)

121B. Industrial Organization (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 1A, 1B, 100, or consent of instructor. The study of antitrust and economic regulation. Emphasis on applying theoretical models to U.S. industries and case studies, including telecommunications, software, and electricity markets. Topics include natural monopoly, optimal and actual regulatory mechanisms, deregulation, mergers, predatory pricing, and monopolization. GE credit: ACGH

122. Theory of Games and Strategic Behavior (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 100, Mathematics 16A and 16B or 21A and 21B or consent of instructor. Introduction to game theory. Explanation of the behavior of rational individuals with interacting and often conflicting interests. Non-cooperative and cooperative theory. Applications to economics, political science and other fields.—I, II, III. (I, II, III.)

125. Energy Economics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 1A and 1B, Mathematics 16A and 16B and course 102 or consent of instructor; intended for advanced economics undergraduates. Pass One open to Economics and Graduate School of Management majors. Application of theoretical and empirical tools to the energy sector. Topics include energy and environmental policy, program evaluation, the California energy crisis, market structure and power, global climate change, and commandand-control regulation. — II. (II.)

130. Public Microeconomics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 100, or consent of instructor. Public expenditures; theory and applications. Efficiency and equity of competitive markets; externalities, public goods, and market failures; positive and normative aspects of public policy for expenditure, including benefitcost analysis. Topics include consumer protection, pollution, education, poverty and crime. - I, III. (I,

131. Public Finance (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 100. Economic burden of taxation; equity and efficiency considerations in tax design; structure and economic effects of the U.S. tax system (including personal income tax, corporation income tax, and property tax); tax loopholes; recent developments; tax reform proposals.—II, III. (II, III.)

132. Health Economics (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or consent of instructor. The health care market, emphasizing the role and use of economics. Individual demand, provision of services by doctors and hospitals, health insurance, managed care and competition, the role of government access to health care. - II. (II.) Cameron

134. Financial Economics (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A, 1B, and 100; Mathematics 16A; Statistics 13. General background and rationale of corporation; finance as resource allocation over time; decision making under uncertainty and the role of information; capital market and interest rate struc-ture; financial decisions. Students who have completed Agricultural and Resource Economics 171A may not receive credit for this course. - I, III. (I, III.)

135. Money, Banks and Financial Institutions (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 100, 101; Statistics 13. Banks and the banking system. Uncertainty and asymmetric information in the lending process; efficiency of competitive equilibrium in lending markets. Regulation and the con duct of monetary policy. - I, II. (I, II.)

136. Topics in Macroeconomic Theory (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 101. Advanced Topics in macroeconomics theory. The course develops the theoretical and empirical analysis of a specific field of macroeconomics. Possible topics include, business cycle theories, growth theory, monetary economics, political economics and theories of unemployment and inflation. - III. (III.)

137. Macroeconomic Policy (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 100, 101; Statistics 13. Theory and practice of macroeconomic policy, both monetary and fiscal. —I. (I.)

140. Econometrics (4)

Lecture - 3 hours; discussion - 1 hours. Prerequisite: course 102, course 100 and course 101; Mathematics 16A and 16B or Mathematics 21A and 21B; Statistics 13, or any upper division Statistics course. Problems of observation, estimation and hypotheses testing in economics through the study of the theory and application of linear regression models. Critical evaluation of selected examples of empirical research. Exercises in applied economics. Not open for credit to students who have enrolled in or completed Agricultural and Resource Economics 106.-

145. Transportation Economics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 100, Mathematics 16A, 16B, Statistics 13 or consent of instructor. Intended for advanced economics undergraduates. Examination of fundamental problems of planning and financing transportation "infrastructure" (roads, ports, airports). The economics of the automobile industry, as well as the impact of government regulation and deregulation in the airlines and trucking industries.

151A. Economics of the Labor Market (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 100. Theory of labor supply and demand; determination of wages and employment in the labor market. Policy issues: labor force participation by married women; minimum wages and youth unemployment; effect of unions on wages. - I, III. (I,

151B. Economics of Human Resources (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 151A. Human resource analysis; introduction to human capital theory and economics of educa-tion; the basic theory of wage differentials, including theories of labor market discrimination; income distribution; poverty. Policy issues; negative income tax; manpower training programs; incomes policy. - II, III. (ii. III.)

152. Economics of Education (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 100; course 102; Mathematics 16B or 21B; Statistics 13 or 32, with grade of C- or better in each course, or consent of the instructor. Application of theoretical and empirical tools of economics to the education sector. Demand for Education; Education Production and Market Structures in Education. Policy applications: class size reduction, school finance equalization, accountability, and school choice.

160A. International Microeconomics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 100, or consent of instructor. International grade theory: impact of trade on the domestic and world economies; public policy toward external trade. Only two units of credit allowed to students who have completed course 162.-I, II, III. (I, II, III.)

160B. International Macroeconomics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: courses 1A, 1B, 100, 101, or consent of instructor. Macroeconomic theory of an open economy. Balance of payments adjustment mechanism, international monetary economics issues; international financial institutions and their policies. Only two units of credit allowed to students who have completed course 162.—I, II, III. (I, II, III.)

162. International Economic Relations (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: courses 1A-1B or consent of instructor. International trade and monetary relations, trade policy, exchange rate policy, policies toward international capital migration and investment. Emphasis on current policy issues. Course intended especially for non-majors. Not open for credit to students who have completed course 160A or 160B. GE credit: SocSci | SS, WC.-I, II, III. (I, II, III.)

171. Economy of East Asia (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: courses 1A-1B or consent of instructor. Intensive reading, discussion and research on selected topics from the economies of the countries of East Asia Consult department for course scheduling. - II, III. (II,

190. Topics in Economics (4)

Lecture/discussion-3 hours; discussion-1 hour. Prerequisite: consent of instructor. Selected topics in economic analysis and public policy. Variable content. May be repeated for credit.

190X. Upper Division Seminar (1-4)

Seminar - 1-4 hours. Prerequisite: courses 100 and 101, and consent of the instructor. In-depth examination at an upper division level of a special topic in Economics. Emphasis on focused analytical work.

192W. Internship in the Davis-in-Washington Program (6-8)

Internship - 18-24 hours. Prerequisite: junior or senior standing in Economics; completion of 84 units of credits with a minimum grade-point average of 3.000; admission to the Davis-in-Washington Program. Internship in Washington, DC with associated research project. Students must arrange for a faculty sponsor before embarking on the internship. Maximum of 3 units will count toward satisfying Economics major requirements. (P/NP grading only.)

194HA-194HB. Special Study for Honors Students (4-4)

Independent study—3 hours; seminar—1 hour. Prerequisite: major in Economics with senior standing; consent of instructor and completion of 135 units with a minimum GPA of 3.500 in courses counted toward the major. A program of research culminating in the writing of a senior honors thesis under the direction of a faculty adviser. (Deferred grading only, pending completion of course.)

197T. Tutoring in Economics (1-5)

Tutorial - 3-15 hours. Prerequisite: consent of instructor and chairperson. Undergraduates assist the instructor by tutoring students in one of the department's regularly scheduled courses. May be repeated for up to 10 units of credit. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading

Graduate Courses

200A. Microeconomic Theory (5)

Lecture - 4 hours; discussion - 1 hour. Prerequisite: graduate standing. Linear and non-linear optimization theory applied to develop the theory of the profit-maximizing firm and the utility-maximizing consumer. (Same course as Agricultural and Resource Economics 200A.)—I. (I.) Silvestre

200B. Microeconomic Theory (5)

Lecture — 4 hours; discussion — 1 hour. Prerequisite: course 200A. Characteristics of market equilibrium under perfect competition, simple monopoly and monopsony. Emphasis on general equilibrium and welfare economics; the sources of market success and market failure. (Same course as Agricultural and Resource Economics 200B.)—II. (II.) Quinzii

200C. Microeconomic Theory (5)

Lecture — 4 hours; discussion — 1 hour. Prerequisite: course 200B. Uncertainty and information economics. Individual decision making under uncertainty. Introduction to game theory, with emphasis on applications to markets with firms that are imperfect competitors or consumers that are imperfectly informed. (Same course as Agricultural and Resource Economics 200C.)—III. (III.) Bonanno

200D. Macroeconomic Theory (5)

Lecture - 4 hours; discussion - 1 hour. Prerequisite: course 101, Mathematics 21A, 21B, and 21C. Macro static theory of income, employment, and prices. - II. (II.) Salyer

200E. Macroeconomic Theory (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 200B (may be taken concurrently) and 200D. Macrodynamic theory of income, employment, and prices.—III. (III.) Geromichales

201A. History of Economic Thought (4)

Lecture—3 hours; discussion—1 hour. Economic thought from the classical Greece era to modern times. Offered in alternate years.

201B. History of Economic Thought II (4)

Lecture - 3 hours; discussion - 1 hour. Origins and emergence of modern economic analysis. Offered in alternate years.

203A. Advanced Economic Theory (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 200A; 200B. Advanced topics in general equilibrium theory and welfare economics: existence, determinateness and efficiency; intertemporal economies; uncertainty.-II. (II.) Quinzii

203B. Advanced Economic Theory: Game Theory (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A, 200B, 200C. Covers the most recent developments in game theory, with the focus changing from year to year. Main topics are: refinements of Nash equilibrium, repeated games, evolution, social situations, bounded rationality, and bargaining theory. - III. (III.) Schipper

203C. Topics in Economic Theory (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 200A, 200B, 200C. Selected topics in contemporary microeconomic theory. May be repeated for credit with the consent of the Graduate Studies Committee.

210A. Economic History (4)

Lecture/discussion-4 hours. Economic history of the eastern hemisphere in the modern period. Medieval Europe or other regions may be studied, depending on student interest.—I. (I.) Clark

210B. Economic History (4)

Lecture/discussion-4 hours. The United States from Colonial times to the present. Other areas of the western hemisphere may be studied, according to student interest.

210C. Economic History (4)

Seminar-4 hours. Prerequisite: a graduate course in economic history. Selected topics and issues, emphasis on current research. (Quarter offered to be flexible.) - II. (II.) Meissner

214. Development Economics (4)

Lecture—4 hours. Prerequisite: Agricultural and Resource Economics 100A, 100B, course 101; Agricultural and Resource Economics/Economics 204 and course 160A-160B recommended. Review of the principal theoretical and empirical issues whose analysis has formed development economics. Analysis of economic development theories and development strategies and their application to specific policy issues in developing country contexts. (Same course as Agricultural and Resource Economics 214.)-III. (III.)

215A. Microdevelopment Theory and Methods I (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 200A or 204; course 240A recommended. Agricultural development theory, with a focus on microeconomics. Agricultural household behavior with and without market imperfections and uncertainty. Analysis of rural land, labor, credit and insurance markets, institutions, and contracts. (Same course as Agricultural and Resource Economics 215A.)—I. (I.)

215B. Open Macroeconomics of Development (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Agricultural and Resource Economics/Economics 200A or 204, 200D or 205, and 214 or 215A. Models and policy approaches regarding trade, monetary and fiscal issues, capital flows and debt are discussed in the macroeconomic framework of an open developing country. The basic analytical focus is real exchange rate and its impact on sectoral allocation of resources. (Same course as Agricultural and Resource Economics 215B.)—II. (II.)

215C. Microdevelopment Theory and Methods II (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 215A. Extension of development theory and microeconomic methods. Agricultural growth and technological change; poverty and income inequality; multisectoral, including village and regional models. Computable general equilibrium methods and applications. (Same course as Agricultural and Resource Economics 215C.)—III. (III.)

215D. Environment and Economic Development (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: courses 200A, 204 or Agricultural and Resource Economics 275. Interdisciplinary course drawing on theoretical and empirical research on interactions between environmental resource use and economic development processes. Analysis of issues emerging at the interface of environmental and development economics. (Same course as Agricultural and Resource Economics 215D.)

221A. The Theory of Industrial Organization (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 200A, 200B, 200C. Game theory is used to analyze strategic interaction of firms in industries. Topics include models of competition, product differentiation, entry-deterring strategies, contractual arrangements, vertical control and antitrust issues. -

221B. Empirical Analysis in Industrial Organization (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 221A and 240B. Recent empirical work in industrial organization. Topics include empirical analysis of cartels, product differentiation, innovation and technological change, and imperfect competition in international markets.—III. (III.) Rapson

221C. Industrial Organization and Regulation (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 221A and 240B. Optimal regulation of natural monopoly. Topics include regulatory mechanisms for single and multiple output firms under symmetric and asymmetric information, optimality without regulation, the economic theory of regulation, and empirical studies of regulation and deregulation.

230A. Public Economics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 200C. Measures of deadweight loss and consumer surplus; optimal commodity and income taxation; tax incidence; policy issues in personal taxation, corporate taxation, and social insurance; the evaluation of effective tax rates. - II. (II.) Hoynes

230B. Public Economics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 230A, 240A, 240B. Effects of government policies on economic behavior; labor supply, program participation, investment, consumption and savings.—III. (III.) Miller

230C. Public Economics (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 200C and 240B. Advanced topics in economics of the public sector, with emphasis on current research. Topics may vary from year to year.—I. (I.) Carrell, Stevens

235A. Alternative Approaches to Monetary Analysis (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 200D (may be taken concurrently). Focuses on relation between changes in money supply and changes in nominal GNP. Also discusses the effect of changes in money supply on interest rates. — (I.) Salyer

235B. Monetary Theory (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 235A. Emphasizes problem of finding an appropriate place for money in microeconomic/general equilibrium models. Consideration given to meaning of money, its relation to inflation and the real economy and to its role in models of finance. -III. (III.) Geromichalos

235C. Monetary Policy (4)

Lecture - 3 hours; discussion - 1 hour. Organization of the Federal Reserve Bank, the definition of money, goals and tools of monetary policy, alternative targets for monetary policy, impact of monetary policy, the problem of lags, alternative policies.

239. Econometric Foundations (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: one course in undergraduate-level econometrics. The course will prepare students for econometric theory

and empirical work by examining the statistical foundation of econometrics. Special attention is paid to problems specific to non-experimental data common to social sciences. Topics from matrix algebra are also covered. (Same course as Agricultural & Resource Economics 239.)—I. (I.) Green

240A. Econometric Methods (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Statistics 133 and a course in linear algebra or the equivalent. Least squares, instrumental variables, and maximum likelihood estimation and inference for single equation linear regression model; linear restrictions; heteroskedasticity; autocorrelation; lagged dependent variables. (Same course as Agricultural and Resource Economics 240A.)—II. (II.)

240B. Econometric Methods (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 240A. Topics include asymptotic theory and instrumental variables, pooled time-series cross-section estimation, seemingly unrelated regression, classical hypothesis tests, identification and estimation of simultaneous equation models, cointegration, errorcorrection models, and qualitative and limited dependent variable models. (Same course as Agricultural and Resource Economics 240B.)—II. (II.)

240C. Time Series Econometrics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 240B. Probability theory; estimation, inference and forecasting of time series models; trends and non-standard asymptotic theory; vector time series methods and cointegration; time series models for higher order moments and transition data; statespace modeling and the Kalman filter. (Same course as Agricultural and Resource Economics 240C).—II.

240D. Cross Section Econometrics (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 240B. Estimation and inference for nonlinear regression models for crosssection data; models for discrete data and for limited dependent variables; models for panel data; additional topics such as bootstrap and semiparametric regression. (Same course as Agricultural and Resource Economics 240D) - I. (I.) Shen

240E. Topics in Time Series Econometrics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: courses 240A, 240B and 240C. Modern econometric techniques for time series data. Expand on topics covered in Economics 240A, 240B and 240C. Contents may vary from year to year. (Same course as Agricultural and Resource Economics 240E.)

240F. Topics in Cross Section Econometrics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: courses 240A, 240B and 240D. Modern econometrics techniques for cross-section data. Expand on topics covered in Economics 240A, 240B and 240D. Contents may vary from year to year. (Same course as Agricultural and Resource Economics 240F.) — III. (III.) Cameron

250A. Labor Economics (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: courses 150A-150B or the equivalent. Philosophy, theory and history of American and foreign labor movements; union structure, organization and collective bargaining under changing labor market conditions; current labor market issues.—I. (I.) Stevens

250B. Labor Economics (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 151A or consent of instructor; course 204 or 200A recommended. Microeconomic theory of labor supply and labor demand, estimation of labor supply and demand functions; human capital theory; labor market analysis. - II. (II.) Page

260A. International Economics (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A or 204. Theory of trade determinants; gains from trade; tariffs and effective protection; economic unions.—I. (I.) Feenstra

260B. International Economics (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 200D and 200E. Balance of payments adjustment mechanisms; foreign exchange markets' theories of balance of payments policy and international monetary mechanisms.—(I.) Bergin

260CN. International Investment and Trade (4)

Seminar—4 hours. Prerequisite: course 260A. Analysis of foreign investment and its links to trade; theories of the firm as they relate to firm's export and investment decisions; and an introduction to the political economy of trade policies.—II. (II.) Swenson

260D. Topics in International Macroeconomics (4)

Seminar—4 hours. Prerequisite: course 260B or consent of instructor. Survey of current literature in international macroeconomic theory.—II. (II.) Simonovska

260E. Topics in International Trade (4)

Seminar—4 hours. Prerequisite: course 260A, 260B. Current literature in international trade theory.—III. (III.) Russ

260F. International Macroeconomic Policy (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 260B. Theory and practice of international macroeconomic policy. Topics include exchange rate regimes, international financial institutions, crises and current topics.

270A. Economics of Growth (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 200D and 200E. Modern theories and empirics of economic growth beginning with the neoclassical theories up to current endogenous growth models. Emphasis on the analysis of human capital and growth, technological innovation, its diffusion and empirical evidence on growth.

270B. Economics of Growth (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 200D and 200E. Empirical analysis of growth patterns and growth models. Emphasis on the relationship between macroeconomic management and long-term growth; the use of foreign capital in accelerating growth and its occasional mishaps; the comparison of growth performance in East Asia and Latin America since WW2; the experiences of centrally-planned economies and transitions to market-based growth; and the transformation from an industrial economy to a knowledge economy.

270C. Economics of Growth (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 200D and 200E. Institutional bases; politics; contracts and commitment; money and finance; malthusian dynamics; modern economic growth; transition of industrialization; dual economies, core and periphery; sources of convergence and divergence; openness and growth; resources, demography, and geography; institutions, imperialism, and class conflicts.

280. Orientation to Economic Research (2)

Discussion—2 hours. Course tries to bridge the gap between students' classwork and their subsequent research. It deals with topics such as the origination of a research project, some mechanics of empirical research and hints on the submission of research papers. (S/U grading only.)

290. Topics in Economics (4)

Seminar – 4 hours. Prerequisite: consent of instructor. Selected topics in economic analysis and public policy, focusing on current research. May be repeated for credit.

291. Contemporary Economics Seminar (2)

Seminar—2 hours. Prerequisite: graduate standing in Economics. Seminar series on topics of current interest. May be repeated for credit. (S/U grading only.)—I, III. (I, III.)

298. Group Study (1-5)

Discussion—1-5 hours. Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

299. Individual Study (1-12)

Prerequisite: consent of instructor and graduate standing. (S/U grading only.)

299D. Dissertation Research (1-12) (S/U grading only.)

Professional Course

397. Teaching of Economics (2)

Lecture/discussion—2 hours. Prerequisite: graduate standing in economics. Teaching of economics: methods of instruction, organization of courses, examination and evaluation procedures. (S/U grading only.)—I. (I.)

Education, School of

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Karen A. Watson-Gegeo, Ph.D., Professor Tobin F. White, Ph.D., Assistant Professor I. Phillip Young, Ph.D., Professor

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Minor in Education

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Capital Area North Doctorate in Educational Leadership (CANDEL)

Paul E. Heckman, UC Davis Co-Director Paul Porter, Sonoma State University Co-Director Program Coordinator: (530) 754-6664

Master of Arts in Education

Paul E. Heckman, Program Chair Program Coordinator: (530) 752-7259

Teacher Education-Credential

Paul E. Heckman, Program Chair Christian Faltis, Director of Teacher Education Barbara G. Goldman, Associate Director of Teacher Education

Program Coordinator: (530) 752-0758

UC Educational Research Center (UCERC)

(530) 752-4663; Fax (530) 752-8019

Minor Program Requirements:

The UC Davis School of Education is committed to developing informed citizens and advocates for productive educational environments in a democratic society. Education courses are designed for undergraduate students from all majors.

A Minor in Education will help students:

- Develop an understanding of the issues and concerns of public and private education
- Complete prerequisites for the teaching credential program
- Work towards a master's degree or doctoral degree in education or related field
- · Seek employment in policy, advocacy, or other education rélated careers

Courses. Students must complete 20 units the Minor program in Education. At least 12 units of the 20-unit minimum for the minor must be in Education. The remaining units for the minor may be in education or a related field as approved on the electives

Minor Program Requirements:

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•	UNITS
Upper Division Required Courses	12
Education 100, 110, 120	12
Elective Courses	8
The remaining eight units may be taken from the following courses:	om
Education 115, 181	. 2
Education 183	
Education 119, 122, 130, 142, 147, 15	0

Approved Courses Outside of Education

Agricultural Education 100......3 Mathematics 197TC* 1-5 University Writing Program 197TC* 2-4 African American & African Studies 130;

* Internship (192, 195A or B, 195TC, 197TC) and Independent Study (199), or a combination of both, may not exceed a total of four units. Elective courses may include only one internship.

Minor Advisers. A designated faculty member in the School of Education may advise students and give final approval on the minor. For additional information contact the Student Services office in School of Education Building

Courses in Education (EDU) Lower Division Courses

81. Learning in Science and Mathematics (2)

Lecture/discussion-2 hours; field work-2 hours. Exploration of how students learn and develop understanding in science and mathematics classrooms. Introduction to case studies and interview techniques and their use in K-6 classrooms to illuminate factors that affect student learning. Limited enrollment. (Same course as Geology 81.) (P/NP grading only.) GE credit: SS, VL, WE.-I, II, III. (I, II,

92. Internship (1-3)

Internship—3-9 hours. Prerequisite: consent of instructor. Enrollment dependent on availability of intern placements. Internship as a teacher's aide or tutor in K-12 classrooms under the supervision of a faculty member. May be repeated for credit. (P/NP grading only.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

Upper Division Courses 100. Introduction to Schools (4)

Lecture-3 hours; field work-3 hours. Prerequisite: upper division standing. Study of occupational concerns of teachers; skills for observing classroom activities; school organization and finance; school reform movement; observing, aiding, and tutoring in schools. GE credit: ACGH, DD, OL, SS.—I, II, III. (I, II, III.) Ambrose, Trexler, Tonkovich

110. Educational Psychology: General (4)

Lecture/discussion-4 hours. Prerequisite: Psychology 1; upper division standing. Learning processes, cognitive development, individual differences, testing and evaluation. GE credit: SocSci, Wrt | SS, WE. – I, II, III. (I, II, III.) Booker, Ching, Martin, Passmore, White

114. Quantitative Methods in Educational Research (4)

Lecture/discussion-4 hours. Prerequisite: two years of high school algebra. Problems and methods in data analysis. Design of research projects. Some consideration of procedures suited to digital computers. GE credit: QL.-I. (I.) Martin

115. Educating Children with Disabilities (2)

Lecture - 2 hours. Prerequisite: upper division standing. Educational issues and processes involved in teaching children with disabilities. The course will focus on the structure of special education, with an emphasis on meeting the educational needs of children who are mainstreamed in regular classes. GE credit: SS.-I, III. (I, III.) Martin

119. The Use and Misuse of Standardized Tests (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 110 or consent of instructor. Principles underlying educational and psychological testing. Purposes of testing for individual achievement and evaluation of school programs. Interpretation and misinterpretations of outcomes. Analysis of SAT, GRE and other common tests. Experience in test administration and outcome interpretation. GE credit: Wrt | QL, SS, WE.-III. (III.) Abedi

120. Philosophical and Social Foundations of Education (4)

Lecture — 3 hours; discussion — 1 hours. Prerequisite: upper division standing. Philosophical, historical, and sociological study of education and the school in our society. GE credit: SocSci, Wrt | ACGH, SS, WE. - I, II, III. (I, II, III.) Heckman, Kurlaender, Timar

122. Children, Learning and Material Culture (4)

Lecture/discussion-3 hours; extensive writing or discussion-1 hour; fieldwork. Prerequisite: upper division standing or consent of instructor. How material artifacts shape what and how children learn in school, at home, and in the community. Artifacts examined include books, computers, household appliances, toys and games, entertainment media, collectibles, sports equipment, clothing, folk arts and crafts, and neighborhood space. Offered in alter nate years. GE credit: SocSci, Div, Wrt | SS, VL, WE. - (II.) White

130. Issues in Higher Education (4)

Discussion - 3 hours; field work - 3 hours. Prerequisite: upper division standing or consent of instructor. Analysis of current issues in higher education and of some practical implications of varying philosophical approaches to the role of the university. GE credit: SS, WE.—III. (III) Gonzalez

142. Introduction to Environmental Education (4)

Lecture - 3 hours; field work. Study of history, philosophy, principles and approaches to environmental education (EE) and outreach; learning theories, teaching strategies and techniques in EE and outreach; evaluation of EE curricula in non-formal and in-school contexts; observing, aiding and facilitating local environmental education programs. GE credit: OL, SS.-I. (I.) Ballard

147. Anglos, Latinos and the Spanish Black Legend: The Origins and Educational Implications of Anti-Hispanic Prejudice (4)

Lecture/discussion-3 hours; field work; term paper. Prerequisite: upper division standing or consent of instructor. Examination of anti-Hispanic prejudice in the United States focusing on the "Black Legend," a 16th Century anti-Spanish myth underpinning the doctrine of "Manifest Destiny." Exploration of the Legend's presence in contemporary American society through interviews and analysis of school textbooks. (Same course as Spanish 147.) GE credit: ArtHum, Div, Wrt | ACGH, AH, DD, WE.-I. (I.) González

150. Cultural Diversity and Education in a Sociopolitical Context (4)

Lecture/discussion-4 hours; extensive writing. Introduction to cultural diversity and education in a sociopolitical context. Interactive course. Small and largegroup discussions explore, extend, and apply readings; range of writing genres for responses to assignments and course themes; lectures, slide shows, speakers, brief fieldwork, and presentations. GE credit: SS, DD, WE.—I, II, III. (I, II, III.) Athanases

151. Language Development in the Chicano Child (3)

Lecture/discussion-3 hours. Prerequisite: some knowledge of Spanish and linguistics recommended. Bilingualism, first and second language acquisition, bilingual education, language assessment, Chicano Spanish and the role of dialect varieties in the classroom. Not open for credit to students who have completed course 151T.—III. (III.) Leonard-Fortes

151T. Language Development in the Chicano Child (3)

Lecture/discussion-3 hours. Prerequisite: some knowledge of Spanish and linguistics recommended. Bilingualism, first and second language acquisition, bilingual education, language assessment, Chicano Spanish and the role of dialect varieties in the classroom. Not open for credit to students who have completed course 151.

152. Academic Spanish for Bilingual Teachers (3)

Lecture/discussion-3 hours; field work. Prerequisite: Spanish 23-24 or Spanish 31-32-33. Communicative class taught in Spanish focused on the development of Spanish communication skills for current and/or future bilingual teachers. Main topics are related to school content areas in bilingual settings, with an emphasis on standard and Southwest Spanish dialects. Restricted to Spanish speaking students. GE credit: AH or SS, OL, WE.—III. (III.)

153. Diversity in the K-12 Classroom (2)

Lecture/discussion-2 hours. Prerequisite: acceptance in Teaching Credential Program. Restricted to Teaching Credential majors. Analysis of research on learning styles among culturally diverse students with review and evaluation of responsive curricula and classroom teaching techniques. The ethnographic interview as a research tool. —I, II, III. (I, II, III.)

160A. Introduction to Peer Counseling (2)

Lecture/discussion - 2 hours. Prerequisite: upper division standing and consent of instructor. Introduction to peer counseling techniques and development of peer counseling skills. (P/NP grading only.)—I, II, III (I, II, III)

160B. Issues in Peer Counseling (2)

Lecture/discussion - 2 hours. Prerequisite: upper division standing and consent of instructor; course 160A recommended. In-depth review and development of skills for specific counseling topics. May be repeated one time for credit when topic differs. (P/ NP grading only.)—I, II, III. (I, II, III.)

163. Guidance and Counseling (4)

Lecture — 4 hours. Prerequisite: course 110 (may be taken concurrently). Nature and scope of pupil personnel services; basic tools and techniques of guidance; theory and practice of counseling psychology, with emphasis on educational and vocational adjust-

173. Language Development (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Linquistics 1 or consent of instructor; Linguistics 103A, 103B. Theory and research on children's acquisition of their native language, including the sound system, grammatical systems, and basic semantic categories. (Same course as Linguistics 173.) GE credit: SS.-III. (III.) Tonkovich

180. Computers in Education (3)

Lecture—1 hour; seminar—1 hour; laboratory—3 hours. Prerequisite: upper division or graduate standing. Applications of computers in education as instructional, intellectual, and communication tools. Not open for credit to students who have completed course 180T, 181, or 182.

180T. Computers in Education (3)

Lecture-1 hour; seminar-1 hour; laboratory-3 hours. Prerequisite: upper division or graduate standing. Applications of computers in education as instructional, intellectual, and communication tools. Not open for credit to students who have completed course 180, 181, or 182.—I, III. (I.III) Bellman, Martindale, Mendle, Pomeroy, White

181. Teaching in Science and Mathematics

Lecture/discussion-2 hours; field work-2 hours. Prerequisite: major in mathematics, science, or engineering; or completion of a one-year sequence of science or calculus and consent of the instructor. Class size limited to 40 students per section. Exploration of effective teaching practices based on examination of how middle school students learn math and science. Selected readings, discussion and field experience in middle school Classrooms. (Same course as Geology 181.) (P/NP grading only.) GE credit: SS, WE.—I, II, III. (I, II, III.) Day, Passmore

182. Computer Project for Curricular Integration (1)

Seminar-1 hour. Prerequisite: Agricultural Systems and Environment 21 or appropriate microcomputer course, experience with instructional computing and consent of instructor. Design and implementation of a curricular unit to integrate computer technology into a K-12 classroom setting. A project-based seminar intended for students with substantial prior experience with instructional use of computers and related technologies. Not open for credit to students who have completed course 180 or 181.

183. Teaching High School Mathematics and Science (3)

Lecture/discussion-2 hours; field work-3 hours. Prerequisite: Geology 81/course 81 or Geology 81/course 181 or consent of instructor. Exploration and creation of effective teaching practices based on examination of how high school students learn mathematics and science. Field experience in high school classrooms. Limited enrollment. (Same course as Geology 183.) GE credit: OL, SS, WE.-I, II, III. (I, II, III.) Stevensor

192. Internship (1-3)

Internship - 2-8 hours; discussion - 1 hour. Prerequisite: upper division standing and consent of instructor. Internship as a tutor, teacher's aide, or peer counselor in a school or educational counseling setting under the supervision of a faculty member. May be repeated for credit. (P/NP grading only.)

197T. Tutoring in Education (1-2)

Tutoring — 1-2 hours. Prerequisite: upper division standing and consent of instructor. Leading of small voluntary discussion groups affiliated with the School's upper division courses under the supervision of, and at the option of, the course instructor, who will submit a written evaluation of the student's work. May be repeated one time for credit for a total of 4 units. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

Graduate Courses

200. Educational Research (4)

Lecture - 2 hours; discussion - 2 hours. Prerequisite: introductory statistics and graduate standing in education or consent of instructor. Defining educational research questions, reviewing relevant literature, developing research designs, developing research instruments, selecting appropriate data analysis procedures, and writing research projects. A case problem will provide practice in designing and reporting research. — I. (I.) Young

201. Qualitative Research in Education (4)

Seminar - 2 hours; lecture - 2 hours. Prerequisite: graduate standing or consent of instructor. Examines the design and conduct of educational research using non-numerical data (e.g., text, discourse, imagery and artifacts). Focuses on issues (e.g., validity, reliability, generalizability, ethics) and reporting genres (e.g., narrative accounts, case studies, and arguments).—II. (II.) Enright

202N. Computer Analysis of Qualitative Data (4)

Seminar-3 hours; laboratory-2 hours. Prerequisite: graduate standing or upper division standing with consent of instructor. Critical and practical understanding of how to use computer software programs to analyze qualitative data (text, images, and videotape) in conducting social research. Offered in alternate years.

203. Educational Testing and Evaluation (4)

Lecture/discussion-4 hours. Prerequisite: graduate standing or consent of instructor. Introduces the theoretical assumptions underlying traditional test construction, as well as the basic statistical principles involved in the design, evaluation, and interpretation of standardized tests. Also introduces the debates surrounding the uses of different kinds of tests and evaluation tools.—III. (III.) Abedi

204A. Quantitative Methods in Educational Research: Analysis of Correlational Designs

Discussion - 2 hours; laboratory/discussion - 2 hours. Prerequisite: course 114 or the equivalent. Methods for analysis of correlation data in educational research. Topics include multiple correlation and regression, discriminant analysis, logistic regression, and canonical correlation. Émphasis on conceptual understanding of the techniques and use of statistical software. Offered in alternate years.—II. (II.) Kurlaender

204B. Quantitative Methods in Educational Research: Experimental Designs (4)

Discussion - 2 hours; discussion/laboratory - 2 hours. Prerequisite: course 114 or the equivalent. Methods for analysis of experimental data in educational research. Topics include ANOVA, fixed v. random effects models, repeated measures ANOVA, analysis of co-variance, MANOVA, chi square tests, small sample solutions to t and ANOVA. - I. (I.)

205A. Ethnographic Research in Schools I: Current Theory and Practice (4)

Lecture - 4 hours. Prerequisite: graduate standing. Current literature from anthropology and society related to schools. Emphasis on the organizational structure of institutions, and the analysis of face-toface interaction. Will explore the relationship between field-based research and theory development on the acquisition of knowledge in specific social and cultural contexts. - I. (I.) Watson-Gegeo

205B. Ethnographic Research in Schools II: Field-Based Research Projects (4)

Discussion—4 hours. Prerequisite: graduate standing and course 205A. Student research projects in spe cific schools with cooperative critical analysis of the design, data collection, and inferencing by researchers. Students will continue to meet with instructor as a group throughout the quarter to discuss specific projects. - II. (II.) Watson-Gegeo

206A. Inquiry into Classroom Practice: Traditions and Approaches (2)

Lecture/discussion - 2 hours; fieldwork. Prerequisite: consent of instructor; open to graduate teaching credential students. Introduction to traditions and approaches of teachers conducting research in their own classrooms: purposes, focal areas, methods of data collection and analysis, and written genre conventions. - II. (II.) Merino

206B. Inquiry into Classroom Practice: Application of Teacher Research Approaches (4)

Lecture/discussion-3 hours; fieldwork-1 hour. Prerequisite: satisfactory completion of course 206A or consent of instructor; open to graduate teaching credential students. Analysis and application of teacher research through the development, implementation and evaluation of a short-term classroom researchbased intervention. Particular attention to research that enhances learning of English language learners and under-performing students.—III. (III.) Trexler, Athanases, Ballard, Passmore, Faltis, Booker, White

206C. Inquiry into Classroom Practice: Study Design (4)

Seminar—3 hour; fieldwork—1 hours. Prerequisite: satisfactory completion of course 206B or consent of instructor. Proposal development for classroombased inquiry designed to address student learning needs. Mixed methods research design and preliminary data collection approaches. Design and application of baseline student assessment for proposal development. Literature review. Data collection in K-12 classrooms required. Open to Graduate MA Credential students only. - I. (I.) Ambrose, Faltis, Merino, White

206D. Inquiry into Classroom Practice: Data Analysis and Research Reporting (4)

Seminar-2 hours; fieldwork-1 hour; extensive writing or discussion. Prerequisite: satisfactory completion of course 206C or consent of instructor. Support of the inquiry begun in course 206C through continuous collaborative critique and feedback resulting in the writing and presentation of a research study. Open to Graduate MA Credential students. - II. (II.) Ambrose, Faltis, Merino, White

207. Concepts of the Curriculum (4)

Lecture - 2 hours; discussion - 2 hours. Prerequisite: graduate standing or consent of instructor. Development of the skills of philosophical analysis and argument for the establishment of a point of view, in the consideration of curriculum theory and practice Classical and contemporary approaches to subject matter and activity emphases, hidden curriculum, and moral education.—I. Heckman

208. Presenting Educational Research in Written Reports (4)

Seminar—3 hours; extensive writing. Prerequisite: graduate standing or consent of instructor. Rhetorical and substantive challenges of presenting educational research through written reports; research rhetoric and genres; competing discourse conventions of educational research, policy, and practice; the social organization of publishing educational research. May be repeated one time for credit. Offered in alternate years

209. Image-based Field Research (4)

Lecture/discussion-3 hours; fieldwork-2 hours. Prerequisite: graduate standing or upper division standing with consent of instructor. Critical and practical understanding of video tape and still photogra-phy as resources for enhancing field research in schools and other social setting. Offered in alternate

210. The Psychology of School Learning (4)

Lecture/discussion-4 hours. Study of human learning theory and research related to learning in school. Classical approaches of scholars such as Ausubel, Bruner, Gagne, Piaget, Vygotsky, Skinner. Review of contemporary issues of constructivism, metacognition, problem solving, learning strategies, science and mathematics learning. - III. Martin,

211. Sociocultural and Situative Perspectives on Learning and Cognition (4)

Lecture/discussion-3 hours; extensive writinghour. Prerequisite: graduate standing or consent of instructor. Sociocultural and situative theories of coanition and learning. Major ideas of L.S. Vygotsky, followed by modern perspectives: situated cognition, cognitive apprenticeship, situated learning, communities of practice, cultural-historical activity theory, and distributed cognition. Implications of each theo retical perspective for educational practice. Offered in alternate years. - (III.) Carter Ching, White

213. Individual Assessment (4)

Lecture-4 hours. Prerequisite: courses 114 and 219, admission to school psychology credential program. Theories of intellectual functioning and the measurement of cognitive abilities in school-aged children. Supervised practice in administration and scoring of contemporary tests for children including the WISC-R, the WAIS-R, the Stanford Binet, the McCarthy Scales of Children's Ability. Offered in alternate years. - Mundy

215. Research on Achievement Motivation in Education (4)

Seminar—3 hours; term paper. Prerequisite: graduate standing in Education or consent of instructor. Analysis and critique of recent research on cognitive processes related to achievement motivation in school settings. Topics include self-determination theory, attribution theory, goal theory, intrinsic and extrinsic motivation, learned helplessness. psychological reactance, gender and culture, and research design. - Booker

220. Concepts and Methods of Policy Analysis (4)

Seminar - 3 hours; fieldwork; term paper. Prerequisite: graduate standing. Introduction to concepts and methods of policy analysis. Emphasis on the relationship between educational issues and problems; policy development; constructing persuasive policy analyses; issues related to policy process. — (I.) Timar

221. Culture and Social Organization of Schools (4)

Seminar — 4 hours. Prerequisite: graduate standing or consent of instructor. Culture and social organization of schools. Examines perspectives of social researchers, educational policy-makers, and school members and their implications for educational research, policy and practice.

222. School Change and Educational Reform (4)

Lecture/discussion-2 hours; seminar-2 hours. Prerequisite: graduate standing in Education with course 120 or the equivalent. Analysis of models, processes, and case studies of school change and educational reform with respect to variable characteristics of schools and schooling, planned and unplanned change, the moral evaluation of school change, and the role of educational research.

223. Education and Social Policy (4)

Seminar-4 hours. Prerequisite: graduate standing in Education or consent of instructor. Focuses on understanding the social and political context of education in the U.S. and California and how education policy is formed in the broader public arena. Develops skills in educational policy analysis. (Former course 237.)

225. Education Policy and Law (4)

Lecture/discussion-4 hours. Prerequisite: graduate standing or consent of instructor. Examination of law as an instrument of social policy. Specific focus on the legalization of education decision making, its causes, dimensions, and effects on administrative and teacher authority. - Timar

226. Culture and Social Organization of **Higher Education (4)**

Seminar—3 hours; field work—1 hour. Prerequisite: graduate standing or consent of instructor. Critical study of culture and social organization of higher education institutions policies and functions in the U.S., with some attention to other countries. - Gonzalez

228. Politics and Governance of Education

Seminar — 3 hours; term paper. Prerequisite: graduate standing. Examination of political power, representation, influence, decision-making and inter governmental relations in the public schools. Offered in alternate years.—Timar

229. Education Finance Policy (4)

Seminar — 3 hours; term paper. Prerequisite: graduate standing. Examination of (1) United States financing public education, (2) the relationship between school finance and education policy, and (3) the relationship between education finance and education practice. - Rose

230. Special Topics in Education Policy (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Selected topics in education policy. Designed to facilitate preparation for the qualifying examination or dissertation. Students will critically analyze scholarly work including their own works in progress. May be repeated for credit when topic differs. Offered irregularly.

235. Critical Pedagogy (4)

Seminar—4 hours. Prerequisite: Critical Theory 200A and graduate standing. A socio-cultural critique, from an interdisciplinary perspective, of educational reform and change. The critique will include an analysis of the influence of text content on the perpetuation of social power differences. -

236. Application of Hierarchical Linear Models in Education Research (4)

Lecture-2 hours; lecture/discussion-2 hours; term paper. Prerequisite: course 204A or similar course with permission of the instructor. Application of hierarchical linear models in education research across multiple areas, such as policy, curriculum, and assessment. Develop working knowledge of hierarchical linear modeling and an understanding of its use in existing research as well as student's work.

237. Survey Research Methods (4)

Lecture/discussion-3 hours; field work-1 hour; term paper. Prerequisite: course 114 or equivalent. Theories, principles and application of survey research methodology. Students develop, validate, and administer survey instruments; select representative samples; conduct focus groups; and collect, organize, and analyze survey data. Familiarity with introductory concepts in descriptive and inferential statistics is assumed. Offered in alternate years. (II.) Abedi

242. Research on Text Comprehension (4)

Seminar — 3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Analysis of recent research related to cognitive processing of written texts. Topics include word decoding, schema theory, background knowledge, assimilation, accommodation, working memory, processing depth, vocabulary acquisition, sentence-level processes, text-level processes, text structure, implications for curriculum and instruction. — Uchikoshi-Tonkovich

243. Research on the Teaching and Learning of Writing (4)

Seminar—4 hours. Prerequisite: graduate standing in Education or consent of instructor. Study of issues in research on composition; history of composition studies; data analysis techniques; product and process approaches; cognitive and social perspectives. Offered in alternate years.

244. Topical Seminar in Language, Literacy and Culture (4)

Seminar—3 hours; project—1 hour. Prerequisite: graduate standing. Critical study of selected issues of language, literacy, and culture as they relate to education. May be repeated two times for credit when topic differs.—I, II, III. (I, II, III.) Athanases, Enright, Uchikoshi-Tonkovich

245. Theory and Research in Early Literacy (4)

Seminar-3 hours; field work-1 hour. Prerequisite: graduate standing or consent of instructor. Analysis of children's initial processes in learning to read extending from the preschool years into second

grade. Topics include emergent literacy, phonological awareness, word recognition, decoding, spe ing, vocabulary, comprehension, second language reading, assessment, intervention, and instruction. Offered in alternate years. - III. Uchikoshi

246. Reading as a Social and Cultural Process (4)

Lecture - 3 hours; field work - 1 hour. Prerequisite: course 211 recommended or consent of instructor. Recent theoretical and empirical work on reading in social contexts. Topics include reading as an individual interactive process; reading as a social and cultural process; critical perspectives on reading; implications of contrastive theoretical perspectives for curriculum and instruction in reading. Offered in alternate years.

247. Research on Response to Culturally Diverse Literature, K-12 (4)

Lecture-3 hours; field work-1 hour. Research on response to culturally diverse literature in classrooms and other K-12 settings. Topics include reader response theories, values in expanding the literary canon, problems of cultural authenticity, resistance to multicultural literature, and instruction for diverse texts and learners. Offered in alternate years. - (II).

248. Academic Language and Literacies (4)

Seminar-3 hours; fieldwork; project. Prerequisite: graduate standing or consent of instructor. Exploration of theories and research on academic language and literacies for the schooling of first and second language learners. Students use basic qualitative methods to collect and analyze classroom language and literacy data. Offered in alternate years. — (III.) Enright

249. Discourse Analysis in Educational Settings (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing and at least one previous course in linguistics or sociolinguistics, or consent of instructor. Examines form and type in discourse (e.g., narration, conversation, routines), approaches to discourse analysis, and research on classroom discourse (lessons, teaching/learning interactional sequences). Final term paper is an analysis of discourse data tape-recorded by student in a field setting. - II. (II.) Watson-Gegeo

251. Research in Bilingual and Second Language Education (3)

Seminar-3 hours. Prerequisite: course 151; knowledge of a foreign language. Discussion and analysis of recent research in bilingual and second language education. Topics include: language acquisition in second language learners and bilinguals, second language teaching methods, language-use models in bilingual education, interaction analysis in bilingual/cross-cultural classrooms, use of the vernacular in classrooms. Merino

253. Language and Literacy in Linguistic Minorities (3)

Seminar—2 hours; field work—3 hours. Prerequisite: familiarity with another language and culture; graduate standing. Analysis and application of research on oral language development and literacy in language minority students, through the development, implementation, and evaluation of research-based language arts curriculum.—III. (III.) Merino

255. Curriculum Development and Evaluation in Mathematics (4)

Seminar-4 hours. Prerequisite: graduate standing in Education with upper division course work in mathematics or consent of instructor. Analysis of curricular issues and goals in mathematics education, including long-term trends, current status and influences, proposed changes, and evaluation issues. Selected curriculum projects will be examined. — Ambrose, White

256A. Research in Mathematics Education (4)

Seminar-4 hours. Prerequisite: graduate standing in Education with upper division course work in mathematics, or consent of instructor. Examination of research process in mathematics education; review

of critical productive problems identified by researchers; evolution of trends, issues, theories and hypotheses in various areas of mathematics education research. Course emphasizes foundations. Offered in alternate years. - Ambrose, White

256B. Research in Mathematics Education

Seminar-4 hours. Prerequisite: graduate standing in Education with upper division course work in mathematics, or consent of instructor. Current research issues and activities in mathematics education: status, trends, theories and hypotheses. Formulation of research questions and design of studies. Projection of future directions for research. Offered in alternate years. - Ambrose, White

257. Computer Technology in Mathematics Education (4)

Seminar-4 hours. Prerequisite: graduate standing in Education with mathematics course work; or consent of instructor. The roles of calculators, computers, and graphing calculators in mathematics education will be addressed, with emphasis on the impact of these technologies on curriculum reform. Selected efforts to integrate technology into mathematics instruction will be examined. Offered in alternate years. - Booker, White

260. The Modern History of Science Education (4)

Seminar-4 hours. Prerequisite: graduate standing in Education with upper division coursework in science, or consent of instructor. History of curricular issues and goals in science education from the late 19th century forward, including long-term trends, current status and influences, proposed changes, and evaluation issues. National science standards and curriculum projects. Offered in alternate years.—Passmore

262A. Research Topics in Science Education I (4)

Seminar-4 hours. Prerequisite: graduate standing in Education with upper division coursework in science, or consent of instructor. Research process and product in science education; review of critical science education issues; evolution of trends, theories and hypotheses in various areas of science education research. Survey of current major research in science education.—Passmore

262B. Research Topics in Science Education II (4)

Seminar-4 hours. Prerequisite: course 262A and graduate standing in Education with upper division coursework in science. Current research issues and activities in science education: status, trends, theories and hypotheses. Formulation of research questions, design of studies and critical, in-depth review of literature related to the student's research interests. —Passmore

264. Scientific Literacy and Science **Education Reform (4)**

Seminar—4 hours. Prerequisite: graduate standing in Education with upper division coursework in science, or consent of instructor. Current trends in science education reform locally, regionally, and nationally focusing on scientific literacy. Equity, access and "science for all." Offered in alternate years.—Ballard, Trexler

270. Research on Teacher Education and Development (4)

Seminar - 3 hours; project. Prerequisite: graduate standing. Experience with formal or informal teaching recommended. Research on teacher preparation in university credential programs and on professional development of in-service teachers, with special attention to teacher preparation for work with culturally and linguistically diverse youth.—III. Atha-

271. Supervision of Student Teachers: Research, Theory & Practice (4)

Lecture/discussion-3 hour; fieldwork-1 hour. Prerequisite: graduate standing. Research, theory and practice in the preparation and supervision of teachers. Practice in the supervision of candidates in university teaching credential programs during the student teaching field placement and the mentoring of novice teachers by expert teachers.

275. Effective Teaching (4)

Seminar-4 hours. Review of research on the relationship of effective teacher behavior and student learning. Use of research on teacher effectiveness to develop teaching strategies. Ways to decide on the most appropriate instructional strategies in specific teaching situations. - I, II. (I, II.)

280A. Inquiry and Practice: Qualitative Research for Educational Leaders (4)

Lecture/discussion—4 hours; fieldwork; project. Pre-requisite: admission into the CANDEL EdD program or consent of instructor. Prepares students to understand the nature/assumptions/logic of qualitative methodology as applied to educational settings, focusing on issues of design/conceptualization/ interpretation/application of qualitative research procedures. Students will use these methods in conducting studies in their educational settings.—I. (I.)

280B. Inquiry and Practice: Quantitative Research for Educational Leaders (4)

Lecture/discussion-4 hours; fieldwork; project. Prerequisite: admission into the CANDEL EdD program or consent of instructor. Field-based and general quantitative research methods in education will focus this course. Students acquire skills and knowledge to collect, organize, analyze, and interpret univariate and multivariate quantitative data in educational research, dissertation projects, and field-based projects. — II. (II.)

280C. Inquiry and Practice: Research Design and Application for Educational Leaders (4)

Lecture/discussion-4 hours; fieldwork; project. Prerequisite: admission into the CANDEL EdD program or consent of instructor. Educational leaders are introduced to qualitative, quantitative, and mixedmethods educational research methods and learn to frame research questions, identify data/data sources, use descriptive statistics, critically examine research studies, make sense of educational research/policy, and conduct independent studies. — III. (III.)

281A. Problem-Based Learning Courses: Part 1 (4)

Lecture/discussion-4 hours; extensive writing or discussion; fieldwork. Prerequisite: admission into the CANDEL EdD program or consent of instructor. Students identify problems from their educational settings, engage in data collection/analysis, write-up the process/results, and present to class. Work may become a dissertation proposal, if the problem or its extension is of sufficient interest and value.—I. (I.)

281B. Problem-Based Learning Courses: Part 2 (4)

Lecture/discussion-4 hours; extensive writing or discussion; fieldwork. Prerequisite: admission into the CANDEL EdD program or consent of instructor. Continuation of part one. — II. (II.)

281C. Problem-Based Learning Courses: Part 3 (4)

Lecture/discussion-4 hours; extensive writing or discussion; fieldwork. Prerequisite: admission into the CANDEL EdD program or consent of instructor. Continuation of part two. - III. (III.)

282A. Beginning Issues and Practices: Contemporary Educational Leadership (4)

Lecture/discussion — 4 hours; fieldwork; project. Pre-requisite: admission into the CANDEL EdD program or consent of instructor. Students explore the history and emergent relationships among leadership theories/practice and their application to current educational settings. Students will reflect on and refine their personal theory of leadership. - I. (I.)

282B. Beginning Issues and Practices: Diversity Issues for Educational Leaders (4)

Lecture/discussion—4 hours; fieldwork; project. Pre-requisite: admission into the CANDEL EdD program or consent of instructor. The diversity of stakeholders and community issues in California schools and col-

leges will be explored. Emphasis will be placed on the interaction between underrepresented segments of society and educational institutions. Best Practices in leading diverse schools will be explored.—II. (II.)

283A. Advanced Issues and Practices: **Leadership Across Communities (4)**

Lecture/discussion – 4 hours; fieldwork; project. Pre-requisite: admission into the CANDEL EdD program or consent of instructor. Students examine the theory/practice/process of leadership in communitybuilding and collaboration in/across communities, while addressing the utilization of human and material resources and the creation of partnerships, community linkages, and collaborative efforts.—III. (III.)

283B. Advanced Issues and Practices: Leadership and Student Services (4)

Lecture/discussion-4 hours; fieldwork; project. Prerequisite: admission into the CANDEL EdD program or consent of instructor. Practical and theoretical perspectives for building a sense of vision to lead the profession of student affairs and to meet the needs of . the whole student.—III. (III.)

284A. Policy: History and Theory of **Educational Policy (4)**

Lecture/discussion—4 hours; fieldwork; project. Pre-requisite: admission into the CANDEL EdD program or consent of instructor. Students learn/analyze the history/theory of educational policy. They see how education leaders have/can positively influence the process and implement effective policies in their local institutions. Policy issues covered: educational opportunity, equity, access, regulation, testing, tenure, accountability. - I. (I.)

284B. Policy: Formulating and Influencing Policy (4)

Lecture/discussion-4 hours; fieldwork; project. Prerequisite: admission into the CANDEL EdD program or consent of instructor. Students will conduct critical analyses of policy at the federal, judicial, state, regional and local levels. Specific California and federal policy environment structures, processes and people will be examined for intended consequences, ethical dilemmas, social justice and equity issues.

284C. Policy: Possibilities and Limitations of Educational Policy in a Democracy (4)

Lecture/discussion-4 hours; fieldwork; project. Prerequisite: admission into the CANDEL EdD program or consent of instructor. Students will critically examine the democratic purposes of education in light of existing National, State, and local policy reform efforts. Questions like, In what ways are these reforms and policies guided by democratic ideas and challenged by those ideals.—II. (II.)

285A. Educational Finance, Human Resources, and Law: Integrated Seminar: Human and Financial Assets: Allocations, and Budgets (4)

Lecture/discussion—4 hours; fieldwork; project. Pre-requisite: admission into the CANDEL EdD program or consent of instructor. Topics include: education finance theory, contemporary finance policy issues, intergovernmental relations, effective resource man agement, budget analysis and preparation.—III. (III.)

285B. Educational Finance, Human Resources, and Law: Ethical and Legal Issues in Education (4)

Lecture/discussion-4 hours; fieldwork; project. Prerequisite: admission into the CANDEL EdD program or consent of instructor. Human resource and legal concepts and activities governing decisions of school leaders in public education. Attention to theory, application, and practice of personnel and risk management, curriculum, student services, teacher rights, torts, student rights. - I. (I.)

285C. Educational Finance, Human Resources, and Law: Human Resources and Personnel (4)

Lecture/discussion-4 hours; fieldwork; project. Prerequisite: admission into the CANDEL EdD program or consent of instructor. Human resource management research and theory and for applying human resource techniques in the educational setting. - III.

286A. Organizational Structures and Change: Data-Driven Decision-Making for

Lecture/discussion—4 hours; fieldwork; project. Pre-requisite: admission into the CANDEL EdD program or consent of instructor. Students use and examine multiple sources of information and data and trends found in making quality decisions to improve P-12/ community college settings and addressing problems at sites. Students learn limitations of these data sources. - I. (I.)

286B. Organizational Structures and Change: Curriculum & Instruction Issues in **Education (4)**

Lecture/discussion-4 hours; fieldwork; project. Prerequisite: admission into the CANDEL EdD program or consent of instructor. This course addresses the historical development of various curriculum and instructional methodologies found in public and private schools and colleges, and their impact on current curriculum development and reform efforts at the national, state and local level.—II. (II.)

287. CANDEL Dissertation Seminars (6-12)

Prerequisite: admission into the CANDEL EdD program or consent of instructor. Third year seminars encourage students to complete dissertations within the year. Cohort members meet together in every three-week meetings with faculty members and share their writing, data collection, analysis, discussion of results, development of conclusions/implications. May be repeated nine times for credit until comple tion of dissertation. (S/U grading only.)—I, II, III. (I,

287D. CANDEL Dissertation (6-12)

Prerequisite: passing of qualifying exams in CAN-DEL program and advancement to candidacy; consent of instructor. Cohort members continue to meet with faculty and share their writing, data collection, analysis, development of conclusions/implications. May be repeated nine times for credit until completion of dissertation. (S/U grading only.)—I, II, III. (I,

291. Proseminar in Education (4)

Seminar—3 hours; fieldwork—3 hours. Prerequisite: admission to the Ph.D. graduate program in Education. Professional induction into educational research field and Graduate Group in Education at UC Davis. Introduction to landscape of educational research methodologies, purposes and theories. Analysis of debates within field. Investigation of K-12 educational outreach efforts at UC Davis.—I. (I.) Ambrose

292. Special Topics in Education (2-4)

Variable - 2-4 hours. Prerequisite: completion of doctoral core courses in Education or consent of instructor. Selected topics in education. Designed to facilitate preparation for the qualifying examination or dissertation. Students will critically analyze scholarly work including their own works in progress. May be repeated for credit.—I, II, III. (I, II, III.)

294. Special Topics in Science, Agriculture and Mathematics Education (4)

Seminar — 3 hours; term paper; project. Prerequisite: graduate standing. Critical study of special topics of research relevant to science, agricultural and mathematics education. Students and faculty present workin-progress on a major research project, and critically analyze and discuss one another's developing scholarly work. May be repeated for credit when topic differs. Offered in alternate years. —I, II, III. (I,

294. Special Topics in Science, Agriculture and Mathematics Education (4)

Seminar—3 hours; term paper; project. Prerequisite: graduate standing. Critical study of special topics of research relevant to science, agricultural and mathematics education. Students and faculty present workin-progress on a major research project, and critically analyze and discuss one another's developing

scholarly work. May be repeated for credit when topic differs. Offered in alternate years. - I, II, III. (I,

298. Group Study (1-5)

(S/U grading only.)

299. Individual Study (1-6)

Independent study - 3-18 hours. Individual study under the direction of a faculty member. (S/U grading only.)

299D. Research (1-12)

Independent study—3-36 hours. Research for individual graduate students. (S/U grading only.)

Professional Courses

300. Reading in the Elementary School (4)

Lecture - 3 hours; fieldwork - 3 hours. Prerequisite: graduate standing. Principles, procedures, and curriculum materials for teaching of reading. Includes decoding skills with a special emphasis on phonics, comprehension skills, study skills, and reading in the content areas. - I. (I.)

301. Reading in the Secondary School (4)

Discussion-4 hours. Prerequisite: graduate standing, enrollment in the secondary credential program, or consent of instructor. Principles, procedures, and materials to help secondary school teachers improve the reading competence of students. Strategies for enhancing learning through reading and writing in all disciplines, with special attention to linguistically diverse populations. - I, II. (I, II.)

302. Language Arts in the Elementary School (2)

Lecture - 2 hours. Prerequisite: graduate standing. Principles, procedures, and materials for the teaching of oral and written expression, listening skills, drama, and children's literature in elementary

303. Art Education in the Elementary School (2)

Lecture/discussion - 2 hours. Prerequisite: admission to multiple subject credential program. Understanding the principles of education in the arts through participation. Development of concepts, introduction to media, and techniques suitable for the elementary school. Curriculum, pedagogy, and materials for teaching the visual and performing arts curriculum in elementary schools.—III. (III.)

304A. Teaching in the Elementary Schools (2-18)

Lecture/discussion - 2 hours; fieldwork - 9-48 hours. Prerequisite: acceptance into a teacher education program. Supervised teaching in regular classrooms in elementary schools. Selection and organization of teaching materials. Introduction to techniques of diagnosing school achievement of children. - I. (I.)

304B. Teaching in the Elementary Schools (2-18)

Lecture/discussion - 2 hours; fieldwork - 9-48 hours. Prerequisite: acceptance into a teacher education program. Supervised teaching in regular classrooms in elementary schools. Current conceptions of elementary school curriculum, emphasis on contributions from the social, biological, and physical sciences. Emphasis on effective teaching methods. -II. (II.)

304C. Teaching in the Elementary Schools (2-18)

Lecture/discussion - 2 hours; fieldwork - 9-48 hours. Prerequisite: acceptance into a teacher education program. Supervised teaching in regular classrooms in elementary schools. Evaluation of teaching materials including instructional technology. Current elementary school curriculum with emphasis on contributions from fine arts and humanities. - III. (III.)

305A. Teaching in the Middle Grades (5-8)

Lecture - 2 hours; seminar - 2 hours; student teaching-15-30 hours. Prerequisite: acceptance into a teacher education program. Supervised teaching in regular or special education classrooms in middle

grades. Current conceptions of the middle-grades curriculum with emphasis on social, biological, and physical sciences. Effective teaching methods.

306A-306B-306C. Teaching in the Secondary Schools (2-18)

Lecture/discussion - 2 hours; fieldwork - 9-48 hours. Prerequisite: acceptance into a teacher education program. Supervised teaching in regular secondary classrooms. Techniques for classroom communications; constructing goals and objectives; assessment of learning; special problems of adolescents; instructional technology.—I-II-III. (I-II-III.)

307. Methods in Elementary Science (2)

Lecture/discussion-2 hours. Prerequisite: acceptance into teacher education program. Principles, procedures, and materials for teaching the biological and physical sciences in elementary schools.—I. (I.) Passmore, Trexlerx

308. Methods in Elementary Social Studies

Lecture/discussion-2 hours. Prerequisite: acceptance into a teacher education program. Principles, procedures, and materials for teaching history and the social sciences in elementary schools.—III. (III.)

309. The Teaching of Mathematics, K-9 (3)

Lecture/discussion-3 hours. Prerequisite: acceptance into a teacher education program. Mathematics curriculum and teaching methods for K-9 reflecting the needs of California's diverse student populations. — II. (II.) Mendle

322A. Pedagogical Preparation for Secondary Social Science I (3)

Lecture/discussion-2 hours; discussion-1 hour. Prerequisite: acceptance into a teacher education program. Introduction to teaching methods and curriculum approaches for secondary social science teaching. State and national curriculum standards; application of learning theory to effective instruction; interdisciplinary teaching and active learning approaches; effective teaching strategies for English Learners.—I. (I.) Rosa

322B. Pedagogical Preparation for Secondary Social Science II (3)

Lecture/discussion-1 hour; discussion-2 hours. Prerequisite: course 322A. Intermediate teaching methods and curriculum approaches for secondary social science teaching. Interdisciplinary approaches to teaching major themes across social science content areas; teaching potentially controversial social science topics; teaching democratic civic values, student assessment and evaluation.—II. (II.) Rosa

323A. Physical Science in the Secondary School (3)

Laboratory/discussion-2 hours; discussion/laboratory-1 hour. Prerequisite: acceptance into a teacher education program. Activity-based overview of concepts and processes in secondary school physical sciences. Emphasis upon philosophy, appropriate teaching methods, materials, assessment and evaluation of learning. — I. (I.) Passmore

323B. Life Sciences in the Secondary School (3)

Laboratory/discussion-2 hours; discussion/laboratory-1 hour. Prerequisite: acceptance into a teacher education program. Activity-based overview of concepts and processes in secondary school biology and life sciences. Emphasis on philosophy, appropriate teaching methods, materials, assessment and evaluation of learning, and issues.—II. (II.) Pomeroy

324A. Methods and Technology in Secondary Mathematics I (4)

Lecture/discussion—4 hours. Prerequisite: admission into a teacher education program or consent of instructor. Introduction to methods and curriculum for teaching mathematics at the secondary level. Introduction to applications of computer technology as instructional, intellectual, and communication tools for mathematics teachers.—I. (I.) Bellman

324B. Methods and Technology in Secondary Mathematics II (4)

Lecture/discussion-4 hours. Prerequisite: admission into a teacher education program or consent of instructor. Expansion of methods and curriculum for teaching mathematics at the secondary level. Intermediate applications of computer technology as instructional, intellectual, and communication tools in mathematics teaching.—II. (II.) Bellman

325. Research and Methods in Secondary English Language Arts (4)

Discussion-4 hours. Prerequisite: admission to graduate standing or credential program in Education or consent of instructor. Research on teaching and learning in the language arts. Principles, procedures and materials for improving the writing, reading and oral language of secondary students, with special attention to students from culturally and linguistically diverse populations. — I. (I.) Holmes

326. Teaching Language Minority Students in Secondary Schools: Methods and Research (4)

Seminar — 3 hours; field work — 3 hours. Prerequisite: graduate standing in Education of consent of instructor. Research on principles, procedures and curricula for teaching discipline-specific concepts to languageminority students in secondary schools. Second-language acquisition principles and instructional strate-

327A. Teaching Methods for Secondary Foreign Language/Spanish, Part I (3)

Lecture—3 hours. Prerequisite: acceptance into a teacher education program or consent of instructor. Introduction to methods for teaching Spanish as a foreign and a heritage language in secondary schools. State and National Standards. Theories on second language acquisition. Lesson plans. Effective teaching strategies and class management. Open to Graduate Teaching Credential students.

327B. Teaching Methods for Secondary Foreign Language/Spanish, Part II (3)

Lecture-3 hours. Prerequisite: course 327A or consent of instructor. Continuation to methods for teaching Spanish as a foreign and a heritage language in secondary schools. Research and practice on foreign and heritage language teaching. Expansion of effective teaching strategies and class management.
Open to Graduate Teaching Credential students.

398. Group Study (1-5)

(S/U grading only.)

399. Individual Study (1-5)

(S/U grading only.)

Education (A Graduate Group)

Cynthia Passmore, Chairperson of the Group

Group Office. 106 School of Education Building (530) 752-7259; Fax (530) 754-6672; phdeduadvising@ucdavis.edu

Jamal Abedi, Ph.D., Professor (Education) Rebecca C. Ambrose, Ph.D., Associate Professor (Education)

Shannon Anderson, Ph.D., Professor (Graduate School of Management)

Steven Z. Athanases, Ph.D., Professor (Education) Heidi Ballard, Ph.D., Assistant Professor (Education) Robert Bayley, Ph.D., Professor (Linguistics)

Angela Booker, Ph.D., Assistant Professor (Education)

Brenda Bryant, Ph.D., Professor (Human Development)

Scott E. Carrell, Ph.D., Associate Professor (Economics)

Cynthia Carter Ching, Ph.D., Associate Professor (Education)

Cecília Colombi, Ph. D., Professor (Spanish)

Adela de la Torre, Ph.D., Professor (Chicano/a Studies)

Kerry Enright, Ph.D., Assistant Professor (Education) Nancy Erbstein, Ph.D., Assistant Research Scientist (Human and Community Development)
Christian Faltis, Ph.D., Professor, Director of Teacher

Education (Education)

Dana Ferris, Ph.D., Professor, Associate Director for Lower-Division Writing (University Writing Project)
Barbara Goldman, Ph.D., Associate Director of
Teacher Education (Education)

Cristina Gonzalez, Professor (Spanish and Education)

Joyce Gutstein, Environmental and Community Outreach Director, Environmental Leaders Program (Public Service Research Program)

Randi Hagerman, M.D., Professor, Medical Director (M.I.N.D. Institute)

Paul Heckman, Ph.D., Professor and Associate Dean (Education) Suad Joseph, Ph.D., Professor (Anthropology)

Susan Kaiser, Ph.D., Professor (Textiles & Clothing, Women and Gender Studies)

Michal Kurlaender, Ed.D., Assistant Professor (Education)

Harold Levine, Ph.D., Professor and Dean (Education)

Lee Martin, Ph.D., Assistant Professor (Education) Ann Mastergeorge, Ph.D., Developmental and Educational Psychologist (M.I.N.D. Institute); Associate Adjunct Professor (Human and

Community Development)
Julia Menard-Warwick, Ph.D., Associate Professor

Barbara J. Merino, Ph.D., Professor (Education) Lisa M. Soederberg Miller, Ph.D., Associate Professor; Director, Adult Development Lab

(Human and Community Development)
Marco Molinaro, Ph.D., Chief Education Officer, Center for Biophotonics Science and Technology

Peter C. Mundy, Ph.D., Professor (Education) Adrienne Nishina, Ph.D., Assistant Professor (Human and Community Development) Patsy Eubanks Owens, Professor, Chair of

Landscape Architecture (Environmental Design) Marianne Page, Ph.D., Associate Professor (Economics)

Cynthia Passmore, Ph.D., Associate Professor (Education)

J. Richard Pomeroy, Ph.D., Lecturer, Supervisor of Teacher Education (Education)

Wendell Potter, Ph.D., Senior Lecturer Emeritus (Physics)

Refugio Rochin, Ph.D., Professor Emeritus (Chicano/ a) Studies, Agricultural & Resource Economics) Gloria Rodriguez, Ph.D., Assistant Professor (Education)

Heather M. Rose, Ph.D., Associate Professor (Education) Tom Sallee, Ph.D., Professor (Mathematics)

Julie Schweitzer, Ph.D., Associate Professor (Psychiatry & Behavioral Sciences); Director (ADHD Program, M.I.N.D. Institute)

Kimberlee A. Shauman, Ph.D., Associate Professor (Sociology)

Christopher Thaiss, Ph.D. (Clark Kerr Presidential Chair and Director, University Writing Program) Ross Thompson, Ph.D., Professor (Psychology) Thomas Timar, Ph.D., Professor (Education) Cary Trexler, Ph.D., Associate Professor (Education) Yuuko Uchikoshi Tonkovich, Ed.D., Assistant Professor (Education)

Stefano Varese, Ph.D., Professor (Native American Studies)

Kenneth Verosub, Ph.D., Professor (Geology)
Jon Wagner, Ph.D., Professor Emeritus (Education) Richard Walters, Professor Emeritus (Computer Science)

Karen Watson-Gegeo, Ph.D., Professor (Education) Tobin White, Ph.D., Assistant Professor (Education) Carl Whithaus, Ph.D., Professor, Director

(University Writing Program)

I. Phillip Young, Ph.D., Professor (Education)

Graduate Study. The Graduate Group in Education offers programs of study and research leading to the Ph.D. degree. Students may concentrate in; language, literacy and culture; learning and mind sciences; mathematics education; school organization and educational policy; or science and agriculture education. Students may also combine these fields of study with designated emphasis areas such as Critical Theory; Second Language Acquisition, Women's Studies, and Writing, Rhetoric, and Composition Studies, Detailed information regarding graduate study may be obtained by writing the Graduate Coordinator or at http://education.ucdavis.edu/programs/ PhDoverview.html.

Preparation. Students should have earned a Bachelor's or M.A. degree or the equivalent in a discipline relevant to their proposed emphasis program. For example, students applying for the mathematics education emphasis should have earned the B.A. or M.A. or M.A.T. degree in mathematics or mathematics education; students applying to the educational psychology program should have a B.A. or M.A. in psychology or educational psychology.

Graduate Advisers. Jamal Abedi, Michal Kurlaender, Lee Martin

Graduate Coordinator. Mary M. Reid Courses. See Education, School of, on page 230.

Education Abroad Center

Eric Schroeder, Ph.D., Michelle Yeh, Ph.D., Faculty

Education Abroad Center 207 Third Street, Suite 130 (530) 297-4633; Fax (530) 297-4695; eacucd@ucdavis.edu, http://eac.ucdavis.edu

The opportunity to study abroad is one of the richest educational experiences a student can have. When students return from study abroad in places like Italy or Hong Kong, they describe their time abroad as an experience that changed their lives. Students study abroad to see the world, to study their academic interests in a global context, to learn a language, to prepare for a job in the global economy and to add distinction to an application for graduate or professional school.

The Education Abroad Center (EAC) can help students decide which program is best for them, whether to study abroad for a summer, quarter, semester or full year and when to go abroad (freshman through senior years). The EAC Coordinators also participate in freshman seminars, offer financial aid workshops and can advise on programs that have internship opportunities. The EAC also administers the Global and International Studies (GIS) minor, which is sponsored by the Humanities Program in the College of Letters and Science.

The EAC is home to the University of California Education Abroad Program (EAP), to UC Davis Quarter Abroad and to UC Davis Summer Abroad. The EAC also provides advising for students interested in non-UC "independent" programs and administers the Non-UC Study Abroad (NUCSA) leave program. Finally, the EAC advises and provides student services for international EAP Reciprocity students.

UC Education Abroad Program (EAP)

Michelle Yeh, Ph.D., Faculty Director Education Abroad Center 207 Third Street, Suite 120 (530) 297-4633; Fax (530) 297-4695; http://eac.ucdavis.edu

The UC Education Abroad Program (EAP) is one of the premiere study abroad programs in the nation. EAP offers international study programs in association with nearly 140 host universities and institutions

in some 32 countries around the world. Participating students remain registered at UC Davis while studying abroad and receive full academic credit for their work. EAP students maintain their financial aid and scholarship eligibility while abroad. EAP has study abroad opportunities for undergraduates at all class levels as well as for qualified graduate students who have completed at least one full year of graduate work and have the support of their graduate program and graduate dean.

EAP offers year, semester, quarter, and summer programs for all majors. Over 50% of the programs are offered in English, while several programs allow students to learn a language while experiencing the culture first hand. Some programs include the possibility of internships or field research. In most cases, students attend courses taught by the faculty of the host institution.

UC faculty members serve as directors at most Study Centers abroad, providing in-country academic advising to students during their program. Full UC credit is granted for courses satisfactorily completed, and courses and grades are recorded on official UC transcripts. With careful planning, most EAP students make normal progress toward their UC degrees, even those students who study abroad for a full year. With approval of their major or college advisers, students may earn credit towards their major, minor and general education requirements.

Graduation Requirements. All prospective applicants, particularly students who intend to study abroad during their senior year, should carefully plan their course programs for Davis and abroad in order to satisfy university, college, and major/minor requirements for their degree.

Although units and grade points earned in the EAP are incorporated into the University transcript and GPA, departments and majors retain the right to determine which EAP courses will be accepted in satisfaction of major and minor requirements.

All degree candidates must meet the University residence requirement. Recognizing the special value of study abroad, the faculty have approved two exceptions to the usual residence requirement for students participating in the Education Abroad Program:

· Students planning to graduate immediately upon completion of participation in the EAP may satisfy the University residence requirement by completing at least 35 of their final 45 units on the Davis campus preceding entry into the EAP,

 Students who have not finished all of their degree requirements following completion of their participation in the EAP may satisfy the University residence requirement by completing at least 35 units, including at least 12 units after returning from the EAP, on the Davis campus within the final 90 units earned toward the degree. With this option, as many as 55 units taken abroad may be applied toward the unit requirement for gradu-

Students should consult with their college Dean's office early during the EAP planning process for information on the university residence requirement.

Students may satisfy GE requirements while on EAP, but should consult with the Education Abroad Center and their college Dean's office prior to departure for information on the certification process.

Students may participate in EAP provided that (1) they will not exceed 225 units prior to their departure and (2) that all their degree requirements have been fulfilled either before they leave campus or during their time on EAP. Participants may only return to campus from EAP to complete any outstanding degree requirements provided that they can do so within 225 units

Participants in programs that conclude in May or June who satisfy all degree requirements while abroad and expect to graduate upon completion of the year abroad should file for candidacy to receive their degree in September; candidacy filing dates

are established by the Office of the University Registrar. In most cases, transcripts from abroad may not be received in time to be posted on the student' Davis transcript for EAP returnees to be included on the June degree list. Such returning students may register to participate in the June commencement ceremony; however, their graduation date will be in September. Participants in programs that conclude in November or December should file for candidacy to receive their degree in March. Such returning students may be able register to participate in either the December or subsequent June commencement ceremony. Their graduation date will be in March.

UC Davis Faculty-Led Programs Abroad

UC Davis Quarter Abroad and UC Davis Summer Abroad offer faculty-led study-abroad programs that provide students with unique opportunities to travel and study in over 25 countries. Participants remain registered UC Davis students while abroad and receive UC Davis units for their academic work. Open to students from any major, these programs allow students to choose courses from a wide range

Programs range from four-week summer offerings to quarter-long options. All programs allow students to experience the host country's unique culture through co-curricular activities, such as day-trips to surrounding areas, museum tours, and theatre visits.

Financial aid and scholarships apply. Students may participate in Quarter Abroad or Summer Abroad as early as their freshman year, or as late as their senior year. Applicants must have a 2.000 GPA, be in good academic and disciplinary standing, and must fulfill any prerequisites specific to the program courses.

Some courses completed through Quarter Abroad or Summer Abroad can apply specifically towards the Global and International Studies minor. The minor is designed for students who want to create an emphasis on a global topic, including regional, historical, political, ethnic or other issues.

In preparation for Quarter Abroad and/or Summer Abroad, students are urged to take Education Abroad Program 90X or 190X.

UC Davis Quarter Abroad

Eric Schroeder, Ph.D., Faculty Director 207 Third Street, Suite 120 (530) 297-4633; Fax (530) 297-4695; quarterabroad@ucdavis.edu; http://quarterabroad.ucdavis.edu

Academic Focus. Students can earn 12-22 quarter units through 3-5 courses taken abroad. The UC Davis faculty leader teaches at least one of the courses of the program, while the rest are led by adjunct faculty of the host country. Students may be able to apply earned units towards their major, minor, language, or general education requirements. In addition to language courses or other core courses, select programs also allow students the opportunity to earn units through an internship com-

UC Davis Summer Abroad

Eric Schroeder, Ph.D., Faculty Director 207 Third Street, Suite 220 (530) 757-8308; Fax (530) 297-7142; summer-abroad@ucdavis.edu; http://summer-abroad.ucdavis.edu

Academic Focus. Students earn 8 quarter units through two courses taken abroad. All courses are taught by UC Davis faculty with select supplemental lectures provided by local experts. Planned group activities and field trips enhance classroom instruction. Students may be able to apply earned units towards their major, minor, or general education requirements. Programs allow students to complete coursework in English in a wide variety of non-English-speaking locations.

Courses in Education Abroad Program (EAP)

Lower Division Course

90X. International Education Seminar (1)

Seminar-1 hour. Prerequisite: open to lower division applicants for EAP or UC Davis study abroad and international internship programs. Séminar examines the academic, cultural, and personal issues of study abroad, including academic programs abroad, country-specific history and culture, cross-cultural experiences, culture shock, racial and gender issues. May be repeated for credit. (P/NP grading only.)—I, İII. (I, III.)

Upper Division Courses

190X. International Education Seminar (1)

Seminar - 1 hour. Prerequisite: open to upper division applicants for EAP or UC Davis study abroad and international internship programs. Seminar examines the academic, cultural, and personal issues of study abroad, including academic programs abroad, country-specific history and culture, cross-cultural experiences, culture shock, racial and gender issues. May be repeated for credit. (P/NP grading only.)—I, İII. (I, III.)

192. Internship in Education Abroad (1-4)

Internship - 3-12 hours. Prerequisite: participation in a study abroad program. Internship related to education abroad. May take place at or away from the university. May be repeated for up to 12 units of credit. (P/NP grading only.) – I, II, III, IV. (I, II, III, IV.)

Endocrinology (A Graduate Group)

Judith Turgeon, Ph.D., Chairperson of the Group Group Office. 3301 Tupper Hall; Department Physiology and Membrane Biology; Human Physiology (530) 752-3230

Faculty

Thomas Adams, Ph.D., Professor (Animal Science) Marylynn Barkley, Ph.D., Associate Professor, Emeritus (Neurobiology, Physiology, and Behavior

Chris Calvert, Ph.D., Professor (Animal Science) Ernest S. Chang, Ph.D., Professor (Bodega Marine Laboratory)

Bruce Hammock, Ph.D., Professor (Entomology) Academic Senate Distinguished Teaching Award Robert Hansen, Ph.D., Professor Emeritus

(Molecular Biosciences) Larry Hjelmeland, Ph.D., Professor (Ophthalmology) Bill L. Lasley, Ph.D., Professor Emeritus (Public Health and Reproduction)

Stanley Meizel, Ph.D., Professor Emeritus (Cell Biology and Human Anatomy) James R. Millam, Ph.D., Associate Professor

(Animal Science) Marty Privalsky, Ph.D., Professor (Microbiology) Jan F. Roser, Ph.D., Professor (Animal Science) Judith Stern, Sc.D., Professor (Nutrition) Dennis M. Styne, M.D., Professor Emeritus

(Pediatrics)

Judith L. Turgeon, Ph.D., Professor (Internal Medicine)

Donal A. Walsh, Ph.D., Professor Emeritus (Biological Chemistry)
Dorothy E. Woolley, Ph.D., Professor Emeritus

(Neurobiology, Physiology, and Behavior)

Courses in Endocrinology (EDO) Graduate Courses

220. Endocrinology Literature Critique (1)

Discussion - 1 hour. Prerequisite: consent of instructor. Critical reading and evaluation of current original publications in endocrinology. Selected papers

will be presented and discussed in detail by faculty and students. May be repeated for credit. (S/U grading only.) — I, II. (I, II.) Turgeor

240. Biochemical Endocrinology (3)

Lecture - 3 hours. Prerequisite: graduate standing or consent of instructor. Examination of recent advances in biochemical endocrinology and molecular and cell biology of endocrine systems with emphasis on processes of hormone and receptor synthesis, second messenger phenomena, and hormonal control of gene expression.—III. (III.) Adams

298. Group Study (1-5)

Prerequisite: consent of instructor.

299. Research (1-12)

(S/U grading only.)

Endocrinology and Metabolism

See Internal Medicine (IMD), on page 400.

Engineering

(College of Engineering)

Enrique J. Lavernia, Ph.D, Dean

Bruce Hartsough, Ph.D., Associate Dean-Academic Personnel and Planning

Karen A. McDonald, Ph.D., Associate Dean-Research and Graduate Studies

Jean S. VanderGheynst, Ph.D, Associate Dean-Undergraduate Studies

Bruce White, Ph.D. Executive Associate Dean

College Office. 1050 Kemper Hall (530) 752-1979;

http://engineering.ucdavis.edu http://www.facebook.com/UCDEngineering

Undergraduate Study

The college has eight departments:

Applied Science Engineering, Biological and Agricultural Engineering, Biomedical Engineering, Chemical Engineering and Materials Science, Civil and Environmental Engineering, Computer Science Engineering, Electrical and Computer Engineering, Mechanical and Aerospace Engineering.

Graduate Study

Graduate degrees (M.S., M.Engr., Ph.D., D.Engr.) are offered in the following engineering disciplines:

Applied Science

Biological Systems Engineering Biomedical Engineering

Chemical Engineering

Civil and Environmental Engineering

Computer Science

Electrical and Computer Engineering Materials Science and Engineering

Mechanical and Aerospace Engineering Transportation Technology and Policy

The Major Programs

Thirteen majors, leading to the B.S. degree, are open to students.

Aerospace Science & Engineering Biochemical Engineering Biological Systems Engineering Biomedical Engineering Chemical Engineering

Civil Engineering

Computer Engineering

Computer Science and Engineering

Electrical Engineering

Electronic Materials Engineering (not accepting new students)

Materials Science and Engineering

Mechanical Engineering

Optical Science and Engineering (not accepting new students)

Two combined majors are offered leading to the B.S.

Chemical Engineering/Materials Science and Engineering

Mechanical Engineering/Materials Science and Engineering

Minor Programs

The College of Engineering offers nine undergraduate minors:

Biomedical Engineering (Department of Biomedical Engineering)

Computational Biology (Department of Computer Science)

Construction Engineering and Management (Department of Civil and Environmental Engineering)

Energy Science and Technology (Department of Biological and Agricultural Engineering)

Energy Policy (Department of Biological and Agricultural Engineering)

Energy Efficiency (Department of Biological and Agricultural Engineering)

Materials Science (Department of Chemical Engineering and Materials Science)

Optical Science and Engineering (Department of Applied Science) (not accepting

Sustainability in the Built Environment (Department of Civil and Environmental Engineering)

Courses in Engineering (ENG)

Students are encouraged to carefully adhere to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

Lower Division Courses

1. Introduction to Engineering (1)

Lecture - 1 hour. Open to first year students only. Introduction to the role of engineers in the acquisition and development of engineering knowledge, the differences and similarities among engineering fields, and the work ethic and skills required for engineering. (P/NP grading only.) GE credit: SciEng | SE.—I, II. (I, II.) VanderGheynst

4. Engineering Graphics in Design (3)

Lecture — 2 hours; laboratory — 3 hours. Engineering design, descriptive geometry, pictorial sketching, computer-aided graphics, and their application in the solution of engineering problems. GE credit: SE, VL.—I, II. (I, II) Schaaf

6. Engineering Problem Solving (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Mathematics 16A or 21A, C- or above; Mathematics 16B or 21B (may be taken concurrently). Methodology for solving engineering problems Engineering computing and visualization based on MATLAB. Engineering examples and applications. GE credit: SciEng | QL, SE.—I, II, III. (I, II, III.)

7. Technology and Culture of the Internet (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: basic computer experience recommended. Technology and culture of networked computing and the

Internet. Topics include the history and development of networked computing; Internet architecture and services; basics of Web page design and hypertext markup language; political, social, cultural, economic and ethical issues related to the Internet. GE credit: SciEng | SE.-II

10. The Science Behind the Technology in Our Lives (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: high school algebra. Understanding of how the technology in our lives works using only basic concepts and rudimentary mathematics. GE credit: SciEng, Wrt | SE, SS.—I, II. Baldis, Orel, Parikh

11. Issues in Engineering (1)

Lecture - 1 hour. Prerequisite: Participation in the MESA Engineering Program or consent of instructor. Designed to broaden student's understanding of the engineering profession, its methods, principles, design and development process, career opportunities, and professional resources. - I. (I.) Vander-

17. Circuits I (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Mathematics 22A, C- or better; Mathematics 22B (may be taken concurrently); Physics 9C, C- or better. Basic electric circuit analysis techniques, including electrical quantities and elements, resistive circuits, transient and steady-state responses of RLC circuits, sinusoidal excitation and phasors, and complex frequency and network functions. GE credit: . SciEng | SE, VL.—I, III. (I, III.)

20. Introduction to Space Exploration: Understanding the Technological and **Environmental Challenges to Our** Exploration of the Solar System (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: high school level Algebra, Geometry, General Science (Physics and Chemistry). Introductory overview of the space environment. Discussion of space exploration technology including propulsion, orbital mechanics, and spacecraft engineering. GE credit: SciEng. — III. (III.) Harris

35. Statics (3)

Lecture - 2 hours; laboratory - 3 hours. Prerequisite: grade of C- or better in Physics 9A; Mathematics 21D (may be taken concurrently); Civil and Environmental Engineering 19 or Engineering 6 recommended. Force systems and equilibrium conditions with emphasis on engineering problems. GE credit: SE. — I, İİ, III. (I, II, III.)

45. Properties of Materials (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: grade of C- or better in Mathematics 16C or 21C; grade of C- or better in Chemistry 2A. Introductory course on the properties of engineering materials and their relation to the internal structure of materials. GE credit: Wrt | QL, SE, SL, WE.-I, II, III. (I, II,

45H. Honors Properties of Materials (1)

Discussion - 1 hour. Prerequisite: enrollment in the Materials Science and Engineering Honors Program; concurrent enrollment in course 45 required. Examination of special materials science and engineering topics through additional readings, discussions, collaborative work, or special activities which may include projects, laboratory experience or computer simulations. Open only to students in the Materials Science and Engineering Honors program.—II. (II.)

98. Directed Group Study (1-4)

Restricted to College of Engineering students only. (P/NP grading only.) May be repeated for credit up to 3 times.

Upper Division Courses 100. Electronic Circuits and Systems (3)

Laboratory—3 hours; lecture—1 hour; discussion—1 hour. Prerequisite: course 17, C- or better. Introduction to analog and digital circuit and system design through hands on laboratory design projects. Stu dents who have completed Électrical and Computer Engineering 100 may receive only 1.5 units of credit. GE credit: SciEng | SE, VL.-II, III. (II, III.)

102. Dynamics (4)

Lecture-4 hours. Prerequisite: grade of C- or better in Engineering 35; grade of C- or better in Mathematics 22B. Open to College of Engineering students only. Kinematics and kinetics of particles, systems of particles, and of rigid bodies; application of these topics are applied to engineering problems. Only two units of credit allowed to students who have previously taken course 36. GE credit: QL, SE, VL. – İ, II, III. (I, İI, III.) Hess, Schaaf, Velinsky

103. Fluid Mechanics (4)

Lecture-4 hours. Prerequisite: grade of C- or better in Engineering 35, Mathematics 22B; Engineering 102 (may be taken concurrently). Open to students in the College of Engineering and Hydrology Majors. Fluid properties, fluid statics, continuity and linear momentum equations for control volumes, flow of incompressible fluids in pipes, dimensional analysis and boundary-layer flows. Not open for credit to students who have completed Chemical Engineering 150A. GE credit: SE.—I, II, III. (I, II, III.)

104. Mechanics of Materials (4)

Lecture - 4 hours. Prerequisite: grade of C- or better in Engineering 35 and Mathematics 22B. Uniaxial loading and deformation. Uniaxial loading and deformation. General concepts of stress-strain-temperature relations and yield criteria. Torsion of shafts. Bending of beams. Deflections due to bending. Introduction to stability and buckling. GE credit: QĽ, SE.—I, II, III. (I, II, III.)

104L. Mechanics of Materials Laboratory

Laboratory-3 hours. Prerequisite: course 104. Experiments which illustrate the basic principles and verify the analysis procedures used in the mechanics of materials are performed using the basic tools and techniques of experimental stress analysis. GE credit: SE.GE credit: SE.-II, III. (II, III.)

105. Thermodynamics (4)

Lecture - 4 hours. Prerequisite: grade of C- or better in Mathematics 22B and Physics 9B. Open to College of Engineering students only. Fundamentals of thermodynamics: heat energy and work, properties of pure substances, First and Second Law for closed and open systems, reversibility, entropy, thermodynamic temperature scales. Applications of thermodynamics to engineering systems. GE credit: QL, SE, VL. — I, II, III. (I, II, III.)

106. Engineering Economics (3)

Lecture—3 hours. Prerequisite: upper division standing in Engineering. The analysis of problems in engineering economy; the selection of alternatives; replacement decisions. Compounding, tax, origins and cost of capital, economic life, and risk and uncertainty are applied to methods of selecting most economic alternatives. GE credit: QL, SE, SL, SS, VL.—II. (II.) Hartsough, Slaughter

111. Electric Power Equipment (3)

Lecture—2 hours; laboratory—3 hours. Prerequisite: grade of C- or better in course 17. Principles of AC and DC electric motors and generators, their control systems and power sources. Selection of electric power equipment components based on their construction features and performance characteristics. Offered irregularly. GE credit: QL, SE, VL, WE. – Delwiche Hartsough

121. Fluid Power Actuators and Systems (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: grade of C- or better in Engineering 100 and Engineering 102. Hydraulic and pneumatic systems with emphasis on analysis and control of actuators. Design of hydraulic and pneumatic systems, specification and sizing of components, and selection of electro-hydraulics/electro-pneumatics, servo valves, and closed loop systems to solve basic control problems. Offered in alternate years. GE credit: QL, SE, SL, VL, WE. - (III.) Rosa

122. Introduction to Mechanical Vibrations

Lecture — 4 hours. Prerequisite: grade of C- or better in Engineering 102. Free and forced vibrations in lumped-parameter systems with and without damping; vibrations in coupled systems; electromechanical analogs; use of energy conservation principles. GE credit: QL, SE.—I. (I.) Hubbard

160. Environmental Physics and Society (3)

Lecture - 3 hours. Prerequisite: Physics 9D, 5C, or 10 or 1B and Mathematics 16B or the equivalent. Impact of humankind on the environment will be discussed from the point of view of the physical sciences. Calculations based on physical principles will be made, and the resulting policy implications will be considered. (In the College of Engineering, students may receive only one unit of credit towards the Technical Electives requirement.) (Same course as Physics 160.) GE credit: SciEng or SocSci.—I. (I.) Jungerman, Craig

180. Engineering Analysis (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: C- or better required in Mathematics 21D, 22B; course 6 or Mechanical Engineering 5. Solutions of systems of linear and nonlinear algebraic equations; approximation methods; solutions of ordinary differential equations; initial and boundary value prob lems; solutions of partial differential equations of Elliptic, parabolic, and hyperbolic types; Eigen value problems. GE credit: SE.—I. (I.) Hafez

188. Science and Technology of Sustainable Power Generation (4)

Laboratory-3 hours; discussion-1 hour. Prerequisite: upper-division standing, Physics 7C or 9C.
Focus on scientific understanding and development of power generation that is the basis of modern society. Concentration on power generation methods that are sustainable, in particular, discussion of the most recent innovations. GE credit: SocSci | SS.-II. (II.) Hwana

190. Professional Responsibilities of **Engineers (3)**

Lecture - 3 hours. Restricted to upper-division students in the College of Engineering. Organization of the engineering profession; introduction to contracts, specifications, business law, patents, and liability; discussion of professional, ethical, societal, and political issues related to engineering. GE credit: SS.—II, III. (II, III.)

198. Directed Group Study (1-5)

May be repeated for credit up to 3 times. (P/NP grading only.) GE credit: SE.

Graduate Course

250. Technology Management (3)

Lecture — 3 hours. Prerequisite: consent of instructor. Management of the engineering and technology activity. Functions of design, planning, production, marketing, sales, and maintenance. Technological product life cycle. Research and development activity. Project planning and organization. Manufacturing issues. Case studies. —I. (III.)

Engineering: Applied Science

(College of Engineering)

Undergraduate Programs

The Department of Applied Science administers one undergraduate program: Optical Science and Engineering. Optical Science and Engineering is currently not accepting new students.

Mission Statement. The mission of the Department of Applied Science is to foster the use of fundamental mathematical and scientific knowledge to improve the quality of life. We provide the profession and academia with outstanding Computational Applied Science and Optical Science and Engineering graduates who advance both engineering practice and fundamental knowledge.

We challenge students to develop attributes that lead to professional growth throughout their careers: a sense of community, ethical responsibility, an expec-

tation for lifelong learning and continuing education, the ability to think independently and perform creatively and effectively in teams, and the ability to communicate effectively both orally and in written

Upon graduation, we challenge our students to understand the fundamentals and the application of mathematics and sciences, to have an ability to design, conduct, and understand experiments, as well as to analyze and interpret data; to have a proficiency in the design of components and systems to meet desired performance specifications; an ability to function effectively on multi-disciplinary teams; a proficiency in the use of techniques, skills, and modern engineering tools to identify, formulate, and solve scientific and engineering problems; an understanding of professional and ethical responsibility; a proficiency in oral and written communication; the broad education necessary to understand the impact of engineering solutions in a global and societal context; an ability to engage in graduate education and life-long learning; and a knowledge of contempo rary issues that have an impact on society and the

Optical Science and Engineering

The Optical Science and Engineering program is accredited by the Engineering Accreditation Commission of ABET; http://www.abet.org.

The Optical Science and Engineering major program is currently not accepting new students

Optical Science and Engineering encompasses the physical phenomena and technologies associated with the generation, transmission, manipulation, detection, and applications of light. The Optical Science and Engineering curriculum prepares students to design, analyze, and fabricate effective optical systems. Much of the nation's high-technology infrastructure is based upon optics and its applications, the most prominent being optical digital information transmission. Optical systems play a central role in nearly all aspects of modern life including health care and the life sciences, remote optical sensing, lighting, cameras, space, and national defense.

Students who complete the Optical Science and Engineering curriculum will receive a Bachelor of Science degree in Optical Science and Engineering.

Objectives. Our fundamental program objective is to educate students in the basics required for optical science and engineering: mathematics, sciences, and engineering. We educate students in the fundamentals of the science, analysis, and design of optical systems.

The Optical Science and **Engineering Major Program**

The Optical Science and Engineering major program is currently not accepting new students.

Students are encouraged to carefully adhere to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisite's have not been completed.

Lower Division Required Courses

•	
	UNITS
Applied Science Engineering 1	.4
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-22B	.6
Physics 9A-9B-9C-9D	19
Chemistry 2A	5
Civil Engineering 19 or Computer Science	
Engineering 30	.4
Engineering 17	
Engineering 45	.4
English 3 or University Writing Program 1	or
Comparative Literature 1, 2, 3, or 4, or	
Native American Studies 5	
Communication 1 or 3	
General Education electives	
Total Lower Division Units1()2
amou Division Dominad Courses	

Upper Division Required Courses

Applied Science Engineering 108A, 108B, 108L 115, 161A-B, 165, 166, and 167
Electrical and Computer Engineering 130A,
130B, and 135
Chemistry 110A4
Applied Science Engineering 137 or
Engineering 190
16 units from the following: Applied
Science Engineering 116, 169, 170, 172;
Biological Sciences 102; Chemistry 110B; Electrical and Computer Engineering 100,
133, 136 A-B, 140A, 140B, 150A, 150B
Technical electives
Minimum Upper Division Units 86

Minimum Units Required for Major..... 180 Optics electives and technical electives should be

chosen in consultation with a staff or faculty adviser.

The Minor in Optical Science and Engineering

The Optical Science and Engineering minor program is currently not accepting new students.

Minor Requirements:

UNITS

Applied Science 108A-B, 108L12 Select 8 units from: Applied Science 115, 165, 167, 169, 170, 172; Electrical and Computer Engineering 130A, 130B, 135; PHY 9D, 104A, 112, 115A, 115B, Chemistry 110A, 110B; Biological Sciences 102.....8

Total Units for the Minor......20

The Graduate Program in Applied Science

M.S. and Ph.D. in Applied Science Designated Ph.D. emphasis available in Biophotonics

http://www.das.ucdavis.edu (530) 754-8858

Graduate students in Applied Science at UC Davis use mathematics and physics to discover new knowledge at the dynamic intersections of engineering, mathematical, physical and biological sciences. Our mission is to advance the leading edge of research and create tools to serve industry, government and society.

We offer unusually rich research opportunities, with a high level of support for graduate students and demonstrated excellence in career prospects following graduation. Nanotechnology and biophotonics are particular areas of interest.

A major strength of the department is its access to the scientists and facilities of the Lawrence Livermore National Laboratory where many of our faculty have joint appointments. Nearly all the students use the laboratory for their thesis research, while the laboratory's facilities are some of the nation's best in atomic and molecular physics, computational physics, fusion technology, laser physics and nonlinear optics, materials science and condensed matter physics, plasma physics and scientific computing.

Generous financial support is available in the form of research assistantships, teaching assistantships, fellowships and financial aid.

Research Highlights:

- · Applied Biosciences & Biotechnology
- Atomic, Molecular and Laser Physics
- **Optical Sciences**
- Computational Science & Engineering
- Materials Science & Condensed Matter Physics
- Plasma Science & Fusion Engineering
- Computer Visualization and Communications

Research Facilities:

- Lawrence Livermore National Laboratory
- Lawrence Berkeley National Laboratory
- · Los Alamos National Laboratory
- · High-Power Microwave Source and Plasma Interaction Laboratory
- Far-Infrared and Millimeter Wave Magnetic Fusion Plasma Diagnostics
- Ultrafast Optics and Optoelectronics Facility
- Center for Biophotonics Science and Technology Complete Information on departmental website.

Courses in Engineering: Applied Science—Davis (EAD) Lower Division Courses

1. Optical Science and Engineering (4)

Lecture - 3 hours; discussion - 1 hour. Discussion and demonstrations of optical science and engineering principles and applications. Discussion of the opportunities and professional practice in the field including ethics and responsibilities.—I. (I.) Baldis,

2. Introduction to Applied Computational Science and Engineering (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 21C (may be taken concurrently), Physics 9A (may be taken concurrently), Computer Science Engineering 30. Role of mathematics in modeling physical, biological, and engineering phenomena. Pitfalls in computation. Limitations of models, numerical implementations, and quality assessment of computational data. Interactions among mathematics, algorithms, computer hardware and software, and selected scientific and engineering applications. GE credit: SE.-III. (III.)

90C. Research Group Conference for Lower Division Students (1)

Discussion - 1 hour. Prerequisite: lower division standing; consent of instructor. May be repeated for credit. (P/NP grading only.) - I, II, III. (I, II, III.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor and lower division standing. (P/NP grading only.)

99. Special Study for Lower Division Students (1-5)

Prerequisite: consent of instructor. (P/NP grading

Upper Division Courses 108A. Optics I (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Physics 9C and Mathematics 21D. Optical properties of matter, the nature of light, reflection, refraction, and other properties of light. Basic optical components, reflecting systems, and dispersive components. Geometrical optics, ray tracing, and optical aberrations. Optical instruments. The color of light. GE credit: QL, SE.-I. (I.) Baldis, Kolner

108B. Optics II (4)

Lecture — 3 hours; laboratory — 3 hours. Prerequisite: course 108A. Introduction to wave theory of optics, including Maxwell's equations and boundary condition, reflection and transmission coefficients, interference, diffraction, polarization, thin film and ultra thin film optics, and radiation from extended distributions of oscillating electric dipoles. Applications of wave optics. Not open for credit to students who have completed Physics 108 and 108L. GE credit: QL, SE. – II. (II.) Baldis, Kolner

108L. Optics Laboratory (4)

Discussion-1 hour; laboratory-6 hours; extensive problem solving-3 hours. Prerequisite: courses 108A, 108B. Practical applications of principles of geometrical and physical optics. Optical properties of materials, imaging, lens fabrication, interferometry, polarization, photometry, polarization, diffraction and propagation. Small course fee for materials. - III. (III.) Kolner

115. Numerical Solution of Engineering and Scientific Problems (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 6 or Computer Science Engineering 30, and Mathematics 22B. Computer problem solving, including error analysis, roots of equations, systems of equations, interpolation and data fitting, integration; initial value, boundary value, and eigenvalue ordinary differential equations. Emphasis on robust methods to solve realistic problems. GE credit: QL, SE.—I. II, III. (I, II, III.)

116. Computer Solution of Physical Problems (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 115. Application of computers to the solution of physical problems. Numerical solution of elliptic, parabolic, and hyperbolic partial differential equations. Eigenvalue problems. Monte Carlo methods. GE credit: SE.—III. Jensen, Cramer, Miller, Orel, Laub, McCurdy, Rodrigue

117A. Simulation and Modeling of **Deterministic Dynamical Systems (5)**

Lecture — 3 hours; laboratory — 3 hours; extensive problem solving—3 hours. Prerequisite: course 2, 116; Physics 104A. Numerical techniques for simulation and modeling of nonlinear deterministic systems. Examples from fluid, continuum, molecular mechanics, low dimensional nonlinear systems. Emphasis on error and stability through adaptive methods, evaluation of relationships between physical systems, the model equations, numerical implementation. GE credit: SE.—Jensen, McCurdy, Miller, Orel, Rocke

117B. Simulation and Modeling of Statistical Systems (5)

Lecture - 3 hours; laboratory - 3 hours; extensive problem solving. Prerequisite: Statistics 131A or Civil and Environmental Engineering 114 or Mathematics 131 and course 117A. Simulation of stochastic systems, maps, and deterministic chaos. Stability and error control in stochastic modeling. Fluctuations and dissipation; dynamics of complex and disordered systems; Monte Carlo techniques, Brownian, Langevin, and molecular dynamics. Simulation of meaningful statistical sampling in stochastic and disordered systems. GE credit: SE.—II. (II.) Miller, Orel, Laub, McCurdy, Rodrique

117C. Topics in Simulation and Modeling (5)

Lecture - 3 hours; laboratory - 3 hours; extensive problem solving. Prerequisite: course 117B. Topics may include algorithms in electromagnetics, materials, biology, and economics. Fast multipole and resummation techniques, algorithms for integral transforms, mesh generation, combinatorics, encryption; data mining, handling, and compression of large data sets; optimization. GE credit: SE.—III. (III.) Miller, Orel, Laub, McCurdy, Rodrigue

118. High Performance Computing (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 117B (may be taken concurrently). Algorithms for efficient scientific computing on modern high-performance computers; influence on algorithms of distributed computing, memory manage ment, networking, and information flow; managing relationships among computer architecture, soft ware, and algorithms. GE credit: SE.—II. (II.) Miller, Orel, Laub, McCurdy, Rodrigue

119. Applied Computational Linear Algebra (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 115 and Physics 104A. Introduction to computational linear algebra with emphasis on applications in engineered systems; matrix factorizations; mathematical software for fundamental algorithms.—I. (I.) Jensen, Laub

137. Nuclear Power, Weapons, and Proliferation (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: upper division standing; one course from Physics 7C, 9C. Scientific and technical aspects of nuclear power production, weapons, and proliferation Basic topics include fission and chain reactions,

fusion and thermo-nuclear reactions, nuclear materials, effects of nuclear arms (delivery, blast, radiation, waste, etc.), and technology related to nuclear non-proliferation. GE credit: SciEng. - II. (II.) Gygi, Jensen, Orel

161A. Optical Design (4)

Lecture—3 hours; lecture/laboratory—3 hours. Pre-requisite: course 108A; senior level standing. Optical materials and design of optical systems. Computer assisted design of optical systems including construction and final system characterization. Knowledge and skills acquired in earlier course work are used for designing that include engineering standards and realistic constraints. (Deferred grading only, pending completion of sequence.)—II. (II.) Baldis

161B. Optical Design (4)

Lecture -3 hours; laboratory -1 hour. Prerequisite: courses 108A, 161A (completed during the previous quarter); senior level standing,. Design of a complete optical system, construction, testing, and calibration. The knowledge and skills acquired in earlier course work are used for designing that includes engineering standards and realistic constraints. Knowledge and skills acquired in 161A are essential. (Deferred grading only, pending completion of sequence.) - III. (III.) Baldis

165. Statistical and Quantum Optics (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Chemistry 110A; Electrical and Computer Engineering 130B. Waves and photons; photon number and fluctuations; field and number correlations; atomphoton interactions; line broadening, Einstein coefficients; strong field interactions; photon bunching and anti-bunching; photoelectric counting distribu-tions for chaotic and coherent light; squeezed states. GE credit: QL, SE.-I. (I.) Yeh

166. Lasers and Nonlinear Optics (4)

Lecture — 3 hours; laboratory — 3 hours. Prerequisite: course 165. Optical gain and amplification, laser threshold conditions, laser pumping requirements and techniques, laser resonator optics, cavity design, specific laser systems, short pulse generation, Q-switching, mode-locking, principles of nonlinear optics, second harmonic generation. optical parametric amplification, electro-optic effect. GE credit: QL, SE.—II. (II.) Krol, Yeh

167. Fourier Optics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Physics 104A and Electrical and Computer Engineering 130B. Linear systems analysis of two-dimensional optical systems, 2D Fourier transforms, scalar diffraction theory, Fresnel and Fraunhofer diffraction, coherent and incoherent optical systems, spatial frequency analysis, analog optical information processing, spatial light modulators, film, holography, character recognition, and image restoration. GE credit: QL, SE.-II. (II.) Kolner, Orel, Jensen

169. Optical Properties of Materials (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 108B, Engineering 45, and Chemistry 110A. Relation between structure, composition, and optical properties of laser materials, nonlinear optical materials, photorefractives, fiber optics, semiconductors, liquid crystals, and thin films. GE credit: QL, SE.—III. (III.) Krol, Parikh

170. Optical Spectroscopy: Concepts and Instrumentation (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Chemistry 110A and course 166. Fundamentals of absorption and emission, spectrometers, interferometers, light sources and detectors, UV, Visible, and IR spectroscopy, fluorescence spectroscopy, Raman and Brillouin scattering, high-resolution laser spectroscopy. GE credit: QL, SE.—III. (III.) Orel, Kolner, Yeh, Parikh

172. Optical Methods for Biological Research (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 108B, Biological Sciences 2A, and Chemistry 110A. Optical techniques for resolving significant research problems in biology. Examples include the sequence, structure, and movement of DNA;

nuclear organization and DNA replication; channel transport; membrane receptor sites and cell fusion; protein-protein interactions and supramolecular organization. GE credit: QL, SE.-III. (III.) Yeh

190C. Research Group Conference for Advanced Undergraduates (1)

Discussion — 1 hour. Prerequisite: advanced standing; consent of instructor. Weekly conference on research problems, progress and techniques in applied science. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

192. Internship (1-5)

Internship - 3-36 hours. Prerequisite: consent of instructor; upper division standing; approval of project prior to the period of the internship. Supervised work experience in Optical Science Engineering or Computational Applied Science. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

198. Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

205A. Mathematical Methods (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: Mathematics 22B or equivalent. Complex variables, theory of convergence, evaluation of definite integrals, factorial function (gamma function), solution of second-order ODEs, Fourier analysis. - I. (I.) Jensen, Miller, Orel, Rodrique

205B. Mathematical Methods (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 205A. Laplace transforms, Fourier transforms, Delta sequences, Direct solution of PDEs, Green's functions for PDEs.—II. (II.) Jensen, Miller, Orel, Rodrique

205C. Mathematical Methods (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Mathematics 22A and 22B or equivalent. Spherical harmonics, Bessel functions, special functions, finite and infinite vector spaces.—I. (I.) Jensen, Miller, Orel

209. Linear Modeling Techniques (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 167 or the equivalent strongly recommended. Matrix theory and linear algebra with emphasis on applications in engineered systems; geometric aspects of linear algebra; matrix factorizations; analysis and design techniques for discreteand continuous-time lumped parameter models.—I. (I.) Laub

210A. Numerical Methods in Applied Science (4)

Lecture-3 hours; lecture/discussion-1 hour. Prerequisite: facility with a programming language; C or C++ strongly recommended. Numerical methods developed from an applied mathematics perspective: Analysis and control of numerical error, interpolation, integration, noniterative solution of linear systems, iterative methods for root finding and minimization. - II. (II.) Rodrigue, Miller, Jensen

210B. Numerical Methods in Applied Science (4)

Lecture — 3 hours; lecture/discussion — 1 hour. Prerequisite: facility with a programming language; C or C++ strongly recommended. Numerical methods developed from an applied mathematics prespective: Iterative methods for linear systems, numerical solutions for ODE initial and boundary value problems, numerical PDEs, eigenvalues and eigenvectors. - III. (III.) Rodrigue, Miller, Jensen

210C. Numerical Methods in Applied Science (3)

Lecture - 3 hours. Prerequisite: course 210B. Computational methods in various fields including: fluid mechanics, kinetic theory, solid mechanics, quantum mechanics. - I. (I.) Rodrigue, Vemuri

211A. Numerical Solution of Partial Differential Equations I (3)

Lecture—3 hours. Prerequisite: course 210A, 210B. Fundamentals of parallel computers, grid generation, domain decomposition, Poisson's equation, elliptic PDEs, Galerkin methods, numerical linear algebra, iterative acceleration.—I. (I.) Rodrigue, Miller, Orel, Jensen

211B. Numerical Solution of Partial Differential Equations II (3)

Lecture - 3 hours. Prerequisite: course 211A. Parabolic PDEs, stability, preconditioned time differencing, hyperbolic PDEs, modified differential equation, advection-diffusion equations, wave equation, Burgers' equation, reaction-diffusion equations.—II. (II.) Rodrigue, Miller, Orel, Jensen

211C. Numerical Solution of Partial Differential Equations III (3)

Lecture - 3 hours. Prerequisite: course 211B. Conservation laws, fluid equations, turbulence, elasticity equations, electromagnetic equations, transport equations. – III. (III.) Rodrigue, Miller, Orel, Jensen

213A. Computer Graphics (3)

Lecture — 3 hours. Prerequisite: consent of instructor. Development of algorithms for perspective line drawings of three-dimensional objects, as defined by polygons or bicubic patches. — (II.) Max

217A. Applied Computational Science (3)

Lecture - 3 hours. Prerequisite: course 210A, Mathematics 229A or the equivalent (may be taken concurrently). Applied modular programming in low level language (c or fortran). Direct implementations and integrated applications of algorithms applied to computational science problems, which are exemplified through projects. Emphasis on the practical use and implementation of theory taught in course 210A.—I. Rodrique, Miller, Orel, Jensen

217B. Applied Computational Science (3)

Lecture-3 hours. Prerequisite: course 210B or the equivalent (may be taken concurrently). Applied modular programming in low level language (c or fortran). Direct implementations of the theory taught in course 210B and integrated applications of algorithms for computational science problems, exemplified through projects including partial differential equations; initial/boundary value problems.—II. Rodrique, Miller, Orel, Jensen

218. Signal Processing (3)

Lecture — 3 hours. Prerequisite: Mathematics 121A, 121B or the equivalent. Discrete-time and continuous-time signal processing. Fourier transforms, Laplace transforms, sampling and reconstruction. LTI systems: convolution. Discrete-time transforms: DFT, FFT, and Discrete wavelet transforms. Filters and filter designs.—I. (I.) Dowla

219. Wavelets and Their Applications (3)

Lecture - 3 hours. Prerequisite: Electrical and Computer Engineering 150A, Mathematics 167. Fourier transforms and digital filters; sampling theorem and analog-to-digital conversion, multirate signal processing; wavelet transforms and filter banks; fast algorithms: FFT, DWT, and pyramid; data compression with wavelets; spectral factorization; designing application-specific wavelets. Offered in alternate years. — (II.) Dowla

220A. Artificial Neural Nets-I (3)

Lecture-3 hours. Prerequisite: Mathematics 167; ability to use computers to solve problems using a traditional language or via tools like Matlab or Mathematica. Biological and Computational motivations. Models of neurons. Supervised and unsuper vised learning. Correlation matrix memories. Discrete and continuous Hopfield nets. Self organization. Kohonen Net. Counter propagation. Perceptron. LMS methods. Back propagation. Offered in alternate years. — (I.) Vemuri

220B. Artificial Neural Nets-II (3)

Lecture - 3 hours. Prerequisite: course 220A. Growing and pruning algorithms for multi-layer perceptrons, acceleration of convergence, conjugate gradient methods. RBF networks. Temporal processing. Modular networks. Reinforcement learning. Neurodynamics. Case studies. Offered in alternate years. - (II.) Vemuri

221. Genetic Algorithms and Optimization (3)

Lecture-3 hours. Prerequisite: Mathematics 145 or the equivalent; graduate standing; ability to program in one of the modern programming languages. Introduction to genetic algorithms. Fundamental theorem; schema processing; genetic operators; applications to function optimization, scheduling, VLSI circuit layout. Implementation on parallel computers; genetic programming; evolutionary algorithms. (III.) Vemuri

225. Computational Structures for Signal and Image Processing and Graphics (3)

Lecture—3 hours. Prerequisite: Computer Science Engineering 40; course 210A. Tools for research in digital media. Relevant computer architectures, algorithms and languages for signal processing, image processing and graphics. Hardware and software issues in parallelism. Programming in SISAL. Parallel C and Parallel Fortran. Parallel algorithms using SISAL on parallel computers. Offered in alternate years. — (III.) Vemuri

226. Practical Data Communications in Digital Media (3)

Lecture-3 hours. Prerequisite: Computer Science Engineering 152. Tools for research in digital media. Communication protocols, algorithms and architectures suitable in modern networked environment. Transmission of digital data over voice-grade channels, telecommunications networks for data transport, Broadband multimedia communications, ATM, and Broadband ISDN. Offered in alternate years. — (II.) Vemuri

228A-228B-228C. Properties of Matter (3-

Lecture - 3 hours. Prerequisite: Mathematics 22B and Physics 112B. Microscopic and macroscopic descriptions of matter; thermodynamics and kinetics; constitutive, electrical, mechanical and thermal properties. - I, II, III. (I, II, III.) Luhmann, Yeh, Baldis, McCurdy

229. Computational Molecular Modeling (4)

Lecture - 3 hours; project. Prerequisite: course 21 and 228A or consent of instructor. Theory and hands-on implementation of algorithm in computational statistical mechanics. Temporal integrators, molecular dynamics, force fields, constrained dynamics, Monte Carlo techniques, fluctuation-dissipation theorem, and parallel vs. serial computing. – II. (II.) Jensen

230. Topics in Computational Fluid Dynamics (3)

Lecture - 3 hours. Prerequisite: course 210A, 210B or consent of instructor. A hands-on approach to numerical methods for compressible fluid flow. Readings and discussions of solution strategies complemented with programming exercises and projects to give first hand experience with performance and accuracy of several computational methods; from upwind differencing to Godunov methods.—III. (III.)

231A. Applied Quantum Mechanics (3)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: courses 205ABC (may be taken concurrently). Classical properties of matter; introduction to quantum mechanics by the correspondence principle. Solvable bound state/continuum problems in 1-D: well, barrier, and harmonic oscillator. Solvable problems in 3-D: HO, well, and hydrogen atom. Matrix theory: Schroedinger, Heisenberg, and interaction pictures.—II. (II.) Orel, Krol, Yeh

231B. Applied Quantum Mechanics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 231A. Approximate methods in quantum mechanics, perturbation methods, variational methods, time dependent perturbation theory, scattering, and radiation. - III. (III.) Orel, Krol, Yeh

233A-233B-233C. Theory and Applications of Solid-State Physics (3-3-3)

Lecture-3 hours. Prerequisite: course 230C or the equivalent. Structure and properties of crystals; theory of dielectrics, metals and alloys; magnetism, superconductivity, and semiconductors. Applications to various solid-state devices.—I-II-III. (I-II-III.)

234A. Applied Electromagnetics I (3)

Lecture-3 hours. Prerequisite: Electrical and Computer Engineering 130B or the equivalent. Electrostatics; Gauss's law, potentials, fields, boundary value problems, multiple pole expansions, dieléctrics, polarization, capacitance, energy, torque, forces, eigenfunction expansions. Magnostatics; Biot-Savart law, Ampere's law, vector potential, gauge transformations, magnetization, inductance, constitutive relations.—II. (II.) Kolner, Hwang

234B. Applied Electromagnetics II (3)

Lecture - 3 hours. Prerequisite: course 234A. Maxwell's Equations, wave equations for fields and potentials. Poynting's Theorem and power flow. Momentum and angular momentum in the electro magnetic field. Stress tensor. Polarization. Reflection/refraction. Dispersion, causality, and susceptibility. Circuit concepts, radiation.-III. (III.) Kolner Hwana

234C. Applied Electromagnetics III (3)

Lecture - 3 hours. Prerequisite: course 234B. Dynamics of relativistic particles; collisions between charged particles, energy loss, and scattering; radiation by moving particles; bremsstrahung, method of virtual quanta, radiative beta processes; multipole fields; radiation damping, self fields of a particle, scattering and absorption of radiation. - I. (I.) Kol-

225. Biophotonics in Medicine and the Life Sciences (3)

Lecture/discussion - 3 hours. Prerequisite: Physics 108 and Biology 101-105; course 202 highly recommended; graduate standing. Introduction to the science and technology of biomedical optics and photonics, with an overview of applications in medicine and the life sciences. Emphasis on research supported by the NSF Center for Biophotonics at UC Davis Medical Center. (Same course as Biomedical Engineering 255 and Biophysics 255.)—II. (II.) Chuang, Matthews

262A. Atomic and Molecular Interactions (3)

Lecture — 3 hours. Prerequisite: Physics 215A-215B-215C or the equivalent. Atomic structure and spectra. Offered in alternate years. — (I.) Orel

262B. Atomic and Molecular Interactions

Lecture - 3 hours. Prerequisite: Physics 215A-215B-215C. Molecular structure and spectra. Offered in alternate years. — (II.) Orel

262C. Atomic and Molecular Interactions

Lecture - 3 hours. Prerequisite: course 262B. Classical and quantum mechanical collision theory of electron and heavy particle scattering. Offered in alternate years. - (III.) Orel

263A. Quantum Statistics of Light (3)

Lecture - 3 hours. Prerequisite: Physics 200B-200C and Physics 215A-215B-215C or the equivalent. Classical susceptibilities, single quantization of light/matter interactions, resonance phenomena, second quantization of electromagnetic fields, number representation and operators.-II. (II.) Orel, McCurdy

263B. Quantum Theory of Optics (3)

Lecture — 3 hours. Prerequisite: course 263A. Statistics of photon fluctuations. Quantum theory of radiation. Theory of lasers.—III. (III.) Orel

264A. Classical Optics I (3)

Lecture - 3 hours. Prerequisite: course 108B and Electrical and Computer Engineering 130B or Physics 110B. Crystal optics; anisotropic wave propagation, dispersion relations, phase and group velocity surfaces. Polarization, Stokes parameters, Poincare

sphere. Optical crystallography; interference figures, optical activity, crystal symmetry and point groups. Piezoelectricity, electro-optic, magneto-optic effects. Geometrical optics; eikonal equation, Lagrange's integral invariant, Fermat's principle. -1.

264B. Classical Optics II (3)

Lecture - 3 hours. Prerequisite: course 264A. Dielectric waveguide theory; slab waveguides, integrated optics waveguides, optical fibers. Guided, radiation, and leaky-wave modes. Dispersion, compensation, and communications bit rates. Coupled-mode theory, waveguide perturbations, directional couplers, fiber gratings. Dielectric microcavities. Selfand cross-phase modulation. Solitons.—II. (II.) Kolner

264C. Classical Optics III (3)

Lecture - 3 hours. Prerequisite: course 264B. Huygens-Fresnel principle, Kirchoff's diffraction theory. Fresnel and Fraunhofer diffraction. Phase and amplitude gratings, aperatures, lenses, two-dimensional linear systems. Spatial filtering. Holography. Coherence theory; spatial/temporal coherence, partial coherence, mutual intensity, degree of coherence, van Cittert-Zernike theorem, coherency matrix.—III.

265A. Laser Physics I (3)

Lecture - 3 hours. Prerequisite: Physics 200C and Physics 215B-215C or the equivalent. Classical theory of lasers. Classical electron oscillator, atomic susceptibility, line broadening mechanisms, rate equations, stimulated transitions, radiative/nonradiative relaxations, multilevel systems, population inversion, saturation, oscillation, Schawlow-Townes limit, paraxial wave propagation, dispersion, pulse compression, resonators, modes, stability, Q-switching, modelocking.—I. (I.) Kolner

265B. Laser Physics II (3)

Lecture—3 hours. Prerequisite: course 265A. Beam propagation, resonators and laser dynamics. Threshold dynamics and cavity modes. Ray optics and matrices, wave optics and Gaussian beams. Resonator stability. Linear pulse propagation, dispersion and pulse compression. Spiking, relaxation, Q-switching, injection locking and modelocking.—II. (II.) Kolner

267. Nonlinear Optics (3)

Lecture - 3 hours. Prerequisite: course 265A-265B. Theory of the nonlinear interaction of radiation and matter. Nonlinear optical properties of materials. Crystal optics, electro-optics, and acousto-optics. Parametric oscillation and amplification. Harmonic conversion. Stimulated Raman and Brillouin scattering, self-focusing, four-wave mixing, phase conjugation and spectroscopy.—III. (III.) Kro

270A-270B. Advanced Laser Plasma Physics (3)

Lecture — 3 hours. Prerequisite: course 205A, 205B, 234. Laser-produced plasmas and advanced applications of high power lasers. Plasma formation with lasers, ponderomotive force, kinetic theory, waves in unmagnetized plasmas, non-linear effects, parametric instabilities, hydrodynamic instabilities, and radiation transport. Applications include ICF, X-ray lasers. — II-III. (II-III.) Baldis

271. Optical Methods in Biophysics (4)

Lecture - 3 hours; discussion/laboratory - 1 hour. Prerequisite: Biological Sciences 102 or the equivalent, course 108B or the equivalent, and Chemistry 110A or the equivalent. Principal optical techniques used to study biological structures and their related functions. Specific optical techniques useful in the studies of protein-nucleic acid, protein-membrane and protein-protein interactions. Biomedical applications of optical techniques. (Same course as Biophysics 271.)-III. (III.) Yeh, Parikh, Balhorn, Matthews

273. X-Ray Spectroscopy and Synchroton Radiation (4)

Lecture -3 hours; discussion -1 hour. Fundamentals of x-ray absorption, emission, and inelastic scattering; x-ray imaging and microscopy; synchroton radiation from bend magnets, wigglers, undulators, and free electron lasers; x-ray optics and storage ring

design; visits to the synchroton radiation facilities SSRL and ALS; optional experiments. Offered in alternate years. - III. Cramer

280A-280B-280C. Plasma Physics and **Controlled Fusion (3-3-3)**

Lecture - 3 hours. Prerequisite: course 234B or consent of instructor. Equilibrium plasma properties; single particle motion; fluid equations; waves and instabilities in a fluid plasma; plasma kinetic theory and transport coefficients; linear and nonlinear Vlasov theory; fluctuations, correlations and radiation; inertial and magnetic confinement systems in controlled fusion. - I, II, III. (I, II, III.) Luhmann, Hwang

285A. Physics and Technology of Microwave Vacuum Electron Beam Devices I

Lecture — 4 hours. Prerequisite: B.S. degree in physics or electrical engineering or the equivalent background. Physics and technology of electron beam emissions, flow and transport, electron gun design, space charge waves and klystrons. Offered in alternate years. — (III.) Luhmann

285B. Physics and Technology of Microwave Vacuum Electron Beam Devices

Lecture - 4 hours. Prerequisite: 285A. Theory and experimental design of traveling wave tubes, backward wave oscillators, and extended interaction oscillators. Offered in alternate years. — (I.) Luhmann

285C. Physics and Technology of Microwave Vacuum Electron Beam Devices

Lecture-4 hours. Prerequisite: 285B. Physics and technology of gyrotrons, gyro-amplifiers, free electron lasers, magnetrons, crossfield amplifiers and relativistic devices. Offered in alternate years. - (II.)

285D. Physics and Technology of Microwave Vacuum Electron Beam Devices

-4 hours. Prerequisite: 285C. Computational models of vacuum electron beam devices. Offered in alternate years. — (III.) Luhmann

289A-N. Special Topics in Applied Science

Lecture, laboratory, or combination. Prerequisite: graduate standing or permission of instructor. Special topics in the following areas: (A) Atomic, Molecular, and Optical Physics; (B) Chemical Physics; (C) Computational Physics; (D) Biophotonics/Biotechnology: (F) Materials Science: (F) Imaging Science and ogy; (E) Materials Science; (F) Imaging Science and Photonics; (G) Nonlinear Optics; (H) Plasma/Fusion Energy Physics; (I) Quantum Electronics; (J) Condensed Matter/Statistical Physics; (K) Classical Optics; (L) Microwave and Millimeter-Wave Technology; (M) Synchrotron Radiation Science; (N) Space Physics. May be repeated for credit up to a total of five units per segment when topic differs. - I, II, III. (I, II, III.)

290. Seminar (1-2)

Seminar - 1-2 hours. (S/U grading only.)

290C. Graduate Research Group Conference (1)

Discussion - 1 hour. Prerequisite: consent of instructor. May be repeated for credit. (S/U grading only.)

298. Group Study (1-5)

(S/U grading only.)

299. Research (1-12)

(S/U grading only.)

Courses in Biophotonics (BPT) Graduate Courses

280. Biophotonics Internship (7-12)

Internship - 36 hours. Prerequisite: graduate standing; consent of instructor. Open only to students in the designated emphasis in Biophotonics. Research experience distinct from the student's dissertation topic at an industrial company, a national laboratory, or a cross-college laboratory for one quarter. (S/U grading only.)—I, II, III. (I, II, III.)

290. Biophotonics Seminar (1)

Seminar - 1 hour. Prerequisite: graduate standing or consent of instructor. Presentation of current research in the area of biophotonics by experts in the field, followed by group discussions. May be repeated up to three times for credit. (S/U grading only.)—I, II, III (I, II, III.) Yeh

Engineering: Biological and **Agricultural**

(College of Engineering)

Raul H. Piedrahita, Ph.D., Chairperson of the Department

Department Office. 2030 Bainer Hall (530) 752-0102;

http://bae.engineering.ucdavis.edu

Faculty

Michael J. Delwiche, Ph.D., Professor Julia Fan, Ph.D., Assistant Professor Fadi A. Fathallah, Ph.D., Professor D. Ken Giles, Ph.D., Professor Mark E. Grismer, Ph.D., Professor (Land, Air and Water Resources)

Bruce R. Hartsough, Ph.D., Professor Bryan M. Jenkins, Ph.D., Professor Tina Jeoh, Ph.D., Assistant Professor Kathryn McCarthy, Ph.D., Professor

(Food Science and Technology) Michael J. McCarthy, Ph.D., Professor (Food Science and Technology) Nitin Nitin, Ph.D., Assistant Professor

(Food Science and Technology)
Ning Pan, Ph.D., Professor (Textiles and Clothing) Ning Fan, Fn.D., Frofessor (Jexnies and Cic Raul H. Piedrahita, Ph.D., Professor R. Paul Singh, Ph.D., Professor David C. Slaughter, Ph.D., Professor Shrinivasa K. Upadhyaya, Ph.D., Professor Jean S. VanderGheynst, Ph.D., Professor Stavros G. Vougioukas, Ph.D., Assistant Professor Wesley W. Wallender, Ph.D., Professor 'Land, Air and Water Resources)

Emeriti Faculty

Ruihong Zhang, Ph.D., Professor

William J. Chancellor, Ph.D., Professor Emeritus Pictiaw (Paul) Chen, Ph.D., Professor Emeritus Roger E. Garrett, Ph.D., Professor Emeritus John R. Goss, M.S., Professor Emeritus David J. Hills, Ph.D., Professor Emeritus John M. Krochta, Ph.D., Professor Emeritus Miguel Mariño, Ph.D., Professor Emeritus R. Larry Merson, Ph.D., Professor Emeritus John A. Miles, Ph.D., Professor Emeritus Stanton R. Morrison, Ph.D., Professor Emeritus Richard E. Plant, Ph.D., Professor Emeritus James W. Rumsey, M.S., Senior Lecturer Emeritus Thomas A. Rumsey, Ph.D., Professor Emeritus Verne H. Scott, Ph.D., Professor Emeritus James F. Thompson, M.S., Extension Specialist Emeritus Wesley E. Yates, M.S., Professor Emeritus

Affiliated Faculty

Atungulu, Griffiths, Ph.D., Associate Project Engineer Dennis R. Heldman, Ph.D., Adjunct Professor Larry Joh, Ph.D., Academic Coordinator Zhongli Pan, Ph.D., Adjunct Professor Mir S. Shafii, Ph.D., Lecturer Martha Stiles, M.S., Academic Coordinator Herbert B. Scher, Ph.D., Research Engineer

Mission. The Department of Biological and Agricultural Engineering is dedicated to the advancement of the discipline of Biological Engineering and to the conduction of research under its many diverse areas of application. Biological engineering (also called biological systems engineering) is the biology-based engineering discipline that integrates life sciences

with engineering in the advancement and application of fundamental concepts of biological systems from molecular to ecosystem levels. Within this discipline, our faculty work in a range of research areas including agricultural production/natural resources, biotechnology engineering, and food engineering.

The mission of the department is to discover, develop, apply, and disseminate knowledge for the sustainable production, management, and use of biological materials, and to educate students for this work. Our goals are to advance the science, teach the principles and application, and disseminate the knowledge of engineering needed to produce, distribute, and process biological products such as food and fiber, while conserving natural resources, preserving environmental quality, and ensuring the health and safety of people.

Objectives. We educate students in the fundamentals of mathematics, physical and biological sciences, and engineering, balanced with the application of principles to practical problems. We teach students to develop skills for solving engineer ing problems in biological systems through use of appropriate analysis, synthesis, and engineering design techniques. We prepare students for entry into engineering practice and graduate education, as well as engagement in life-long learning. We foster the ability of our students to collaborate and communicate effectively, and provide an awareness of the importance of economics, professional responsibility, and the environment.

Students graduating with a B.S. degree in Biological Systems Engineering from UC Davis are prepared

- · Apply life sciences in engineering at the biochemical, cellular, organismal, and macro levels,
- Solve biological systems engineering problems while employed in the private or public sector,
- Consider the environmental consequences of their engineering activities,
- Communicate effectively with professional colleagues and public constituencies,
- Act in an ethical manner, and
- Continue their education in a changing professional world.

The Biological Systems Engineering Undergraduate Program

Biological Systems Engineering is an engineering major that uses biology as its main scientific base. In the new age of biology and biotechnology, engineers are needed to work side by side with life scientists to bring laboratory developments into commercial production. Industries in plant and animal production, bioenergy, bioprocessing, biotechnology, food processing, aquaculture, agriculture, and forest production all need engineers with strong training in biology. Concern for environmental resources and their preservation creates many engineering opportunities as society strives to maintain a balance within the biosphere.

In the freshman and sophomore years, the Biological Systems Engineering major requires sequences of courses standard in all engineering programs, including mathematics, physics, chemistry, engineering science, and humanities. In addition, the Biological Systems Engineering major also requires courses in the biological sciences. In the junior and senior years, core courses are taken in the discipline of biological engineering, involving the integration of engineering with the life sciences.

Biological Systems Engineering Program

The Biological Systems Engineering program is accredited by the Engineering Accreditation Commission of ABET; http://www.abet.org.

Students are encouraged to carefully adhere to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed

Lower Division Required Courses

	UNITS
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-22B	6
Physics 9A-9B-9C	15
Chemistry 2A-2B	
Biological Sciences 2A-2B-2C	14
Engineering 6, 35, 17	
Biological Systems Engineering 1, 75	
University Writing Program 1	
Communication 1 or 3	
Minimum Lower Division Units	

Upper Division Requirements:

In the junior and senior years, the Biological Systems Engineering major requires courses that cover the core discipline of biological engineering by integrating biology and physical sciences with engineering. Depending on your area of interest, you may select elective courses from one of three specializations, or you may develop your own specialization in consultation with your adviser. The areas of specialization are offered to help you select your electives, but it is not necessary for you to select or declare a specialization. If your career objective is a professional degree in the health sciences (e.g., medicine, veterinary medicine, or dentistry), you should consult with advisers from the appropriate school to plan for successful admission and to ensure that you take spe cific courses that may be required and that you have the necessary experience. The upper division requirements are listed following the areas of specialization:

- Biotechnology Engineering
- · Agricultural and Natural Resources Engineering
- Food Engineering

Areas of Specialization

Biotechnology Engineering. Students specializing in biotechnology engineering integrate analysis and design with applied biology to solve problems in the production of energy from renewable biological resources, in transferring laboratory developments to large-scale biotechnical production, and in the development of biosensors and biomaterials. Students interested in biotechnology engineering may focus on the mechanisms and processes for the sustainable production and use of energy from renewable biological sources. Students may also focus on addressing the challenges in scaling up the production of genetically altered plants, plant materials and food products, production, packaging, and application of biocontrol agents for plant pests and diseases, microbial production of biological products, tissue culture, and bioremediation. Students may also focus on the development of biosensors for the detection of microorganisms or specific substances, or on the development of products based on biological processes and materials. The recommended electives provide students with strong training in genetics, biochemistry, microbiology, molecular biology, and plant production, in addition to engineering courses on topics such as process design and life-cycle analysis. Modern laboratory techniques in biochemistry are also included in the specialization to provide hands-on skills.

Biological engineers specializing in biotechnology engineering will be needed in the future to work within industrial, governmental, and academic settings in the U.S. and around the world.

Recommended biological science electives:

Biological Sciences 101, 102, 103 Microbiology 102 Molecular and Cellular Biology 120L

Plant Biology 113

Recommended engineering electives:

Biological Systems Engineering 161 Chemical Engineering 161B, 161C, 161L Civil and Environmental Engineering 143, 148A, 149, 150, 153

Engineering 180

Mechanical Engineering 161, 162, 163

Suggested advisers. M. Delwiche, J. Fan, K. Giles, M. Grismer, B. Hartsough, B. Jenkins, T. Jeoh, N. Pan, J. VanderGheynst, N. Nitin, R. Zhang

Agricultural and Natural Resources Engineering. Students specializing in agricultural and natural resources engineering integrate analysis and design with applied biology to solve problems in producing, transporting and processing biological products leading to food, fiber, energy, pharmaceuticals and other human needs. Students may focus on automation of agricultural activities and on the biomechanics of humans and animals involved in agriculture. Students specializing in agricultural and natural resources engineering may also focus on engineering issues related to the sustainable use of natural resources, particularly water, but also land and air. Agricultural and natural resources engineers design machinery, processes, and systems for pro-ductive plant and animal culture, including managing nutrients and waste, while minimizing adverse environmental effects. The recommended electives provide students with the fundamental principles of agricultural production and a broad background in engineering and natural resources.

Depending on their specific interests, agricultural and natural resources engineers are employed as practicing professionals and managers with agricultural producers, equipment manufacturers, irrigation districts, food processors, consulting engineering firms, start-up companies and government agencies. Graduates with particular interests in biomechanics may go on to work on the design, evaluation, and application of human-centered devices and systems (e.g., medical devices), as well as on improving worker's health and safety

Recommended biological science electives:

Animal Emphasis

Avian Sciences 100

Animal Science 143, 144, 146

Neurobiology, Physiology, and Behavior 101

Soil Science 100

Aquaculture Emphasis

Animal Science 118, 131, 136A

Applied Biological Systems Technology 163 Wildlife, Fish, and Conservation Biology 120,

Biomechanics Emphasis

Biological Sciences 102

Neurobiology, Physiology and Behavior 101

Exercise Biology 103

Cell Biology and Human Anatomy 101

Plant Emphasis

Entomology 100

Environmental Horticulture 102

Environmental Science and Policy 100

Environmental Toxicology 101

Hydrologic Sciences 124

Microbiology 120

Plant Biology 111

Soil Science 100

Plant Sciences 101, 110A, 114, 142

Recommended engineering electives:

Biological Systems Engineering 114, 120, 128,

Biomedical Engineering 109, 116, 126

Civil and Environmental Engineering 140, 141, 142, 144, 145, 148A, 1*7* Î

Engineering 111, 121, 180

Additional recommended electives:

Applied Biological Systems Technology 150, 161,

Suggested Advisers. M. Delwiche, J. Fan, F. Fathallah, K. Giles, M. Grismer, B. Hartsough, B. Jenkins, R. Piedrahita, D. Slaughter, S. Upadhyaya, S. Vougioukas, J. VanderGheynst, W. Wallender, R. Zhang

Food Engineering. The food industry is the largest industrial sector of the U. S. economy. Students specializing in food engineering conceive, design, and operate food processes, equipment, and plants for the production of high quality, safe, and nutritious food with minimal impact on the environment. Students learn to apply engineering principles and concepts to handling, storing, processing, packaging, and distributing food and related products. In addition to engineering principles, the food engineering specialization is intended to provide an understand ing of the chemical, biochemical, microbiological, and physical characteristics of foods. In the junior and senior years, students take courses that focus on the integration of biological and food science with engineering. Concepts of food refrigeration, freezing, thermal processing, drying, and other food operations are studied.

Depending on their specific interests, food engineers are employed as practicing engineers, scientists, and managers in the food industry.

Recommended biological sciences electives:

Biological Sciences 101, 102, 103

Environmental Science and Policy 110

Environmental Toxicology 101

Food Science and Technology 104, 104L, 119,

Plant Sciences 172

Recommended engineering electives:

Biological Systems Engineering 161

Chemical Engineering 157

Mechanical Engineering 171, 172

Suggested Advisers. K. McCarthy, M. McCarthy, N. Nitin, R. P. Singh, D. Slaughter

Upper Division Required Courses

11.117	_
UNITS Chemistry 8A or 118A 2 or 4)
Chemistry 8B or 118B	
Engineering 100, 102, 104 105,	
106 18	
Biological Systems Engineering 103, 125,	
127, 130, 165, 170Å, 170B, 170BL,	
170C, 170CL	
Biological Systems Engineering electives- Select a minimum of 4 units from all upper-	
division Biological Systems Engineering	
courses not otherwise required, with the	
exception of Biological Systems Engineering	
courses 189-199 4	
Statistics 100	
Engineering electives — Select a minimum of 3	
units. All upper division courses offered by the College of Engineering may be taken as	
engineering electives with the exception of the	
following: Civil and Environmental	
Engineering 123, Computer Science	
Engineering 188, Engineering 103, 160, all	
courses numbered 190-197 and 199 (except	
Engineering 190, which may be taken for 2	
units of engineering elective credit) 3	
Biological science electives—All upper- division courses in the College of Biological	
Sciences (with the exception of Biological	
Sciences 132, Evolution and Ecology 175,	
Exercise Biology 102, 112, 115, 118	
through 149L, Microbiology 100 and all	
courses numbered 190-199) may be used as	
biological science electives. The following	
courses may also be taken as biological science electives: Applied Biological Systems	
Technology 161; Animal Science 118, 143,	
144, 146; Agricultural Management and	
, ,g	

Rangeland Resources 110A; Atmospheric Science 133; Avian Sciences 100; Cell Biology and Human Anatomy 101, 101L; Entomology 100; Environmental Horticulture 102; Environmental Science Policy and Management 120, 182, 185 (offered at UC Berkeley); Environmental Science and Policy 100, 110, 155; Environmental Toxicology 101, 112A, 131; Food Science and Technology 102A, 104L, 119, 120, 121, 128, 159; Infectious Diseases 141; Soil Science 100; Wildlife, Fish, and Conservation Biology 121. Students may choose other upper division courses with substantial biological content offered by the College of Agricultural and Environmental Sciences; consultation with a faculty adviser and approval by petition is required)...... 3 Upper Division Composition Requirement* one course from the following: University Writing Program 101, 102B, 102E, 102F, 102G, 104A, 104E, 104F..... Minimum Upper Division Units......72

*The Upper-Division composition exam administered by the College of Letters and Sciences cannot be used to satisfy the upper-division composition requirement for students in the Biological Systems Engineering program.

Minimum Units Required for Major 185 Master Undergraduate Adviser, M. Delwiche

Energy Minor Programs

There is an urgent need to develop and commercialize technologies for the sustainable conversion and use of energy. The goal of these minors is to prepare students for careers that require training in energy science and technology and energy policy. Cleantech and green-tech markets including energy are some of the fastest growing in new investment, and well-trained individuals in all related fields are needed to provide the level of expertise required to advance technology and policy, and to satisfy state, national, and international objectives for greater energy sustainability. The minors are expected to accommodate persons of diverse background with educational interests in areas that may include engineering, science, policy, economics, planning, and

Energy Science and Technology Minor

All courses must be taken for a letter grade. Grade of C- or better required for all courses used to satisfy minor requirements with overall GPA in minor requirement courses of 2.000 or better.

Minor Requirements:

UNITS Engineering 105 or Chemical Engineering 152B4 Applied Science 188..... Select 12 units from: Biological Systems Engineering 162; Chemical Engineering 146, 158C, 161A, 161B, 161L, 166; Civil Engineering 125, 143, 162, 163; Mechanical Engineering 161; Agricultural and Resource Economics 175; Food Science and Technology 123; Applied Biological Systems Technology 182; Atmospheric Science 116; Plant Science 101; **Environmental Science and Policy** 167......12

Total Units for the Minor 20

Minor Advisors. Bryan Jenkins (Department of Biological and Agricultural Engineering), Karen McDonald (Department of Chemical Engineering and Materials Science), Case van Dam (Department of Mechanical and Aerospace Engineering)

Energy Policy Minor

All courses must be taken for a letter grade. Grade of C- or better required for all courses used to satisfy minor requirements with overall GPA in minor requirement courses of 2.000 or better.

Minor Requirements:

UNITS Applied Science 188 and Environmental Science and Policy......8 Select 10 units from: Civil Engineering 125; Environmental Science and Policy 171, 163, 168A, 169B; Political Science 105, 109, 122, 164 143, 162, 164; ... 10

Total Units for the Minor18

Minor Advisors. Deb Niemeier (Department of Civil and Environmental Engineering), Joan Ogden (Environmental Science and Policy)

The Graduate Program in Biological **Systems Engineering**

Integrated B.S./M.S, M.S., M.Engr., D.Engr., and Ph.D. in Biological Systems Engineering Designated Ph.D. emphasis available in Biotechnology http://bae.engineering.ucdavis.edu

(530) 752-0102

Graduate students in Biological Systems Engineering focus on finding economically and environmentally sustainable solutions to many of the most important global issues of our time-the safety, security and abundance of our food, detection of pathogens, development of bio-energy alternatives, control of insect-borne disease and damage, as well as the preservation of our land, air and water resources.

We enjoy the strategic advantage of being located in California, the national leader in agricultural production and crop diversity, and a major center for biotechnology. With the unique status of belonging to both the College of Engineering and the College of Agricultural and Environmental Sciences, collaboration is the rule. We interact with colleagues in both engineering and the life sciences to create multidisciplinary approaches to our teaching and research. Students benefit from this dynamic environment that combines the strengths of nationally ranked engineering, agricultural and environmental programs.

Financial support is available in the form of research assistantships, teaching assistantships, fellowships and financial aid.

Research Highlights:

- Bioenvironmental Engineering
- Renewable Energy
- Industrial Biotechnology
- Food Safety
- Biosensors
- Bioprocess Engineering
- Bioinstrumentation
- Ergonomics, Health and Safety
- Aquacultural Engineering
- Ecological Systems Engineering
- Food Engineering
- Forest and Fiber Engineering
- Postharvest Engineering
- Soil and Water Engineering
- · Machine Systems and Precision Agriculture

Research Facilities and Partnerships:

- · Agricultural Ergonomics Research Center
- GIS Visualization Lab
- Energy Institute
- Bodega Marine Lab
- Western Center for Agricultural Equipment
- California Biomass Collaborative

Complete Information on departmental website.

Courses in Engineering: Biological Systems (EBS)

Lower Division Courses

1. Foundations of Biological Systems Engineering (4)

Lecture - 2 hours; laboratory - 3 hours; project -3 hours. Restricted to students in Biological Systems Engineering. Introduction to engineering and the engineering design process with examples drawn from the field of biological systems engineering. Introduction to computer-aided design and mechanical fabrication of designs. Students work on a quarter-long group design project. GE credit: OL, QL, SE, SL, VL.—I. (I.) Jenkins, Piedrahita

75. Properties of Materials in Biological Systems (4)

Lecture — 3 hours; laboratory — 3 hours. Prerequisite: Biological Sciences 1A; grade of C- or better in Physics 9B; Physics 9C (may be taken concurrently). Properties of typical biological materials; composi tion and structure with emphasis on the effects of physical and biochemical properties on design of engineered systems; interactions of biological materials with typical engineering materials. GE credit: SciEng | QL, SE, SL, VL, WE.—II. (II.) Jeoh, Slaugh-

90C. Research Group Conference in **Biological Systems Engineering (1)**

Discussion - 1 hour. Prerequisite: lower division standing in Biological Systems Engineering or Food Engineering; consent of instructor. Research group conference. May be repeated for credit. (P/NP grading only.) GE credit: SE.—I, II, III. (I, II, III.)

92. Internship in Biological Systems Engineering (1-5)

Internship. Prerequisite: lower division standing; project approval prior to period of internship. Supervised work experience in biological systems engineering. May be repeated for credit. (P/NP grading only.) GE credit: SE.

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. Group study of selected topics; restricted to lower division students. (P/NP grading only.) GE credit: SE.

99. Special Study for Lower Division Students (1-5)

(P/NP grading only.) GE credit: SE.

Upper Division Courses 103. Fluid Mechanics Fundamentals (4)

Lecture - 4 hours. Prerequisite: Physics 9B. Fluid mechanics axioms, fluid statics, kinematics, velocity fields for one-dimensional incompressible flow and boundary layers, turbulent flow time averaging, potential flow, dimensional analysis, and macroscopic balances to solve a range of practical prob lems. (Same course as Hydrologic Science 103N.) GE credit: QL, SE, VL.—II. (II.) Wallender

114. Principles of Field Machinery Design (3)

Lecture - 2 hours; laboratory - 3 hours. Prerequisite: Engineering 102, 104. Traction and stability of vehicles with wheels or tracks. Operating principles of field machines and basic mechanisms used in their design. GE credit: QL, SE, VL, WE.-III. Rosa

115. Forest Engineering (3)

Lecture - 3 hours. Prerequisite: Engineering 104, Biological Sciences 1C. Applications of engineering principles to problems in forestry including those in forest regeneration, harvesting, residue utilization, and transportation. GE credit: QL, SE, SL, VL.—(III.) Hartsough

120. Power Systems Design (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 17, 102, 103, 105. Design and performance of power devices and systems including combustion engines, electric generators and motors, fluid power systems, fuels, and emerging technologies. Selection of units for power matching and optimum performance. GE credit: QL, SE, SL, VL, WE.—I. (I.)

125. Heat Transfer in Biological Systems (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 103; Engineering 105; Biological Sciences 2A, 2B and 2C. Fundamentals of heat transfer with application to biological systems. Steady and transient heat transfer. Analysis and simulation of heat conduction, convection and radiation. Heat transfer operations. GE credit: OL, QL, SE, VL, WE.—III. (III.) Fan, Nitin

127. Mass Transfer and Kinetics in Biological Systems (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 125. Fundamentals of mass transfer and kinetics in biological systems. Molecular diffusion and convection. Thermodynamics and bioenergetics. Biological and chemical rate equations. Heterogeneous kinetics. Batch and continuous reaction processes. GE credit: QL, SE, VL, WE.—I. (I.) VanderGheynst, Zicari

128. Biomechanics and Ergonomics (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Statistics 100, Engineering 102. Anatomical, physiological, and biomechanical bases of physical ergonomics. Human motor capabilities, body mechanics, kinematics and anthropometry. Use of bioinstrumentation, industrial surveillance techniques and the NIOSH lifting guide. Cumulative trauma disorders. Static and dynamic biomechanical modeling. Emphasis on low back, shoulder, and hand/wrist biomechanics. GE credit: QL, SE, SL, VL, WE.—III. (III.) Fathallah

130. Modeling of Dynamic Processes in Biological Systems (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 75; Engineering 6 or Computer Science & Engineering 30; grade of C- or better in Mathematics 22B required for enrollment eligibility. Techniques for modeling processes through mass and energy balance, rate equations, and equations of state. Computer problem solution of models. Example models include package design, evaporation, respiration heating, thermal processing of foods, and plant growth. GE credit: OL, QL, SE, SL, VL.—II. (II.) K. McCarthy, Upadhyaya

135. Bioenvironmental Engineering (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 125, 130. Biological responses to environmental conditions. Principles and engineering design of environmental control systems. Overview of environmental pollution problems and legal restrictions for biological systems, introduction of environmental quality assessment techniques, and environmental pollution control technologies. GE credit: QL, SE, SL, VL, WE.—I. (I.) Jenkins, Zhang

144. Groundwater Hydrology (4)

Lecture—4 hours. Prerequisite: Mathematics 16B or 21A; Hydrologic Science 103 or Engineering 103 recommended. Fundamentals of groundwater flow and contaminant hydrology. Occurrence, distribution, and movement of groundwater. Well-flow systems. Aquifer tests. Well construction operation and maintenance. Groundwater exploration and quality assessment. Agricultural threats to groundwater quality: fertilizers, pesticides, and salts. Same course as Hydrologic Science 144. GE credit: QL, SE, SL, VL.—I. (I.) Fogg

145. Irrigation and Drainage Systems (4)

Lecture—4 hours. Prerequisite: Engineering 103 or Hydrologic Science 103. Engineering and scientific principles applied to the design of surface, sprinkle and micro irrigation systems and drainage systems within economic, biological, and environmental constraints. Interaction between irrigation and drainage. (Same course as Hydrologic Science 115.) GE credit: QL, SE, SL, VL.—II. Grismer, Wallender

147. Runoff, Erosion and Water Quality Management in the Tahoe Basin (3)

Lecture/laboratory—30 hours; fieldwork—15 hours; discussion—10 hours; term paper. Prerequisite: Physics 7B or 9B, Mathematics 16C or 21C, Civil and Environmental Engineering 142 or Hydrologic

Science 141 or Environmental and Resource Sciences 100. Five days of instruction in Tahoe City. Practical hydrology and runoff water quality management from Tahoe Basin slopes. Development of hillslope and riparian restoration concepts, modeling and applications from physical science perspectives including precipitation-runoff relationships, sediment transport, and detention ponds. (Same course as Hydrologic Science 147.) GE credit: QL, SE, SL.—

161. Kinetics and Bioreactor Design (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 127. Provide the basic principles of reactor design for bioprocess applications. This course emphasizes the following topics: 1) kinetics and reactor engineering principles; 2) bio-reaction kinetics; and 3) bioreactor design. GE credit: QL, SE, VL.—II. (II.) Fan, Zicari

165. Bioinstrumentation and Control (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 100. Instrumentation and control for biological production systems. Measurement system concepts, instrumentation and transducers for sensing physical and biological parameters, data acquisition and control. GE credit: QL, SE, SL, VL, WE.—I. (I.) Delwiche, Slaughter

170A. Engineering Design and Professional Responsibilities (3)

Lecture — 2 hours; laboratory — 3 hours. Prerequisite: course 1, Engineering 102, 104. Engineering design including professional responsibilities. Emphasis on project selection, data sources, specifications, human factors, biological materials, safety systems, and professionalism. Detailed design proposals will be developed for courses 170B and 170BL. GE credit: OL, QL, SE, SL, VL, WE.—I. (I.) Giles, Zhang

170B. Engineering Projects: Design (2)

Discussion—2 hours. Prerequisite: course 170A; course 170BL required concurrently. Individual or group projects involving the design of devices, structures, or systems to solve specific engineering problems in biological systems. Project for study is jointly selected by student and instructor. GE credit: OL, QL, SE, SL, VL, WE.—II. (II.) Giles, Zhang

170BL. Engineering Projects: Design Laboratory (1)

Laboratory—3 hours. Prerequisite: course 170B required concurrently. Individual or group projects involving the design of devices, structures, or systems to solve specific engineering problems in biological systems. GE credit: OL, QL, SE, SL, VL, WE.—II. (II.)

170C. Engineering Projects: Design Evaluation (1)

Discussion—1 hour. Prerequisite: course 170B; required to enroll in course 170CL concurrently. Individual or group projects involving the fabrication, assembly and testing of components, devices, structures, or systems designed to solve specific engineering problems in biological systems. Project for study previously selected by student and instructor in course 170B. GE credit: OL, QL, SE, SL, VL, WE.—III. (III.) Giles, Zhang

170CL. Engineering Projects: Design Evaluation (2)

Laboratory—6 hours. Prerequisite: required to enroll in course 170C concurrently. Individual or group projects involving the fabrication, assembly and testing of components, devices, structures, or systems designed to solve specific engineering problems in biological systems. GE credit: OL, QL, SE, SL, VL, WE.—III. (III.)

175. Rheology of Biological Materials (3)

Lecture—3 hours. Prerequisite: Engineering 103 or Chemical Engineering 150A. Fluid and solid rheology, viscoelastic behavior of foods and other biological materials, and application of rheological properties to food and biological systems (i.e., pipeline design, extrusion, mixing, coating). GE credit: QL, SE, VL.—II. K. McCarthy

189A-G. Special Topics in Biological Systems Engineering (1-5)

Variable—3-15 hours. Prerequisite: upper division standing in engineering; consent of instructor. Special topics in: (A) Agricultural Engineering; (B) Aquacultural Engineering; (C) Biomedical Engineering; (D) Biotechnical Engineering; (E) Ecological Systems Engineering; (F) Food Engineering; and (G) Forest Engineering. May be repeated for credit when topic differs. GE credit: SE.—I, II, III. (I, II, III.)

190C. Research Group Conference in Biological Systems Engineering (1)

Discussion—1 hour. Prerequisite: upper division standing in Biological Systems Engineering or Food Engineering; consent of instructor. Research group conference. May be repeated for credit. (P/NP grading only.) GE credit: SE.—I, II, III. (I, II, III.)

192. Internship in Biological Systems Engineering (1-5)

Internship. Prerequisite: upper division standing; approval of project prior to period of internship. Supervised work experience in biological systems engineering. May be repeated for credit. (P/NP grading only.) GE credit: SE.

197T. Tutoring in Biological Systems Engineering (1-5)

Tutorial—3-15 hours. Prerequisite: upper division standing. Tutoring individual students, leading small voluntary discussion groups, or assisting the instructor in laboratories affiliated with one of the department's regular courses. May be repeated for credit if topic differs. (P/NP grading only.) GE credit: SE.

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.) GE credit: SE.

Graduate Courses 200. Research Methods in Biological Systems Engineering (2)

Lecture—2 hours. Prerequisite: graduate standing. Planning, execution and reporting of research projects. Literature review techniques and proposal preparation. Record keeping and patents. Uncertainty analysis in experiments and computations. Graphic analysis. Oral and written presentation of research results, manuscript preparation, submission and review.—I. (I.) Zhang, Giles

205. Continuum Mechanics of Natural Systems (4)

Lecture/discussion—4 hours. Prerequisite: Mathematics 21D and 22B, Physics 9B. Continuum mechanics of static and dynamic air, water, earth and biological systems using hydraulic, heat and electrical conductivity; diffusivity; dispersion; strain; stress; deformation gradient; velocity gradient; stretch and spin tensors. (Same course as Hydrologic Science 205.)—III. Wallender

215. Soil-Machine Relations in Tillage and Traction (3)

Lecture—3 hours. Prerequisite: course 114. Mechanics of interactions between agricultural soils and tillage and traction devices; determination of relevant physical properties of soil; analyses of stress and strains in soil due to machine-applied loads; experimental and analytical methods for synthesizing characteristics of overall systems. Offered in alternate years.—(II.) Upadhyaya

216. Energy Systems (3)

Lecture—3 hours. Prerequisite: Engineering 105. Theory and application of energy systems. System analysis including input-output analysis, energy balances, thermodynamic availability, economics, environmental considerations. Energy conversion systems and devices including cogeneration, heat pump, fuel cell, hydroelectric, wind, photovoltaic, and biomass conversion processes. Offered in alternate years.—II. Jenkins

218. Solar Thermal Engineering (3)

Lecture - 3 hours. Prerequisite: course in heat transfer. Familiarity with FORTRAN language. Analysis and design of solar energy collection systems. Sunearth geometry and estimation of solar radiation. Steady state and dynamic models of solar collectors. Modeling of thermal energy storage devices. Computer simulation. Offered in alternate years.—III. Jen-

220. Pilot Plant Operations in Aquacultural Engineering (3)

Lecture—1 hour; laboratory—6 hours. Prerequisite: Civil Engineering 243A-243B or Applied Biological Systems Technology 161, 163. Topics in water treatment as they apply to aquaculture operations. Laboratory study of unit operations in aquaculture. Offered in alternate years. — (I.) Piedrahita

228. Occupational Musculoskeletal Disorders (3)

Lecture -2 hours; laboratory -3 hours. Prerequisite: graduate standing and consent of instructor. Epidemiology and etiology of occupational musculoskeletal disorders (MSDs) with focus on low back and upper extremities disorders; anatomical and biome-chanical functions of lower back and upper extremities; MSDs risk factors assessment and control; research opportunities related to MSDs.-III. (III.) Fathallah

231. Mass Transfer in Food and Biological Systems (3)

Lecture/discussion-3 hours. Prerequisite: graduate standing. Application of mass transfer principles to food and biological systems. Study of mass transfer affecting food quality and shelf life. Analysis of mass transfer in polymer films used for coating and packaging foods and controlling release of biologically active compounds. Offered in alternate years. — (IÍ.) Krochta, K. McCarthy

233. Analysis of Processing Operations: **Drying and Evaporation (3)**

Lecture - 3 hours. Prerequisite: course in food or process engineering, familiarity with FORTRAN. Diffusion theory in drying of solids. Analysis of fixed-bed and continuous-flow dryers. Steady-state and dynamic models to predict performance evaporators: multiple effects, mechanical and thermal recompression, control systems. Offered in alternate

235. Advanced Analysis of Unit Operations in Food and Biological Engineering (3)

Lecture—3 hours. Prerequisite: course 132. Analysis and design of food processing operations. Steady state and dynamic heat and mass transfer models for operations involving phase change such as freezing and frying. Separation processes including membrane applications in food and fermentation systems. — (İIİ.) Singh

237. Thermal Process Design (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: course in heat transfer. Heat transfer and biological basis for design of heat sterilization of foods and other biological materials in containers or in bulk. Offered in alternate years.—III.

239. Magnetic Resonance Imaging in **Biological Systems (3)**

Lecture—3 hours. Prerequisite: graduate standing. Theory and applications of magnetic resonance imaging to biological systems. Classical Bloch model of magnetic resonance. Applications to be studied are drying of fruits, flow of food suspensions, diffusion of moisture, and structure of foods. Offered in alternate years.—I. M. McCarthy

240. Infiltration and Drainage (3)

Lecture — 3 hours. Prerequisite: Soil Science 107, Engineering 103. Aspects of multi-phase flow in soils and their application to infiltration and immiscible displacement problems. Gas phase transport and entrapment during infiltration, and oil-water-gas displacement will be considered. Offered in alternate years.-II. Grismer

241. Sprinkle and Trickle Irrigation Systems

Lecture - 2 hours; laboratory - 3 hours. Prerequisite: course 145/Hydrologic Science 115. Computerized design of sprinkle and trickle irrigation systems. Consideration of emitter mechanics, distribution functions and water yield functions. Offered in alternate

242. Hydraulics of Surface Irrigation (3)

Lecture — 3 hours. Prerequisite: course 145, Hydrologic Science 115. Mathematical models of surfaceirrigation systems for prediction of the ultimate disposition of water flowing onto a field. Quantity of runoff and distribution of infiltrated water over field length as a function of slope, roughness, infiltration and inflow rates. Offered in alternate years. — (III.)

243. Water Resource Planning and Management (3)

Lecture—3 hours. Prerequisite: Hydrologic Science 141 or the equivalent. Applications of deterministic and stochastic mathematical programming techniques to water resource planning, analysis, design, and management. Water allocation, capacity expansion, and reservoir operation. Conjunctive use of surface water and groundwater. Water quality management. Irrigation planning and operation models. (Same course as Hydrologic Science 243.) Offered in alternate years—(I.)

245. Waste Management for Biological **Production Systems (3)**

Lecture—3 hours. Prerequisite: graduate standing or consent of instructor. Characterization of solid and liquid wastes from animal, crop, and food production systems. Study of methods and system design for handling, treatment, and disposal/utilization of these materials. — II. (II.) Zhang

260. Analog Instrumentation (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 100. Instrument characteristics: generalized instrument models, calibration, and frequency response. Signal conditioning: operational amplifier circuits, filtering, and noise. Transducers: motion, force, pressure, flow, temperature, and photoelectric. Offered in alternate years.—II. Delwiche

262. Computer Interfacing and Control (4)

Lecture — 3 hours; laboratory — 3 hours. Prerequisite: Engineering 100, course 165. Procedural and object-oriented programming in C++, analog and digital signal conversion, data acquisition and computer control. Offered in alternate years. - (III.) Del-

265. Design and Analysis of Engineering Experiments (5)

Lecture—3 hours; lecture/discussion—2 hours. Prerequisite: Statistics 100, Agricultural Systems and Environment 120, or an introductory course in statistics. Simple linear, multiple, and polynomial regression, correlation, residuals, model selection, oneway ANOVA, fixed and random effect models, sample size, multiple comparisons, randomized block, repeated measures, and Latin square designs, factorial experiments, nested design and subsampling, split-plot design, statistical software packages.—III. (III.) Upadhyaya, Plant

267. Renewable Bioprocessing (3)

Lecture-3 hours. Prerequisite: course 160, Biological Sciences 101 or Microbiology 102. Applications of biotechnology and bioprocess engineering toward the use of agricultural and renewable feedstocks for the production of biochemicals. Design and modeling of microbial- and plant-based production systems including associated fermentation extraction, and purification processes. Offered in alternate years.—I. VanderGheynst

270. Modeling and Analysis of Biological and Physical Systems (3)

Lecture - 3 hours. Prerequisite: familiarity with a programming language. Mathematical modeling of biological systems: model development; analytical and numerical solutions. Case studies from various specializations within biological and agricultural engineering. Offered in alternate years. - III. Upadhyaya

275. Physical Properties of Biological Materials (3)

Lecture—2 hours; laboratory—3 hours. Prerequisite: consent of instructor. Selected topics on physical properties, such as mechanical, optical, rheological, and aerodynamic properties, as related to the design of harvesting, handling, sorting, and processing equipment. Techniques for measuring and recording physical properties of biological materials. Offered in alternate years.—III. Slaughter, Rosa

289A-K. Selected Topics in Biological Systems Engineering (1-5)

Variable - 1-5 hours. Prerequisite: consent of instructor. Special topics in: (A) Animal Systems Engineering; (B) Aquacultural Engineering; (C) Biological Engineering; (D) Energy Systems; (E) Environmental Quality; (F) Food Engineering; (G) Forest Engineering; (H) Irrigation and Drainage; (I) Plant Production and Harvest; (J) Postharvest Engineering; (K) Sensors and Actuators. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)

290. Seminar (1)

Seminar-1 hour. Prerequisite: graduate standing. Weekly seminars on recent advances and selected topics in biological systems engineering. Course theme will change from quarter to quarter. May be repeated for credit. (S/U grading only.)

290C. Graduate Research Conference (1)

Discussion - 1 hour. Prerequisite: consent of instructor. Research problems, progress and techniques in biological systems engineering. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

298. Group Study (1-5) 299. Research (1-12)

(S/U grading only.)

Professional Course

390. Supervised Teaching in Biological and Agricultural Engineering (1-3)

Laboratory-3 hours; tutorial-3-9 hours. Prerequisite: graduate standing; consent of instructor. Tutoring and teaching students in undergraduate courses offered in the Department of Biological and Agricultural Engineering. Weekly conferences with instruc-tor; evaluation of teaching. Preparing for and conducting demonstrations, laboratories and discussions. Preparing and grading exams. May be repeated for a total of 6 units. (S/U grading only.)— I, İI, III. (I, İİ, İİİ.)

Engineering: Biomedical

(College of Engineering)

Kyriacos Athanasiou, Chairperson of the Depart-

Department Office. 2303 Genome and Biomedical Sciences Facility (530) 752-1033; http://www.bme.ucdavis.edu

Faculty

Kyriacos Athanasiou, Ph.D., Distinguished Professor (Biomedical Engineering; Medicine: Orthopaedic

Ramsey Badawi, Ph.D., Associate Professor (Biomedical Engineering; and Medicine: Radiology)

Craig Benham, Ph.D., Professor (Biomedical Engineering; Mathematics; and Genome Center: Bioinformatics)

John Boone, Ph.D., Professor (Biomedical

Engineering; and Medicine: Radiology)
Ye Chen-Izu, Ph.D., Assistant Professor (Biomedical Engineering; Medicine: Pharmacology; and Internal Medicine)
Simon Cherry, Ph.D., Professor (Biomedical

Engineering; and Medicine: Radiology)

Fitz-Roy Curry, Ph.D., Professor (Biomedical Engineering; and Medicine: Physiology and Membrane Biology) Yong Duan, Ph.D., Professor

Marc Facciotti, Ph.D., Assistant Professor (Biomedical Engineering; and Genome Center) Katherine Ferrara, Ph.D., Professor

David Fyhrie, Ph.D., Professor (Biomedical Engineering; and Medicine: Orthopaedic Surgery)

Volkmar Heinrich, Ph.D., Associate Professor Maury Hull, Ph.D., Professor (Biomedical Engineering, and Mechanical and Aerospace Engineering)
Tonya Kuhl, Ph.D., Professor (Biomedical

Engineering; and Chemical Engineering & Materials Šcience)

J. Kent Leach, Ph.D., Associate Professor Angelique Louie, Ph.D., Professor Laura Marcu, Ph.D., Professor (Biomedical Engineering; and Medicine: Neurological Surgery)

Tingrui Pan, Ph.D., Associate Professor Atul Parikh, Ph.D., Professor (Biomedical Engineering; and Chemical Engineering & Materials Science)

Anthony Passerini, Ph.D., Assistant Professor Jinyi Qi, Ph.D., Professor

Subhadip Raychaudhuri, Ph.D., Assistant Professor Alexander Révzin, Ph.D., Associate Professor David Rocke, Ph.D., Distinguished Professor (Biomedical Engineering; and Medicine: , Biostatistics)

Leonor Saiz, Ph.D., Assistant Professor Michael Savageau, Ph.D., Distinguished Professor Eduardo Silva, Ph.D., Assistant Professor Scott Simon, Ph.D., Professor

Julie Sutcliffe, Ph.D. Associate Professor (Biomedical Engineering; and Medicine: Hematology and Oncology)

Soichiro Yamada, Ph.D., Assistant Professor Yohei Yokobayashi, Ph.D., Associate Professor

The Biomedical Engineering **Undergraduate Major**

The Biomedical Engineering program is not currently accredited by ABET but is pursuing ABET accreditation in 2012-13; http://www.abet.org.

Biomedical Engineering is an interdisciplinary area of study that integrates knowledge from engineering with the biomedical sciences. It is a very diverse field with Biomedical Engineers working in systems ranging from medical imaging to the design of artificial organs. Some major research advances in Biomedical Engineering include the left ventricular assist device (LVAD), artificial joints, kidney dialysis, bioengineered skin, angioplasty, computed tomography (CT), and flexible endoscopes. Students who choose Biomedical Engineering are interested in being of service to human health but do not routinely interact directly with patients.

The Mission of the BS degree program of the Department of Biomedical Engineering is to combine exceptional teaching with state-of-the-art research for the advancement of technologies and computational techniques that meet medical and societal challenges. As a Biomedical Engineer, you can choose from employment opportunities in industry, hospitals, academic research institutes, teaching, national laboratories, or government regulatory agencies.

Our Program Educational Objectives are for our graduates to be employed in a technical area related to Biomedical engineering or another area of their choosing or be pursuing a graduate or professional degree; and to contribute effectively to society through engineering practice, research and development, education, or in governmental, regulatory or

The Biomedical Engineering curriculum has been designed to provide a solid foundation in mathematics, life and physical sciences, and engineering, and to provide sufficient flexibility in the upper division requirements to encourage students to explore specializations within Biomedical Engineering. Our

instructional program is designed to impart knowledge of contemporary issues at the forefront of biomedical engineering research.

Students completing the program will be able to: demonstrate their ability to conduct measurements on and interpret results from experiments involving living systems; design experiments, systems, devices components, and processes to meet real-world chal-lenges for solutions to problems in biomedical research and development; identify, formulate and solve engineering problems applied to questions in medicine and biology; work effectively in groups and communicate in oral, written, computer-based and graphical forms; have an understanding of the impact of engineering solutions in a societal and global context, and a commitment to professionalism and ethical responsibility; understand the need for life-long learning; use the techniques, skills, and modern engineering tools necessary for engineering practice and for successful pursuit of post-baccalau-

For information about graduate degree options, see Biomedical Engineering (A Graduate Group), on

Lower Division Required Courses

Students are encouraged to carefully adhere to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

	UNITS
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-22B	6
Physics 9A-9B-9C	15
Chemistry 2A-2B-2C, 8A-8B or	
118A-118B	21
Engineering 6, 17	8
University Writing Program 1, or English	
3, or Comparative Literature 1, 2, 3,	
or 4, or Native American Studies 5	4
Communication 1	4
Biological Sciences 2A	4
Biomedical Engineering 1, 20	6
General Education electives	8
Minimum Lower Division Units	92

Upper Division Required Courses Engineering 100 or Electrical and

Computer Engineering 100 3
Engineering 105, 1907
Biomedical Engineering 116 or
Neurobiology Physiology Behavior
1015
Biomedical Engineering 105, 106, 107,
108, 109, 110A-110B, 11134
Science electives
To be chosen according to specialization.
Any graded upper division course in the
Biological Sciences, Chemistry or Physics
including Biological Sciences 2B, 2C,
Biomedical Engineering 102, 161A, 161L,

161S, and Physics 9D, excluding courses for GE Social Science topical breadth. Ăny graded upper division Biomedical Engineering course (except Biomedical Engineering 102, 161A, 161L, 161S). No more than 4 units allowed from lower division coursework. Engineering 4, 35, 45, 102, 103, 104, 104L, 106; Applied Science Engineering 108AB, 108L, 161AB, 165, 166, 167; Biological Systems Engineering 128, 130, 165, 175; Systems Engineering 128, 130, 165, 175; Chemical Engineering 141, 144, 155AB, 160, 161AB, 161L, 170; Computer Science 124; Electrical and Computer Engineering 110AB, 118, 130AB, 140AB, 150AB, 151, 157AB, 160; Materials Science and Engineering 147, 160, 162, 162L, 164, 172, 172L, 174, 174L, 180, 181, 182; Mechanical Engineering 50. 181, 182; Mechanical Engineering 50, 150AB, 151, 152, 154, 165, 171, 172.

Minimum Upper Division Units77
Minimum Total Units Required for
Major 161
General Education electives24-29
Minimum Total Units for B.S. in
Biomedical Engineering 185-190
Additional upper division elective policies:

- 2 units from Chemistry 118AB may be applied towards Science electives if 118AB are also used to satisfy lower division subject credit.
- 2 units from Electrical and Computer Engineering 100 may be applied towards Engineering electives if Electrical and Computer Engineering 100 is taken to satisfy upper division subject
- 4 units of Biomedical Engineering 199 may be counted towards Engineering or Science electives with approval of Biomedical Engineering Undergraduate Committee.

Science electives and Engineering Electives are to be selected in consultation with a staff or faculty advisor.

Areas of Specialization

As Biomedical Engineering is defined so broadly, specializing in a subfield of engineering can help to provide more in-depth expertise in a focus area. Through judicious selection of upper division engineering and science electives, students can create this depth in one of our suggested areas of specialization or in an area of the student's choosing. One of the strengths of the UC Davis program is this flexibility to design one's own emphasis of study. These specializations are neither required nor degreenotated:

Biomechanics

This is a broad subfield that includes orthopedic/ rehabilitation engineering (design of wheelchairs, prosthetics etc) as well as the study of mechanical forces produced by biological systems. Biomechanics allows a better understanding of the fluid dynamics of blood flow and forces acting on tissue in the artery to allow design of better cardiovascular interventions. This field involves more intensive study of mechanics, dynamics and thermodynamics.

Cellular and Tissue

The application of biomedical engineering principles to control cellular behavior at the gene, protein, cell, and tissue level. Scientists in this area can work in diverse areas including cellular therapies, protein production, gene therapy, tissue engineering and regeneration, and biomaterials development. Depending upon the area of interest, this field can require more in depth study in biomedical transport, natural or synthetic biomaterials, pharmacokinetics and pharmacodynamics. This area draws heavily from knowledge in the chemical and biological sci-

Imaging

The visualization of living tissues for diagnosis of disease. An imaging scientist can work in areas rang ing from developing instruments for imaging, to creating algorithms for three-dimensional reconstruction of imaging data, to generating new contrast agents for enhancing image quality. Depending upon the area of medical imaging of interest, this field can require more in depth study in electronics signal processing, chemistry or computer programming.

Medical Devices

The development of an instrument, apparatus, machine, implant, in vitro reagent, which is intended for use in the diagnosis of disease or other conditions, or in the treatment, or prevention of disease. Medical devices do not achieve any primary purpose through chemical actions within/on the body nor are dependent on metabolization. Biomedical engineers have begun to combine technologies from pharmaceuticals and electronics with mechanical

devices in the development of combination medical

Systems & Synthetic Biology

Concepts, principles and techniques from engineering are applied to build and understand biological processes and systems at a fundamental level. Engineers describe biochemical, genetic and mechanical processes mathematically and integrate this information into models of natural and synthetic systems. These models are analyzed analytically, computationally and statistically to uncover design principles of natural systems and to guide development of methods capable of redirecting normal expression for biotechnological purposes or correcting pathological expression for therapeutic purposes

Pre-Medical Students

To meet admission requirements for the various medical school programs, students must complete extra course work. These courses will be in addition to the listed BME curricular requirements.

Courses in Biomedical Engineering (BIM)

Lower Division Courses

1. Introduction to Biomedical Engineering

Lecture — 2 hours. Pass one open to freshmen. Introduction to the field of biomedical engineering with examples taken from the various areas of specialization within the discipline. Areas include (1) nano-bioengineering, (2) cellular bioengineering, (3) tissue bioengineering, (4) computational bioengineering, and (5) biomedical imaging. GE credit: SciEng | SE, SL.—I. (I.) Savageau

20. Fundamentals of Bioengineering (4)

Lecture-4 hours. Prerequisite: Physics 9B and Mathematics 21D. Basic principles of mass, energy and momentum conservation equations applied to solve problems in the biological and medical sciences. Only two units of credit to students who have previously taken Chemical Engineering 51, Engineering 105. GE credit: QL, SE, VL.—III. (III.) Silva

89A. Topics in Biomedical Engineering (1-5)

Prerequisite: consent of instructor. Restricted to lower division students. Topics in Biomedical Engineering. (A) Cellular and Molecular Engineering. May be repeated for credit when topic differs. GE credit: SE.

89B. Topics in Biomedical Engineering (1-5)

Prerequisite: consent of instructor. Restricted to lower division students. Topics in Biomedical Engineering. (B) Biomedical Imaging. May be repeated for credit when topic differs. GE credit: SE.

89C. Topics in Biomedical Engineering (1-5)

Prerequisite: consent of instructor. Restricted to lower division students. Topics in Biomedical Engineering. (C) Biomedical Engineering. May be repeated for credit when topic differs. GE credit: SE.

99. Special Study for Undergraduates (1-5) (P/NP grading only.) GE credit: SE.

Upper Division Courses

102. Quantitative Cell Biology (4)

Lecture/discussion-4 hours. Prerequisite: Biological Sciences 2A; Physics 9B; Mathematics 22B; Chemistry 8B. Fundamental cell biology for bioengineers. Emphasis on physical concepts underlying cellular processes including protein trafficking, cell motility, cell division and cell adhesion. Current topics including cell biology of cancer and stem cells will be discussed. Only two units of credit for students who have completed Biological Sciences 104 or Molecular and Cellular Biology 143. GE credit: QL, SE, VL.—I. (I.) Yamada

105. Probability, Random Processes, and Statistics for Biomedical Engineers (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: Mathematics 21D; upper division. Concepts of probability, random variables and processes, and statistical analysis with applications to engineering problems in biomedical sciences. Contents include

discrete and continuous random variables, probability distributions and models, hypothesis testing, statistical inference and stochastic processes. Emphasis on BME applications. Limited to upper division standing. GE credit: QL, SE, VL.—I. (I.) Saiz

106. Biotransport Phenomena (4)

Lecture — 4 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101 or equivalent, Physics 9B, Mathematics 22B, grade of C- or better in Biomedical Engineering 20, or consent of instructor. Open to Biomedical Engineering majors only. Principles of momentum and mass transfer with applications to biomedical systems; emphasis on basic fluid transport related to blood flow, mass transfer across cell membranes, and the design and analysis of artificial human organs. GE credit: QL, SE, SL, VL.—II. (II.) Leach

107. Mathematical Methods for Biological Systems (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 20; Mathematics 22B; Engineering 6 Restricted to Biomedical Engineering majors only. Mathematical and computational modeling to solve biomedical problems. Topics include stochastic processes and Monte Carlo simulations, and partial differential equations. Introduced to numerical techniques in MATLAB. GE credit: QL, SE, VL.-II. (II.) Duan

108. Biomedical Signals and Control (4)

Lecture - 4 hours. Prerequisite: Engineering 6, 17; grade of C- or better in Mathematics 22B. Restricted to Biomedical Engineering majors only. Systems and control theory applied to biomedical engineering problems. Time-domain and frequency-domain analyses of signals and systems, convolution, Laplace and Fourier transforms, transfer function, dynamic behavior of first and second order processes, and design of control systems for biomedical applications. No credit for students who have taken Electrical and Computer Engineering 150A; two units of credit for students who have taken Mechanical Engineering 171. GE credit: SciEng | QL, SE.-III. (III.)

109. Biomaterials (4)

Lecture-4 hours. Prerequisite: course 106 Restricted to upper-division Engineering majors. Introduce important concepts for design, selection and application of biomaterials. Given the interdisciplinary nature of the subject, principles of polymer science, surface science, materials science and biology will be integrated into the course. GE credit: SE, SL, VL. - III. (III.) Revzin

110A. Biomedical Engineering Senior Design Experience (3)

cture/discussion-1 hour; laboratory-6 hours. Prerequisite: courses 107, 108, 109. Restricted to senior Biomedical Engineering majors (or by consent of instructor). Application of bioengineering theory and experimental analysis to a design project culminating in the design of a unique solution to a problem. Design may be geared towards current applications in biotechnology or medical technology. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | OL, SE, SL, VL.—II. (II.) Louie, Passerini

110B. Biomedical Engineering Senior **Design Experience (3)**

Lecture/discussion-1 hour; laboratory-6 hours. Prerequisite: course 110A. Restricted to senior Biomedical Engineering majors (or by consent of instructor). Application of bioengineering theory and experimental analysis to a design project culminating in the design of a unique solution to a problem. Design may be geared towards current applications in biotechnology or medical technology. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | OL, SE, SL, VL.—III. (III.) Louie, Pas-

110L. Biomedical Engineering Senior Design Lab (2)

Laboratory-5 hours. Prerequisite: courses 107, 108, 109. Restricted to senior Biomedical Engineering majors. Application of fabrication and computer aided design techniques to the development of biomedical devices. Techniques will be utilized for senior design projects pursued in courses 110A and 110B. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE.-I. (I.) Louie, Passerini

111. Biomedical Instrumentation Laboratory (6)

Lecture—4 hours; laboratory—6 hours. Prerequisite: courses 105, 107 and 108; Engineering 100 or Electrical Engineering 100; Neurology, Physiology, & Behavior 101 or equivalent. Open to Biomedical Engineering majors only. Basic biomedical signals and sensors. Topics include analog and digital records using electronic, hydrodynamic, and optical sensors, and measurements made at cellular, tissue and whole organism level. GE credit: QL, SE, SL.— II. (II.) Marcu, Pan

116. Physiology for Biomedical Engineers

Lecture - 2 hours; discussion - 3 hours. Prerequisite: Biological Sciences 2A, Mathematics 22B, Physics 9C. Basic human physiology for the nervous, musculoskeletal, cardiovascular, respiratory, gastrointesti nal, renal, and endocrine systems. Emphasis on small group design projects and presentations in interdisciplinary topics relating biomedical engineering to medical diagnostic and therapeutic applications. GE credit: Wrt | OL, SE, SL, VL, WE. - I. (I.)

117. Analysis of Molecular and Cellular Networks (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: grade of C- or better in Biological Sciences 2A and Mathematics 22A. Restricted to upper division standing. Network themes in biology, emphasizing metabolic, genetic, and developmental networks. Mathematical and computational methods for analysis of such networks. Elucidation of design principles in natural networks. Engineering and ethical issues in the design of synthetic networks. Offered alternate years. GE credit: SciEng | QL, SE, SL, VL.-III. Savageau

118. Microelectromechanical Systems (4)

Lecture - 2 hours; laboratory - 3 hours; discussion -1 hour. Prerequisite: Chemistry 2A; Engineering 100; Biomedical Engineering 106 or Engineering 103. Restricted to upper division standing. Introduction to the theory and practice of micro-electrome chanical systems (MEMS), including fundamentals of micro-nanofabrication, microscale sensing and actuation, self assembly, microfluidics and lab-on-a-chip. Weekly hands-on laboratory sections are emphasized on implementation and utilization of MEMS technologies. GE credit: QL, SE.-II. (II.) Pan

126. Tissue Mechanics (3)

Lecture - 2 hours; laboratory/discussion - 3 hours. Prerequisite: Exercise Science 103 and/or Engineering 45 and/or consent of instructor. Structural and mechanical properties of biological tissues, including bone, cartilage, ligaments, tendons, nerves, and skeletal muscle. (Same course as Exercise Science 126.) GE credit: QL, SE, SL, WE.—II. (II.) Hawkins

140. Protein Engineering (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 2A, Chemistry 8B. Introduction to protein structure and function. Modern methods for designing, producing, and characterizing novel proteins and peptides. Design strategies, computer modeling, heterologous expression, in vitro mutagenesis. Protein crystallography, spectroscopic and calorimetric methods for characterization, and other techniques. Offered in alternate years. GE credit: QL, SE', SL, VL.—I. Facciotti

141. Cell and Tissue Mechanics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Physics 9C; Engineering 35 or equivalent. Mechanical properties that govern blood flow in the microcirculation. Concepts in blood rheology and cell and tissue viscoelasticity, biophysical aspects of cell migration, adhesion, and motility. GE credit: QL, SE, VL.—II. (II.) Parikh

142. Principles and Practices of Biomedical Imaging (4)

Lecture—4 hour. Prerequisite: Physics 9D, Mathematics 22B, course 108 (may be taken concurrently). Basic physics, engineering principles, and applications of biomedical imaging techniques including xray imaging, computed tomography, magnetic resonance imaging, ultrasound and nuclear imaging. GE credit: QL, SE, SL, VL.—III. (III.) Ferrara

151. Mechanics of DNA (3)

Lecture - 3 hours. Prerequisite: Biological Sciences 2A and Mathematics 22B. Structural, mechanical and dynamic properties of DNA. Topics include DNA structures and their mechanical properties, in vivo topological constraints on DNA, mechanical and thermodynamic equilibria, DNA dynamics, and their roles in normal and pathological biological processes. Offered in alternate years. GE credit: OL, QL, SE.—III. Benham

161A. Biomolecular Engineering (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Biological Sciences 2A; Chemistry 8B. Restricted to upper division standing. Introduction to the basic concepts and techniques of biomolecular engineer ing such as recombinant DNA technology, protein engineering, and molecular diagnostics. Three units of credit for students who have taken course 161S. Offered in alternate years. GE credit: SciEng | QL, SE.-I. Yokobayashi

161L. Biomolecular Engineering Laboratory

Laboratory-4.5 hours; lecture/discussion-1.5 hours. Prerequisite: course 161A or Biological Sciences 101, or consent of instructor. Introduction to the basic techniques in biomolecular engineering. Lectures, laboratory, and discussion sessions will cover basic techniques in DNA cloning, bacterial cell culture, gene regulation, protein expression, and data analysis. Offered alternate years. GE credit: SciEng | QL, SE, SL.—I. Yokobayashi

1615. Biomolecular Engineering: Brief Course (1)

Lecture - 1 hour. Prerequisite: Biological Sciences 2A; Chemistry 8B; course 161L (may be taken concurrently). Basic concepts and techniques in biomolecular analysis, recombinant DNA technology, and protein purification and analysis. Not open for credit to students who have taken course 161A. Not offered every year. GE credit: SciEng | QL, SE.—IV. Yokobayashi

162. Introduction to the Biophysics of Molecules and Cells (4)

Lecture — 4 hours. Prerequisite: Mathematics 22B and Physics 9C. Introduction to fundamental physical mechanisms governing structure and function of bio-macromolecules. Emphasis on a quantitative understanding of the nano- to microscale biome chanics of interactions between and within individual molecules, as well as of their assemblies, in particular membranes. Offered in alternate years. GE credit: QL, SE, SL.—II. Heinrich

163. Bioelectricity, Biomechanics, and Signaling Systems (4)

Lecture - 2 hours; lecture/discussion - 1 hour; project-1 hour. Prerequisite: course 116 or the equivalent; grade of C- or better in Mathematics 22B. Fundamentals of bioelectricity in cells, the calcium signaling system, and mechanical force generation in muscle. Combination of lecture and projects to promote learning of important concepts in hands-on projects using neurons and muscle as microcosms. GE credit: QL, SE.—III. (III.) Chen-Izu

167. Biomedical Fluid Mechanics (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 106 (may be taken concurrently) or Engineering 103. Basic biofluid mechanics, Navier Stokes equations of motion, circulation, respiration and specialized applications including miscellaneous topics such as boundary layer flow. Not open for credit to ing 167C. Not offered every year. GE credit: QL, SE. students who have completed Mechanical Engineer-

173. Cell and Tissue Engineering (4)

Lecture/discussion-4 hours. Prerequisite: grade of C- or better in courses 106 and 109. Engineering principles to direct cell and tissue behavior and formation. Cell sourcing, controlled delivery of macromolecules, transport within and around biomaterials, bioreactor design, tissue design criteria and outcomes assessment. GE credit: SciEng | OL, SE, SL, WE.—I. (I.) Leach

189A-C. Topics in Biomedical Engineering

Prerequisite: consent of instructor. Topics in Biomedical Engineering. (A) Cellular and Molecular Engineering (B) Biomedical Imaging (C) Biomedical Engineering. May be repeated if topic differs. Not offered every year. GE credit: SE.

190A. Upper Division Seminar in Biomedical Engineering (1)

Seminar-1 hour. Prerequisite: upper division standing. In depth examination of research topics in a small group setting. Question and answer session with faculty members. May be repeated for credit. (P/NP grading only.) GE credit: SE.

192. Internship in Biomedical Engineering

Internship - 3-36 hours. Prerequisite: consent of instructor. Restricted to upper division majors. Supervised work experience in the Biomedical Engineering field. May be repeated for credit. (P/NP grading only.) GE credit: SE.—I, II, III, IV. (I, II, III, IV.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. May be repeated up to three times for credit. (P/NP grading only.) GE credit: SE.-I, II, III. (I, II, III.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. Special study for advanced undergraduates. (P/NP grading only.) GE

Biomedical Engineering Minor

This minor allows students from any engineering discipline to build upon their existing core strengths and add expertise in biomedical applications. This additional training would help to make students more attractive to employers in the medical device industry, and also position the students for graduate training in health related applications of engineering. The minor requires two life sciences courses, not typically required for engineering students, one at the cellular (Biomedical Engineering 102) and the other at the physiological (Neurobiology, Physiology, and Behavior 101 or Biomedical Engineering 116) level. The remaining 12 units are to be selected in consultation with an advisor from the list of upper division Biomedical Engineering courses. Students will be advised to select additional courses to complement their existing curricula; examples of relevant course-work for different majors are provided as a reference. These listings classify the upper division BIM courses into categories and provide a suggested subset of coursework for the majors most likely to have students interested in health-related applica-

All courses must be taken for a letter grade. Grade of C- or better required for all courses used to satisfy minor requirements with overall GPA in minor requirement courses of 2.000 or better. No more than 1 course counted towards both the student's major and the minor.

Minor Requirements

UNITS Neurobiology, Physiology, and Behavior 101 or Biomedical Engineering

116 Physiology...... 5 Biomedical Engineering 102 Quantitative Cell Biology....

Select 12 units from Biomedical Engineering 117, 118, 126, 140, 141, 142, 143, 151, 152, 161A, 161L, 162, 163, 173, 189A,

Total units for the Minor.....21

Minor Advisors. Rosalind Christian, Angelique

The Graduate Program in **Biomedical Engineering**

Doctoral and Masters degrees in Biomedical Engineering are offered through the interdisciplinary Graduate Group in Biomedical Engineering. Pléase see http://www.bme.ucdavis.edu and Biomedical Engineering (A Graduate Group), on page 180 of the catalog for a description of graduate education offerings, requirements, group faculty and research

Graduate Courses

202. Cell and Molecular Biology for Engineers (4)

Lecture/discussion—4 hours. Prerequisite: Biological Sciences 104 or Molecular and Cellular Biology 121. Preparation for research and critical review in the field of cell and molecular biology for biomedical or applied science engineers. Emphasis on biophysical and engineering concepts intrinsic to specific topics including receptor-ligand dynamics in cell signaling and function, cell motility, DNA replication and RNA processing, cellular energetics and protein sorting. Modern topics in bioinformatics and proteomics.—II. (II.) Yamada

204. Physiology for Bioengineers (5)

Lecture — 4 hours. Prerequisite: Biological Sciences 1A or equivalent; graduate standing or consent of instructor. Basic human physiology of the nervous, muscular, cardiovascular, respiratory, and renal systems and their interactions; Emphasis on the physical and engineering principles governing these systems, including control and transport process, fluid dynamics, and electrochemistry. – I. (I.) Benham

209. Scientific Integrity for Biomedical Engineers (2)

Lecture - 1 hour; discussion - 1 hour. Scientific integrity and ethics for biomedical engineers, with emphasis and discussion on mentoring, authorship and peer review, use of humans and animals in biomedical research, conflict of interest, intellectual property, genetic technology and scientific record keeping. Biomedical Engineering majors only. (S/U grading only.) — III. (III.) Simon

210. Introduction to Biomaterials (4)

Lecture-4 hours. Prerequisite: Engineering 45 or consent of instructor. Mechanical and atomic properties of metallic, ceramic, and polymeric implant materials of metallic, ceramic, and polymeric implant materials; corrosion, degradation, and failure of implants; inflammation, wound and fracture healing, blood coagulation; properties of bones, joints, and blood vessels; biocompatibility of orthopaedic and cardiovascular materials

211. Design of Polymeric Biomaterials and Biological Interfacés (4)

Lecture — 4 hours. Prerequisite: Engineering 45 or consent of instructor; upper division undergraduates or graduate students. Design, selection and application of polymeric biomaterials. Integration of the principles of polymer science, surface science, materials science and biology.—II. (II.) Revzin

212. Biomedical Heat and Mass Transport Processes (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: Mechanical Engineering 165, Biological Systems Engineering 125, Chemical Engineering 153 or the equivalent. Application of principles of heat and mass transfer to biomedical systems related to heat exchange between the biomedical system and its environment, mass transfer across cell membranes and the design and analysis of artificial human organs. (Same course as Mechanical and Aeronautical Engineering 212.) Offered in alternate years. (II.) Alderidge

213. Principles and Applications of Biological Sensors (4)

Lecture-4 hours. Prerequisite: Chemistry 2C. Biological sensors based on principles of electrochemical, optical and affinity detection. Methods for

integration of sensing elements (e.g. enzymes) into biosensors and miniaturization of biosensors.—I. (I.)

214. Blood Cell Biomechanics (4)

Lecture—4 hours. Prerequisite: Engineering 102. Mechanical properties that govern blood flow in the microcirculation and cell adhesion and motility. Constitutive equations of vasculature tissue and blood. Blood rheology and viscoelasticity. Red and white blood cell mechanics. Remodeling of blood vessels in disease and engineering of blood vessels and cells.—II. Simon

215. Biomedical Fluid Mechanics and Transport Phenomena (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103 or Chemical Engineering 150B or Civil and Environmental Engineering 141. Application of fluid mechanics and transport to biomedical systems. Flow in normal physiological function and pathological conditions. Topics include circulatory and respiratory flows, effect of flow on cellular processes, transport in the arterial wall and in tumors, and tissue engineering. (Same course as Mechanical and Aeronautical Engineering 215.)—III. (III.)

216. Advanced Topics in Cellular Engineering (4)

Lecture—4 hours. Prerequisite: course 214 or consent of instructor. Advanced research strategies and technologies used in the study of immune function and inflammation. Static and dynamic measurements of stress, strain, and molecular scale forces in blood and vascular cells, as well as genetic approaches to the study of disease.—I. (I.) Simon

217. Mechanobiology in Health and Disease (4)

Lecture/discussion—4 hours. Prerequisite: course 106 or equivalent (e.g. Engineering 103), Biological Sciences 101 or equivalent, Neurology, Physiology, and Behavior 101 or equivalent. Principles by which biomechanical forces affect cell and tissue function to impact human health and disease. Emphasis on cardiovascular system: structure and function, biofluid mechanics and mechanotransduction, disease mechanisms and research methods. Cartilage, bone and other systems; current topics discussed.—III. (III.) Passerini

218. Microsciences (4)

Lecture/discussion—4 hours. Introduction to the theory of physical and chemical principles at the microscale. Scale effects, surface tension, microfluidic mechanics, micromechanical properties, intermolecular interactions and micro tribology. (Same course as Electrical and Computer Engineering 244B.)—I. (I.) Islam, Kiehl, Pan

222. Cytoskeletal Mechanics (4)

Lecture/discussion—4 hours. Prerequisite: course 202. Current topics in cytoskeletal mechanics including physical properties of the cytoskeleton and motor proteins, molecular force sensor and generator, cytoskeletal regulation of cell motility and adhesion. Offered in alternate years.—(I.) Yamada

223. Multibody Dynamics (4)

Lecture—4 hours. Prerequisite: Engineering 102. Coupled rigid-body kinematics/dynamics; reference frames; vector differentiation; configuration and motion constraints; holonomicity; generalized speeds; partial velocities; mass; inertia tensor/theorems; angular momentum; generalized forces; comparing Newton/Euler, Lagrange's, Kane's methods; computer-aided equation derivation; orientation; Euler; Rodrigues parameters. (Same course as Mechanical and Aeronautical Engineering 223.)—II. (II.) Eke, Hubbard

225. Spatial Kinematics and Robotics (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: C Language and course 222. Spatial kinematics, screw theory, spatial mechanisms analysis and synthesis, robot kinematics and dynamics, robot workspace, path planning, robot programming, real-time architecture and software implementation. (Same course as Mechanical and Aeronautical Engineering 225.) Offered in alternate years.—II. Cheng

227. Research Techniques in Biomechanics (4)

Lecture—2 hours; laboratory—4 hours; term paper/discussion—1 hour. Prerequisite: consent of instructor, Mathematics 22B; Exercise Science 115 recommended. Experimental techniques for biomechanical analysis of human movement are examined. Techniques evaluated include data acquisition and analysis by computer, force platform analysis, strength assessment, planar and three-dimensional videography, data reduction and smoothing, body segment parameter determination, electromyography, and biomechanical modeling. (Same course as Mechanical and Aeronautical Engineering 227/Exercise Science 227.)—II. (II.) Williams, Hawkins

228. Skeletal Muscle Mechanics: Form, Function, Adaptability (4)

Lecture—4 hours. Prerequisite: basic background in biology, physiology, and engineering; Engineering 35 and 45, Mathematics 21D; Neurobiology, Physiology, and Behavior 101 recommended. Basic structure and function of skeletal muscle examined at the microscopic and macroscopic level. Muscle adaptation in response to aging, disease, injury, exercise, and disuse. Analytic models of muscle function are discussed. (Same course as Exercise Science 228.)—I. (I.) Hawkins

231. Musculo-Skeletal System Biomechanics (4)

Lecture—4 hours. Prerequisite: Engineering 102. Mechanics of skeletal muscle and mechanical models of muscle, solution of the inverse dynamics problem, theoretical and experimental methods of kinematic and kinetic analysis, computation of intersegmental load and muscle forces, applications to gait analysis and sports biomechanics. [Same course as Mechanical and Aeronautical Engineering 231.]—III. [III.] Hull

232. Skeletal Tissue Mechanics (3)

Lecture—3 hours; laboratory—1 hour. Prerequisite: Engineering 104B. Overview of the mechanical properties of the various tissues in the musculoskeletal system, the relationship of these properties to anatomic and histologic structure, and the changes in these properties caused by aging and disuse. The tissues covered include bone, cartilage and synovial fluid, ligament and tendon. (Same course as Mechanical and Aeronautical Engineering 232.)—III. (III.) Fyhrie

239. Advanced Finite Elements and Optimization (4)

Lecture—4 hours. Prerequisite: Engineering 180 or Applied Science 115 or Mathematics 128C. Introduction to advanced finite elements and design optimization methods, with application to modeling of complex mechanical, aerospace and biomedical systems. Application of states of the art in finite elements in optimum design of components under realistic loading conditions and constraints. Offered in alternate years. (Same course as Mechanical Engineering 239.)—(II.) Sarigul-Klijn

240. Computational Methods in Nonlinear Mechanics (4)

Lecture—4 hours. Prerequisite: Applied Science Engineering 115 or Mathematics 128B or Engineering 180. Deformation of solids and the motion of fluids treated with state-of-the-art computational methods. Numerical treatment of nonlinear dynamics; classification of coupled problems; applications of finite element methods to mechanical, aeronautical, and biological systems. Offered in alternate years. (Same course as Mechanical and Aeronautical Engineering 240.)—II. Sarigul-Klign

241. Introduction to Magnetic Resonance Imaging (3)

Lecture—3 hours. Prerequisite: Physics 9D, Mathematics 22B. Equipment, methods, medical applications of MRI. Lectures review basic, advanced pulse sequences, image reconstruction, display and technology and how these are applied clinically. Lecture complements a more technical course. (course 246 can be taken concurrently.)—I. (I.) Buonocore

242. Introduction to Biomedical Imaging (4)

Lecture—4 hours. Prerequisite: Physics 9D and Electrical and Computer Engineering 106 or consent of instructor. Basic physics and engineering principles of image science. Emphasis on ionizing and nonionizing radiation production and interactions with the body and detectors. Major imaging systems: radiography, computed tomography, magnetic resonance, ultrasound, and optical microscopy.

243. Radiation Detectors for Biomedical Applications (4)

Lecture/discussion—4 hours. Prerequisite: Physics 9D, Mathematics 21D, 22B. Radiation detectors and sensors used for biomedical applications. Emphasis on radiation interactions, detection, measurement and use of radiation sensors for imaging. Operating principles of gas, semiconductor, and scintillation detectors.—II. (II.) Cherry

246. Magnetic Resonance Technology (3)

Lecture—3 hours. Prerequisite: Physics 9D, Mathematics 22B. Course covers MRI technology at an advanced level with emphasis on mathematical descriptions and problem solving. Topics include spin dynamics, signal generation, image reconstruction, pulse sequences, biophysical basis of T1, T2, RF, gradient coil design, signal to noise, image artifacts.—I. (I.) Buonocore

247. Current Concepts in Magnetic Resonance Imaging I (3)

Lecture—3 hours. Prerequisite: course 241 or 246 or consent of instructor. Modern pulse sequences, pulse sequence options, and biomedical/industrial applications; velocity encoded phase imaging and angiography, echo planar imaging, spiral imaging, computer simulation of MRI, fast spin echo, other topics.—Buonocore

248. Current Concepts in Magnetic Resonance Imaging II (3)

Lecture—3 hours. Prerequisite: course 247 or consent of instructor. Continuation of lecture coverage of modern pulse sequences, pulse sequence options, and biomedical/industrial applications: Control of tissue contrast by magnetization refocusing and spoiling, RF pulse design, diffusion and perfusion imaging, image artifact reduction methods, others.—Buonocore

250. Mathematical Methods of Biomedical Imaging (4)

Lecture — 4 hours. Prerequisite: graduate standing or consent of instructor. Advanced mathematical techniques with emphasis on imaging systems. Matrices and vector spaces, Fourier analysis, integral transforms, signal representations, probability and random processes.

251. Medical Image Analysis (4)

Lecture—4 hours. Prerequisite: Electrical and Computer Engineering 106. Techniques for assessing the performance of medical imaging systems. Principles of digital image formation and processing. Measurements that summarize diagnostic image quality and the performance of human observers viewing those images. Definition of ideal observer and other mathematical observers that may be used to predict performance from system design features.

252. Computational Methods in Biomedical Imaging (4)

Lecture—4 hours. Prerequisite: course 105 or Statistics 120; course 108 or Electrical and Computer Engineering 150A. Analytic tomographic reconstruction from projections in 2D and 3D; model-based image reconstruction methods; maximum likelihood and Bayesian methods; applications to CT, PET, and SPECT. (Same course as Electrical and Computer Engineering 205.)—II. (II.) Qi

255. Biophotonics in Medicine and the Life Sciences (3)

Lecture/discussion—3 hours. Prerequisite: Physics 108 and Biology 101-105; course 202 highly recommended; graduate standing. Introduction to the science and technology of biomedical optics and photonics, with an overview of applications in medicine and the life sciences. Emphasis on research supported by the NSF Center for Biophotonics at UC

Davis Medical Center. (Same course as Applied Science 255 and Biophysics 255.)—II. (II.) Chuang, Matthews

257. Fundamentals of Tissue Optics and Biomedical Applications (5)

Lecture—3 hours; discussion—1 hour; laboratory—3 hours. Fundamentals of optical properties of tissue. Range of optical technologies and their applications to tissue characterization and diagnostics.—III. (III.) Marcu, Wachsmann-Hogiu

262. Cell and Molecular Biophysics for Bioengineers (4)

Lecture—4 hours. Prerequisite: course 284 or equivalent; graduate standing; undergraduate students by consent of instructor. Introduction to fundamental mechanisms governing the structure, function, and assembly of bio-macromolecules. Emphasis is on a quantitative understanding of the nano-to-microscale interactions between and within individual molecules, as well as of their assemblies, in particular membranes. Not open for credit to students who have completed course 162.—II. (II.) Heinrich

270. Biochemical Systems Theory (4)

Lecture—4 hours. Prerequisite: course 202 concurrently or consent of instructor. Systems biology at the biochemical level. Mathematical and computational methods emphasizing nonlinear representation, dynamics, robustness, and optimization. Case studies of signal-transduction cascades, metabolic networks and regulatory mechanisms. Focus on formulating and answering fundamental questions concerning network function, design, and evolution.—I. (I.) Savageau

271. Gene Circuit Theory (4)

Lecture—4 hours. Prerequisite: course 270 or 202 and consent of instructor. Analysis, design, and construction of gene circuits. Modeling strategies, elements of design, and methods for studying variations in design. Case studies involving prokaryotic gene circuits to illustrate natural selection, discovery of design principles, and construction of circuits for engineering objectives.—II. (II.) Savageau

272. Tissue Engineering (3)

Lecture/discussion—3 hours. Prerequisite: Biological Sciences 104 or Molecular and Cellular Biology 121. Based on morphogenetic signals, responding stem cells and extracellular matrix scaffolding. Design and development of tissues for functional restoration of various organs damaged/lost due to cancer, disease and trauma. Fundamentals of morphogenetic signals, responding stem cells and extracellular matrix scaffolding.—II. (II.) Reddi

273. Integrative Tissue Engineering and Technologies (4)

Lecture/discussion—4 hours. Prerequisite: courses 202 and 204 or similar; graduate standing; course 272 strongly encouraged, although not a prerequisite. Engineering principles to direct cell and tissue behavior and formation. Contents include controlled delivery of macromolecules, transport within and around biomaterials, examination of mechanical forces of engineered constructs, and current experimental techniques used in the field.—I. (I.) Leach

281. Acquisition and Analysis of Biomedical Signals (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 100, Statistics 130A. Basic concepts of digital signal recording and analysis; sampling; empirical modeling; Fourier analysis, random processes, spectral analysis, and correlation applied to biomedical signals.—III. (III.) Heinrich

282. Biomedical Signal Processing (4)

Lecture — 4 hours. Prerequisite: Electrical and Computer Engineering 150A, 150B. Characterization and analysis of continuous- and discrete-time signals from linear systems. Examples drawn from physiology illustrate the use of Laplace, Z, and Fourier transforms to model biological and bioengineered systems and instruments. Filter design and stochastic signal modeling. Genomic signal processing.

284. Mathematical Methods for Biomedical Engineers (4)

Lecture/discussion—4 hours. Prerequisite: Mathematics 22B, Statistics 130A, or consent of instructor; upper division biomedical engineering majors, and graduate students in sciences and engineering; priority given to Biomedical Engineering graduate students. Theoretical applications of linear systems, ordinary and partial differential equations, and probability theory and random processes that describe biological systems and instruments that measure them. Students will be introduced to numerical solution techniques in MATLAB.—(I.) I. Raychaud-

285. Computational Modeling in Biology and Immunology (4)

Lecture/discussion—4 hours. Prerequisite: graduate standing or consent of instructor. Essential computational modeling techniques in biology and immunology. Emphasis on applications of Monte Carlo methods in studying immune recognition and response. Introduction to Brownian dynamics and Molecular dynamics simulations as applied in molecular level diffusion and interactions.—III. (III.) Ray-chaudhuri

286. Nuclear Imaging in Medicine and Biology (4)

Lecture/discussion—4 hours. Prerequisite: course 243 or consent of instructor. Radioactive decay, interaction of radiation with matter, radionuclide production, radiation detection, digital autoradiography, gamma camera imaging, single photon emission computed tomography, positron emission tomography and applications of these techniques in biology and medicine.—III. (III.) Cherry

287. Concepts in Molecular Imaging (4)

Lecture—2 hours; lecture/discussion—2 hours; term paper. Prerequisite: Chemistry 2C, Mathematics 21C, Physics 9D, consent of instructor. Current techniques and tools for molecular imaging. Emphasis on learning to apply principles from the physical sciences to imaging problems in medicine and biology.—III. (III.) Sutclife

289A-E. Selected Topics in Biomedical Engineering (1-5)

Variable. Prerequisite: consent of instructor. Selected topics in (A) Cellular and Molecular Systems Engineering; (B) Biomedical Imaging; (C) Computational Bioengineering; (D) Cell and Tissue Biomechanics; (E) Analysis of Human Movement. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)

290. Seminar (1)

Seminar—1 hour. Seminar in biomedical engineering. (S/U grading only.)

290C. Graduate Research Conference (1)

Discussion—1 hour. Prerequisite: consent of instructor. Individual and/or group conference on problems, progress, and techniques in biomedical engineering research. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

298. Directed Group Study (1-5)

Open to graduate students in the Biomedical Engineering Graduate Group, or consent of instructor. Directed group study in Biomedical Engineering. (S/U grading only.)—I, II, III. (I, II, III.)

299. Research (1-12)

(S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Engineering: Chemical Engineering and Materials Science

(College of Engineering)

Ahmet Palazoglu, Ph.D., Chairperson of the Department (530) 752-5132; Fax (530) 754-6350

Department Office. 3001 Ghausi Hall (530) 752-6496; Fax (530) 752-1031; http://chms.engineering.ucdavis.edu

Faculty

Klaus van Benthem, Ph.D., Assistant Professor David E. Block, Ph.D., Professor and Endowed Chair (Chemical Engineering, Viticulture and Enology) Academic Senate Distinguished Teaching Award Roger B. Boulton, Ph.D., Professor and Endowed Chair (Chemical Engineering, Viticulture and

Ricardo Castro, Ph.D., Assistant Professor Stephanie R. Dungan, Ph.D., Professor (Chemical Engineering, Food Science and Technology) Nael El-Farra, Ph.D., Associate Professor Roland Faller, Ph.D., Professor Bruce C. Gates, Ph.D., Distinguished Professor Jeffery C. Gibeling, Ph.D., Professor Niels Jensen, Ph.D., Professor (Chemical

Engineering & Materials Science, Mechanical & Aeronautical Engineering) Sangtae Kim, Ph.D., Associate Professor

Denise Krol, Ph.D., Professor
Tonya L. Kuhl, Ph.D., Professor
Enrique J. Lavernia, Ph.D., Distinguished Professor
Marjorie L. Longo, Ph.D., Professor

Subhash Mahajan, Ph.D., Distinguished Professor Karen A. McDonald, Ph.D., Professor Grea Miller, Ph.D., Professor

Greg Miller, Ph.D., Professor Adam Moulé, Ph.D., Assistant Professor Alexandra Navrotsky, Ph.D., Distinguished Professor and Endowed Chair (Materials Science and Engineering; Chemistry; Land, Air and Water Resources)

Ann Orel, Ph.D., Professor Ahmet Palazoglu, Ph.D., Professor Atul Parikh, Ph.D., Professor (Chemical Engineering & Materials Science, Biomedical Engineering) Ronald J. Phillips, Ph.D., Professor

Robert L. Powell, Ph.D., Professor Subhash H. Risbud, Ph.D., Distinguished Professor Distinguished Teaching Award-Graduate/ Professional

William Ristenpart, Ph.D., Assistant Professor Julie M. Schoenung, Ph.D., Professor Sabyasachi Sen, Ph.D., Professor James F. Shackelford, Ph.D., Professor Academic Senate Distinguished Teaching Award Pieter Stroeve, Sc.D., Distinguished Professor Academic Senate Distinguished Teaching Award Yayoi Takamura, Ph.D., Associate Professor Spyros Tseregounis, Ph.D., Lecturer SOE

Emeriti Faculty

Joanna R. Groza, Ph.D., Professor Emeritus Brian G. Higgins, Ph.D., Professor Emeritus David G. Howitt, Ph.D., Professor Emeritus Alan P. Jackman, Ph.D., Professor Emeritus Benjamin J. McCoy, Ph.D., Professor Emeritus Amiya K. Mukherjee, Ph.D., Professor Emeritus Academic Senate Distinguished Teaching Award, UC Davis Prize for Teaching and Scholarly Achievement, Distinguished Graduate Mentoring Award

Zuhair A. Munir, Ph.D., Professor Emeritus Dewey D.Y. Ryu, Ph.D., Professor Emeritus Stephen Whitaker, Ph.D., Professor Emeritus Academic Senate Distinguished Teaching Award

Affiliated Faculty

Diran Apelian, Ph.D., Visiting Professor Ilke Arslan, Ph.D., Assistant Adjunct Professor Mark Asta, Ph.D., Adjunct Professor Nigel Browning, Ph.D., Adjunct Professor Andrew Canning, Ph.D. Adjunct Professor Jarek Majewski, Ph.D., Adjunct Professor Koichi Takamura, Ph.D., Adjunct Professor Dan Thoma, Ph.D., Adjunct Professor Ruxanadra Vidu, Ph.D. Associate Adjunt Professor Frank Yaghmaie, Ph.D., Associate Adjunct Professor

The Department of Chemical Engineering and Materials Science offers five undergraduate programs: Chemical Engineering, Biochemical Engineering, Chemical Engineering/Materials Science and Engineering, Electronic Materials Engineering, and Materials Science and Engineering

Mission Statement. To advance, through teaching and research programs, the frontiers of chemical engineering, biochemical engineering, and materials science and engineering; to educate students with a sense of professionalism and community; and to serve the public of California through outreach

Chemical Engineering Undergraduate Program

The Chemical Engineering program is accredited by the Engineering Accreditation Commission of ABET; http://www.abet.org.

Chemical engineers apply the principles of chemistry and engineering to produce useful commodities, ranging from fuels to polymers. Chemical engineers are increasingly concerned with chemical and engineering processes related to the environment and food production. They work in diverse areas ranging from integrated circuits to integrated waste management. Preparation for a career in chemical engineering requires an understanding of both engineering and chemical principles to develop proficiency in conceiving, designing, and operating new processes.

The chemical engineering curriculum has been planned to provide a sound knowledge of engineering and chemical sciences so that you may achieve competence in addressing current and future technical problems.

Objectives. The objectives of the program in Chemical Engineering are to educate students in the fundamentals of chemical engineering, balanced with the application of these principles to practical problems; to train them as independent, critical thinkers who can also function effectively in teams; to foster a sense of community, ethical responsibility, and professionalism; to prepare them for careers in industry, government, and academia; to illustrate the necessity for continuing education and self-learning; and to help students to learn to communicate proficiently in written and oral form.

Students are encouraged to carefully adhere to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

Lower Division Required Courses

ower Division Required Courses	
UNITS	
Mathematics 21A-21B-21C-21D 16	
Mathematics 22A-22B	
Physics 9A-9B-9C	
Chemistry 2A, 2B, 2C or Chemistry 2AH,	
2BH, 2CH15	
Chemical Engineering and Materials Science	
5, 66	
Chemical Engineering 514	
Chemical Engineering 801	
Engineering 454	
Biological Science 2A or	
Biotechnology 14	
English 3 or University Writing Program 1, or	
Comparative Literature 1, 2, 3, or 4, or	
Native American Studies 54	
Minimum Lower Division Units75	
Chemical Engineering Upper Division	
Required Courses	

Chemical Engineering 140, 141, 142, 143, 148A, 148B, 152A, 152B, 155A, 155B, 157, 158A, 158B, 158C54

Chemistry 110A, 110B, 128A, 128B, Chemical Engineering and Materials Science Choose upper division courses in the areas of Chemistry (CHE), Chemical Engineering (ECH) or Materials Science and Engineering (EMS). Courses may also be selected from the following: BIS 102; Food Science and Technology 100A, 102A, 102B; Fiber and Polymer Science 150. Minimum Upper Division Units78 Minimum Units Required for Major 153

The focus in your junior year is on fundamentals, such as thermo-dynamics, fluid mechanics, energy transfer, and mass transfer phenomena. In the senior year, you draw together these fundamentals and apply them in a study of kinetics, process design, and process dynamics and control. The program includes ten units of technical electives, and six units of chemical engineering and materials science electives that allow you to strengthen specific areas in chemical engineering, explore new areas, or pursue new areas of specialization.

Options for Junior and Senior Years

Honors Program. An Honors Program is available to qualified students in the Chemical Engineering, Biochemical Engineering, and Materials Science and Engineering majors. The Honors Program is also available to the dual majors: Chemical Engineering/Materials Science and Electronic Materials Engineering, and Mechanical Engineering/ Materials Science and Engineering. The Chemical Engineering and Materials Science Honors Program is a four-year program designed to challenge the most talented students in these majors. Students invited to participate will take a one-unit honors seminar in their freshman year and will enroll in various one-unit honors courses. In the upper division, students will complete either an honors thesis or a project that might involve local industry (Chemical engineering 194 HA, HB, HC). Students must maintain a grade point average of 3.500 to continue in the program. Successful completion of the Honors Program will be acknowledged on the student's tran-

Chemical Engineering/Materials Science and Engineering **Undergraduate Program**

The Chemical Engineering/Materials Science program is not accredited by the Engineering Accreditation Commission of ABET; http://www.abet.org.

The Chemical Engineering/Materials Science Program is a combined major that offers unique interdisciplinary courses requiring chemical engineering and materials science students to work together. Chemical engineers apply the principles of chemistry and engineering to produce useful commodities, ranging from antibiotics to high strength polymers. Materials science and engineering is directed toward an understanding of the structure, properties, and processing of materials. The development of new materials and the understanding of chemical processes demand a thorough knowledge of basic engineering and scientific principles, including crystal structure, elastic and plastic behavior, thermodynamics, phase equilibria and reaction rates, and physical and chemical behavior of engineering materials. The Chemical Engineering/Materials Science program provides the background for activities in research, processing, and the design of materials. The curriculum is based on a common core of courses basic to engineering; courses taken during your first two years provide a strong foundation in fundamental engineering concepts.

Lower Division Required Courses

	UNITS
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-22B	
Physics 9A-9B-9C Chemistry 2A, 2B, 2C or Chemistry 2AH	15
Chemistry 2A, 2B, 2C or Chemistry 2AH	,
2BH, 2CH	

Chemical Engineering and Materials Science 5, 6
Upper Division Required Courses
Chemical Engineering 140, 141, 142, 143, 148A, 148B, 152A, 152B, 155A, 155B, 157, 158A, 158B, 158C
Minimum Upper Division Units92
Minimum Units Required for Major 163

Honors Program. An Honors Program is available to qualified students in the Chemical Engineering, Biochemical Engineering, and Materials Science and Engineering majors. The Honors Program is also available to the dual majors: Chemical Engineering/Materials Science and Electrical Engineering/Materials Science and Engineering, and Mechanical Engineering/Materials Science and Engineering. The Chemical Engineering and Materials Science Honors Program is a four-year program designed to challenge the most talented students in these majors. Students invited to participate will take a one-unit honors seminar in their Freshman year and will enroll in various one-unit honors courses. In the upper division, students will complete either an honors thesis or a project that might involve local industry (Chemical Engineering 194 HA, HB, HC). Students must maintain a grade point average of 3.500 to continue in the program. Successful completion of the Honors Program will be acknowledged on the student's transcript.

Biochemical Engineering Undergraduate Program

The Biochemical Engineering program is accredited by the Engineering Accreditation Commission of ABET; http://www.abet.org.

As the biotechnology industry expands and matures, there is increasing need for engineers who can move products from the research stage to large scale manufacturing. As they fill this need, engineers must also understand the production, purification, and regulatory issues surrounding biopharmaceutical manufac-

Biochemical engineers-with their strong foundations in chemistry, biological sciences, and chemical process engineering-are in a unique position to tackle these problems. Biochemical engineers apply the principles of cell and molecular biology, biochemistry, and engineering to develop, design, scale-up, optimize, and operate processes that use living cells, organisms, or biological molecules for the production and purification of products (such as monoclonal antibodies, vaccines, therapeutic proteins antibiotics, and industrial enzymes); for health and/ or environmental monitoring (such as diagnostic kits, microarrays, biosensors); or for environmental improvement (such as bioremediation). An understanding of biological processes is also becoming increasingly important in the industries that traditionally employ chemical engineers, such as the materials, chemicals, food, energy, fuels, and semiconductor processing industries.

Objectives. We educate students in the fundamentals of chemical and biochemical engineering, balanced with the application of these principles to practical problems; educate students as independent, critical thinkers who can also function effectively in a team; educate students with a sense of community, ethical responsibility, and professionalism; educate students for careers in industry, government, and academia; teach students the necessity for continuing education and self learning; and foster proficiency in written and oral communications.

Students are encouraged to carefully adhere to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

Lower Division Required Courses

o. 2		
UN	IITS	
thematics 21A-21B-21C-21D 16		
thematics 22A-22B6		
vsics 9A-9B-9C		
emistry 2A, 2B, 2C or Chemistry 2AH,		
H, 2CH15		
logical Sciences 2A4		
emical Engineering and Materials		
ence 5, 66		
emical Engineering 514		
emical Engineering 801		
glish 3 or University Writing Program 1,		
Comparative Literature 1, 2, 3, or 4, or		
tive American Studies 54		
nimum Lower Division Units 71		
Jpper Division Required Courses		

Laboratory elective list:
Biomedical Engineering 161L;
Biotechnology 161A, 161B; Food Science and Technology 123L; Microbiology 102L, 155L; Molecular and Cellular Biology 120L (the italicized courses counts as two laboratory electives and completely satisfies the laboratory requirement), 160L; Neurobiology, Physiology, and Behavior 104L; Plant Sciences 153; two units of an internship (192), independent study (199), or Biotechnology 189L taken for 2 or more units can be used to satisfy one biochemical engineering laboratory elective requirement with the approval of a petition, provided that the course is a laboratory-based experimental project, related to the biological and/or biochemical engineering sciences, and the student submits a written report that demonstrates proficiency in laboratory skills, techniques, or method. Lecture elective list: Biological Sciences Applied Science 172;

Biological Sciences 2B, 2C, 101, 104, 107; Biological Systems Engineering 160, 175; Biomedical Engineering 102, 107, 109, 117, 140, 162; Biotechnology 160, 188; Chemical Engineering 170; Chemistry 130A, 130B; Food Science and Technology 123; Microbiology 140, 150; Molecular and Cellular Biology 122, 123; Neurobiology, Physiology, and Behavior 103; Plant Biology 111, 112; Plant Sciences 152; Statistics 120, 130A, 131A.

Minimum Upper Division Units 87 Minimum Units Required for Major..... 158

Honors Program. An Honors Program is available to qualified students in the Chemical Engineering, Biochemical Engineering, and Materials Science and Engineering majors. The Honors Program is also available to the dual majors: Chemical Engineering/Materials Science and Electrical Engineering/Materials Science and Engineering, and Mechanical Engineering/Materials Science and Engineering. The Chemical Engineering and Materials Science Honors Program is a four-year program designed to challenge the most talented students in

these majors. Students invited to participate will take a one-unit honors seminar in their Freshman year and will enroll in various one-unit honors courses. In the upper division, students will complete either an honors thesis or a project that might involve local industry (Chemical Engineering 194 HA, HB, HC). Students must maintain a grade point average of 3.500 to continue in the program. Successful completion of the Honors Program will be acknowledged on the student's transcript.

Materials Science and Engineering Undergraduate Program

The Materials Science and Engineering program is accredited by the Engineering Accreditation Commission of ABET; http://www.abet.org.

Materials science and engineering is directed toward an understanding of the structure, properties, and processing of materials. Society demands new and improved materials with capabilities far superior to common metals, polymers, and ceramics. New materials are needed for high-speed transportation systems, surgical and dental implants, new generations of power plants, and renewable energy sources, and solid-state electronic and photonics devices in computer and communication technology. Both the development of new materials and the understanding of present-day materials demand a thorough knowledge of basic engineering and scientific principles, including crystal structure, elastic and plastic behavior, thermodynamics, phase equilibria and reaction rates, and structural and physical and chemical behavior of engineering materials.

Materials engineers study phenomena found in many different engineering operations, from fracture behavior in automobiles to fatigue behavior in aircraft frames; from corrosion behavior in petro-chemical refineries to radiation-induced damage in nuclear power plants; and from the fabrication of steel to the design of semiconductors. Materials engineers are also increasingly involved in developing the new materials needed to attain higher efficiencies in existing and proposed energy conversion schemes and will play a central role in the development of new technologies based on composites and high-temperature superconductivity.

The undergraduate materials science and engineering program provides the background for activities in research, processing, and the design of materials. The curriculum is based on a common core of courses basic to engineering; courses taken during your first two years provide a strong foundation in fundamental engineering concepts.

There are also several combined majors with Materials Science and Engineering: Chemical Engineering/Materials Science and Engineering; and Mechanical Engineering/Materials Science and Engineering. A minor in Materials Science is also available.

Objectives. We educate students in the fundamentals of materials science and engineering, balanced with the application of these principles to practical problems; educate students as independent, critical thinkers who can also function effectively in a team; educate students with a sense of community, ethical responsibility, and professionalism; educate students for careers in industry, government, and academia; teach students the necessity for continuing education and self-learning; and foster proficiency in written and oral communications.

Students are encouraged to carefully adhere to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

Lower Division Required Courses

Mathematics 21A-21B-21C-21D 10	5
Mathematics 22A-22B	5
Physics 9A-9B-9C-9D	9
Chemistry 2A, 2B, 2C or Chemistry 2AH,	
2BH 2CH 11	5

Engineering 17, 35, 45
Upper Division Required Courses
Engineering 102, 103, 104, 190
Materials Science Minor

There is a constant need for professionals with more knowledge and experience in understanding the behavior of materials from which products such as electronics, sensors, biological implants, transportation vehicles, medical devices and infrastructure are made. The goal of this minor is to prepare students for careers that require training in materials science, including the fundamentals of thermodynamics and kinetics and their effects on phase composition and structure, as well as the complex relationships between composition, structure, processing and behavior/performance. Topics covered include material thermodynamics and kinetics, materials structural analysis, and structure-property relationships for electronic, optical, magnetic and mechanical behavior. The minor is expected to accommodate persons of diverse backgrounds, such as those majoring in engineering, physical sciences, biological sciences, and mathematics.

All courses must be taken for a letter grade. Grade of C- or better required for all courses used to satisfy minor requirements with overall GPA in minor requirement courses of 2.000 or better.

Minor Requirements

Minor Advisor. Julie Schoenung (Department of Chemical Engineering and Materials Science)

Honors Program. An Honors Program is available to qualified students in the Chemical Engineering, Biochemical Engineering, and Materials Science and Engineering majors. The Honors Program is also available to the dual majors: Chemical Engineering/Materials Science and Mechanical Engineering/Materials Science and Engineering. The Chemical Engineering and Materials Science Honors Program is a four-year program designed to challenge the most talented students in these majors. Students invited to participate will take a one-unit honors seminar in their Freshman year and will enroll in various one-unit honors courses. In the upper division, students will complete either an honors thesis or a project that might involve local industry (Chemical Engineering 194 HA, HB, HC). Students must maintain a grade point average of 3.500 to continue in the program. Successful completion of the Honors Program will be acknowledged on the student's transcript.

Electronic Materials Engineering Undergraduate Program

The Electronic Materials Engineering program is accredited by the Engineering Accreditation Commission of ABET; http://www.abet.org.

The Electronic Materials Engineering program is not accepting new students.

The Electronic Materials Engineering Program is a combined major, including portions of the Electrical Engineering curriculum in the Department of Electrical and Computer Engineering and the Materials Science curriculum in the Department of Chemical Engineering and Materials Science. In the past decade, the fields of solid-state electronics, optoelectronics, photonics, magnetics, and superconductivity have developed to the point that demand for new materials now sets the pace for progress in these fields. Materials scientists with an electronics background are key to continued progress in these areas. The Electronics Materials Engineering curriculum provides students with the background necessary to pursue careers in electrical engineering or materials science or to go on to graduate study.

Objectives. The Electronic Materials Engineering program has adopted the following objectives to serve the long-term interests of our students and the industries of Northern California and the nation. Foundation—To provide our graduates with a solid foundation in science and engineering, including mathematics, physical science, and the fundamentals of electrical engineering and materials science and engineering. This foundation is necessary to succeed in more advanced engineering courses and to be able to continue learning throughout a career. Breadth—To provide our graduates with sufficient breadth in electrical engineering and materials science and engineering. This breadth is required for students to understand engineering tradeoffs that cross disciplines, for them to contribute effectively to multi-disciplinary projects and for them to make an informed decision about their area of study. Depth-To provide our graduates with sufficient depth in a specific area of electrical engineering and materials science and engineering. This depth is necessary to solve complex real-world engineering problems and to prepare to contribute to a specific discipline within electrical engineering and materials science and engineering. Ethics—To provide our graduates with a basic understanding of, and ability to handle correctly, ethical problems that may arise during their careers. To provide them with an understanding of their obligations to society at large.

Students are encouraged to carefully adhere to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

Lower Division Required Courses

UNITS	
Mathematics 21A-21B-21C-21D 16	
Mathematics 22A-22B 6	
Physics 9A-9B-9C-9D	
Chemistry 2A, 2B, 2C or Chemistry 2AH,	
2BH, 2CH15	
Engineering 17, 35, 4512	
Chemical Engineering and Materials	
Science 64	
English 3 or University Writing Program 1,	
or Comparative Literature 1, 2, 3, or 4, or	
Native American Studies 54	
Communication 1 or 34	
Minimum Lower Division Units 80	
Jpper Division Required Courses	
Electrical and Computer Engineering 100,	
110A, 110B, 130A, 130B, 140A, 140B,	
146A32	
Electrical and Computer Engineering 100,	
110A, 110B, 130A, 130B, 140A, 140B,	

Materials Science and Engineering 160,

162, 162L, 164, 172, 172L, 174, 181,

188A, 188B......36

Select one course from Statistics 120, 131A,
Mathematics 135A, or Civil and
Environmental Engineering 1144
Engineering 190
Electronic Materials elective

Electrical and Computer Engineering 106, 112, 118, 132A, 133, 135, 136A-B, 146B, 150A, 151, 157A, 160, 166, 170, 172, 180A, 180B, 194A-194B-194C (must be taken in consecutive quarters to count as one design elective), 195A-195B (must be taken in consecutive quarters to count as one design elective); Engineering 105; Materials Science and Engineering 180, 182.

Unrestricted elective 3
Minimum Upper Division Units78

Minimum Units Required for Major 158

Honors Program. An Honors Program is available to qualified students in the Chemical Engineering, Biochemical Engineering, and Materials Science and Engineering majors. The Honors Program is also available to the dual majors: Chemical Engineering/Materials Science and Electronic Materials Engineering, and Mechanical Engineering/ Materials Science and Engineering. The Chemical Engineering and Materials Science Honors Program is a four-year program designed to challenge the most talented students in these majors. Students invited to participate will take a one-unit honors seminar in their Freshman year and will enroll in various one-unit honors courses. In the upper division, students will complete either an honors thesis or a project that might involve local industry (Chemical Engineering 194 HA, HB, HC). Students must maintain a grade point average of 3.500 to continue in the program. Successful completion of the Honors Program will be acknowledged on the student's tran-

The Graduate Program in Chemical Engineering

M.S. and Ph.D. in Chemical Engineering Designated Ph.D. emphasis available in Biotechnology

Designated Ph.D. emphasis available in Biophotonics

http://chms.engineering.ucdavis.edu (530) 752-7952

Our graduate students benefit from the combined faculty expertise and laboratory facilities of two dynamic disciplines—chemical engineering and materials science. A coordinated and highly multidisciplinary approach in this blended department translates into broader preparation for all of our students.

Chemical engineers apply chemistry and engineering principles to industrial processes, thus altering the state, chemical composition and microstructure of materials to create products in such diverse industries as petroleum, food, pharmaceuticals, chemicals and semiconductors.

Both chemical engineering and materials science focus on integrating products and product design with the environment. The interdisciplinary activities of department faculty receive strong external funding in materials synthesis and processing, biochemical/biomaterials, including polymers, with increasing activity in nanophases research as well.

We embrace diversity in our programs; approximately 50% of our graduate students are women, while overall, the College of Engineering has been rated among the top ten schools nationwide for the number of female faculty. We are able to recruit and engage highly qualified students overall.

We promote an environment that nurtures and promotes collegial interaction between graduate students and faculty in an environment where graduate students are viewed as junior faculty. The department is committed to providing ample dissertation/thesis advising and financial support for students focused on making progress towards their advanced degree objectives.

Generous financial support is available in the form of research assistantships, teaching assistantships, fellowships and financial aid.

Research Highlights:

- Biotechnology, Biochemical and Biomolecular Engineering
- Biomimetic Thin Films/Biomaterials
- Molecular Modeling
- Membrane Biophysics
- Transport Phenomena
- Separation Processes
- Rheology
- Catalysis
- Process Design and Control
- Analytical Techniques in Electron Microscopy
- Solid Oxide Fuel Cells
- Properties of Glasses and Ceramics
- Thermochemistry/Calorimetry and Kinetics of Materials Synthesis
- Colloid, Polymer and Surface Science
- Green Engineering

Research Facilities:

- Interdisciplinary Center for Electron Microscopy
- Northern California Nanotechnology Center
- Center for Nanomaterials in the Environment, Agriculture and Technology

Complete Information on our website.

The Graduate Program in Materials Science and Engineering

M. Eng, M.S. and Ph.D. in Materials Science and Engineering

Engineering Designated Ph.D. emphasis available in Biotechnology

Designated Ph.D. emphasis available in Biophotonics

http://chms.engineering.ucdavis.edu (530) 752-7952

Our graduate students in materials science benefit from the combined faculty expertise and laboratory facilities of two dynamic disciplines-chemical engineering and materials science. A coordinated and highly multidisciplinary approach in this blended department translates into broader preparation for all of our students.

Materials science focuses on the synthesis, processing, characterization, structural and property relations of new and existing materials. Both chemical engineering and materials science focus on integrating products and product design into the environment. The interdisciplinary activities of department faculty receive strong external funding in materials synthesis and processing, biochemical/biomaterials, including polymers, with increasing activity in nanophases research as well.

We embrace diversity in our programs; approximately 50% of our graduate students are women, while overall, the College of Engineering has been rated among the top ten schools nationwide for the number of female faculty. We are able to recruit and engage highly qualified students overall.

We promote an environment that nurtures and promotes collegial interaction between graduate students and faculty in an environment where graduate students are viewed as junior faculty. The department is committed to providing ample dissertation/thesis advising and financial support for students focused on making progress towards their advanced degree objectives.

Generous financial support is available in the form of research assistantships, teaching assistantships, fellowships and financial aid.

Research Highlights:

- Biomimetic Thin Films
- Molecular Modeling

- · Synthesis of Advanced Materials
- Biomaterials
- Forensics
- Analytical Techniques in Electron Microscopy
- Solid Oxide Fuel Cells
- Properties of Glasses and Ceramics
- Computational Materials Science
- Thermochemistry/Calorimetry and Kinetics of Materials Synthesis
- Properties and Processing of Nanomaterials
- Growth and Characterization of Thin Films
- Colloid, Polymer and Surface Science
- Fracture and Fatigue of Solids and Superplasticity in Metals and Ceramics
- Industrial Ecology and Pollution Prevention

Research Facilities and Partnerships:

- Interdisciplinary Center for Electron Microscopy
- Center for Northern California Nanotechnology
- Center for Nanomaterials in the Environment, Agriculture and Technology

Complete Information on our website

Courses in Engineering: Chemical and Materials Science (ECM)

Courses in Chemical and Materials Science Engineering (ECM) are listed below; courses in Chemical Engineering (ECH) are listed immediately following; courses in Materials Science and Engineering (EMS)

Lower Division Courses

5. Analysis in Biochemical, Chemical and Materials Engineering (2)

Lecture/discussion - 2 hours. Prerequisite: Chemistry 2B (may be taken concurrently), Mathematics 21B (may be taken concurrently). Analysis of systems of interest to chemical engineers and materials scientists. Applications of differential and integral calculus. Dimensional analysis. GE credit: QL, SE.-II. (II.)

6. Computational Methods for Bio/ Chemical/Materials Engineers (4)

Lecture/discussion-4 hours. Prerequisite: Mathematics 21C and course 5. Programming methods for solving problems in chemical, biochemical and materials engineering using Mathematica. Programming styles, data structures, working with lists, functions and rules. Applications drawn from material balances, statistics, numerical methods, and bioinformatics. Introduction to object oriented programming using Java. GE credit: QL, SE.-III. (III.)

90X. Honors Discussion Section (1)

Discussion-1 hour. Prerequisite: open only to students enrolled in the Chemical Engineering or Biochemical Engineering Honors programs. Examination of special topics covered in selected lower-division courses through additional readings, discussions, collaborative work, or special activities which may include projects, laboratory experience or computer simulations. May be repeated for credit when topic differs. - II, III.

94H. Honors Seminar (1)

Seminar - 1 hour. Prerequisite: open only to students enrolled in the Chemical Engineering or Biochemical Engineering Honors programs. Examination of selected current topics in chemical or biochemical engineering through readings, discussions, collaborative work or special activities which may include projects, laboratory experiences or computer simulations. -1. (I.)

Upper Division Courses 188H. Honors Materials Design (1)

Discussion - 1 hour. Prerequisite: enrollment in the Materials Science and Engineering Honors Program. Examination of special topics covered in the materials design course through additional readings, discussions, collaborative work, or special activities which may include projects, laboratory experience

or computer simulations. Open only to students in the Materials Science and Engineering Honors program. - II. (II.)

188BH. Honors Materials Design (1)

Discussion - 1 hour. Prerequisite: enrollment in the Materials Science and Engineering Honors Program. Examination of special topics covered in the materials design course through additional readings, discussions, collaborative work, or special activities which may include projects, laboratory experience or computer simulations. Open only to students in the Materials Science and Engineering Honors Program. — III. (III.)

189A-R. Special Topics in ECM (1-5)

Lecture and/or laboratory. Prerequisite: consent of instructor. Special topics in (A) Fluid Mechanics; (B) Nonlinear Analysis and Numerical Methods; (C) Process Control; (D) Chemistry of Catalytic Processes, (E) Biotechnology; (F) Interfacial Engineering; (G) Thermodynamics; (H) Membrane Separations; (I) Novel Experimental Methods; (J) Transport Phenomena; (K) Biomolecular Engineering (L) Electronic Materials; (M) Ceramics and Minerals; (N) Physics and Chemistry of Materials; (O) Materials Processing; (P) Materials Science and Forensics; (Q) Biomaterials; (R) Surface Chemistry of Metal Oxides. May be repeated for credit when topic differs. — I, II, III. (Í,

190X. Honors Discussion Section (1)

Discussion - 1 hour. Prerequisite: open only to students enrolled in the Chemical Engineering or Biochemical Engineering Honors programs. Examination of special topics covered in selected upper division courses through additional readings, discussions, collaborative work, or special activities which may include projects, laboratory experience or computer simulations. May be repeated for credit when topic differs. —I, II, III. (I, II, III.)

194HA. Special Study for Honors Students

Independent study-6 hours. Open to only students enrolled in the Chemical Engineering or Biochemical Engineering Honors Programs. Guided independent study of a selected topic in Chemical Engineering or Biochemical Engineering. Preparation for course 194HB. GE credit: SE. -I, II, III. (I, II, III.)

194HB. Special Study for Honors Students

Independent study—3 hours. Prerequisite: course 194HA. Open to only students enrolled in the Chemical Engineering or Biochemical Engineering Honors programs. Guided independent study of a selected topic in Chemical Engineering or Biochemical Engineering. Preparation for course 194HC. May be repeated for credit. GE credit: SE.-I, II, III. (I, II, III.)

194HC. Special Study for Honors Students

Prerequisite: course 194HB; open only to students enrolled in the Chemical Engineering or Biochemical Engineering Honors programs. Guided independent study of a selected topic in Chemical Engineering or Biochemical Engineering leading to the presentation of an honors project or thesis, under the supervision of a faculty adviser. GE credit: QL, SE.—I, II, III. (I, II,

Graduate Courses

261. Molecular Modelling of Soft and Biological Matter (4)

Lecture/discussion-4 hours. Prerequisite: Materials Science and Engineering 247 or Engineering: Chemical 252 or equivalent course in advanced thermodynamics/statistical mechanics. Modern molecular simulation techniques with a focus on soft matter like polymers, biologically relevant systems, and glasses. Offered in alternate years.—II. Faller

268. Process Monitoring and Data Analysis

Lecture—3 hours. Prerequisite: senior or graduate standing in engineering or physical sciences or consent of instructor. Analytical approaches to the proper management of experimental and process system data, ranging from univariate and multivariate statistical methods to neural networks, wavelets and Markov models. Offered in alternate years. - III.

280. Seminar in Ethics for Scientists (2)

Seminar—2 hours. Prerequisite: graduate standing in any department of Science or Engineering. Studies of topical and historical issues in the ethics of science, possibly including issues such as proper authorship, peer review, fraud, plagiarism, respons ble collaboration, and conflict of interest. Limited enrollment. (Same course as Chemistry 280 and Physics 280.) (S/U grading only.)—III. (III.)

281. Green Engineering: Theory and Practice (3)

Lecture/discussion-3 hours. Prerequisite: graduate standing in Engineering or consent of instructor. Methods of evaluating alternative technologies, processes, materials, chemicals, and/or products relative to pollution, waste, toxic substance use, and sustainability. Topics include environmental regulations, recycling, life-cycle assessment, economic analysis, design for the environment, green chemistry and toxicology. Offered in alternate years. - II.

290. Chemical Engineering & Materials Science Seminar (1)

Seminar - 1 hour. Prerequisite: graduate standing or consent of instructor. Selected topics of current interest in Chemical Engineering and Materials Science Engineering. The subjects covered will vary from year to year and will be announced at the beginning of each quarter. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Courses in Engineering: Chemical (ECH)

Lower Division Courses

51. Material Balances (4)

Lecture—4 hours. Prerequisite: Mathematics 21D with C- or better, and Mathematics 22A or concurrent. Application of the principle of conservation of mass to single and multicomponent systems in chemical process calculations. Studies of batch, semibatch, and continuous processes involving mass transfer, change of phase, stoichiometry and chemical reaction. Not open for credit to students who have completed course 151. GE credit: SE.-II. (II.)

80. Chemical Engineering Profession (1)

Lecture/discussion — 1 hours. Prerequisite: Engineering 102, course 130 or 131. Professional opportunities and professional responsibilities of chemical engineers. Opportunities and needs for post-baccalaureate education. Relationship of chemical engi neering to contemporary issues. GE credit: SE, ŠS. –

98. Directed Group Study (1-5)

Prerequisite: consent of instructor and lower division standing. (P/NP grading only.) GE credit: SciEng | SE.—I, II, III. (I, II, III.)

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SciEng | SE.-I, II, III. (I, II, III.)

Upper Division Courses

140. Mathematical Methods in Biochemical and Chemical Engineering (4)

Lecture/discussion-4 hours. Prerequisite: Mathematics 22B. Mathematical methods for solving problems in chemical and biochemical engineering, with emphasis on transport phenomena. Fourier series and separation of variables. Sturm-Liouville eigenvalue problems. Similarity transformations. Tensor analysis. Finite difference methods for solving time dependent diffusion problems. Not open for credit to students who have completed course 159. GE credit: QL, SE.-I. (I.)

141. Fluid Mechanics for Biochemical and Chemical Engineers (4)

Lecture/discussion-4 hours. Prerequisite: course 140 and course 51 or concurrent. Principles and applications of fluid mechanics in chemical and biochemical engineering. Hydrostatics. The stress tensor

and Newton's law of viscosity. Not open for credit to students who have completed course 150B. GE credit: QL, SE.-II. (II.)

142. Heat Transfer for Biochemical and Chemical Engineers (4)

Lecture/discussion—4 hours. Prerequisite: course 51 with a C- or better, course 141. Conduction, convection, and radiation of thermal energy in applications to chemical and biochemical engineering. Derivation of thermal and mechanical energy equations. Thermal boundary layers. Macroscopic balances. Applications: heat transfer in tubes, channels, and integrated circuits, and analysis of heat exchangers. Not open for credit to students who have completed course 153. GE credit: QL, SE.-III. (III.)

143. Mass Transfer for Biochemical and **Chemical Engineers (4)**

Lecture/discussion-4 hours. Prerequisite: course 51 with a C- or better, course 141. Derivation of species conservation equations describing convective and diffusive mass transfer. Fick's law and the Stefan-Maxwell constitutive equations. Mass transfer coefficients. Multicomponent mass transfer across gas/liquid interfaces. Applications include drying, heterogeneous chemical reactions, and membrane separations. GE credit: SE.—III. (III.)

144. Rheology and Polymer Processing (3)

Lecture/Discussion-3 hours. Prerequisite: Course 141. Deformation in steady shear, unsteady shear, and elongational flows. Linear and non-linear viscoelastic constitutive models. The principle of material indifference and admissibility of constitutive equations. Introduction to the unit operations of polymer processing. Not open for credit to students who have completed course 150C. GE credit: SE.—III.

152A. Chemical Engineering Thermodynamics (3)

Lecture - 3 hours. Prerequisite: Chemical and Materials Science Engineering 6 or concurrent enrollment. Application of principles of thermodynamics to chemical processes. Not open for credit to students who have completed Engineering 105 or 105A. GE credit: SE.-II. (II.)

152B. Chemical Engineering Thermodynamics (4)

Lecture/discussion-4 hour. Prerequisite: course 152A. Continuation of course 152A. Not open for credit to students who have completed Engineering 105. GE credit: SE.—III. (III.)

155A. Chemical Engineering Laboratory (4)

Laboratory-6 hours; discussion-1 hour; term paper. Prerequisite: courses 141, 142, and 143 (may be taken concurrently); satisfaction of the upper division English composition requirement. Open only to majors in Chemical Engineering, Chemical Engineering/Materials Science, Biochemical Engineering, Biomedical Engineering, and Biological Systems Engineering. Laboratory experiments in transport phenomena, chemical kinetics, and thermodynamics. GE credit: Wrt | OL, QL, SE, VL, WE.-I, II. (I, II.)

155B. Chemical Engineering Laboratory (4)

Laboratory-6 hours; discussion-1 hour; extensive writing — 1 hour. Prerequisite: courses 143 (may be taken concurrently), 155A; satisfaction of the upper division English composition requirement. Open only to majors in Chemical Engineering, Chemical Engineering/Materials Science, Biochemical Engineer ing, Biomedical Engineering, Food Engineering, and Biosystems Engineering. Continuation of course 155A. Laboratory experiments in transport phenomena, chemical kinetics, and thermodynamics. GE credit: Wrt | QL, SE, VL, WE.—II, III. (II, III.)

157. Process Dynamics and Control (4)

Lecture/discussion-4 hours. Prerequisite: course 140. Fundamentals of dynamics and modeling of chemical processes. Design and analysis of feedback control of chemical processes. GE credit: QL, SE.-I. (I.)

158A. Process Design and Analysis I (4)

Lecture - 4 hours. Prerequisite: courses 142 and 143. Process and product creation and design. Cost accounting and capital investment estimation. Profitability analysis techniques. Green chemistry, health risk assessment and life cycle assessment concepts. GE credit: SE, SL, SS, VL.-I. (I.)

158B. Separations and Unit Operations (4)

Lecture - 4 hours. Prerequisite: course 158A. Senior design experience with multiple realistic constraints. Heuristic and rigorous design of chemical process equipment. Separation by filtration, distillation and extraction. Synthesis of reactor and separation networks, heat and power integration. GE credit: QL,

158C. Plant Design Project (4)

Laboratory/discussion—2 hours; project—2 hours. Prerequisite: course 158B or 161C. Senior design experience for chemical and biochemical processes. Impact of multiple realistic constraints. Design, costing and profitability analysis of complete plants. Use of computer-aided design techniques. GE credit: OL, QL, SE, SL, VL, WE.—III. (III.)

160. Fundamentals of Biomanufacturing (3)

Lecture—3 hours. Prerequisite: Microbiology 102, Biological Sciences 102 or Animal Biology 102. Principles of large scale bioreactor production of metabolites, enzymes, and recombinant proteins including the development of strains/cell lines, fermentor/bioreactor design, monitoring and operation, product recovery and purification, and biomanufacturing economics. Not open for credit to students who have completed course 161C or both 161A and 161B; only two units of credit to students who have completed either course 161A or 161B. GE credit: QL, SE, VL.-McDonald

161A. Biochemical Engineering Fundamentals (4)

Lecture/discussion-4 hours. Prerequisite: Chemistry 128A, Mathematics 22B, Microbiology 102 (or consent of instructor). Biokinetics; bioreactor design and operation; transport phenomena in bioreactors; microbial, plant, and animal cell cultures. GE credit: QL, SE, VL. - II. (II.)

161B. Bioseparations (4)

Lecture/discussion-4 hours. Prerequisite: course 143. Product recovery and purification of biochemicals. Cell disruption, centrifugation, filtration, membrane separations, extraction, and chromatographic separation. GE credit: QL, SE.-II. (II.)

161C. Biotechnology Facility Design and Regulatory Compliance (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 161A, 161B (may be taken concurrently). Design of biotechnology manufacturing facilities. Fermentation and purification equipment, and utility systems. Introduction to current good manufacturing practices, regulatory compliance, and documentation. GE credit: QL, SE, SL, SS, VL.—II. (II.) Block

161L. Bioprocess Engineering Laboratory

Laboratory-9 hours; discussion-1 hour; term paper. Prerequisite: course 161A and 161B, or Viticulture and Enology 186, or Biological Sciences 103 and Molecular and Cellular Biology 120L. Restricted to chemical/biochemical engineering majors during pass 1. Laboratory experiments in the operation and analysis of bioreactors; determination of oxvaen mass transfer coefficients in bioreactors and ion exchange chromatography. GE credit: Wrt | QL, SE, VL, WE. — III.

166. Catalysis (3)

Lecture—3 hours. Prerequisite: course 146 (may be taken concurrently) or consent of instructor. Principles of catalysis based on an integration of principles of physical, organic, and inorganic chemistry and chemical kinetics and chemical reaction engineering. Catalysis in solution; catalysis by enzymes; catalysis in swellable polymers; catalysis in microscopic cages (zeolites); catalysis on surfaces. GE credit: SciEng | SE.—II. (II.) Gates

170. Introduction to Colloid and Surface Phenomena (3)

Lecture - 3 hours. Prerequisite: Chemistry 110A. Introduction to the behavior of surfaces and disperse systems. The fundamentals will be applied to the solution of practical problems in colloid science. The course should be of value to engineers, chemists, biologists, soil scientists, and related disciplines. GE credit: SciEng | SE.—III. (III.) Stroeve

190C. Research Group Conferences (1)

Discussion - 1 hour. Prerequisite: upper division standing in Chemical Engineering; consent of instructor. Research group conferences. May be repeated for credit. (P/NP grading only.) GE credit: SciEng | SE. – I, II, III. (I, II, III.)

190X. Upper Division Seminar (1)

Seminar - 1 hour. Prerequisite: upper division standing. In-depth examination of a special topic in a small group setting.

198. Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SciEng | SE.—I, II, III. (I, II, III.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SciEng | SE.-I, II, III. (I, II, III.)

Graduate Courses

206. Biochemical Engineering (3)

Lecture—3 hours. Prerequisite: Microbiology 102 and 102L, Biological Sciences 101, 102, 103, Molecular and Cellular Biology 120L, 200A; Food Science and Technology 205 recommended; or consent of instructor. Interaction of chemical engineering, biochemistry, and microbiology. Mathematical representations of microbial systems. Kinetics of growth, death, and metabolism. Continuous fermentation, agitation, mass transfer and scale-up in fermentation systems, product recovery, enzyme technology. Offered in alternate years.—(II.) Ryu

226. Enzyme Engineering (3)

Lecture — 3 hours. Prerequisite: Microbiology 102 and 102L, Biological Sciences 102, 103, Molecular and Cellular Biology 122, 120L, 200A; or consent of instructor. Application of basic biochemical and engineering principles of practical enzymatic processes. Lectures cover large scale production and separation of enzymes, immobilized enzyme systems, enzyme reactor design and optimization, and new application of enzymes in genetic engineering related biotechnology. Offered in alternate years. -II. Ryu

246. Advanced Biochemical Engineering (2)

Lecture-2 hours. Prerequisite: course 206 or con sent of instructor. Advances in the field of biotechnology including genetic engineering, enzyme engineering, fermentation science, and renewable resources development. The important results of original research will be evaluated for understanding of the fundamental principles and for potential practical application.—II. (II.) Ryu

252. Statistical Thermodynamics (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 152B, Engineering 105B, or the equivalent. A treatment of the statistical basis of thermodynamics; introduction to statistical mechanics; discussion of the laws of thermodynamics; application of thermodynamic relationships to phase and chemical reaction equilibrium; introduction to molecular simulations and the evaluation of thermodynamic properties from molecular simulations. - I. (I.)

253A. Advanced Fluid Mechanics (4)

Lecture-4 hours. Prerequisite: courses 141 and 259. Kinematics and basic principles of fluid flow. Principles of constitutive equations. Navier-Stokes equations for Newtonian fluids. Survey of rectilinear creeping flow, lubrication flow and boundary layer theory. —I. (I.)

253B. Advanced Heat Transport (4)

Lecture-4 hours. Prerequisite: courses 142 and 259 or the equivalent. Fundamental energy postulates and derivation of microscopic and macroscopic energy equations. Mechanisms of conduction. Isotropic, thermoelastic and anisotropic materials solution problems using Greens functions and perturbation theory.—II. (II.)

253C. Advanced Mass Transfer (4)

Lecture—4 hours. Prerequisite: courses 143 and 259 (may be taken concurrently) or the equivalents. Kinematics and basic conservation principles for multicomponent systems. Constitutive equations for momentum, heat and mass transfer, applications to binary and ternary systems. Details of diffusion with reaction, and the effects of concentration.—I. (I.)

254. Colloid and Surface Phenomena (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: graduate standing in science or engineering or consent of instructor. Thermodynamics and rate processes at interfaces. These fundamental processes will be applied to determine the collective properties of thin films and membranes, self-assembled systems, liquid crystals and colloidal systems. Experimental techniques in surface analysis.—III. (III.) Stroeve, Longo

256. Chemical Kinetics and Reaction Engineering (4)

Lecture—4 hours. Prerequisite: courses 146 or the equivalent. Analysis of the performance of chemical reactors and design of chemical reactors based on the principles of chemical kinetics and transport phenomena. Consideration of noncatalytic/catalytic reactions in single fluid phases and emphasis on reactions in multiphase mixtures, especially gas-solid reactors.—II. (II.)

259. Advanced Engineering Mathematics (4)

Lecture—4 hours. Prerequisite: Mathematics 21D, 22A, 22B. Applications of methods of applied mathematics to the analytical and numerical solution of linear and nonlinear ordinary and partial differential equations arising in the study of transport phenomena.—I. (I.)

262. Transport Phenomena in Multiphase Systems (3)

Lecture/discussion—3 hours. Prerequisite: course 253C. Heat, mass and momentum transfer in multiphase, multicomponent systems with special emphasis on transport processes in porous media. Derivation of the averaging theorem and application of the method of volume averaging to multicomponent, reacting systems.—III. (III.)

263. Rheology and Mechanics of Non-Newtonian Fluids (3)

Lecture—3 hours. Prerequisite: courses 253A and 259 or consent of instructor. Mechanics of polymer solutions and suspension, especially the development of properly invariant constitutive equations. Topics include: viscometry, linear and nonlinear viscoelasticity, continuum mechanics, kinetic theory. Offered in alternate years.—II. Powell

265. Emulsions, Microemulsions and Bilayers (3)

Lecture—3 hours. Prerequisite: an undergraduate course in physical chemistry. Thermodynamic and mechanical descriptions of surfactant-laden interfaces. Forces between and within interfaces. Physics of micelle and microemulsion formation. Structure and stability of emulsions. Properties of phospholipid bilayers, with emphasis on vesicles.—II. (II.) Dungan

267. Advanced Process Control (3)

Lecture—3 hours. Prerequisite: course 157 or the equivalent. Advanced course in analysis and synthesis of linear multivariable systems. Emphasis on frequency domain techniques and applications to chemical processes. Topics include singular value analysis, internal model control, robust controller design methods as well as self-tuning control techniques. Offered in alternate years.—III.

289A-L. Special Topics in Chemical Engineering (1-5)

Lecture and/or laboratory. Prerequisite: consent of instructor. Special topics in (A) Fluid Mechanics; (B) Nonlinear Analysis and Numerical Methods; (C) Process Control; (D) Chemistry of Catalytic Processes;

(E) Biotechnology; (F) Interfacial Engineering; (G) Molecular Thermodynamics; (H) Membrane Separations; (I) Advanced Materials Processing; (J) Novel Experimental Methods; (K) Advanced Transport Phenomena; (L) Biomolecular Engineering. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)

290. Seminar (1)

Seminar — 1 hour. (S/U grading only.)

290C. Graduate Research Group Conference (1)

Discussion—1 hour. Prerequisite: consent of instructor. Research problems, progress and techniques in chemical engineering. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

294. Current Progress in Biotechnology (1)

Seminar—1 hour. Prerequisite: graduate standing. Seminars presented by guest lecturers on subjects of their own research activities. May be repeated for credit. (Same course as Molecular and Cellular Biology 294.) (S/U grading only.)—I, II, III. (I, II. III.) Ryu, Doi

298. Group Study (1-5)

Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12)

(S/U grading only.)

Professional Course

390. Teaching of Chemical Engineering (1)

Discussion—1 hour. Prerequisite: qualifications and acceptance as teaching assistant and/or associate-in in chemical engineering. Participation as a teaching assistant or associate-in in a designated engineering course. Methods of leading discussion groups or laboratory sections, writing and grading quizzes, use of laboratory equipment, and grading laboratory reports. May be repeated two times for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Courses in Materials Science and Engineering (EMS)

Lower Division Courses

2. Stuff: Diversity of Materials in Our Lives (2)

Lecture/discussion—2 hours. Role of materials in technological societies and their impact on our way of living. Exploration of how materials are extracted from the earth, processed, and shaped into products, including discussion of disposal and re-use of materials. GE credit: SciEng | SE.—I. (I.) Risbud

6H. Honors Materials Science Computer Applications (1)

Discussion—1 hour. Prerequisite: enrollment in the Materials Science and Engineering Honors Program; concurrent enrollment in Engineering 6 required. Restricted to students in the Materials Science and Engineering Honors Program. Examination of materials science computer applications through additional readings, discussions, collaborative work, or special activities which may include projects or computer simulations.

9H. Honors Solid-State Materials Science (1)

Discussion—1 hour. Prerequisite: enrollment in the Materials Science and Engineering Honors Program; concurrent enrollment in Physics 9D required. Restricted to students in the Materials Science and Engineering Honors program. Examination of solid-state materials science and modern physics topics through additional readings, discussions, collaborative work, or special activities which may include projects, laboratory experience or computer simulations.

Upper Division Courses 147. Principles of Polymer Materials Science (3)

Lecture—3 hours. Prerequisite: Chemistry 2A-2B; Chemistry 8A-8B or Engineering 45; introductory physics. Basic principles of polymer science presented including polymer structure and synthesis; polymerization mechanisms, polymer classes, properties, and reactions; polymer morphology, rheology, and characterization; polymer processing. (Same course as Fiber and Polymer Science 100.) GE credit: QL, SE.—II. (II.) Pan

160. Thermodynamics of Materials Processes and Phase Stability (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45, Chemistry 2C, Physics 9B, Mathematics 22B. Review of thermodynamic principles of interest to materials scientists and engineers. Application of thermodynamics to material processing, phase stability, corrosion. GE credit: QL, SE, SL, VL.—I. (I.)

162. Structure and Characterization of Engineering Materials (4)

Lecture—4 hours. Prerequisite: Engineering 45, Mathematics 22, Physics 9B. Description of the structure of engineering materials on the atomic scale by exploring the fundamentals of crystallography. The importance of this structure to materials' properties. Description of experimental determination using x-ray diffraction techniques. GE credit: QL, SE.—II. (II.)

162L. Structure and Characterization of Materials Laboratory (2)

Laboratory—3 hours; discussion—1 hour. Prerequisite: course 162 (concurrent enrollment recommended). Experimental investigations of structure of solid materials are combined with techniques for characterization of materials. Laboratory exercises emphasize methods used to study structure of solids at the atomic and microstructural levels. Methods focus on optical, x-ray and electron techniques. Only 2 units of credit allowed to students who have completed course 134L. Not open for credit to students who have completed course 132L. GE credit: Wrt | QL, SE, SL, VL, WE.—II.

164. Rate Processes in Materials Science (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45 and course 160. Basic kinetic laws and the principles governing phase transformations. Applications in diffusion, oxidation, nucleation, growth and spinodal transformations. GE credit: QL, SE, SL, VL.—II. (II.)

172. Electronic, Optical and Magnetic Properties of Materials (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45, Chemistry 110A, or Physics 9D; Engineering 6 or course 6 (recommended). Electronic, optical, and magnetic properties of materials as related to structure and processing of solid state materials. Physical principles for understanding the properties of metals, semiconductors, ceramics, and amorphous solids and the applications of these materials in engineering. GE credit: QL, SE, SL, VL.—I. (I.)

172L. Electronic, Optical and Magnetic Properties Laboratory (2)

Laboratory—3 hours; lecture/laboratory—1 hour. Prerequisite: course 172 (concurrent enrollment recommended). Experimental investigation of electronic, optical and magnetic properties of engineering materials, emphasizing the fundamental relationship between microstructure and properties as well as the influence of rate processes on the evolution of the microstructure and properties. GE credit: Wrt | QL, SE, SL, VL, WE.—I.

174. Mechanical Behavior of Materials (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45 and course 162; course 164 recommended. Microscopic and macroscopic aspects of the mechanical behavior of engineering materials, with emphasis on recent development in materials characterization by nondestructive testing. The fundamental aspects of plasticity in engineering materials, strengthening mechanisms and mechanical failure modes of materials systems. GE credit: Wrt | QL, SE, SL, VL.—I. (I.)

174L. Mechanical Behavior Laboratory (2)

Laboratory—3 hours; lecture/laboratory—1 hour.
Prerequisite: course 174 (concurrent enrollment recommended). Experimental investigation of mechanical behavior of engineering materials. Laboratory

exercises emphasize the fundamental relationship between microstructure and mechanical properties, and the evolution of the microstructure as a consequence of rate process. Not open for credit to students who have completed course 138L. GE credit: Wrt | QL, SE, SL, VL, WE.-I.

180. Materials in Engineering Design (4)

Lecture - 3 hours; lecture/discussion - 1 hour. Prerequisite: Engineering 45; Engineering 105 or course 160. Quantitative treatment of materials selection for engineering applications. Discussion of design and material selection strategy; process and process selection strategy; process economics; lifecycle thinking and eco-design. Use of materials selection software. GE credit: Wrt | OL, SE, SL, VL, WE.-III. (III.)

181. Materials Processing (4)

Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: Engineering 45; Engineering 105, Electrical and Computer Engineering 140A, or course 164. Principles of phase equilibria, thermodynamics and reaction kinetics applied to materials processing. Effects of processing variables on the structureproperty relationship. Fundamentals of the manufacturing processes for electronic, optical, functional and structural materials. GE credit: Wrt | OL, SE, VL, WE.-II. (II.)

182. Failure Analysis (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 45, upper division standing in science or engineering. Analysis of the way materials fail. Effects of temperature, mechanical deformation and corrosion on the properties of materials. Forensics and methodologies for investigating failures of materials including optical microscopy, x-ray analysis and scanning electron microscopy. Investigation of practical problems. Only 1 unit of credit to students who have completed course 148. Only 3 units of credit to students who have completed course 142 or course 144. Not open for credit to students who have completed both courses 142 and 148 or both courses 144 and 148. GE credit: Wrt | WE.—II.

188A. Materials Design Project (4)

Laboratory-4 hours; discussion-1 hour. Prerequisite: courses 160, 162, 164, 172, and 174. Major materials design experience involving analysis of real materials synthesis/processing/fabrication and technological applications including critical assessments of economic, manufacturing, and ethical constraints. Various principles of materials science are integrated into a culminating team design project. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | OL, SE, SL, VL, WE.-II (II.) Sen

188B. Materials Design Project (4)

Laboratory—4 hours; discussion—1 hour. Prerequisite: course 188A. Major materials design experience involving analysis of real materials synthesis/ processing/fabrication and technological applications including critical assessments of economic, manufacturing, and ethical constraints. Various principles of materials science are integrated into a culminating team design project. (Deferred grading only, pending completion of sequence.) GE credit: OL, SE, SL, VL, WE.—III. (III.) Sen

190C. Research Group Conferences (1)

Discussion-1 hour. Prerequisite: consent of instructor; upper division standing. Individual and/or group conference on problems, progress and techniques in materials research. May be repeated for credit. (P/NP grading only.) – I, IÍ, III. (I, II, III.)

198. Directed Group Study (1-5)

Lecture - 1-5 hours. Prerequisite: consent of instructor. Group study of selected topics. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

230. Fundamentals of Electron Microscopy

Lecture - 2 hours; lecture/discussion - 1 hour. Prerequisite: course 162. Principles and techniques of scanning and transmission of electron microscopy used in the study of materials will be described Emphasis upon practical applications. Offered in alternate years. — (II.)

230L. Laboratory for Electron Microscopy (2)

Laboratory-6 hours. Prerequisite: course 230 concurrently. Practical application of techniques of electron scanning and transmission microscopy including x-ray microanalysis. Offered in alternate years. — (II.)

232. Advanced Topics in Transmission Electron Microscopy (3)

Lecture - 1 hour; discussion - 2 hours. Prerequisite: course 230. Advanced course in the techniques of electron microscopy including analytical techniques, probe diffraction methods, and high resolution imaging. Offered in alternate years.—II.

232L. Laboratory for Advanced Transmission Electron Microscopy (2)

Discussion - 1 hour; laboratory - 3 hours. Prerequisite: course 230L. Laboratory in advanced transmission electron microscopy techniques relevant to specific graduate research projects in materials science. Offered in alternate years.—II.

241. Principles and Applications of Dislocation Mechanics (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: graduate standing in Engineering; consent of instructor. Concepts in dislocation theory are applied to explain plasticity of crystalline solids. Glide and climb of dislocations, strain hardening, recrystallization, theories of creep processes and interaction of dislocation with solute atoms, precipitates and impurity clouds are discussed. Offered in alternate years. — (II.)

243. Kinetics of Phase Transformation in **Engineering Materials (3)**

Lecture - 3 hours. Prerequisite: graduate standing in Engineering and consent of instructor; course 160 recommended. Theory of alloying, kinetics of phase changes, homogenous and heterogeneous transformation, transformation by shear, order-disorder reactions. Offered in alternate years.—(III.) Groza

244. Interaction of Materials and their **Environment (3)**

Lecture—3 hours. Prerequisite: Engineering 45 and 105A, or consent of instructor. Thermodynamic and kinetic foundations of the corrosion and oxidation processes. Practical aspects of corrosion control and prevention. Stress-corrosion and gas-embrittlement phenomena. Special topics in corrosion; microbiological and atmospheric corrosion. Offered in alter-

248. Fracture of Engineering Materials (3)

Lecture-3 hours. Prerequisite: course 174. Description of the failure of materials by crack propagation. Topics include the stress fields about elastic cracks, the Griffith-Irwin analysis, descriptions of plastic zones, fracture toughness testing, microstructural aspects of fracture and failure at elevated temperatures. Offered in alternate years. — (I.) Gibeling

249. Mechanisms of Fatigue (3)

Lecture - 3 hours. Prerequisite: course 174 or consent of instructor; course 248 recommended. Microstructural description of the mechanisms of fatigue in metals. Topics include a phenomenological treatment of cyclic deformation, dislocation processes in cyclic deformation, fatigue crack nucleation, Stage I crack growth, threshold effects and high temperature cyclic deformation. Offered in alternate years. — (I.) Gibel-

250A-F. Special Topics in Polymer and Fiber Science (3)

Lecture-3 hours. Prerequisite: course 147 or consent of instructor. Selected topics of current interest in polymer and fiber sciences. Topics will vary each time the course is offered. (Same course as Textiles and Clothing 250A-F.)—II. (II.)

251. Applications of Solid State Nuclear Magnetic Resonance Spectroscopy (3)

Lecture—3 hours. Prerequisite: graduate standing in chemistry, physics or engineering, or consent of instructor. Fundamentals of solid state NMR spectroscopy and principles of advanced NMR techniques for analyzing structure of solid materials. — III. (III.)

260. Advanced Thermodynamics of Solids

Lecture/discussion-4 hours. Prerequisite: course 160. Thermodynamic principles, formalism and their application to solid materials. Specific examples from ceramic and solid state systems. Use of thermodynamic approach in developing understanding of and constraints for processes in real systems. Offered in alternate years.—I. Kim

262. Advanced Topics in Structure of Materials (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 162; course 174 recommended; graduate standing in Engineering or consent of instructor. Nature of microstructure in engineering materials. Crystalline and non-crystalline structures, with special emphasis on grain boundary segregation in the development of polycrystalline microstructure and the radial distribution function of amorphous materials. Not open for credit to students who previously completed (cancelled) course 245. Offered in alternate years. - (I.)

264. Transport Phenomena in Materials Processes (4)

Lecture/discussion-4 hours. Prerequisite: graduate standing in Engineering. Thermodynamic driving forces and atomic-scale mechanisms underlying diffusive mass transport and interface motion in materials. Nucleation, growth and coarsening dynamics of phase transformations. Not open for credit to stu-dents who previously completed course 240.—II, III. (II, III.)

272. Advanced Functional Properties of Materials (4)

Lecture/discussion—4 hours. Prerequisite: graduate standing in Physics, Chemistry, and Engineering. Fundamental physical properties of solid materials important to solid state devices, specifically electronic, magnetic, and optical properties. Topics include band structures, metals, superconductors, semiconductors, dielectrics, optical properties, and magnetic properties and implementation of these properties into devices.—I. (I.) Moule, Takamura

274. Advanced Mechanical Properties of Materials (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 174. Comprehensive study of mechanical properties of materials, with special attention to dislocations and deformation and fracture control mechanisms. Mechanical properties of conventional engineering materials as well as advanced materials such as nanocrystalline solids and thin films are considered. Offered in alternate years. — (II.) Gibeling

282. Glass: Science and Technology (3)

Lecture - 2 hours; extensive writing - 1 hour. Prerequisite: graduate standing in Chemistry, Physics or Engineering, or consent of instructor. Modern paradigms in glass science and their applications to technologies. Relation of macroscopic properties of glasses and glass-forming liquids to atomic-level structures, including principles of formation, relaxation, transport phenomena, nucleation, crystallization and phase separation in glasses. Offered in alternate years.—İII. Sen

289A-G. Special Topics in Materials Science

Lecture and/or laboratory. Prerequisite: consent of Lecture and/or laboratory. Prerequisite: consent of instructor. Special topics in: (A) Electronic Materials; (B) Ceramics and Minerals; (C) Physics and Chemistry of Materials; (D) Materials Processing; (E) Materials Science and Forensics; (F) Biomaterials; (G) Surface Chemistry of Metal Oxides. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)

290C. Graduate Research Conference (1)

Discussion - 1 hour. Prerequisite: consent of instructor. Individual and/or group conference on problems, progress, and techniques in materials science and engineering research. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

294. Materials Science Seminar (1)

Seminar-1 hour. Current literature and developments in materials science with presentations by individual students. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

298. Group Study (1-5) 299. Research (1-12)

Prerequisite: consent of instructor. (S/U grading

Professional Course

390. The Teaching of Materials Science (1)

Discussion-1 hour. Prerequisite: meet qualifications for teaching assistant and/or associate-in in materials science and engineering. Participation as a teaching assistant or associate-in in a designated engineering course. Methods of leading discussion groups or laboratory sections, writing and grading quizzes, use of laboratory equipment, and grading laboratory reports. May be repeated two times for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Engineering: Civil and Environmental

(College of Engineering)

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Academic Senate Distinguished Teaching Award S. Geoffrey Schladow, Ph.D., Professor

Debbie Niemeier, Ph.D., Professor

Mark M. Rashid, Ph.D., Professor

Daniel Sperling, Ph.D., Professor (Civil and Environmental Engineering; Environmental Science and Policy) N. Sukumar, Ph.D., Professor Anthony S. Wexler, Ph.D., Professor (Civil and Environmental Engineering; Mechanical and Aerospace Engineering; Land, Air and Water Resources) Stefan Wuertz, Ph.D., Professor Thomas M. Young, Ph.D., Professor Bassam A. Younis, Ph.D., Professor H. Michael Zhang, Ph.D., Professor

Takashi Asano, Ph.D., Professor Emeritus

Emeriti Faculty

Takashi Asano, Ph.D., Professor Emeritus
Don O. Brush, Ph.D., Professor Emeritus
Robert H. Burgy, M.S., Professor Emeritus
Daniel P. Y. Chang, Ph.D., Professor Emeritus
James A. Cheney, Ph.D., Professor Emeritus Leonard R. Herrmann, Ph.D., Professor Emeritus Academic Senate Distinguished Teaching Award, UC Davis Prize for Teaching and Scholarly Achievement James R. Hutchinson, Ph.D., Professor Emeritus I.M. Idriss, Ph.D., Professor Emeritus lan P. King, Ph.D., Professor Emeritus Bruce E. Larock, Ph.D., Professor Emeritus Miguel A. Mariño, Ph.D., Professor Emeritus (Civil and Environmental Engineering; Land, Air and Water Resources) Gerald T. Orlob, Ph.D., Professor Emeritus Otto G. Raabe, Ph.D., Professor Emeritus Melvin R. Ramey, Ph.D., Professor Emeritus Karl M. Romstad, Ph.D., Professor Emeritus Academic Senate Distinguished Teaching Award Edward D. Schroeder, Ph.D., Professor Emeritus Academic Senate Distinguished Teaching Award Verne H. Scott, Ph.D., Professor Emeritus Chih-Kang Shen, Ph.D., Professor Emeritus Michael A. Taylor, Ph.D., Professor Emeritus George Tchobanoglous, Ph.D., Professor Emeritus

Affiliated Faculty

Norman A. Abrahamson, Ph.D., Adjunct Professor Brian Maroney, D.Engr., Adjunct Assistant Professor David Schoellhamer, Ph.D., Adjunct Professor

The Civil and Environmental **Engineering Programs**

Mission. The Department of Civil and Environmental Engineering integrates research, education, and professional service in areas related to civil infrastructure and the environment. We provide the profession and academia with outstanding graduates who advance both engineering practice and fundamental knowledge

Program Educational Objectives. The objectives of the Civil Engineering undergraduate program at the University of California, Davis are to produce civil and environmental engineers that: (1) Are proficient in the fundamentals of engineering science, analytical and quantitative reasoning, and design in the context of civil and environmental engineering, (2) Are able to apply these skills in developing safe, sustainable, economical and environmentally sound solutions to civil engineering problems either within the profession or through post-graduate research, (3) Grow professionally in their careers through continued development of technical and management skills, achievement of professional licensure, and assumption of roles of responsibility in professional service, (4) Understand the needs and represent the diversity of the program's constituencies*, thereby serving the needs of society and the profession.

*The constituency of the CEE program includes our students and those organizations or employers that they might join during career paths spanning professional practice, education, and research. Specifically, these constituents may include consulting firms and organizations, state and federal agencies or laboratories, universities, cities and counties, contractors, civil-product manufacturers and suppliers, and environmental organizations.

Study Abroad and Civil Engineering. The department offers courses in locations such as Ireland and Italy through the Summer Abroad Program. It is also possible for students to complete a portion of the civil engineering program at an international institution, such as the University of Edinburgh, by participating in an Education Abroad Program. The department encourages interested students to participate in both Summer Abroad and Education Abroad Programs. Please consult with the undergraduate staff adviser in Civil Engineering for more informa-tion. Often students are in their junior or senior year of study when they participate in this option.

Civil Engineering Undergraduate Program

The Civil Engineering program is accredited by the Engineering Accreditation Commission of ABET; http://www.abet.org

Students are encouraged to carefully adhere to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

Lower Division Required Courses

UN	VIT:
Mathematics 21A-21B-21C-21D	
Mathematics 22A-22B	
Physics 9A-9B-9C and choice of Physics 9D,	
Chemistry 2C, Biological Science 2A or	
Geology 50-50L	
Chemistry 2A-2B or 2AH-2BH 10	
Civil and Environmental Engineering 3 4	
(Civil and Environmental Engineering 3 is	
designed for freshman students and is not	
open to upper division students. Students	
who do not take this course will substitute	
four units of additional engineering	
coursework.)	
One course from Civil and Environmental	
Engineering 19, Engineering 6, or Computer	
Science Engineering 30	
Engineering 17, 35, 45	
Civil and Environmental Engineering	
16, 17 4	
English 3 or University Writing Program 1,	
or Comparative Literature 1, 2, 3, or 4, or	
Native American Studies 5 4	
Communication 1 or 34	
Minimum Lower Division Units 83	
Immon Division Descrivements.	

Upper Division Requirements: Areas of Specialization

Undergraduates may emphasize one or more of the following areas of specialization, or generalize across all areas. You are urged to consult a departmental adviser when developing your individual program. Additional information on areas of specialization and potential faculty advisers can be obtained from the College of Engineering Bulletin and the departmental website.

Environmental Engineering. The focus of this area is on the management and improvement of air, land, and water quality in the face of increasing population, expanding industrialization, and global warming. Examples of environmental engineering problems include innovative analysis and design of air, water, wastewater, and solid waste treatment systems; mathematical modeling of natural and engineered systems; sampling, analysis, and transport and transformation of natural and anthropogenic pollutants; and modeling of air pollutant emissions.

Suggested Advisers. C. Cappa, J. L. Darby, T. R. Ginn, A. Kendall, M. J. Kleeman, F.J. Loge, J. R. Lund, M. Modera, D. Niemeier, S. G. Schladow, S. Wuertz, T. M. Young

Geotechnical Engineering. This area deals with civil infrastructure and environmental problems that require quantifying the behavior of geologic materials (e.g., soils and rocks). Examples of geotechnical engineering problems include foundations for buildings and bridges, earthwork (e.g., dams, tunnels, highways), earthquake hazards (e.g., ground motions, liquefaction, soil-structure interaction), and

geo-environmental problems (ground water flow, subsurface contaminant transport and remediation).

Suggested Advisers. R. W. Boulanger, Y. F. Dafalias, J.T. DeJong, J. T. Harvey, B. Jeremic, B. L.

Structural Engineering and Structural

Mechanics. The focus of this area is the conception, design, analysis, construction, and life-cycle modeling of all types of civil infrastructure, including buildings, bridges, dams, ports, highways, and industrial facilities. Structural materials include metals, reinforced concrete, timber, and advanced composites. Loads range from earthquakes to adverse environmental conditions. Structural mechanics emphasizes theoretical and computational tools that may be used in structural engineering

Suggested Advisers. J. E. Bolander, Y. K. Chai, L. Cheng, Y. F. Dafalias, J.T. Harvey, A. Kanvinde, S. Kunnath, B. Maroney, M. M. Rashid, N. Sukumar

Transportation Planning and Engineering.

This area deals with the movement of people and goods in a manner consistent with society's environmental (e.g. air and water quality) and socio-economic goals (e.g. equity and mobility).

Transportation engineering applies engineering, economic, and behavioral science principles to the planning, analysis, design, and operation of transportation systems such as highways and public transit. Transportation planning involves the formulation and analysis of transportation policy, program, and project alternatives in consideration of societal goals, budgetary constraints, economic objectives, and technological feasibilities.

Suggested Advisers. Y. Fan, J. T. Harvey, A. Kendall, M. Modera, P. L. Mokhtarian, D. Niemeier, D. Sperling, H. M. Zhang

Water Resources Engineering. This area includes hydrology, hydraulics, fluid mechanics, and water resources systems planning and design. Hydrology deals with quantifying and understanding all aspects of the hydrologic cycle, including the relationships between precipitation, runoff, groundwater, and surface water. Water quality and contaminant transport issues are linked to hydrologic conditions. Hydraulics and fluid mechanics deal with flows in pipes, open-channel water-distribution systems, and natural systems, such as lakes and estuaries. Water resources systems planning and design deals with the comprehensive development of water resources to meet the multiple needs of industry, agriculture, municipalities, recreation, and other activi-

Suggested Advisers. F. Bombardelli, J. L. Darby, T. R. Ginn, M. L. Kavvas, J. R. Lund, S. G. Schladow, B. A. Younis

Civil Engineering Upper Division Required Courses

U	pper Division Required Courses
	Engineering 102, 103, 104, 104L, 105, 106, 190
	Applied Science Engineering 1154 Civil and Environmental Engineering
	1144
	One course from Civil and Environmental Engineering 153, Mathematics 118A, or
	Statistics 108
	A minimum of four of the following group
	options (a minimum of two courses in each of the four areas and a minimum of 19 design
	units from group option selections, technical
	electives, and programming elective. Courses
	listed in more than one group may be counted
	only once. The design unit content of each course is noted on the Civil Engineering
	degree requirement advising sheet, available
	from the department, also shown in its entirety
	on the department's undergraduate
	website

Environment: Civil and Environmental Engineering 148A or 149 and at least one from courses 140, 143, 148B, 150; Geotechnical: Civil and Environmental Engineering 171 and 171 Lab and at least one from courses 173, 175, 179; Structures: Civil and Environmental Engineering 135 and at least one from courses 130, 131, 132, 136, 137, 138, Transportation: Civil and Environmental

Engineering 161 or 163 and at least one from courses 162, 165, 179; Water Resources: Civil and Environmental

Engineering 141 and 141 Lab and at least one from courses 142, 144, 145, 146, 1.5.5

division, letter-graded Civil & Environmental Engineering course not already used towards another degree requirement, and may include, but not exceed, a combination of 6 units from Civil & Environmental

Engineering 198 & 199.** Minimum Upper Division Units79 Minimum Units Required for Major 162

*Units in excess of the 28 unit requirement may count toward the technical elective requirement. Please consult with the undergraduate staff adviser.

**A maximum of 4 units of upper-division courses outside of Civil & Environmental Engineering may be considered on a petition basis. Please consult with the undergraduate staff adviser.

The Minor in Construction **Engineering and Management**

To pre-apply to this minor program offered by Civil and Environmental Engineering, find full details regarding admission and completion in the Application Form available from the department website or the undergraduate staff adviser in 2045 Ghausi

Minor Requirements:

Prerequisite courses must be completed prior to enrollment in coursework taken for minor.

UNITS

Construction Engineering and Management 24

Civil and Environmental Engineering 137, 143, 153 12 Twelve units from Civil and Environmental Engineering 179, Agricultural and Resource Economics 112, 155, 157, 171A, 171B, Economics 134, 162; may include one course from Agricultural and Resource Economics 18, Management 11A,

Minor advisors. J. Darby, J.T. Harvey, J. Lund

The Minor in Sustainability in the **Built Environment**

All courses must be taken for a letter grade. Grade of C- or better required for all courses used to satisfy minor requirements with overall GPA in minor requirement courses of 2.000 or better.

UNITS

Sustainability in the Built Environment .. 20

Civil and Environmental Engineering 123, Twelve units from Civil and Environmental Engineering 127, 128, 143, 148A, 149, 155, 162, 165, Engineering Applied Science 188, Anthropology 104N, 191, Agricultural and Resource Economics 175, 176, Atmospheric Science 116, Community and Regional Development 142, 154, 172, Environmental Science and Policy 161, 162, 172, 191, Environmental Toxicology 101, 102A, Geology 130, 134, Landscape

Architecture 180**, Nature and Culture 120, Plant Sciences 101, 141, 150, 162; may include one course from Landscape Architecture 312

*Student enrollment requests will be reviewed by the instructor to ensure that a balanced group of students with different experience, majors or expertise are able to enroll.

**Due to variability in series course offering, consent of minor advisor is required.

Minor advisors. F. Loge, A. Kendall

The Graduate Program in Civil and **Environmental Engineering**

M.S. and Ph.D. Professional Certificate Designated Ph.D. emphasis available in Biotechnol-

http://cee.engr.ucdavis.edu (530) 752-1441

With over 30 faculty, over \$20 million in annual research expenditures and over 220 graduate students, the department of Civil and Environmental Engineering integrates research, education and professional service in areas related to civil infrastructure and the environment. Graduate students benefit from close working relationships with professors who are the leading international experts in their field. They are supported in their study and research by robust funding, and they have access to state-of-theart research centers. For example, one of the experimental laboratories that constitutes NEES, the Network for Earthquake Engineering Simulation, nees@ucdavis.edu, has the largest centrifuge of its kind in the nation and gives researchers access to their peers at other unique centers via high-speed networks. Since 1960, researchers at the J. Amorocho Hydraulics Laboratory (JAHL) have served the state of California by solving ecological, biological, environmental and hydraulic engineering problems. Students may also have the opportunity to work in one of the many modern environmental engineering labs or the structural testing facilities in the department. Our graduates go on to serve the profession and academia by advancing the leading edge of fundamental knowledge, as well as engineering practice.

Generous financial support is available in the form of research assistantships, teaching assistantships, fellowships and financial aid. About 75% of the graduate students in our program are either fully or partially supported.

Research Highlights:

- Alternative Fuel Transportation Infrastructure
- Earthquake Engineering
- **Environmental Engineering**
- Environmental Planning and Management
- Geotechnical Engineering
- Hydraulics and Fluid Mechanics
- Hydrology
- Structural Engineering
- Structural Health Monitoring
- Structural Mechanics
- Systems Planning and Design
- Transportation Engineering
- Transportation Planning and Design
- Water Resources Engineering

Research Facilities and Partnerships:

- Center for Environmental and Water Resources Engineering
- Institute of Transportation Studies
- J. Amorocho Hydraulics Laboratory (JAHL)
- Nano-Engineering and Smart Structures Technolo-
- NSF NEES Geotechnical Centrifuge

- · Pavement Research Center
- Tahoe Environmental Research Center Complete Information on our website.

Courses in Engineering: Civil and Environmental (ECI)

Lower Division Courses

3. Introduction to Civil and Environmental **Engineering Systems (4)**

Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 21A (may be taken concurrently). Restricted to lower division students; Civil Engineering majors during Pass 1. Introduction to civil engineering systems. General view of the engineering process as obtained by participation in laboratory experiments illustrative of the solution of representative, but simplified, engineering problems. Not open for credit to upper division students. GE credit: QL, SE.—I. (I.) Darby

16. Spatial Data Analysis (2)

Lecture-1 hour; laboratory-3 hours. Restricted to Civil Engineering and Biological Systems Engineering majors; non-majors accommodated on a spaceavailable basis. Computer-aided design and geographic information systems in civil engineering practice. GE credit: QL, SE.—III. (III.) Fan

17. Surveying (2)

Lecture - 2 hours. Prerequisite: Physics 9A (may be taken concurrently). Restricted to Civil Engineering and Biological Systems Engineering majors. Nonmajors accommodated on a space-available basis. Theory behind and description of modern methods of land surveying in Civil Engineering. GE credit:

19. C Programming for Civil and **Environmental Engineers (4)**

Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 21A (may be taken concurrently). Pass 1 open to Civil Engineering majors and Optical Science and Engineering majors. Computational prob-lem solving techniques for Civil and Environmental Engineering applications using structured C programming. Algorithm design applied to realistic problems. GE credit: SE.—Jeremic, Kleeman

90X. Lower Division Seminar (1-4)

Seminar - 1-4 hours. Prerequisite: consent of instructor. Examination of a special topic in a small group setting. May be repeated for credit. GE credit: SE.

92. Internship in Engineering (1-5)

Internship. Prerequisite: lower division standing; approval of project prior to period of internship. Supervised work experience in civil engineering May be repeated for credit. (P/NP grading only.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor and lower division standing. (P/NP grading only.) GE credit: SE.

99. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor: lower division standing. (P/NP grading only.) GE credit: SE.

Upper Division Courses

114. Probabilistic Systems Analysis for Civil Engineers (4)

Lecture-4 hours. Prerequisite: Mathematics 21C. Probabilistic concepts and models in engineering. Statistical analysis of engineering experimental and field data. Introduction to stochastic processes and models of engineering systems. Not open for credit to students who have completed Statistics 120. GE credit: QL, SE.-I, II. (I, II.) Mokhtarian

119. Parallel Processing for Engineering Applications (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: C programming or consent of instructor. Fundamental skills in parallel computing for engineering applications; emphasis on structured parallel programming for distributed memory parallel clusters. Not open for credit to students who have completed course 119B. Offered in alternate years. GE credit: SE.—Kleeman, Jeremic

123. Urban Systems and Sustainability (4)

Lecture—4 hours. Prerequisite: upper division standing. Systems-level approach of how to evaluate and then modify sustainability of urban systems based on interaction with natural environments. Topics include: definition/metrics of urban sustainability; system analyses of urban systems; enabling technology, policies, legislation; measures and modification of ecological footprints. GE credit: SciEng or SocSci, Div, Wrt | ACGH, DD, SE, SL, SS, WE. – II. (II.) Kendall

125. Building Energy Performance (4)

Lecture - 4 hours. Prerequisite: upper division standing in Engineering. Open to students in the College of Engineering. Mechanisms of energy consumption in buildings including end uses, thermal loads, ventilation, air infiltration, thermal energy distribution, and HVAC systems; energy performance simulation; methods and strategies of energy efficiency. GE credit: SE.—II. (II.) Modera

126. Integrated Planning for Green Civil Systems (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Physics 9C or Landscape Architecture 60 or Design 145 or Environmental Science and Policy 100 or Nature and Culture 120 or Anthropology 100 or Statistics 32 or Plant Sciences 101; consent of instructor. Working within multidisciplinary teams and a heuristic learning environment, an integrated design process will be applied to the planning of a project-based green and sustainable civil system. GE credit: SE.—II. (II.) Kendall, Loge

127. Integrated Design for Green Civil Systems (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 126; consent of instructor. Working within multidisciplinary teams and a heuristic learning environment, an integrated design process will be applied to the design of a project-based green and sustainable civil system. GE credit: SE.—III. (III.) Ken-

128. Integrated Construction for Green Civil Systems (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 127. Working within multidisciplinary teams and a heuristic learning environment, an integrated design process will be applied to the construction of a project-based green and sustainable civil system.

Offered irregularly. GE credit: SE.—Kendall, Loge

130. Structural Analysis (4)

Lecture—4 hours. Prerequisite: Mathematics 22A, Engineering 104. Elastic structural analysis of determinate and indeterminate trusses, beams and frames. Plastic bending and limit analysis. GE credit: QL, SE, -III, (III.)

131. Matrix Structural Analysis (4)

Lecture-3 hours; laboratory-3 hours. Prerequisite: Engineering 6 and 104; restricted to Engineering majors only. Matrix formulation and computer analysis of statically indeterminate structures. Stiffness and flexibility formulations for elastic structures. Finite element methods for elasticity and bending problems. GE credit: SE.-I

132. Structural Design: Metallic Elements

Lecture—4 hours. Prerequisite: Engineering 104.
Design of metallic beams, columns, and other members for various types of loading and boundary conditions; design of connections between members; member performance within structural systems. GE credit: SE, VL.—II. (II.) Kanvinde

135. Structural Design: Concrete Elements (4)

Lecture — 3 hours; laboratory — 3 hours. Prerequisite: Engineering 104; restricted to majors in Civil Engineering, Civil Engineering/Materials Science and Engineering, or Materials Science and Engineering only. Strength design procedures for columns, rectangular beams, T-beams and beams of general crosssection. Building code requirements for bending, shear, axial load, combined stresses and bond Introduction to prestressed concrete. GE credit: QL, SE.—I, III. (I, III.) Chai

136. Building Design: Wood, Steel, and Concrete Applications (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 130 or 131, course 135; course 132 recommended. Horizontal and lateral load paths; dead and live loading; earthquake and wind forces. Approximate analyses of building frames; wood engineering for buildings. Steel, concrete and wood building design. GE credit: SE.

137. Construction Principles and Project Management (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: upper division standing in Engineering; Engineering 104 recommended. Project management, with civil engineering construction and design applications, including project scope, schedule, resources, cost, quality, risk, and control. Construction industry overview. Interactions between planning, design, construction, operations. Construction operations analysis. Contract issues. Project management software, field trips, guest lectures. GE credit: ACGH, OL, QL, SE or SS, VL, WE.—II. (III.) Harvey

138. Earthquake Loads on Structures (4)

Lecture - 3 hours; discussion - 1 hours. Prerequisite: Engineering 102, course 130 or 131. Determination of loads on structures due to earthquakes. Methods of estimating equivalent static lateral forces; response spectrum and time history analysis. Concepts of mass, damping and stiffness for typical structures. Design for inelastic behavior. Numerical solutions and Code requirements. GE credit: SE. - II. (II.) Kunnath

139. Advanced Structural Mechanics (3)

Lecture—3 hours. Prerequisite: Engineering 104 or the equivalent. Review of stress, strain, equilibrium, compatibility, and elastic material behavior. Plane stress and plane strain problems in elasticity theory; stress function. Theories for straight, tapered, composite, and curved beams. Beams on elastic foundations. Introduction to plates, curved membranes, and cables. GE credit: QL, SE. - (III.) Dafalias

140. Environmental Analysis of Aqueous

Lecture - 3 hours. Prerequisite: Chemistry 2B; course 148A recommended. Introduction to chemical principles underlying current practices in sampling and analysis of water and wastewater. GE credit: SE.-I. (I.) Young

140L. Environmental Analysis of Aqueous Systems Laboratory (1)

Laboratory-3 hours. Prerequisite: Chemistry 2B or the equivalent; course 140 (may be taken concurrently). Restricted to Civil Engineering undergraduate and graduate students. Introduction to "wet chemical" and instrumental techniques commonly used in the examination of water and wastewater and associated data analysis. GE credit: SE.

141. Engineering Hydraulics (3)

Lecture - 3 hours. Prerequisite: Engineering 103. Nature of flow of a real fluid; flow in pipes; open channel flow; turbomachinery; fluid forces on objects: boundary layers, lift and drag. GE credit: SE.—I, III. (I, III.) Schladow

141L. Engineering Hydraulics Laboratory

Laboratory—3 hours. Prerequisite: course 141 (may be taken concurrently). Open to Engineering students only. Laboratory experiments and demonstrations on flow measurement, sluice gates, hydraulic jump, flow characteristics, and centrifugal pumps. GE credit: SE.—I, III. (I, III.) Schladow

142. Engineering Hydrology (4)

Lecture - 4 hours. Prerequisite: course 141 (may be taken concurrently); course 114 recommended Restricted to students in the College of Engineering. The hydrologic cycle. Evapotranspiration, interception, depression storage and infiltration. Streamflow analysis and modeling. Flood routing through channels and reservoirs. Frequency analysis of hydrologic variables. Precipitation analysis for hydrologic design. Hydrologic design. GE credit: QL, SE.-I. (I.) Kavvas

143. Green Engineering Design and Sustainability (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: upper division standing. Restricted to Civil Engineering and Civil Engineering/Materials Science and Engineering majors only. Application of concepts, goals, and metrics of sustainability, green engineering, and industrial ecology to the design of engineered systems. Life-cycle analyses, waste audit and environmental management systems, economics of pollution prevention and sustainability, and substitute materials for products and processes. GE credit: QL, SE, SL, WE. - I. (I.) Loge

144. Groundwater Systems Design (4)

Lecture - 4 hours. Prerequisite: course 141. Groundwater occurrence, distribution, and movement; groundwater flow systems; radial flow to wells and aquifer testing; aquifer management; groundwater contamination; solute transport by groundwater; fate and transport of subsurface contaminants. Groundwater supply and transport modeling. GE credit: SE.—Ginn

144L. Groundwater Systems Design Laboratory (1)

Laboratory-3 hours. Prerequisite: course 144, taken concurrently. Computer modeling of groundwater flow under regional gradient, well injection/ withdrawal, and natural and engineered boundary conditions. Use of Groundwater Vistas computer program.—I. (I.) Ginn

145. Hydraulic Structure Design (4)

Lecture — 2 hours; discussion — 1 hour; laboratory — 3 hours. Prerequisite: course 141 and 141L; course 142 recommended. Fundamental principles and practical aspects of the design of hydraulic structures including water storage, conveyance, and pumping systems. Emphasis on use of industry-standard computer software for hydraulic design. GE credit: SE.-

146. Water Resources Simulation (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Engineering 103; Applied Science Engineering 115, course 141, 142 recommended. Computer simulation techniques in the analysis, design and operation of surface water systems; modeling concepts and practices with application to surface runoff; water quality in rivers and streams and dispersion of contaminants in water bodies. GE credit: Wrt | SE. - II. (II.) Bombardelli

148A. Water Quality Management (4)

Lecture—4 hours. Prerequisite: Chemistry 2B. Basic concepts of water quality measurements and regulations. Introduction to physical, biological and chemical processes in natural waters. Fundamentals of mass balances in water and wastewater treatment. GE credit: SE.-II. (II.) Wuertz, Young

148B. Water Quality Management Systems Design (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 103, course 148A. Application of the principles of fluid mechanics to the analysis and design of flow measuring devices, pumps and pump station design, water distribution systems, wastewater collection systems, water and wastewater treatment plant headloss analysis, and bioremediation systems. GE credit: QL, SÉ, VL, WE.-III. (III.) Darby

149. Air Pollution (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 21D, 22B, Chemistry 2B, Atmospheric Science 121A or Engineering 103. Physical and technical aspects of air pollution. Emphasis on geophysical processes and air pollution meteorology as well as physical and chemical properties of pollutants. (Same course as Atmospheric Science 149.) GE credit: SE, SL.-I. (I.) Cappa

150. Air Pollution Control System Design

Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103, 105, 106; course 149. Design and evaluation of air pollution control devices and systems. GE credit: Qİ, SE, SL.—II. (II.) Cappa

153. Deterministic Optimization and Design

Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 21C, 22A, computer programming course; Applied Science Engineering 115 recommended. Operations research. Optimization techniques such as linear programming, dynamic programming, and non-linear programming. Applications in water, transportation, environmental, infrastructure systems, and other civil engineering disciplines through computer-based course projects. GE credit: QL, SE, SL.—I. (I.) Fan

155. Water Resources Engineering Planning (4)

Lecture - 4 hours. Prerequisite: Engineering 106 or Economics 1A, course 114, 142; course 153 recommended. Basic engineering planning concepts; role of engineering, economic, environmental and social information and analysis; institutional, political and legal aspects. Case studies and computer models illustrate the planning of water resource systems. GE credit: Wrt | QL, SE, SL, SS, WE.—(III.)

161. Transportation System Operations (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Engineering 6 (or the equivalent) and 102. Principles of transportation system operations; traffic characteristics and methods of measurement; models of transportation operations and congestion applied to urban streets and freeways. GE credit: QL, SE.—II. (II.) Zhana

162. Transportation Land Use Sustainable Design (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 161 or 163. Interactions between land use and transportation systems design. Generalized design paradigm; group problem solving. GE credit: SE, SL.-III. (III.) Niemeier

163. Energy and Environmental Aspects of Transportation (4)

Lecture - 3 hours; extensive writing. Prerequisite: Economics 1A and course 162. Engineering, economic, and systems planning concepts. Analysis and evaluation of energy, air quality and selected environmental attributes of transportation technologies. Strategies for reducing pollution and petroleum consumption in light of institutional and political constraints. Evaluation of vehicle emission models. (Same course as Environmental Science and Policy 163.) Offered in alternate years. GE credit: Wrt | SE, SL, SS, WE.—I. Sperling

165. Transportation Policy (3)

Lecture—3 hours. Prerequisite: Economics 1A and Engineering 106 recommended. Transportation and associated environmental problems confronting urban areas, and prospective technological and institutional solutions. Draws upon concepts and methods from economics, engineering, political science and environmental studies. Offered in alternate years. GE credit: SocSci, Wrt | QL, SE, SS.—(I.)

171. Soil Mechanics (4)

Lecture—4 hours. Prerequisite: Engineering 103 and 104 (may be taken concurrently), course 171L must be taken concurrently. Restricted to Civil Engineering and Civil Engineering/Materials Science and Engineering majors only. Soil formations, mass-volume relationships, soil classification, effective stress, soilwater-void relationships, compaction, seepage, capillarity, compressibility, consolidation, strength, states of stress and failure, lateral earth pressures, and slope stability. GE credit: SE.-I, III. (I, III.) Kutter

171L. Soil Mechanics Laboratory (1)

Laboratory—3 hours. Prerequisite: course 171 must be taken concurrently. Laboratory studies utilizing standard testing methods to determine physical, mechanical and hydraulic properties of soil and demonstration of basic principles of soil behavior. GE credit: SE.-I, III. (I, III.) Kutter

173. Foundation Design (4)

Lecture - 4 hours. Prerequisite: courses 135 (may be taken concurrently) and 171. Soil exploration and determination of soil properties for design; consolidation and elastic settlements of foundations; bearing capacity of soils and footing design; lateral earth pressures and retaining wall design; pile foundations; excavations and dewatering. GE credit: QL, SE.-II. (II.) Boulanger

175. Geotechnical Earthquake Engineering

Lecture-4 hours. Prerequisite: course 171 and 171L. Earthquake sources and ground motions. Cyclic behavior of soils; triggering, consequences, and mitigation of effects of liquefaction. NEES (Network for Earthquake Engineering Simulation) equipment and techniques for studying earthquake engineering with focus on liquefaction problems. GE credit: QL, SE.—(II.) Kutter

179. Pavement Engineering (4)

Lecture - 3 hours; discussion/lecture - 3 hours. Prerequisite: Engineering 104. Pavement types (rigid, flexible, unsurfaced, rail), their applications (roads, airfields, ports, rail) and distress mechanisms. Materials, traffic and environment characterization. Empirical and mechanistic-empirical design procedures. Maintenance, rehabilitation and reconstruction; construction quality; asphalt concrete mix design. GE credit: QL, SE, SL, VL.—I. (I.) Harvey

189A-J. Selected Topics in Civil Engineering

Prerequisite: consent of instructor. Directed group study of selected topics with separate sections in (A) Environmental Engineering; (B) Hydraulics and Hydrologic Engineering; (C) Engineering Planning; (D) Geotechnical Engineering; (E) Structural Engineering; (F) Structural Mechanics; (G) Transportation Engineering; (H) Transportation Planning; (I) Water Resources Engineering; (J) Water Resources Planning. May be repeated for credit when the topic is different. GE credit: SE.-I, II, III. (I, II, III.)

190C. Research Group Conferences in Civil and Environmental Engineering (1)

Discussion - 1 hour. Prerequisite: upper division standing in Civil and Environmental Engineering; consent of instructor. Research group conferences. May be repeated for credit. (P/NP grading only.) GE credit: SE.-I, II, III. (I, II, III.)

192. Internship in Engineering (1-5)

Internship. Prerequisite: upper division standing; approval of project prior to the period of the internship. Supervised work experience in civil engineering. May be repeated for credit. (P/NP grading only.) GÉ credit: SE.

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: senior standing in engineering and at least a B average. (P/NP grading only.) GE credit:

Graduate Courses

201. Introduction to Theory of Elasticity (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Engineering 104. Fundamental equations of elasticity in three dimensions; plane stress and plane strain; flexture and torsion of bars of various shapes. Introduction to variational and approximate methods. - I. (I.) Rashid

203. Inelastic Behavior of Solids (3)

Lecture - 3 hours. Prerequisite: course 201. Fundamentals of theories of plasticity, viscoelasticity and viscoplasticity for solids. Macroscopic constitutive modelling for engineering materials, e.g., metals, polymers, soils, etc., and microscopic motivation. Offered in alternate years. — Dafalias

205. Continuum Mechanics (3)

Lecture - 3 hours. Prerequisite: course 201. Tensor formulation of the field equations for continuum mechanics, including large deformation effects. Invariance and symmetry requirements. Introduction to nonlinear thermoelasticity and thermodynamics Solution of three-dimensional problems. Selected topics. Offered in alternate years. - Dafalias

206. Fracture Mechanics (4)

Lecture - 4 hours. Prerequisite: course 201; Engineering 104. Linear and nonlinear fracture mechanics, stress analysis, energy concepts, brittle fracture criteria, path independent integrals, Dugdale-Barenblatt model, general cohesive zone models, ductile fracture criteria, crack tip fields for stationary and propagating cracks, fatigue. Application of numerical methods for fracture mechanics.Offered in alternate years.—Rashid

211. Advanced Matrix Structural Analysis

Lecture - 4 hours. Prerequisite: course 131. Analysis of complex frameworks by the displacement method; treatment of tapered beams, curved beams, and beams on elastic foundations; partially rigid connections; geometric and material nonlinearities; buckling; flexibility-based formulations; FEM-software for nonlinear analysis of structures. - I. (I.) Kunnath

212A. Finite Element Procedures in Applied Mechanics (4)

Lecture - 4 hours. Prerequisite: Applied Science Engineering 115, or Mathematics 128A and Mathematics 128B (may be taken concurrently). Weighted-residual and Rayleigh-Ritz methods. Weak/variational formulation and development of discrete equations using finite element approximations. Application to one- and two-dimensional problems (heat conduction).—II. (II.) Sukumar

212B. Finite Elements: Application to Linear and Non-Linear Structural Mechanics Problems (4)

Lecture — 4 hours. Prerequisite: course 212A. Application to linear and nonlinear structural mechanics problems. Linear elasticity, weak form, and finite element approximation. Incompressible media problems. Non-linear problems with material nonlinearity. — (III.) Sukumar

213. Analysis of Structures Subjected to Dynamic Loads (4)

Lecture - 4 hours. Prerequisite: courses 138 and 211. Analysis of structures subjected to earthquake, wind and blast loading; distributed, consistent and lumped mass techniques; computer implementation; nonlinear response spectrum; frequency and time domain analysis; seismic protection of structures; numerical methods in linear and nonlinear structural dynamics. — I. (I.) Kunnath

221. Theory of Plates and Introduction to Shells (3)

Lecture - 3 hours. Prerequisite: course 201 (may be taken concurrently). Development of classical and refined plate theories. Application to isotropic, orthotropic and composite plates. Solutions for rectangular and circular plates. Membrane theory for axisymmetric shells and bending of circular shells.

223. Advanced Dynamics, Signal Processing, and Smart Structures Technology (4)

Lecture - 4 hours. Prerequisite: course 213 or equivalent. Signal processing and system identification of structures under dynamic excitations; Fourier and Laplace transforms; data acquisition and sensor design fundamentals; sensor technologies/tech niques for nondestructive evaluation; structural control; actuators and dampers for smart structures; piezoelectrics and acoustic emissions; micro- and nano-fabrication.—II. (II.) Loh

232. Advanced Topics in Concrete Structures (4)

Lecture — 4 hours. Prerequisite: course 130, 135, 138 and graduate standing. Ductility of reinforced concrete; strength of two-way slabs; modified compression field theory.—I. (I.) Chai

233. Advanced Design of Steel Structures

Lecture - 4 hours. Prerequisite: courses 130 or 131, 132. Review of Load and Resistance Factor Design (LRFD); steel-plate girder design; plastic design of indeterminate systems; moment frames and bracing

systems; connection design; seismic design of steel structures; vibration of flooring systems; steel-concrete composite design. — III. (III.) Kanvinde

234. Prestressed Concrete (4)

Lecture-4 hours. Prerequisite: courses 130 or 131, 135. Survey of methods and applications; prestressing materials and systems; prestress losses; flexural design; design for shear and torsion; deflection computation and control; continuous beams and indeterminate structures; floor systems; partial prestressing; design of compression members; strut-and-tie models. Öffered in alternate years.—Bolander

235. Cement Composites (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 104. Applications of cement composites; materials selection and proportioning; component and composite properties; hydration reactions and microstructure development; mechanisms of failure; nondestructive test methods; fiber reinforcement; concrete durability; novel reinforcing materials; ferrocement; repair and retrofit technologies; applications to structural design. Offered in alternate years. - (II.) Bolander

236. Design of Fiber Reinforced Polymer Composite Structures (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 135. Basics of mechanics and design of polymer matrix composites: composite classification, manufacturing process, micromechanical property determination, classical lamination theory, strength theories, first-ply-failure, test methods, design practice, strengthening and retrofitting of existing reinforced concrete structures. - I. (I.) Cheng

237. Bridge Design (4)

Lecture - 4 hours. Prerequisite: courses 130, 135; course 234 recommended. Open to graduate students only. Bridge types, behavior and construction characteristics; design philosophy, details according to Caltrans and American Association of State Highway and Transportation Officials codes, principles; seismic design and retrofit of concrete bridges; modern bridges using advanced fiber reinforced polymer composites; fieldtrip required.—III. (II.) Cheng

238. Performance-Based Seismic Engineering (4)

Lecture-4 hours. Prerequisite: Courses 138 and 213. Modern seismic design; performance-based seismic design; seismic hazard; seismic demands: linear and nonlinear procedures; performance assessment: deterministic and probabilistic procedure; review of FEMA-350, FEMA-356, ATC-40 and other performance-based guidelines. — (II.) Kunnath

240. Water Quality (4)

Lecture—4 hours. Prerequisite: courses 141 and 142. Quality requirements for beneficial uses of water. Hydrologic cycle of quality. Hydromechanics in relation to quality of surface and groundwaters; transport and fate of waterborne pollutants. Heat budget for surface waters; predictive methods; introduction to water quality modeling.—II. (II.) Schladow

241. Air Quality Modeling (4)

Lecture—4 hours. Prerequisite: Applied Science Engineering 115, course 119A, 149, 150, one from course 242 or 247, or the equivalent, graduate standing. Modeling of urban and regional air quality problems including gas-phase chemical reactions, aqueous-phase chemical reactions, phase partitioning, and numerical solution schemes. Offered in alternate years.—I. Kleeman

242. Air Quality (4)

Lecture-4 hours. Prerequisite: Engineering 105, course 141, 149 or the equivalent. Factors determining air quality. Effects of air pollutants. Physical and chemical fundamentals of atmospheric transport and reaction. Introduction to dispersion modeling. Offered in alternate years. - (III.) Kleeman

243A. Water and Waste Treatment (4)

Lecture-4 hours. Prerequisite: course 148A or the equivalent. Characteristics of water and airborne wastes; treatment processes and process kinetics; treatment system design. - I. (I.) Young

243B. Water and Waste Treatment (4)

Lecture-4 hours. Prerequisite: course 243A. Continuation of course 243A. Aeration, thickening, biological processes, design of biological treatment systems. — II. (II.) Loge

244. Life Cycle Assessment for Sustainable Engineering (4)

Lecture — 4 hours. Prerequisite: graduate standing. Life cycle assessment methodology is taught emphasizing applications to infrastructure and energy systems. Life cycle design, life cycle cost methods, other tools from industrial ecology, and links to policy are covered as well. — I. (I.) Kendall

245A. Applied Environmental Chemistry: Inorganic (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Engineering 105, Chemistry 2B or the equivalent, course 140; Chemistry 2C or 107A recommended. Chemistry of natural and polluted waters. Topics include chemical, kinetic and equilibrium principles, redox reactions, gas solution and solid-solution equilibria, thermodynamics, carbonate systems, coordination chemistry, interfacial phenomena. Offered in alternate years.—(II.) Young

245B. Applied Environmental Chemistry: Organic (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 128A, 128B, 128C, or the equivalent; Chemistry 2C or 107A recommended. Transport and transformation of organic chemicals in the environment. Topics include application of thermodynamics to predict solubility and activity coefficients; distribution of organic chemicals between the aque ous phase and air, solvent, or solid phases; chemical, photochemical and biological transformation reactions. Offered in alternate years. - (III.) Young

246. Pilot Plant Laboratory (4)

Lecture - 1 hour; discussion - 1 hour; laboratory - 6 hours. Prerequisite: course 243A, 243B (may be taken concurrently) or consent of instructor, graduate standing. Laboratory investigation of physical, chemical, and biological processes for water and wastewater treatment. — II. (II.) Darby

247. Aerosols (4)

Lecture - 4 hours. Prerequisite: Engineering 103, 105, course 141, 149. Behavior of airborne particles including particle formation, modification, and removal processes. Offered in alternate years.—III. Kleeman

247L. Aerosols Laboratory (4)

Lecture — 2 hours; laboratory — 6 hours. Prerequisite: course 247. Methods of generation and characterization of aerosols. Detailed topics may include flow rate measurement, aerosol generation, aerosol collection, ions measurement, metals measurement, and carbon measurement. May be repeated one time for credit. — Kleeman

248. Biofilm Processes (4)

Lecture - 4 hours. Prerequisite: Soil Science 111 or 211 or course 243B or consent of instructor; calculus and basic cell molecular biology recommended. Natural and engineered biofilms, including biofilm occurrence and development, spatial structure, microbial processes, fundamental and applied research tools, biofilm reactors, beneficial uses, and detrimental effects. - Wuertz

249. Probabilistic Design and Optimization

Lecture — 4 hours. Prerequisite: courses 114 and 153 and Engineering 106, or equivalents. Design by optimization for probabilistic systems, decision theory, the value of information, probabilistic linear programming, probabilistic dynamic programming, nonlinear probabilistic optimization. Applications in civil engineering design, project evaluation, and risk management. Offered in alternate years.—II. Lund

250. Civil Infrastructure System Optimization and Identification (4)

Lecture - 4 hours. Prerequisite: Mathematics 21C, 22A, programming course; Applied Science Engineering 115 and mathematical modeling course recommended. Applied mathematics with a focus on

modeling, identifying, and controlling dynamic, stochastic, and underdetermined systems. Applications in transportation networks, water resource planning, and other civil infrastructure systems. Offered in alternate years. — (III.) Fan

251. Transportation Demand Analysis (4)

Lecture - 4 hours. Prerequisite: course 114 or the equivalent. Procedures used in urban travel demand forecasting. Principles and assumptions of model components (trip generation, trip distribution, model split). New methods of estimating travel demand. Computer exercises using empirical data to calibrate models and forecast travel demand. - I. (I.) Niemeier

252. Sustainable Transportation Technology and Policy (3)

Lecture — 2 hours; discussion — 1 hour. Prerequisite: course 165. Role of technical fixes and demand management in creating a sustainable transportation system. Emphasis on technology options, including alternative fuels, electric propulsion, and IVHS. Analysis of market demand and travel behavior, environmental impacts, economics and politics. (Same course as Environmental Science and Policy 252.) Offered in alternate years—III. Sperling

253. Dynamic Programming and **Multistage Decision Processes (4)**

Lecture-4 hours. Prerequisite: Mathematics 21C, 22A, programming course; Applied Science Engineering 115 recommended. Operations research. Optimization techniques with a focus on dynamic programming in treating deterministic, stochastic, and adaptive multistage decision processes. Brief review of linear programming and non-linear programming. Applications in transportation networks and other civil infrastructure systems.—III. (III.) Fan

254. Discrete Choice Analysis of Travel Demand (4)

Lecture-4 hours. Prerequisite: course 114. Behavioral and statistical principles underlying the formulation and estimation of discrete choice models. Practical application of discrete choice models to characterization of choice behavior, hypothesis testing, and forecasting. Emphasis on computer exercises using real-world data sets.—III. (III.)

256. Urban Traffic Management and Control (4)

Lecture-4 hours. Prerequisite: course 114. Basic concepts, models, and methods related to the branch of traffic science that deals with the movement of vehicles on a road network, including travel speed, travel time, congestion concepts, car-following and hydrodynamic traffic models.—I. (I.) Zhang

257. Flow in Transportation Networks (4)

Lecture — 4 hours. Prerequisite: course 153; 161 or 256 recommended. Elements of graph theory, a survey of pertinent optimization techniques, extremal principles in network flow problems, deterministic equilibrium assignment, stochastic equilibrium assignment, extensions of equilibrium assignments and dynamic transportation network assignment. -II. (II.) Zhang

258. Transportation Planning in Developing Countries (3)

Lecture - 3 hours. Prerequisite: course 160 or consent of instructor. Investigation of the role that transportation investments and policies play in the development of regions and countries. Emphasis is on identifying appropriate technologies, policies, and planning methods for designing transportation systems in regions of differing socioeconomic, geographic, and institutional settings. Offered in alternate years. — (III.) Sperling

259. Asphalt and Asphalt Mixes (4)

Lecture - 4 hours. Prerequisite: course 179 or consent of instructor. Asphalts and asphalt mix types and their use in civil engineering structures, with primary emphasis on pavements. Asphalt, aggregate properties and effects on mix properties. Design, construction, recycling. Recent developments and research. Offered in alternate years.—(II.) Harvey

260. Sediment Transport (4)

Lecture-4 hours. Prerequisite: course 141 or equivalent. Sediment transport in hydrologic systems. Process-oriented course which will emphasize how sediment moves and the physical processes that affect sediment transport. Field trip. Offered in alternate years. - Schoellhamer

264A. Transport, Mixing and Water Quality in Rivers and Lakes (4)

Lecture — 4 hours. Prerequisite: course 141 and 240. Principal causes of mixing and transport in rivers, lakes and reservoirs, and their impacts on water quality. Case studies of specific lakes and rivers. Offered in alternate years. - Schladow

264B. Transport, Mixing and Water Quality in Estuaries and Wetlands (4)

Lecture-4 hours. Prerequisite: courses 141 and 240. Principal causes of mixing and transport in estuaries and wetlands, and their impacts on water quality. Topics include advection/diffusion; tides; transverse mixing; longitudinal dispersion; sediment transport; nutrient cycling; computer modeling of estuaries. Case studies of specific systems. Offered in alternate years.—Schladow

265. Stochastic Contaminant Transport (4)

Lecture - 4 hours. Prerequisite: course 266. Stochastic theory of molecular diffusion covered by means of Taylor-Chandrasekhar theory. Turbulence diffusion covered in the Lagrangian-Eulerian frameworks. Application of theory to contaminant transport in groundwater aquifers, atmosphere, river and oceanic environments. Offered in alternate years. — (I.)

266. Applied Stochastic Methods in Engineering (4)

Lecture—4 hours. Prerequisite: course 114 or Mathematics 131 or Statistics 130A or 131A; Mathematics 118A (may be taken concurrently). Stochastic processes classification; Gaussian random fields; stochastic calculus in mean square; Ito and Stratonovich stochastic differential equations; Fokker-Planck equation; stochastic differential equations with random coefficients. Offered in alternate years. -

267. Water Resources Management (3)

Lecture - 3 hours. Prerequisite: courses 114, 141 and 142; course 153 recommended. Engineering, institutional, economic, and social basis for managing local and regional water resources. Examples in the context of California's water development and management. Uses of computer modeling to improve water management.—I. (I.) Lund

268. Infrastructure Economics (3)

Lecture — 3 hours. Prerequisite: Economics 1A, Engineering 106 or the equivalent. Economics applied to infrastructure engineering planning, operations, maintenance, and management problems; microeconomic and macroeconomic theories; benefit-cost analysis; effect of uncertainty; optimization economics; non-classical economics; public finance. Offered in alternate years. - (II.) Lund

269. Transportation-Air Quality: Theory and Practice (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 149 or the equivalent. Health and regulatory aspects of airborne pollutants. Principles of modeling vehicle emissions. Conformity issues and the regulatory framework. Regional and micro-scale modeling. Offered in alternate years.—Niemeier

270. Advanced Water Resources Management (3)

Lecture — 3 hours. Prerequisite: courses 153 and 267 or the equivalent. Discussion of technical papers related to planning theory, system maintenance, regionalization, multi-objective methods, risk analysis, institutional issues, pricing model application, economic development, forecasting, operations, and other topics. Offered in alternate years. -

271. Inverse Problems (4)

Lecture-3 hours. Prerequisite: courses 114 and 144 or equivalents. Inverse calibration of distributed parameter models, using data representing model outputs. Forward and inverse mappings, stability, uniqueness, identifiability. Optimization formulation of inverse problems, maximum likelihood and other objective functions, indirect and direct approaches, solution by UCODE in hands-on project format. — (I.)

272A. Advanced Hydrogeology (4)

Lecture-4 hours. Prerequisite: course 144; Mathematics 118A recommended. Flow in confined, unconfined, and leaky aquifers. Geological aspects of aquifers. Regional groundwater flow and hydraulics of pumping and recharging wells. Identification of aquifer parameters. Isotope hydrogeology and recharge estimation. — (II.) Ginn

272B. Advanced Hydrogeology (4)

Lecture - 4 hours. Prerequisite: courses 212A and 272A. Processes of subsurface flows and transport. Numerical methods of subsurface fluid flow and transport systems. Flow in the unsaturated zone. Fresh water/salt water interface in coastal aquifers. Macrodispersion. Identification of regional aquifer parameters. Modeling of aquifer systems. Offered in alternate years. — (III.) Ginn

272C. Multiphase Reactive Transport (4)

Lecture-4 hours. Prerequisite: courses 142, 144, 148A. Multicomponent reactive transport including multiple phases. Advective/dispersive transport, chemical equilibria, and mass transformation kinetics. Natural chemical/microbiological processes including sorption, complexation, biodegradation, and diffusive mass transfer. Eulerian and Lagrangean averaging methods. Applications to contaminant remediation problems in river and subsurface hydrology. Offered in alternate years. - Ginn

273. Water Resource Systems Engineering (3)

Lecture-3 hours. Prerequisite: courses 114 and 153 or the equivalent. Planning, design, and management of water resource systems. Application of deterministic and stochastic optimization techniques. Water allocation, capacity expansion, and design and operation of reservoir systems. Surface water and groundwater management. Offered in alternate years. — (I.) Lund

275. Hydrologic Time-Series Analysis (4)

Lecture — 4 hours. Prerequisite: course 114 and 142. Application of statistical methods for analysis and modeling of hydrologic series. Statistical simulation and prediction of hydrologic sequences using time series methodology. Offered in alternate years. — (III.) Kavvas

276. Watershed Hydrology (4)

Lecture-4 hours. Prerequisite: course 142 or the equivalent. Analysis and mathematical modeling of hydrologic processes taking place in a watershed. Precipitation analysis and modeling. Theory of overland flow and its kinematic wave approximation. Analysis and modeling of saturated and unsaturated subsurface flow processes taking place on a hill slope.—II. (II.) Kavvas

277A. Computational River Mechanics I (4)

Lecture-4 hours. Prerequisite: Applied Science Engineering 115, course 141 (both may be taken concurrently). Unsteady open channel flows, computation of water surface profiles, shallow water equations, St. Venant equations, method of characteristics, finite difference methods, stability and accuracy of explicit and implicit schemes, flood routing in simple and compound channels, advection of plumes. Not open for credit to students who have completed course 277.—I. (I.) Younis

277B. Computational River Mechanics II (4)

Lecture - 4 hours. Prerequisite: course 277A. Open channel flows, physical aspects of river mechanics, formulation of depth-averaged equations, boundary conditions, coordinates transformation and grid generation, finite-difference solution techniques, applications to two-dimensional momentum and pollutant transport in rivers. Offered in alternate years. — (III.)

277C. Turbulence and Mixing Processes (4)

Lecture - 4 hours. Prerequisite: graduate standing. Nature of turbulent flows, conservation equations, momentum, heat and mass transport in free and wall-bounded flows, body forces and mixing, roughness effects, turbulence modeling and simulation. Offered in alternate years.—(III.) Younis

278. Hydrodynamics (3)

Lecture - 3 hours. Prerequisite: course 141. Perturbation methods. Basic water waves. Governing equations for fluid motion on a rotating earth. Rotation effects, vorticity dynamics, Ekman layer. Stratification effects, internal waves and turbulent mixing. Combined effects. Offered in alternate years.—(II.)

279. Advanced Mechanics of Fluids (4)

Lecture-4 hours. Prerequisite: course 141. Rotational flows. Navier-Stokes equations and solutions for laminar flow; boundary layer equations and solution techniques. Nature of turbulence. Reynolds equations. Introduction to turbulence modeling. Offered in alternate years.—I. Bombardelli

280A. Nonlinear Finite Elements for Elastic-Plastic Problems (4)

Lecture - 4 hours. Prerequisite: consent of instructor. State of the art finite element methods and tools for elasticplastic problems, including computational techniques based on the finite element method and the theory of elastoplasticity. Offered in alternate years.—(III.) Jeremic

280B. Nonlinear Dynamic Finite Elements

Lecture-4 hours. Prerequisite: consent of instructor. State of the art computational methods and tools for analyzing linear and nonlinear dynamics problems. Offered in alternate years.—Jeremic

281A. Advanced Soil Mechanics (4)

Lecture-4 hours. Prerequisite: course 171. Consolidation and secondary compression. Preloading and wick drains. Seepage and seepage pressures. Filtration, drainage, and dewatering. Shear strength: friction, cohesion, dilatancy and critical states. - I. (I.)

281B. Advanced Soil Mechanics (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 281A. Site investigation methods: CPT, SPT, pressuremeter, vane, seismic investigation, electrical properties. Slope stability, including seepage pressures and earthquake effects. Slope stabilization and reinforcement methods. Centrifuge modeling.—II. (II.) DeJong

282. Pavement Design and Rehabilitation

Lecture - 4 hours. Prerequisite: course 179 or consent of instructor. Advanced pavement design and structural/functional condition evaluation for concrete and asphalt pavements. Highways, airfields, port facilities; new facilities, rehabilitation, recon struction. Mechanistic-empirical procedures, materials, climate and traffic characterization. Use of current design methods; recent developments and research. Offered in alternate years. - III. Harvey

283. Physico-Chemical Aspects of Soil Behavior (3)

Lecture - 2 hours; laboratory - 3 hours. Prerequisite: course 171. Soil formation, mineralogy, and transport; soil-fluid-electrolyte systems; electrical, surface tension, van der Waals forces; particle shape and contact mechanics, and electromagnetic and mechanical properties of soils. Laboratories demonstrate effects of chemical admixtures, salts and particle texture on soil behavior.—I. (III.) Kutter

284. Theoretical Geomechanics (4)

Lecture - 4 hours. Prerequisite: course 171. Elasticity, plasticity, micromechanics, coupled behavior and large deformations for geomaterials. Prediction of stress-strain-volume change behavior of geomaterials. Monotonic and cyclic loading, anisotropy, bifurcation of deformation.—II. (II.) Kutter

286. Advanced Foundation Design (4)

Lecture-4 hours. Prerequisite: course 173. Design and analysis of pile and pier foundations, including seismic effects; deep excavation systems; tie-back, nailing, and anchor systems; coffer dams; loads on buried conduits; ground modification techniques; and other related topics. - III. (I.) DeJong

287. Geotechnical Earthquake Engineering (4)

Lecture-4 hours. Prerequisite: courses 138 and 281A. Characteristics and estimation of earthquake ground motions; wave propagation and local site response; liquefaction potential and remediation; residual strength and stability considerations; ground deformations; dynamic soil-structure interac-

288. Earth and Rockfill Dams (4)

Lecture—4 hours. Prerequisite: courses 281A and 281B (may be taken concurrently). Site selection; design considerations; layout; seismic effects including considerations of fault movements; construction; environmental considerations, instrumentation; maintenance remediation and retrofit of existing dams. Offered in alternate years. — (II.)

289A-I. Selected Topics in Civil Engineering (1-5)

Lecture, laboratory, or combination. Prerequisite: consent of instructor. Directed group study of special topics with separate sections in (A) Environmental Engineering; (B) Hydraulics and Hydrologic Engineering; (C) Engineering Planning; (D) Geotechnical Engineering; (E) Structural Engineering; (F) Structural Mechanics; (G) Transportation Engineering; (H) Transportation Planning; (I) Water Resources Engineering; (J) Water Resources Planning. May be repeated for credit. - I, II, III. (I, II, III.)

290. Seminar (1)

Seminar-1 hour. Discussion of current graduate research, and guest lectures on recent advances. Oral presentation of individual study. Course required of graduate degree candidates. (S/U grading only.)—I, II, III. (I, II, III.)

290C. Graduate Research Group Conference (1)

Discussion-1 hour. Research problems, progress, and techniques in civil engineering. May be repeated for credit. (S/U grading only.)-I, II, III. (I,

296. Topics in Water and Environmental Engineering (1)

Seminar-2 hours. Seminars presented by visiting lecturers, UC Davis faculty and, graduate students. May be repeated for credit. (S/U grading only.)-I, II, III. (I, II, III.)

298. Group Study (1-5)

Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12)

(S/U grading only.)

Professional Course

390. The Teaching of Civil Engineering (1)

Discussion - 1 hour. Prerequisite: meet qualifications for teaching assistant and/or associate-in in Civil Engineering. Participation as teaching assistant or associate-in in a designated engineering course. Methods of leading discussion groups or laboratory sections, writing and grading quizzes, use of laboratory equipment, and grading laboratory reports.

May be repeated for total of 9 units. (S/U grading only.)—I, Iİ, III. (I, II, III.)

Engineering: Computer Science

(College of Engineering)

Prasant Mohapatra, Ph.D., Chairperson of the Department

Department Office. 2063 Kemper Hall (530) 752-7004; http://www.cs.ucdavis.edu

Nina Amenta, Ph.D., Professor Zhaojun Bai, Ph.D., Professor Matthew Bishop, Ph.D., Professor Hao Chen, Ph.D., Associate Professor lan Davidson, Ph.D. Associate Professor Premkumar T. Devanbu, Ph.D., Professor Raissa D'Souza, Ph.D, Associate Professor Matthew K. Farrens, Ph.D., Professor Vladimir Filkov, Ph.D, Associate Professor Matthew Franklin, Ph.D., Professor Dipak Ghosal, Ph.D., Professor Todd J. Green, Ph.D., Assistant Professor Daniel Gusfield, Ph.D., Professor Francios Gygi, Ph.D, Professor Bernd Hamann, Ph.D., Professor Kenneth I. Joy, Ph.D., Professor

Academic Senate Distinguished Teaching Award Patrice Koehl, Ph.D., Associate Professor Karl Levitt, Ph.D., Professor Xin Liu, Ph.D., Associate Professor Bertram Ludaescher, Ph.D., Professor Kwan-Liu Ma, Ph.D., Professor Charles U. Martel, Ph.D., Professor Norman S. Matloff, Ph.D., Professor Nelson Max, Ph.D., Professor Prasant Mohapatra, Ph.D., Professor Biswanath Mukherjee, Ph.D., Professor Distinguished Graduate Mentoring Award Michael Neff, Ph.D., Assistant Professor

Ronald A. Olsson, Ph.D., Professor Academic Senate Distinguished Teaching Award
Raju Pandey, Ph.D., Associate Professor
Phillip Rogaway, Ph.D., Professor
Zhendong Su, Ph.D., Associate Professor
Ilias Tagkopoulos, Ph.D., Assistant Professor
S. Felix Wu, Ph.D.

S. Felix Wu, Ph.D., Professor

Emeriti Faculty

Lawrence T. Kou, Ph.D., Professor Emeritus Peter Linz, Ph.D., Professor Emeritus Richard F. Walters, Ph.D., Professor Emeritus Academic Senate Distinguished Teaching Award

Affiliated Faculty

Sean Davis, M.S., Lecturer Sean Peisert, Ph.D, Assistant Adjunct Professor Owen Carmichael, Ph.D, Assistant Adjunct Professor Gunther Weber, Ph.D, Assistant Adjunct Professor

The Computer Science and **Engineering Program**

The Department of Computer Science administers two curricula: Computer Science and Engineering in the College of Engineering, and Computer Science in the College of Letters and Science. It also administers a minor in the College of Letters and Science. For information on the Computer Science curriculum and minor, see Computer Science, on page 211

The field of Computer Science and Engineering encompasses the organization, design, analysis, theory, programming, and application of digital computers and computing systems. It develops versatile engineers with backgrounds spanning a broad computer hardware/software spectrum.

The Computer Science and Engineering major provides students with a solid background in mathematics, physics, chemistry, and electronic circuits and systems, all supporting the computer hardware and computer software courses that constitute the focus of the curriculum.

A key theme of this curriculum is the hardware/software interaction in today's computer systems design, a theme reflected in the balance between computer hardware and computer software aspects in the course requirements. The key theme of hardware/ software interaction is also reflected in the orientation of the courses themselves. The Computer Science and Engineering major also requires additional general education electives, helping to develop the verbal skills and intellectual breadth demanded by today's employers.

The Computer Science and Engineering program prepares students to do further work in hardware, software, or electronics, either in industry or postgraduate study.

Mission. The University of California, Davis, is first and foremost, an institution of learning and teaching, committed to serving the needs of society. The Department of Computer Science contributes to the mission of the University in three ways. First, its undergraduate and graduate education programs seek to educate students in the fundamental principles of computer science and the skills needed to solve the complex technological problems of modern society; the breadth of course work provides a framework for life-long learning and an appreciation for multidisciplinary activities. Second, through its research programs, the department contributes to the development and progress of computer science, and software and information technology, to provide innovative, creative solutions for societal needs. Finally, the department disseminates its research—to enhance collaborations with the public sector, further interdisciplinary interests that benefit society, and educate the public—through publications, public service, and professional activities.

Department Objectives. Teaching—To provide undergraduate students with a thorough understanding of the key principles and practices of computing, which include a strong theoretical background in mathematics, basic sciences, and engineering fundamentals and an ability to apply this knowledge to practical problems. To provide students with sufficient breadth to work creatively and productively in multidisciplinary work teams; this breadth, in its broadest context, will form the basis for an appreciation and interest in life-long learning. To provide students with the ability to design and conduct experiments, and to collect and analyze data in core, as well as more specialized, areas of computer science. To provide students with breadth in the humanities and social sciences so they learn to communicate effectively, understand professional and ethical issues in society, and appreciate the interrelatedness between computing and society. To educate graduate students to be our next generation of teachers or leaders in industry, or to pursue meaningful, creative research in industry, government, or academia. Research—To develop and maintain research programs that produce fundamental scientific advances, as well as useful technological innovations, while simultaneously training the next generation of researchers and leaders in the field of computer science.

Objectives. To train graduates to practice computer science and engineering in a broad range of industries; to prepare interested graduates for graduate education or other professional degrees; to give students an understanding of computer software and hardware systems, and both theoretical and experi mental approaches to problem solving; to ready graduates for lifelong learning; and to encourage graduates to contribute to their profession and soci-

Integrated Degree Program. An integrated B.S./M.S. plan in Computer Science allows Davis students in Computer Science, Computer Science Engineering, or Computer Engineering to complete a master's degree in Computer Science in one year. Formal course work for the master's degree is reduced by 6 units for students. Students can begin graduate studies immediately after completing their B.S. degree. More information is available in the graduate section of the College of Engineering Bulletin, or at http://www.cs.ucdavis.edu/graduate/

Computer Science and Engineering Undergraduate Program

The Computer Science and Engineering program is accredited by the Engineering Accreditation Commission of ABET; http://www.abet.org.

Students are encouraged to carefully adhere to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

Lower Division Required Courses

2
UNITS
Mathematics 21A-21B-21C-21D 16
Mathematics 22A-22B6
Physics 9A-9B-9C-9D
Chemistry 2A 5
Engineering 20, 30, 40, 60
Computer Science Engineering 50 or
Electrical and Computer Engineering 70 4
Engineering 174
English 3 or University Writing Program 1, or
Comparative Literature 1, 2, 3, or 4, or
Native American Studies 54
Communication 1 4
General Education electives 32
Minimum Lower Division Units 110

Upper Division Requirements:

Upper Division Required Courses

	iter Science Engineering 188 4
Electric	al and Computer Engineering 100,
172, a	ınd 180A 14
Compu	iter Science Engineering 120† or
122ņ	· 4
Compu	iter Science Engineering 132, 140A,
150, 1	52A, 154A, 154B and 160 28
	uter electives—a minimum of 4 courses
and a	minimum of 15 units chosen from
Compu	iter Science Engineering 120†,
122ņ	, 122B, 124, 129, 130, 140B, 142,
145, 1	52B, 152C, 153, 156, 158, 163,
165A,	165B, 170, 175, 177, 178,; one
course	(minimum 3 units from one single
course	from approved 192 or 199 or
Electric	al and Computer Engineering
194AB	BC; Electrical and Computer
Engine	ering 180B15
Unrestr	ricted elective5
Minim	num Upper Division Units70

Minimum Units Required for Major 180

† Completion of both Computer Science Engineering 120 and 122A will satisfy the computer science theory requirement and a computer elective requirement.

The Minor in Computational **Biology**

The minor in Computational Biology will provide to students with engineering, physical or biological majors the foundations necessary to build efficient computational models and algorithms, use state-ofthe-art techniques for scientific analysis and create scalable infrastructure environments for biological and biotechnological applications.

Students must take a total of 20 upper-division units, with two required courses and 12 units of upper-division electives, as specified below. At most one course may be counted toward both the student's minor and major. A minimum GPA of 2.000 is equired for coursework in the minor. Students should note that most of the courses listed below have lower division prerequisites. In particular, required course Engineering: Computer Science 122A has a prerequisite chain of Engineering: Computer Science 20, 30, 40, and 60.

	UNITS
Computational Biology	20
Required courses	8
Engineering: Computer Science 122A; 1	24
Electives	12
At least one biology course from the follo Molecular & Cellular Biology 121 124, 182: Evolution and Ecology 100, 102, 1 131; Biological Sciences 101, 104, 122	161, 104,
At least one computational or statistics of from the following: Engineering: Comput- ence 130, 132, 140, 145, 156, 158, 1 165A, 166, 170, 177; Evolution and Ec 175, Statistics 141, 130A; Biotechnolog	er Sci- 60, ology

At least one computational biology and bioinformatics course from the following: Engineering: Computer Science 129, Biological Sciences 132; Biomedical Engineering 117, Evolution and Ecology 175, Biotechnology 150

Minor Advisors. Lori Avellar, Vladimir Filkov, Dan Gusfield, Patrice Koehl, Bertram Ludaescher, Ilias

Courses in Engineering: Computer Science (ECS)

Lower Division Courses

Biological Sciences 132

10. Basic Concepts of Computing (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: two years of high school algebra. Not open for credit to students who have completed course 30 or Engineering 6, or to students in upper division standing. Introduction to principles of computing. Methods and algorithms for solving problems by use of a digital computer. GE credit: SciEng | QL, SE, SL.-I, II, III. (I, II, III.) Amenta, Gertz, Ludaeschei

15. Introduction to Computers (4)

Lecture - 3 hours; laboratory - 3 hours. Not open for credit to students who have completed course 30 or students in upper division standing. Computer uses in modern society. Emphasis on uses in nonscientific disciplines. Includes word processing, spreadsheets, web-page creation, elementary programming, basic computer organization, the uses of computers and their influence on society. Not intended for computer science majors. Only two units of credit allowed to students who have completed Plant Science 21. GE credit: SciEng, Wrt | QL, SE, SL.-I, II, III. (I, II, III.)

20. Discrete Mathematics for Computer Science (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: grade of C- or better in Mathematics 16A, 17A or 21A. Discrete structures and applications in computer science. Proofs, particularly induction. Introduction to propositional logic, logic circuit design, combinatorics, recursion and solution of recurrence relations, analysis of algorithms, graph theory and trees, finite state machines. Not open for credit to students who have taken course 100. GE credit: QL, SE.-I, II, III. (I, II, III.) Bai, Gusfield, Levitt, Martel, Rogaway

30. Introduction to Programming and Problem Solving (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Mathematics 16A or 21A (may be taken concurrently); prior experience with basic programming concepts (variable, loops, conditional statements) recommended. Introduction to computers and computer programming, algorithm design, and debugging. Elements of good programming style.

Programming in the C language. Use of basic UNIX tools. GE credit: QL, SE.—I, II, III. (I, II, III.)

40. Introduction to Software Development and Object-Oriented Programming (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 30 or the equivalent with a grade of C- or better. Elements of program design, style, documentation, efficiency. Methods for debugging and verification. Operating system tools. Principles and use of object-oriented programming in C++. Basic data structures and their use. GE credit: SE, VL.-I, II, III.

50. Computer Organization and Machine-Dependent Programming (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 40. Comparative study of different hardware architectures via programming in the assembly lan-guages of various machines. Role of system software in producing an abstract machine. Only one unit of credit allowed for students who have taken Electrical and Computer Engineering 70. GE credit: SE.—I, II, III. (I, II, III.) Farrens, Matloff

60. Data Structures and Programming (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: courses 20, 40 (C++ and UNIX); grade of C- or better in each course. Design and analysis of data structures for a variety of applications. Trees, heaps, searching, sorting, hashing, graphs. Extensive programming. Not open for credit to students who have completed course 110. GE credit: QL, SE.-I, II, III. (I, II, III.) Chen, Joy, Rogaway

89A-L. Special Topics in Computer Science (1-5)

Lecture, laboratory or combination. Prerequisite: consent of instructor. Special topics in (A) Computer Science Theory; (B) Architecture; (C) Programming Languages and Compilers; (D) Operating Systems; (E) Šoftware Engineering; (F) Databases; (G) Artifi cial Intelligence; (H) Computer Graphics; (I) Networks; (J) Computer-Aided Design; (K) Scientific Computing; (L) Computer Science. May be repeated for credit when the topic is different. GE credit: SE. - I, II, III. (I, II, III.)

92. Internship in Computer Science (1-5)

Internship. Prerequisite: lower division standing; project approval prior to period of internship. Supervised work experience in computer science. May be repeated for credit. (P/NP grading only.)

98. Directed Group Study (1-5)

(P/NP grading only.)

99. Special Study for Lower Division Students (1-5)

(P/NP grading only.)

Upper Division Courses

120. Introduction to the Theory of Computation (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 20; Mathematics 108 recommended. Fundamental ideas in the theory of computation, including formal languages, computability and complexity. Reducibility among computational problems. GÉ credit: QL, SE.-I, II, III. (I, II, III.) Bai, Franklin, Gusfield, Rogaway, Martel

122A. Algorithm Design and Analysis (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: courses 20, 60. Complexity of algorithms, bounds on complexity, algorithms for searching, sorting, pattern matching, graph manipulation, combinatorial problems, randomized algorithms, introduction to NP-complete problems. GE credit: SE. – I, II, III. (I, II, III.) Gusfield, Martel, Rogaway

122B. Algorithm Design and Analysis (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 122A. Theory and practice of hard problems, and problems with complex algorithm solutions. NP-completeness, approximation algorithms, randomized algorithms, dynamic programming and branch and bound. Students do theoretical analysis, implementation and practical evaluations. Examples from parallel, string, graph, and geometric algorithms. GE credit: QL, SE.—I. (I.) Rogaway, Gusfield, Martel

124. Theory and Practice of Bioinformatics

Lecture—3 hours; laboratory—1 hour. Prerequisite: course 10 or 30 or Engineering 6; Statistics 12 or 13 or 32 or 100 or 131A or Mathematics 135A; Biological Science 1A or Molecular and Cellular Biology 10. Fundamental biological, mathematical and algorithmic models underlying bioinformatics;

sequence analysis, database search, gene prediction, molecular structure comparison and prediction, phylogenetic trees, high throughput biology, massive datasets; applications in molecular biology and genetics; use and extension of common bioinformatics tools. GE credit: SE.-III. (III.) Filkov, Gusfield

129. Computational Structural Bioinformatics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: college level programming course; Biological Science 1A or Molecular and Cellular Biology 10. Fundamental biological, chemical and algorithmic models underlying computational structural biology; protein structure and nucleic acids structure; comparison of protein structures; protein structure prediction; molecular simulations; databases and online services in computational structural biology. GE credit: SE.-I. (İ.) Koehl

130. Scientific Computation (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 30 or Engineering 6; Mathematics 22A or Mathematics 67. Matrix-vector approach using MAT-LAB for floating point arithmetics, error analysis, interpolations, numerical integration, matrix computations, nonlinear equations and optimization. Parallel computing for matrix multiplication and the Cholesky factorization. GE credit: SE.—III. (III.) Bai, Hamann, Joy

132. Probability and Statistical Modeling for Computer Science (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: courses 50 or Engineering Electrical and Computer 70; course 60; Mathematics 21C; Mathematics 22A or Mathematics 67. Univariate and multivariate distributions. Estimation and model building. Markov/ Hidden Markov models. Applications to data mining, networks, security, software engineering and bioinformatics. GE credit: QL, SE.—II. (II.) Davidson, Ghosal, Matloff

140A. Programming Languages (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 50 or Electrical Computer Engineering 70; course 60. Syntactic definition of programming languages. Introduction to programming language features including variables, data types, data abstraction, object-orientedness, scoping, parameter disciplines, exception handling. Comparative study of several high-level programming languages. GE credit: SE.-I, III. (I, III.) Olsson, Pandey, Su

140B. Programming Languages (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 140A. Continuation of programming language principles. Further study of programming language paradigms such as functional and logic; additional programming language paradigms such as concurrent (parallel), dataflow, and constraint; key implementation issues for those paradigms; and programming language semantics. GE credit: SE.—
I. (I.) Olsson, Pandey

142. Compilers (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: courses 20, 140A; course 120 recommended. Principles and techniques of lexical analysis, parsing, semantic analysis, and code generation. Implementation of compilers. GE credit: SE.-II. (II.) Pandey,

145. Scripting Languages And Their Applications (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: programming skill at the level of course 60. Goals and philosophy of scripting languages, with Perl and Python as prime examples. Applications include networking, threaded programming, and graphical user interfaces (GUI's). Offered in alternate years. GE credit: SE. - III. Matloff

150. Operating Systems and System Programming (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 40; course 154A or Electrical and Computer Engineering 70; course 154B or Electrical and Computer Engineering 170 strongly recommended. Basic concepts of operating systems and system programming. Processes and interprocess communication/

synchronization; virtual memory, program loading and linking; file and I/O subsystems; utility programs. Study of a real operating system. GE credit: ŠE.—I, II, III. (I, II, III.) Levitt, Matloff, Wu

152A. Computer Networks (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 60; Mathematics 135A or Statistics 131A or Statistics 120 or Statistics 32. Overview of local and wide-area computer networks. ISO seven-layer model. Physical aspects of data transmission. Datalink layer protocols. Network architectures. Routing. TCP/IP protocol suite. Local area networks. Medium access protocols. Network performance analysis. Only two units of credit for students who have taken course 157. (Same course as Electrical and Computer Engineering 173A.) GE credit: SE.-I, III. (I, III.) Chuah, Ghosal, Liu, Matloff, Mohapatra, Mukherjee

152B. Computer Networks (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 152A, 150. TCP/IP protocol suite, network layer protocols, transport layer protocols, transport layer interfaces, sockets, UNIX network programming, computer networking applications, remote procedure calls and network management. GE credit: SE.—I, II, III. (I, II, III.) Mukherjee, Ghosal, Matloff, Mohapatra

152C. Design Projects in Communication Networks (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 152A or Electrical and Computer Engineering 173A. Advanced topics and design projects in communication networks. Example topics include wireless networks, multimedia networking, network design and management, traffic analysis and modeling, network simulations and performance analysis. Offered in alternate years. (Same course as Electrical and Computer Engineering 173B.) GE credit: SE. — (III.) Chuah, Liu, van der Schaar, Mukherjee

153. Computer Security (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: courses 150 and 152A. Principles, mechanisms, and implementation of computer security and data protection. Policy, encryption and authentication, access control, and integrity models and mechanisms; network security; secure systems; programming and vulnerabilities analysis. Study of an existing operating system. Not open for credit to students who have completed course 155. GE credit: SE.—II, III. (II, III.) Bishop, Chen

154A. Computer Architecture (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 50 or Electrical and Computer Engineering 70; and course 110. Introduction to digital design. Interfacing of devices for I/O, memory and memory management. Input/output programming, via wait loops, hardware interrupts and calls to operating system services. Hardware support for operating systems software. Only one unit of credit allowed for students who have taken Electrical and Computer Engineering 170. GE credit: SE.—I, II, III. (I, II, III.) Farrens

154B. Computer Architecture (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 154A or Electrical and Computer Engineer ing 170; and course 110. Hardwired and microprogrammed CPU design. Memory hierarchies. Uniprocessor performance analysis under varying program mixes. Introduction to pipelining and multi-processors. GE credit: SE.—I, II, III. (I, II, III.) Farrens

155. Computer Security for Non-Majors (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: programming skill at the level of course 30; Mathematics 21C. Principles, mechanisms, implementation, and sound practices of computer security and data protection. Cryptography. Authentication and access control. Internet security. Malicious software. Common vulnerabilities. Practical security in everyday life. Not open for credit to students who have completed course 153. GE credit: SE, SL.-I. (I.) Chen, Bishop

156. Discrete-Event Simulation (4)

Lecture - 3 hours: discussion - 1 hour. Prerequisite: programming skill at the level of course 60; calculusbased course in probability theory, such as Statistics 120 or 130A or 131A or Mathematics 135A or Engineering Civil and Environmental 114. Design of discrete-event simulation software. Random number generators. Event, process and activity-scanning approaches. Data structures and algorithms for event lists. Statistical output analysis. Applications to computer systems and networks; reliable systems; transportation; business management. GE credit: SE, SL.—I. (I.) Matloff

157. Computer Networks for Non-Majors

Lecture—3 hours; discussion—1 hour. Prerequisite: programming skills on the level of course 30. Shorter version of course 152AB featuring World Wide Web and e-mail examples. Local and wide-area computer network structures. ISO seven-layer model. Network protocols for data transmission and internetworking. Introduction to basic TCP/IP and Web programming. No credit allowed to students who have completed courses 152A or 152B. GE credit: SE, SL.—IİI. (III.) Ghosal, Liu, Matloff, Mohapatra, Mukherjee

158. Programming on Parallel Architectures (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 150; course 154B recommended. Techniques for software development using the shared-memory and message-passing paradigms, on parallel architectures and networks of workstations. Locks, barriers, and other techniques for synchronization. Introduction to parallel algorithms. GE credit: SE.-III. (III.) Farrens, Ma, Matloff, Pandey

160. Introduction to Software Engineering

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 140A. Requirements, specification, design, implementation, testing, and verification of large software systems. Study and use of software engi-neering methodologies. Team programming. GE credit: SE.—I, II, III. (I, II, III.) Levitt, Devanbu

163. Information Interfaces (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 60; 175 recommended. Art and science of information visualization and interfaces for information systems. Design principles of human-computer interaction. Visual display and navigation of nonspatial and higher dimensional data. Implementations, performance issues, tradeoffs, and evaluation of interactive information systems. GE credit: SE, VL.— III. (III.) Amenta, Ma

165A. Database Systems (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 60. Database design, entity-relationship and relational model, relational algebra, query language SQL, storage and file structures, query processing, system architectures. GE credit: SE.—II. (II.) Gertz,

165B. Database Systems (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 165A. Advanced database systems: objectoriented and object-relational database systems; distributed and multidatabase systems; advanced database applications: Web-based database access, data warehouses. GE credit: SE.-III. (III.) Gertz, Ludaescher

166. Scientific Data Management (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: programming skills at course level 40; Mathematics 21C. Relational databases, SQL, non-standard databases, XML, scientific workflows, interoperability, data analysis tools, metadata. GE credit: SE, SL.-I. (I.) Gertz, Ludaescher

170. Introduction to Artificial Intelligence

Lecture—3 hours; discussion—1 hour. Prerequisite: course 140A. Design and implementation of intelligent computer systems. Knowledge representation

and organization. Memory and inference. Problem solving. Natural language processing. GE credit: SE. — II. (II.) Davidson, Levit

173. Image Processing and Analysis (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 60; Mathematics 67 or C- or better in Mathematics 22A. Techniques for automated extraction of high-level information from images generated by cameras, three-dimensional surface sensors, and medical devices. Typical applications include automated construction of 3D models from video footage and detection of objects in various types of images. GE credit: SE. — II. (İI.) Amenta

175. Computer Graphics (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 60; Mathematics 22A or Mathematics 67A. Principles of computer graphics. Principles of computer graphics. Current graphics hardware, elementary operations in two-and three-dimensional space, transformational geometry, clipping, graphics system design, standard graphics systems, individual projects. GE credit: SE, VL.-I, II. (I, II.) Amenta, Hamann, Joy

177. Introduction to Visualization (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 175. Graphics techniques for generating images of various types of measured or computersimulated data. Typical applications for these graphics techniques include study of air flows around car bodies, medical data, and molecular structures. GE credit: SE, VL.—II. (II.) Joy, Hamann, Ma

178. Introduction to Geometric Modeling

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 175. Interactive graphics techniques for defining and manipulating geometrical shapes used in computer animation, car body design, aircraft design, and architectural design. GE credit: SE, VL. -I. (I.) Joy, Hamann, Max

188. Ethics in an Age of Technology (4)

Lecture/discussion-4 hours. Prerequisite: upper division standing. Foundations of ethics. Views of technology. Technology and human values. Costs and benefits of technology. The character of technological change. The social context of work in computer science and engineering. GE credit: Wrt | SS, . WE.—I, II, III. (I, II, IIĬ.)

189A-N. Special Topics in Computer Science

Lecture, laboratory or combination. Prerequisite: consent of instructor. Special topics in (A) Computer Science Theory; (B) Architecture; (C) Programming Languages and Compilers; (D) Operating Systems; (E) Software Engineering; (F) Data Bases; (G) Artifi-(c) Soliware Engineering, (r) Data Bases, (g) Affin-cial Intelligence; (H) Computer Graphics; (I) Net-works; (J) Computer-Aided Design; (K) Scientific Computing; (L) Computer Science; (M) Computer Security; (N) Bioinformatics and Computational Biology. May be repeated for credit when topic differs. GE credit: SE.-I, II, III. (I, II, III.)

190C. Research Group Conferences in Computer Science (1)

Discussion — 1 hour. Prerequisite: upper division standing in Computer Science and Engineering; consent of instructor. Research group conferences. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

190X. Senior Seminar (2)

Seminar - 2 hours. Prerequisite: senior standing. Examination of a special topic in a small group set-

192. Internship in Computer Science (1-5)

Internship. Prerequisite: completion of a minimum of 84 units; project approval prior to period of internship. Supervised work experience in computer science. May be repeated for credit. (P/NP grading only.)

193A. Senior Design Project (2)

Lecture—1 hour; laboratory—3 hours. Prerequisite: senior standing in Computer Science or Computer Science and Engineering or consent of instructor. Team design project involving analysis, design,

implementation and evaluation of a large-scale problem involving computer and computational systems. The project is supervised by a faculty member. Students must take course 193A and 193B to receive credit. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE. GE credit: SE.-II, III. (II, III.) Davidson, Joy

193B. Senior Design Project (2)

Lecture—1 hour; laboratory—3 hours. Prerequisite: IP grade in course 193A. Team design project involving analysis, design, implementation and evaluation of a large-scale problem involving compute and computational systems. The project is supervised by a faculty member. Students must take course 193A and 193B to receive credit. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE.—II, III. (II, III.) Davidson, Joy

197T. Tutoring in Computer Science (2-3)

Discussion - 1 hour; laboratory/discussion - 3-6 hours. Prerequisite: upper division standing, consent of instructor. Tutoring in computer science courses, especially introductory courses. (P/NP grading

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

The Graduate Program in Computer

Doctoral and Masters degrees in Computer Science are offered through the interdisciplinary Graduate Group in Computer Science. Please see http:/ www.cs.ucdavis.edu and Computer Science (A Graduate Group), on page 211, for a description of graduate education offerings, requirements, group faculty and research foci.

Graduate Courses

201A. Advanced Computer Architecture (4)

Lecture-3 hours; term paper. Prerequisite: course 154B or Electrical and Computer Engineering 170; course 150. Modern research topics and methods in computer architecture. Design implications of memory latency and bandwidth limitations. Performance enhancement via within-processor and between-processor parallelism. Term project involving studentproposed extensions/modifications of work in the research literature. Not open for credit to students who have completed course 250A.—I. Farrens

201B. High-Performance Uniprocessing (4)

Lecture — 3 hours; term paper. Prerequisite: course 201A. Maximizing uniprocessor performance. Barriers to high performance; solutions to the problems; historical and current processor designs. Not open for credit to students who have completed course 250B.-II. Farrens

201C. Parallel Architectures (4)

Lecture - 3 hours; project - 1 hour. Prerequisite: course 201A. Evolution of parallel architectures from special-purpose machines to commodity servers. Emphasis on recent machines and applications that drive them. Not open for credit to students who have completed course 250C.-III.

203. Novel Computing Technologies (4)

Lecture - 3 hours; project - 1 hour. Prerequisite: course 201A. Novel computing technologies that could revolutionize computer architecture. Quantum computing technologies, including algorithms, devices, and fault tolerance. A survey of other unconventional technologies including nanoscale electronics, MEMS devices, biological devices, and nanotechnology. Offered in alternate years.—II.

220. Theory of Computation (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 120, 122A. Time and space complexity classes. Reductions, completeness, and the role of randomness. Logic and undecidability.—III. Rogaway

222A. Design and Analysis of Algorithms

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 122A; Statistics 131A recommended. Techniques for designing efficient algorithms, analyzing their complexity and applying these algorithms to a broad range of applications. Methods for recognizing and dealing with difficult problems.—I, II. (Ĭ, II.) Amenta, Franklin, Gusfield, Martel, Rogaway

222B. Advanced Design and Analysis of Algorithms (4)

Lecture - 3 hours; project - 1 hour. Prerequisite: course 222A. Advanced topics in complexity theory. Problem classification. The classes P, NP, P-space, co-NP. Matching and network flow algorithms. Matrix multiplication. Approximation algorithms. -III. (III.) Gusfield, Franklin, Martel, Rogaway

223. Parallel Algorithms (4)

Laboratory/discussion-3 hours; project-1 hour. Prerequisite: course 222A. Models of parallel computer systems including PRAMs, loosely coupled systems and interconnection networks. Parallel algorithms for classical problems and general techniques for their design and analysis. Proving lower bounds on parallel computation in several settings.-II. (II.) Martel

224. String Algorithms and Applications in Computational Biology (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 122A. Algorithms that operate on strings. Pattern matching, sets of patterns, regular expression pattern matching, suffix trees and applications, inexact similarity, parametric sequence alignment, appli-cations to DNA sequencing and protein database searching. Offered in alternate years—I, III. Gusfield, Filkov

225. Graph Theory (3)

Lecture - 3 hours. Prerequisite: graduate standing in electrical engineering or computer science or consent of instructor. Fundamental concepts. Vector spaces and graphs. Planar graphs: Whitney's and Kuratowski's theorems. Topological parameters: packings and coverings. Connectivity: Menger's theorem. Hamilton graphs: Posa's and Chvatal's theorems. Graph factorization: Tutte's theorem. Graph coloring: Brooks; and Vizing's theorem. — II. (II.) Franklin

226. Computational Geometry (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 175, 222A. Mathematics of unstructured data. Algorithms for data structures such as Voronoi diagrams, oct-trees, and arrangements. Applications in computer graphics, concentrating on problems in three-dimensions. Offered in alternate years.—III. Amenta, Max

227. Modern Cryptography (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 220 or 222A. Modern cryptography as a discipline emphasizing formal definitions and proofs of security. One-way functions, pseudo-randomness, encryption, digital signatures, zero-knowledge, secure protocols.—II. (II.) Rogaway

228. Cryptography for E-Commerce (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 222A. Cryptographic primitives and protocols of importance to e-commerce, present and future, including content distribution mechanisms, payment mechanisms, pricing mechanisms, anonymity and privacy mechanisms, fair exchange mechanisms. Offered in alternate years.—II. Franklin

229. Advanced Computational Structural **Bioinformatics (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: graduate standing. Algorithmic problems in structural biology; protein structure classification; protein structure prediction (including comparative modeling and ab initio protein structure prediction); molecular simulations (molecular dynamics and Monte Carlo simulations). - II. (II.) Koéhl

230. Applied Numerical Linear Algebra (4)

Laboratory/discussion - 3 hours; discussion - 1 hour. Prerequisite: course 130 or Engineering
Applied Science 209 or Mathematics 167. Numerical linear algebra (NLA) with emphasis on applications in engineered systems; matrix factorizations; perturbation and rounding error analyses of fundamental NLA algorithms. Offered in alternate years. — (I.) Bai

231. Large-Scale Scientific Computation (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 130. Algorithms and techniques for large scale scientific computation, including basics for high performance computing, iterative methods, discrete approximation, fast Fourier transform, Poisson solvers, particle methods, spectral graph partition and its applications. Offered in alternate years. - II.

234. Computational Functional Genomics

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 124; graduate standing in Computer Science or Life Sciences. Bioinformatics methods for analysis and inference of functional relationships among genes using large-scale genomic data, including methods for integration of gene expression, promoter sequence, TF-DNA binding and other data, and approaches in modeling of biological networks.—II. (II.) Filkov

235A. Computer and Information Security

Lecture - 3 hours; project. Prerequisite: course 150; course 152A recommended. Modern topics in computer security, including: protection, access control, operating systems security, network security, applied cryptography, cryptographic protocols, secure programming practices, safe languages, mobile code, malware, privacy and anonymity, and case studies from real-world systems. Not open for credit to students who have taken course 235.—I. (I.) Chen

235B. Foundations of Computer and Information Security (4)

Lecture—3 hours; project. Prerequisite: course 235A; courses 120, 150 recommended. Theoretical foundations of methods used to protect data in computer and communication systems. Access control matrix and undecidability of security; policies; Bell-LaPadula, Biba, Chinese Wall models; non-interference and non-deducibility; information flow and the confinement problem. Not open for credit to students who have taken course 235.-II. (II.) Bishop

236. Computer Security: Intrusion Detection Based Approach (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 150; course 153 recommended. Concepts of intrusion detection, anomaly detection based on machine learning, signature-based detection using pattern matching, automated response to attacks using artificial intelligence planning, tracing intruders based on principal component analysis, security policy languages. Offered in alternate years. - I. Lev-

240. Programming Languages (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisites: courses 140A, 142. Advanced topics in programming languages, including formal syntax and semantics, the relation between formal semantics and verification, an introduction to the lambda calculus. Additional topics will include language design principles, alternative programming languages, in-depth semantic theory and models of language implementation.—II. (II.) Pandey

242. Translation of Programming Languages (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 240. Lexical analysis, parsing, storage management, symbol table design, semantic analysis and code generation. LR, LALR grammars. Compilercompilers.—III. (III.) Pandey

243. Code Generation and Optimization (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 201A or Engineering Electrical and Computer 270. Compiler optimizations for performance, code size and power reduction. Topics include control- and data-flow analysis, redundancy elimination, loop and cache optimizations, register allocation, local and global instruction scheduling, and modulo scheduling. - II. (II.) Wilken

244. Principles of Concurrent Programming

Lecture — 3 hours; laboratory — 3 hours. Prerequisite: courses 20, 150. Fundamental concepts and applications of concurrent programs; concurrent program verification and derivation; synchronization mechanisms in programming languages; distributed programming techniques; case studies of languages. — I. (I.) Olsson, Pandey, Su

247. Concurrent Programming Languages

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 140A, 150. Language design parameters. Models of parallel machines. Load balancing. Scalability. Portability. Efficiency measures. Design and implementation techniques for several classes of concurrent programming languages (such as object-oriented, functional, logic, and constraint programming languages).—I. (I.) Pandey, Olsson, Su

251. Operating Systems (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 150. Models, design, implementation, performance evaluation in operating systems. Algorithms, internal architectures for single processor OS and distributed systems. Concurrency control, recovery, security. OS kernel-level programming. Special topics embedded systems, real-time system, device driver, NPU (Network Processor Unit).—III. (III.) Pandey, Wu

252. Computer Networks (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 152B. Internet protocol based computer networks applications, transport, network layer protocols. High speed LAN technologies: Ethernet, Asynchronous Transfer Mode (ATM). Delay models in data networks: analysis of multiaccess techniques in polling, ring, random access networks. Multimedia applications requirements and design. - II. Mukherjee, Mohapatra, Ghosal

255. Resource Management in Wireless Communication Networks (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 252A. Advanced research issues in wireless communication networks, including multi-user diversity and cross-layer optimization, basic network information theory, MIMO systems and the impact on networks, and dynamics spectrum management. Offered in alternate years. – III. Liu

256. Performance Evaluation (4)

Lecture — 3 hours; project — 1 hour. Prerequisite: courses 20, 152A, 154A-154B or Electrical and Computer Engineering 170, Statistics 131A; course 150 recommended. Use of simulation and queueing theory in computer and communication system design. Applications to processor scheduling, memory hierarchies; I/O systems; packet and circuit switched networks; fault-tolerance; computer networks applications. Not open for credit to students who have completed course 256A.—I, II. (I, II.) Matloff, Ghosal, Mohapatra, Mukherjee

257. Mobile and Wireless Networks (4)

Lecture—3 hours; independent study. Prerequisite: course 252. Fundamental techniques in design of second generation wireless networks: cellular network and protocols, medium access techniques, handoff control, signaling and mobility management, wireless data works, Internet mobility and Personal Communication Services (PCS). Third generation wideband systems, novel technologies, adhoc networks. Offered in alternate years. - I. Ghosal, Mohapatra, Mukherjee

258. Networking Architecture and Resource Management (4)

Lecture — 3 hours; project — 1 hour. Prerequisite: course 152A or Electrical & Computer Engineering 173A; course 252 recommended. Design and implementation principles of networking architecture and protocols. Internet, ATM, and telephony

case studies. Topics: Internet technology; application and services; resource management; Quality of Service (QoS) provisioning; traffic engineering; performance evaluation and future research issues. (Same course as Electrical & Computer Engineering 273.)—II. (II.) Chuah, Mohapatra

259. Optical Networks (4)

Lecture—3 hours; independent study. Prerequisite: course 252. Optical networks. Enabling technologies. Multiplexing techniques. WDM. Broadcast networks. Wavelength-routed networks. Network architectures. Protocols. Network algorithms. Devicenetwork interface. Optimization problems.—I. (I,) Mukherjee, Ghosal

260. Software Engineering (4)

Lecture—3 hours; project. Prerequisite: course 142; course 160 recommended. Advanced techniques for domain-specific software reuse.—I. (I.) Devanbu

261. Program Verification (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 125 or Philosophy 112 or familiarity with first-order logic; knowledge of an iterative and functional programming language. Methods of proving correctness of programs with respect to formal specifications, with attention to those suited for employing automated deduction. Logic background, symbolic execution, techniques suited to iterative programming, methods from denotational semantics, termination, dynamic logic and proofs of concurrent programs.—I. (I.) Levitt

262. Formal Specification (3)

Lecture—3 hours. Prerequisite: course 261. Formal specification of modules, and its relationship to top-down programming development and verification. Abstract data types, together with methods for specifying them. Implementations and proofs of implementation. Using specifications to reason about programs. Parameterized types. Constructing good formal specifications. Offered in alternate years.—II. levit!

265. Distributed Database Systems (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 165A. Concepts of distributed database systems and architectures, distributed database design, distributed query processing and optimization, transaction management and concurrency control, heterogeneous and multidatabase systems.—1, III. (III.) Gertz, Ludaescher

266. Spatial Databases (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 165A. Concepts, models, and architectures for spatial databases, spatial access methods, query processing, spatio-temporal data management, moving objects, spatial data mining. Offered in alternate years.—(II.) Gertz, Ludaescher

267. Wide-Area Distributed Information Systems (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 152B or 165A. Wide-area distributed information systems, data broadcast, multicast, publish/subscribe, service differentiation, information retrieval, Web caching. Offered in alternate years.—III. Askoy

268. Scientific Data And Workflow Management (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 165A. Scientific data integration, metadata, knowledge representation, ontologies, scientific workflow design and management. Offered in alternate years.—(II.) Gertz, Ludaescher

270. Artificial Intelligence (3)

Lecture—3 hours. Prerequisite: courses 140A, 172. Concepts and techniques underlying the design and implementation of models of human performance on intelligent tasks. Representation of high-level knowledge structures. Models of memory and inference. Natural language and story understanding. Common sense planning and problem solving.—II. (II.) Davidson, Levitt

271. Machine Learning and Discovery (4)

Lecture—3 hours; project—1 hour. Prerequisite: course 170. Artificial intelligence techniques for knowledge acquisition by computers. Fundamental problems in machine learning and discovery. Systems that learn from examples, analogies, and solved problems. Systems that discover numerical laws and qualitative relationships. Projects centering on implementation and evaluation.—III. Levitt, Vemuri

272. Information Visualization (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 163 or 175 recommended. Advanced topics in information visualization: perceptually effective display methods, color design and selection, interaction models and techniques, focus-context techniques, distortion methods, large graph visualization techniques, visual data mining methods, and evaluation methods.—II. (II.) Ma

273. Applied Visual Computing (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: graduate standing. Visual computing paradigms, current visualization technologies, principles of 3-D graphics, user interface designs, and exploratory visualization. Offered in alternate years.—1. Hamann, Joy, Ma, Max

274. Automated Deduction (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 125 or Philosophy 112 or familiarity with first-order logic. Techniques of mechanical theorem proving. Methods based on resolution and term-rewriting. Decision procedures. Induction. Applications to program verification, question/answering and plan generation. Study existing mechanical theorem provers. Offered in alternate years.—III. Levitt

275A. Advanced Computer Graphics (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 175 or 177 or 178. Advanced topics in computer graphics. Hidden surface models, rendering of various surface types, subdivision methods, shading techniques, anti-aliasing, modeling techniques.—II. (II.) Joy, Hamann, Ma

275B. Advanced Computer Graphics (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 175 or 177 or 178. Advanced topics in computer graphics and geometric modeling. Topics taken from advanced research papers in computer graphics, image synthesis, visualization and geometric modeling. Discussion of current research in the field. Offered in alternate years.—(II.) Joy, Hamann,

276. Advanced Volume Visualization (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 177. Applications, available tools and techniques, the challenges confronting the field of volume visualization, and some of the advanced topics in the field. Primary emphasis on advanced software and hardware techniques to achieve interactive visualization.—III. (III.) Hamann, Joy, Ma, Max

277. Advanced Visualization (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 177. Visualization of 3D data, including scalar fields, vector fields, and medical data.—III. (III.) Hamann, Joy

278. Computer-Aided Geometric Design (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 175. Mathematical techniques for the definition and manipulation of curves and surfaces. Bezier curves and surfaces, B-spline curves and surfaces, subdivision surfaces, wavelets. Integration into various computer graphics rendering models, visualization systems and computer-aided design systems. Offered in alternate years.—(III.) Joy, Hamann

279. Computer Animation (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 175 or 275. Course surveys current research and fundamental techniques that lie behind character animation tools. Emphasis on improving expressive aspects of movement and how physics, motion capture data, the arts and psychology literature, and interactive techniques can be used towards this goal. Offered in alternate years.—II. Neff

280. Virtual Reality Technology (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 175. Fundamentals and principles of Virtual Reality (VR) technology. Potential and limits for its useful application. Developing a complete virtual reality application. Offered in alternate years.—III. Joy

289A-N. Special Topics in Computer Science (1-5)

Lecture, laboratory, or combination. Prerequisite: consent of instructor. Special topics in (A) Computer Science Theory; (B) Architecture; (C) Programming Languages and Compilers; (D) Operating Systems; (E) Software Engineering; (F) Data Bases; (G) Artificial Intelligence; (H) Computer Graphics; (I) Networks; (J) Computer-Aided Design; (K) Scientific Computing; (L) Computer Science; (M) Security; (N) Bioinformatics and Computational Biology. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)

290. Seminar in Computer Science (1)

Seminar—1 hour. Participating seminar; discussion and presentation of current research and development in computer science. (S/U grading only.)—I, II, III. (I, II, III.)

290C. Graduate Research Group Conference (1)

Discussion—1 hour. Research problems, progress and techniques in computer science. May be repeated for credit. (S/U grading only.)—I, II, III. (I, III III)

293A. Research in Computer Science (1)

Lecture—1 hour. Prerequisite: graduate standing in computer science. Study of research topics in computer science, Ph.D. level research methodologies (experimental, applied and theoretical). Study skills necessary to successfully find/solve significant research problems. Finding and successful interacting with a research advisor. Ethical issues in research/collaborative work. (S/U grading only.)—1. (I.) Martel

293B. Research in Computer Science (1)

Lecture—1 hour. Prerequisite: graduate standing in computer science; course 293A recommended. Study of Ph.D. level research methodologies (experimental, applied and theoretical), presenting research results for the computer science community. Study skills necessary to successfully find/solve significant research problems. [S/U grading only.]—II. (II.) Martel

298. Group Study (1-5)

Lecture, laboratory, or combination. Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12)

(S/U grading only.)

Professional Courses

390. The Teaching of Computer Science (1)

Discussion—1 hour. Prerequisite: meet qualifications for teaching assistant and/or associate-in in Computer Science. Participation as a teaching assistant or associate-in in a designated engineering course. Methods of leading discussion groups or laboratory sections, writing and grading quizzes, use of laboratory equipment, and grading laboratory reports. May be repeated for credit. (S/U grading only.)—I, II, III. (II, II, III.)

396. Teaching Assistant Training Practicum (1-4)

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)

Engineering: Electrical and Computer Engineering

(College of Engineering)

Richard A. Kiehl, Ph.D., Chairperson of the Department

Saif Islam, Ph.D., Vice Chairperson for Undergraduate Studies

Venkatesh Akella, Ph.D., Vice Chairperson for Graduate Studies

Department Office. 2064 Kemper Hall (530) 752-0583; http://www.ece.ucdavis.edu

Faculty

Khaled Abdel-Ghaffar, Ph.D., Professor Venkatesh Akella, Ph.D., Professor Hussain Al-Asaad, Ph.D., Associate Professor Rajeevan Amirtharajah, Ph.D., Associate Professor Bevan Baas, Ph. D., Associate Professor G. R. Branner, Ph.D., Professor Tsu-Shuan Chang, Ph.D., Professor Chen-Nee Chuah, Ph.D., Professor Zhi Ding, Ph.D., Professor Soheil Ghiasi, Ph.D., Associate Professor A. Nazli Gündes, Ph.D., Professor Joshua Hihath, Ph.D., Assistant Professor Charles E. Hunt, Ph.D., Professor Saif Islam, Ph.D., Associate Professor

Academic Senate Distinguished Teaching Award Richard A. Kiehl, Ph.D., Professor Andre Knoesen, Ph.D., Professor H. Brian Kolner, Ph.D., Professor Bernard C. Levy, Ph.D., Professor Stephen H. Lewis, Ph.D., Professor Xiaoguang "Leo" Liu, Ph.D., Assistant Professor Neville C. Luhmann, Jr., Ph.D., Professor Omeed Momeni, Ph.D., Assistant Professor Stephen D. O'Driscoll, Assistant Professor John Owens, Ph.D., Associate Professor Erkin Seker, Ph.D., Associate Professor Kent Wilken, Ph.D., Professor Stephen D. O'Driscoll, Assistant Professor Stephen D. O'Driscoll, Assistant Professor John Owens, Ph.D., Associate Professor Kent Wilken, Ph.D., Professor S.J. Ben Yoo, Ph.D., Professor Qing Zhao, Ph.D., Associate Professor Qing Zhao, Ph.D., Associate Professor

Emeriti Faculty

V. Ralph Algazi, Ph.D., Professor Emeritus
Robert W. Bower, Ph.D., Professor Emeritus
John N. Churchill, Ph.D., Professor Emeritus
Jean-Pierre Colinge, Ph.D., Professor Emeritus
K. Wayne Current, Ph.D., Professor Emeritus
Andrew J. Dienes, Ph.D., Professor Emeritus
Richard C. Dorf, Ph.D., Professor Emeritus
Herman J. Fink, Ph.D., Professor Emeritus
Gary E. Ford, Ph.D., Professor Emeritus
Academic Senate Distinguished Teaching Award

Academic Senate Distinguished Teaching Award
William A. Gardner, Ph.D., Professor Emeritus
Mohammed S. Ghausi, Ph.D., Professor Emeritus/
Dean Emeritus

Stephen Haley, Ph.D., Professor Emeritus Jonathan P. Heritage, Ph.D., Professor Emeritus T.C. Steve Hsia, Ph.D., Professor Emeritus Vojin G. Oklobdzija, Ph.D., Professor Emeritus G.R. Redinbo, Ph.D., Professor Emeritus Ronald F. Soohoo, Ph.D., Professor Emeritus Richard R. Spencer, Ph.D., Professor Emeritus Shih-Ho Wang, Ph.D., Professor Emeritus

Affiliated Faculty

Ivor Brodie, Ph.D., Adjunct Professor Shu Lin, Ph.D., Adjunct Professor Diego Yankelevich, Ph.D., Associate Adjunct Professor

The Electrical and Computer Engineering Undergraduate Programs

The department administers two undergraduate curricula in the College of Engineering: (1) the Electrical Engineering curriculum and (2) the Computer Engineering curriculum.

Integrated Degree Program (IDP). The IDP leads to both the Bachelor of Science and the Master of Science degrees. The program provides a student the opportunity to obtain superior breadth and depth of technical material. The IDP program in the Department of Electrical and Computer Engineering is available only to UC Davis undergraduates with strong academic records enrolled in the Electrical Engineering, Computer Engineering, Electronic Materials Engineering or Applied Physics curricula. Applicants in their junior year must apply for the IDP by March 31. For more information on IDP, see http://www.ece.ucdavis.edu.

Mission. Under its land grant status, the University of California has a mission to provide the state with the trained workforce it needs and to advance knowledge and research in directions that contribute to the general welfare of the state and the nation. The Department of Electrical and Computer Engineering contributes to the mission of the University in three ways: First, its undergraduate and graduate education programs seek to provide students with an understanding of the fundamental principles of electrical and computer engineering, the skills needed to solve the complex technological problems of modern society and the ability to continue to learn and develop throughout their careers. Second, through its research programs, the department contributes to the development and progress of electronics, communications, and computer technology. Finally, the department helps to transfer research results to industry through publication, public service and profes-

Objectives. Teaching—To provide undergraduate students with sufficient breadth to allow them to participate in teams, continue their own education after graduation and select a focus area intelligently; to provide undergraduate students with sufficient depth in a narrower discipline to allow them to develop the ability to solve complex engineering problems; to educate the students in the graduate program to be leaders in industry or to do meaningful research in industry, government or academia. Research—To develop and maintain research programs that produce useful technological advances while simultaneously training the next generation of researchers and leaders; to update and/or shift the foci of these programs frequently in response to the needs of our constituency and the nation; to provide a stimulating environment that encourages our graduate students to develop their abilities as far as possible.

Electrical Engineering Undergraduate Program

The Electrical Engineering program is accredited by the Engineering Accreditation Commission of ABET; http://www.abet.org.

Electrical Engineering involves the design, analysis, and effective use of electrical systems including electronic computers. Electrical systems and computers play a central role in nearly all aspects of modern life, including communication, medicine, education, environmental protection, space exploration, defense, and home entertainment.

Students who complete the Electrical Engineering curriculum will obtain a Bachelor of Science in Electrical Engineering, one of the engineering degrees recognized in all fifty states as eligible for registration as a Professional Engineer.

Objectives. The Electrical Engineering program has adopted the following objectives to serve the long-term interests of our students and the industries of Northern California and the nation. Foundation—To provide our graduates with a solid foundation in engineering science, including mathematics, physi-

cal science, and the fundamentals of electrical engineering. This foundation is necessary to succeed in more advanced engineering courses and to be able to continue learning throughout a career. Breadth—To provide our graduates the sufficient breadth in electrical engineering in order to understand engineering tradeoffs that cross disciplines, to contribute effectively to multidisciplinary projects and to make an informed decision about their area of specialization. Depth—To provide our graduates with sufficient depth in a specific area of electrical engineering necessary to solve complex real-world engineering problems and to contribute to a specific discipline within electrical engineering. Ethics—To provide our graduates with a basic understanding of, and ability to handle correctly, ethical problems that may arise during their careers. To provide them with an understanding of their obligations to society at large.

Students are encouraged to carefully adhere to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

Lower Division Required Courses

UNITS
Mathematics 21A-21B-21C-21D 16
Mathematics 22A-22B
Physics 9A-9B-9C-9D
Chemistry 2A 5
Computer Science Engineering 30 4
Engineering 6 4
Electrical and Computer Engineering 1 1
Electrical and Computer Engineering 70 or
Computer Science Engineering 50 4
Engineering 17 4
English 3 or University Writing Program 1,
or Comparative Literature 1, 2, 3, or 4, or
Native American Studies 5 4
Communication 1 or 3
Lower Division Units71

Upper Division Requirements: Electrical Engineering Curriculum Areas of Specialization

For updated recommended courses, see department website at http://www.ece.ucdavis.edu/undergrad/undergradhandbook.html.

Physical Electronics: solid-state devices, circuits and fabrication and the theory courses supporting those subjects.

Recommended elective courses:

Core electives: Electrical and Computer Engineering 130B, 140B
Design Electives with Lab: Electrical and Computer Engineering 118, or 132A, 132B or 135. Select remaining upper-division design electives from Electrical and Computer Engineering 110B, 146A, 146B
Technical electives: Electrical and Computer Engineering 112, 180B

Suggested Advisers. E. Seker, J. Hihath, C.E. Hunt, S. Islam, R.A. Kiehl

Electromagnetics: microwave circuits and systems, and fiber optical systems.

Recommended elective courses:

Core electives: Electrical and Computer Engineering 130B, 140B
Design Electives with Lab: Electrical and Computer Engineering 132A, 132B. Select remaining upper-division design electives from Electrical and Computer Engineering 110B, 132C, 135
Technical electives: Select from Electrical and Computer Engineering 112 and 133

Suggested Advisers. G.R. Branner, A. Knoesen, X. Liu, N. Luhmann, O. Momeni, A. Pham, B. Yoo

Analog Electronics: transistor- and system-level analog circuit design.

Recommended elective courses:

Core electives: Electrical and Computer Engineering 110B, 140B, 150B

Design Electives with Lab: at least two from Electrical and Computer Engineering 112, 157A, 165, 195A-195B Select remaining upper-division design electives from Electrical and Computer Engineering 118, 132A, 132B, 132C, 151, 157B, 160, 210 Technical electives: Select from Electrical and

Suggested Advisers. R. Amirtharajah, P.J. Hurst, S.H. Lewis, S.D. O'Driscoll

Computer Engineering 130B, 146A

Digital Electronics: transistor- and system-level digital circuit design.

Recommended elective courses:

Core electives: Electrical and Computer Engineering 110B, 140B, 150B Design Electives with Lab: Electrical and Computer Engineering 118 and 180B or 151 or 172 or 183 or 195A-195B Select remaining upper-division design electives from Electrical and Computer Engineering 116, 170 or 171
Technical electives: Select from Electrical and Computer Engineering 130B and 112 or 146A or 157A or 160 or 210

Suggested Advisers. R. Amirtharajah, P.J. Hurst, S.H. Lewis, S.D. O'Driscoll

Communication Controls and Signal Processing: digital communication, robotics, classical controls and communication, wireless and cellular digital communication systems, signal and image processing, and computer vision.

Recommended elective courses:

Core electives: Electrical and Computer Engineering, 150B, 180B Design Electives with lab: Electrical and Computer Engineering 151, 157A and 157B

Select remaining upper-division design electives from Electrical and Computer Engineering 158 or 160
Technical Electives: select from Electrical and Computer Engineering 112, 195A-195B

Suggested Advisers. T.S. Chang, Z. Ding, A.N. Gündes, B.C. Levy, A. Scaglione, Q. Zhao

Upper Division Required Courses

Electrical and Computer Engineering 100, 110A, 130A, 140A, 150A, 161, Chose at least eight courses for a minimum of 31 units from the following:

Two core electives: Electrical and Computer Engineering 110B*, 130B, 140B, 170*, 180B*, one from 150B, 157A*, or 160* Design laboratory electives: At least two design electives with lab: Electrical and Computer Engineering 110B, 112, 116, 118, 132A, 132B, 132C, 135, 146A, 146B, 151, 152, 157A, 157B, 165, 172,

At least one design project course**: ECE course with "Design Project" in the title; The remaining design electives may be chosen from the lists above or from the following courses: Electrical and Computer

Engineering 133, 158, 171, 173A; Computer Science and Engineering 40, 150, 152B, 163, 175, 177, 178 Technical electives***, ****.....

Minimum Upper Division Units 74

- * Maximum of one course appearing on both the core elective list and the design elective list may be counted in both categories.
- ** All design project courses are also considered design lab courses and may be counted in both categories simultaneously.

- *** Computer Science Engineering 154B may be substituted for Electrical and Computer Engineering
- *** After completion of the upper division elective requirement (at least 8 courses, 2 core, 2 with labs, 1 project) any units in excess of 31 will count toward the technical elective requirement; Computer Science Engineering 157 may NOT be counted toward the technical elective requirement.

The list of Technical Electives can be found at http://www.ece.ucdavis.edu/undergraduate/ electives.html.

Computer Engineering Undergraduate Program

The Computer Engineering program is accredited by the Engineering Accreditation Commission of ABET; http://www.abet.org.

Students are encouraged to carefully adhere to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

Lower Division Required Courses

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UNITS
Mathematics 21A-21B-21C-21D 16
Mathematics 22A-22AL-22B7
Physics 9A-9B-9C-9D
Chemistry 2A 5
Computer Science Engineering 20, 30,
40, 60 16
Electrical and Computer Engineering 1 1
Electrical and Computer Engineering 70 or
Computer Science Engineering 50 4
Engineering 17
English 3 or University Writing Program 1,
or Comparative Literature 1, 2, 3, or 4, or
Native American Studies 54
Communication 1 or 3
Lower Division Units80

Upper Division Required Courses

	•	
Electric	al and Computer Engineering	
100, 1	10A, 140A, 161, 170*, 172, 17	3A
180A,	180B, 196	39
Compu	ter Science Engineering 122A,	
		8
Engine	ering 160, 190, or Computer Scie	nce
	ering 188	
	Division Elective Courses:7-	
	sign project course**: Electrical a	
	ter Engineering course with "Desig	
	in the title	
	per division Electrical and Compu	ter
	ering or Computer Science course	
	ing Computer Science 157)	
	al electives**	9
	u. 0.0000	

Minimum Upper Division Units66

- * Computer Science Engineering 154B may be substituted for the Electrical and Computer Engineering 170 requirement.
- ** Computer Science Engineering 157 may not be counted toward the technical elective requirement.

The list of Technical Electives can be found at http://www.ece.ucdavis.edu/undergraduate/

The Graduate Program in Electrical and Computer Engineering

M.S. and Ph.D. http://www.ece.ucdavis.edu (530) 752-8251

The Department of Electrical and Computer Engineering prepares graduate students to do meaningful research and acquire skills and insights vital to solving some of the world's most complex technological problems. Our graduate program offers a chal lenging and stimulating environment, covering optical, wireline and wireless communications, telecommunication networks, computer engineering, circuits, electromagnetics, physical electronics,

optoelectronics, control, and signal processing. The depth of resources in the study of circuit design alone, with one of the largest faculty groups in the field in the UC system, distinguishes us from other programs, while our program in microwave communications and devices is unique.

The Electrical and Computer Engineering Graduate Program benefits from the highly interdisciplinary culture at UC Davis and attracts faculty from biomedical, chemical, electrical, computer, civil, and mechanical engineering, as well as computer science and mathematics.

Many of our graduates go on to leadership and technology management roles in industry, returning each year for our industrial affiliates meeting to network with other industry representatives, current students and faculty.

Generous financial support is available in the form of research assistantships, teaching assistantships, fellowships and financial aid.

Research Highlights:

- Communications, Control, Networking, and Signal Processing
- Computer Engineering
- Electronic Circuits
- Optoelectronics
- RF, Micro- and Millimeter Waves
- Physical Electronics

Research Facilities and Partnerships:

- Center for Information Technology in the Interest of Society
- Northern California Center for Nanotechnology
- Center on Polymer Interfaces and Macromolecu-
- Lawrence Livermore National Laboratory
- Lawrence Berkeley National Laboratory
- Los Alamos National Laboratory
- California Lighting Technology Center
- PlanetLab Consortium
- · Sandia National Laboratory

Complete Information on our website.

Courses in Engineering: Electrical and Computer Engineering (EEC)

Lower Division Courses

1. Introduction to Electrical and Computer Engineering (1)

Lecture - 1 hour. Electrical and Computer Engineering as a professional activity. What Electrical and Computer Engineers know and how they use their knowledge. (P/NP grading only.) GE credit: SE.—I.

70. Computer Structure and Assembly Language (4)

Lecture - 3 hours; workshop - 1 hour. Prerequisite: Computer Science Engineering 30. Computer architecture; machine language; assembly language; macros and conditional macros; subroutine/parameter passing; input-output programming, interrupt and trap; direct-memory-access; absolute and relocatable code; re-entrant code; program development in an operating system. Only one unit of credit to students who have completed Computer Science Engineering 50. GE credit: SE. — I, II. (İ, II.) Akella, Al-Asaad, Chuah, Wilken

89A-F. Special Topics in Electromagnetics (1-

Prerequisite: consent of instructor. Special Topics in (A) Electromagnetics, (B) Physical Electronics, (C) Active and Passive Circuits, (E) Computer Systems and Software, (F) Digital System Design for freshmen and sophomore level students. May be repeated for credit if topic differs. Offered irregularly. GE credit:

90C. Research Group Conference in Electrical and Computer Engineering (1)

Discussion - 1 hour. Prerequisite: consent of instructor; lower division standing. Research group conferences. May be repeated for credit. (P/NP grading only.) - I, II, III. (I, II, III.)

90X. Lower Division Seminar (1-4)

Seminar — 1-4 hours. Prerequisite: consent of instructor. Examination of a special topic in a small group setting. May be repeated for credit.

92. Internship in Electrical and Computer Engineering (1-5)

Internship - 3-15 hours. Prerequisite: lower division standing; project approval prior to period of internship. Supervised work experience in Electrical and Computer Engineering. May be repeated for credit. (P/NP grading only.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Lower Division Students (1-5)

(P/NP grading only.)

Upper Division Courses 100. Circuits II (5)

Laboratory-3 hours; lecture-3 hours; discussion-1 hour. Prerequisite: Engineering 17, C- or better. Restricted to the following majors: Electrical Engineering, Computer Engineering, Computer Science & Engineering, Electronic Materials Engineering, Electrical Engineering/Materials Science, Optical Science & Engineering, Biomedical Engineering,
Applied Physics, Electrical & Computer Engineering graduate students. Theory, application, and design of analog circuits. Methods of analysis including frequency response, SPICE simulation, and Laplace transform. Operational amplifiers and design of active filters. Students who have completed Engineering 100 may receive 3.5 units of credit. GE credit: SciEng | QL, SE, VL.—I, II. (I, II.)

110A. Electronic Circuits I (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 100; 140A. Use and modeling of nonlinear solid-state electronic devices in basic analog and digital circuits. Introduction to the design of transistor amplifiers and logic gates. GE credit: SE, VL.—II, III. (II, İII.) Amirtharajah, Hurst, Lewis, O'Driscoll

110B. Electronic Circuits II (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 110A. Analysis and design of integrated circuits. Single-stage amplifiers, cascaded amplifier stages, differential amplifiers, current sources, frequency response, and return-ratio analysis of feedback amplifiers. GE credit: SE, VL.—III. (III.) Hurst, Lewis, O'Driscoll

112. Communication Electronics (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 110B and 150A. Electronic circuits for analog and digital communication, including oscillators, mixers, tuned amplifiers, modulators, demodulators, and phase-locked loops. Circuits for amplitude modulation (AM) and frequency modulation (FM) are emphasized. GE credit: SE.—II. (II.) Lewis

116. VLSI Design (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 110A and 180A. CMOS devices, layout, circuits, and functional units; VLSI fabrication and design methodologies. GE credit: SE.-I. (I.) Baas

118. Digital Integrated Circuits (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 110A, 180A. Analysis and design of digital integrated circuits. Emphasis on MOS logic circuit families. Logic gate construction, voltage transfer characteristics, propagation delay, and power consumption. Regenerative circuits, sequential elements, interconnect, RAMs, ROMs, and PLAs. GE credit: SciEng | SE.—III. (III.)

119A. Integrated Circuit Design Project (3)

Workshop-1 hour; laboratory-5 hours. Prerequisite: course 116 or 118. Design course involving architecture, circuit design, physical design, and validation through extensive simulation of a digital or mixed-signal integrated circuit of substantial complexity under given design constraints. Team project that includes a final report. (Deferred grading only, pending completion of sequence.) GE credit: SE. –II.

119B. Integrated Circuit Design Project (2)

Workshop - 1 hour; laboratory - 3 hours. Prerequisite: course 119A. Design course involving architecture, circuit design, physical design, and validation through extensive simulation of a digital or mixedsignal integrated circuit of substantial complexity under given design constraints. Team project that includes a final report. (Deferred grading only, pending completion of sequence.) GE credit: SE.—III. (III.)

130A. Electromagnetics I (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: Mathematics 21D, Physics 9D, Engineering 17 Basics of static electric and magnetic fields and fields in materials. Work and scalar potential. Maxwell's equations in integral and differential form. Plan waves in lossless media. Lossless transmission lines. GE credit: SE.-I, II. (I, II.) Pham, Luhmann,

130B. Introductory Electromagnetics II (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 130A. Plane wave propagation in lossy media, reflections, guided waves, simple modulated waves and dispersion, and basic antennas. GE credit: SE.—III. (III.) Knoesen, Pham, Yoo

132A. RF and Microwaves in Wireless Communication (5)

Lecture—3 hours; laboratory—3 hours; discussion— 1 hour. Prerequisite: course 110B, 130B, 140B. The study of Radio Frequency and Microwave theory and practice for design of wireless electronic sys tems. Transmission lines, microwave integrated circuits, circuit analysis of electromagnetic energy transfer systems, the scattering parameters. GE credit: SE.—I. (I.) Branner, Luhmann

132B. RF and Microwaves in Wireless Communication (5)

Lecture—3 hours; laboratory—3 hours; discussion— 1 hour. Prerequisite: course 132A. Passive RF and microwave device analysis, design, fabrication, and testing for wireless applications. RF and microwave filter and coupler design. Introductory analysis and design of RF and microwave transistor amplifiers. GE credit: SE.—II. (II.) Branner, Luhmann

132C. RF and Microwaves in Wireless Communications (5)

Lecture—3 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: course 132B. RF and microwave amplifier theory and design, including transistor circuit models, stability considerations, noise models and low noise design. Theory and design of microwave transistor oscillators and mixers. Wireless system design and analysis. GE credit: SE.—III. (III.) Branner, Luhmann

133. Electromagnetic Radiation and Antenna Analysis (4)

Lecture—3 hours; discussion—1 hour. Prerequisites: course 130B. Properties of electromagnetic radiation; analysis and design of antennas: ideal cylindrical, small loop, aperture, and arrays; antenna field measurements. GE credit: SE.-I. (Í.) Pham

135. Optical Communications I: Fibers (4)

Lecture - 4 hours. Prerequisite: course 130B. Principles of optical communication systems. Planar dielectric waveguides. Optical fibers: single-mode, multimode, step and graded index. Attenuation and dispersion in optical fibers. Optical sources (LEDs and lasers) and receivers. Design of digital optical transmission systems. GE credit: SciEng | SE.—II. (II.) Knoesen, Yoo

136A. Electronic Design Project (3)

Workshop-1 hour; laboratory-8 hours. Prerequisite: Computer Science Engineering 30, courses 110A, 150A, 180A. Pass one restricted to major. Optical, electronic and communication-engineering design of an opto-electronic system operating under performance and economic constraints. Measurement techniques will be designed and implemented, and the system will be characterized. GE credit: SE.—III. (İII.) Knoesen

136B. Electronic Design Project (2)

Workshop—1 hours; laboratory—5 hours. Prerequisite: course 136A. Optical, electronic and communication-engineering design of an opto-electronic system operating under performance and economic constraints. Measurement techniques will be designed and implemented, and the system will be characterized. GE credit: SE.—II. (II.)

140A. Principles of Device Physics I (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 17; Physics 9D. Semiconductor device fundamentals, equilibrium and non-equilibrium statistical mechanics, conductivity, diffusion, electrons and holes, p-n and Schottky junctions, first-order metal-oxide-semiconductor (MOS) field effect transistors, bipolar junction transistor fundamentals. GE credit: SE, SL.-I, II. (I, II.) Fink, Hunt, Islam, Kiehl,

140B. Principles of Device Physics II (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 140A. Electrical properties, designs, models and advanced concepts for MOS, Bipolar, and Junction Field-Effect Transistors, including scaling, minority-carrier distributions, non-ideal effects, and device fabrication methods. MESFET and heterojunction bipolar transistors (HBTs). Fundamentals of solar cells, photodetectors, LEDs and semiconductor lasers. GE credit: SE.-III. (III.) Hunt, Islam, Kiehl

146A. Integrated Circuits Fabrication (3)

Lecture - 2 hours; laboratory - 3 hours. Prerequisite: course 140B. Basic fabrication processes for Metal Oxide Semiconductor (MOS) integrated circuits. Laboratory assignments covering oxidation, photolithography, impurity diffusion, metallization, well chemical etching, and characterization work together in producing metal-gate PMOS test chips which will undergo parametric and functional testing. GE credit: SE.—I. (I.) Hunt, Islam

146B. Advanced Integrated Circuits Fabrication (3)

Lecture - 2 hours; laboratory - 3 hours. Prerequisite: course 146A. Restricted to Électrical, Computer, and Electrical/Materials Science majors and Electrical Engineering graduate students. Non-majors accommodated when space available. Fabrication processes for CMOS VLSI. Laboratory projects examine deposition of thin films, ion implantation, process simulation, anisotropic plasma etching, sputter metallization, and C-V analysis. Topics include isolation, projection alignment, epilayer growth, thin gate oxidation, and rapid thermal annealing. GE credit: SE. — IÍ. (II.)

150A. Introduction to Signals and Systems I (4)

Lecture—4 hours. Prerequisite: Engineering 6 (may be taken concurrently), course 100. Characterization and analysis of continuous-time linear systems. Fourier series and transforms with applications. Introduction to communication systems. Transfer functions and block diagrams. Elements of feedback systems. Stability of linear systems. GE credit: QL, SE.—II. (II.) Abdel-Ghaffar, Ding, Levy, Zhao

150B. Introduction to Signals and Systems II (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 150A. Characterization and analysis of discrete time systems. Difference equation models Ztransform analysis methods. Discrete and fast Fourier transforms. Íntroduction to digital filter design. GE credit: QL, SE.-I. (I.)

151. Instrumentation Interfacing, Signals and Systems (4)

Lecture — 2 hours; laboratory — 4 hours. Prerequisite: courses 100, 150A and 180A. Study of instrumentation interfacing systems, including software development, hardware interfacing, transducers, dynamic response, signal conditioning, A/D conversion, and data transmission. Offered irregularly. GE credit: SE.—II. (II.) Chang, Yankelevich

152. Digital Signal Processing (4)

Lecture — 2 hours; laboratory — 6 hours. Prerequisite: courses 70 and 150B. Theory and practice of realtime digital signal processing. Fundamentals of realtime systems. Programmable architectures including I/O, memory, peripherals, interrupts, DMA. Interfacing issues with A/D and D/A converters to a programmable DSP. Specification driven design and implementation of simple DSP applications. GE credit: SE.-III. (III.) Ding

157A. Control Systems (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 150A. Analysis and design of feedback control systems. Examples are drawn from electrical and mechanical systems as well as other engineering fields. Mathematical modeling of systems, stability criteria, root-locus and frequency domain design methods. GE credit: SE. – I. (I.) Chang, Gundes

157B. Control Systems (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 157A. Control system design; transfer-function and state-space methods; sampled-data implementation, digital control. Laboratory includes feedback system experiments and simulation studies. GE credit: SE.—II. (II.) Gundes

158. Control System Design Methods (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 157A. Design methods for feedback control systems, including quantitative feedback theory and linear quadratic regulators. GE credit: SE.—III. (III.) Chang

160. Signal Analysis and Communications

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 150A. Signal analysis based on Fourier methods. Fourier series and transforms; time-sampling, convolution, and filtering; spectral density; modulation: carrier-amplitude, carrier-frequency, and pulse-amplitude. GE credit: SE. - I. (I.) Ding

161. Probabilistic Analysis of Electrical & Computer Systems (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 100. Probabilistic and statistical analysis of electrical and computer systems. Discrete and continuous random variables, expectation and moments. Transformation of random variables. Joint and conditional densities. Limit theorems and statistics. Noise models, system reliability and testing. GE credit: QL, SE.—I, III. (I, III.) Abdel-Ghaffar, Ding, Levy, Scaglione, Zhao

165. Statistical and Digital Communication (4)

Lecture—3 hours; project—3 hours. Prerequisite: course 160, 161. Introduction to random process models of modulated signals and noise, and analysis of receiver performance. Analog and digitally modulated signals. Signal-to-noise ratio, probability of error, matched filters. Intersymbol interference, pulse shaping and equalization. Carrier and clock synchronization. GE credit: SE. - II. (II.) Abdel-Ghaffar, Ding, Ford, Levy

170. Introduction to Computer Architecture

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 180A; course 70 or Computer Science Engineering 50. Introduces basic aspects of computer architecture, including computer performance measurement, instruction set design, computer arithmetic, pipelined/non-pipelined implementation, and memory hierarchies (cache and virtual memory). Presents a simplified Reduced Instruction Set Computer using logic design methods from the prerequisite course. GE credit: SE.-I. (I.) Owens, Wilken

171. Parallel Computer Architecture (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 170. Organization and design of parallel processors including sharedmemory multiprocessors, cache coherence, memory consistency, snooping protocols, synchronization, scalable multiprocessors, message passing protocols, distributed shared memory and interconnection networks. GE credit: SE.-III. (III.) Akella, Wilken

172. Embedded Systems (4)

Lecture - 2 hours; laboratory - 6 hours. Prerequisite: course 170 or Computer Science Engineering 154B. Introduction to embedded-system hardware and software. Topics include: embedded processor and memory architecture; input/output hardware and software, including interrupts and direct memory access; interfacing with sensors and actuators; wired and wireless embedded networking. GE credit: SE.—II, III. (II, III.) Akella, Ghiasi, Wilken

173A. Computer Networks (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: Computer Science Engineering 60; Mathematics 135A or Statistics 131A, or Statistics 120 or Statistics 32. Overview of local and wide-area computer networks. ISO seven-layer model. Physical aspects of data transmission. Data-link layer protocols. Network architectures. Routing. TĆP/IP protocol suite Local area networks. Medium access protocols. Network performance analysis. Only two units of credit for students who have taken Computer Science Engineering 157. (Same course as Computer Science Engineering 152A.) GE credit: SE. -I, III. (I, III.) Chuah

173B. Design Projects in Communication Networks (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 173A or Computer Science and Engineering 152A. Advanced topics and design projects in communication networks. Example topics include wireless networks, multimedia networking, network design and management, traffic analysis and modeling, network simulations and performance analysis. Offered in alternate years. (Same course as Computer Science Engineering 152C.) GE credit: SE.-III. (III.) Chuah

180A. Digital Systems I (5)

Lecture—3 hours; laboratory—6 hours. Prerequisite: Physics 9C. Introduction to digital system design including combinational logic design, sequential and asynchronous circuits, computer arithmetic, memory systems and algorithmic state machine design; computer aided design (CAD) methodologies and tools. GE credit: SE.—I, II. (I, II.) Akella, Al-Asaad, Amirtharajah, Baas, Ghiasi, Owens

180B. Digital Systems II (5)

Lecture — 3 hours; laboratory — 6 hours. Prerequisite: course 110A; 180A. Computer-aided design of digital systems with emphasis on hardware description languages (VHDL), logic synthesis, and field-pro-grammable gate arrays (FPGA). May cover advanced topics in digital system design such as static timing analysis, pipelining, memory system design, testing digital circuits. GE credit: SE.—III. (III.) Akella, Al-Asaad, Ghiasi

181A. Digital Systems Design Project (2)

Workshop - 1 hour; laboratory - 4 hours. Prerequisite: courses 180B and either course 170 or Computer Science 122A. Digital-system and computerengineering design course involving architecture, design, implementation and testing of a prototype application-specific processor under given design constraints. This is a team project that includes a final presentation and report. (Deferred grading only, pending completion of sequence.) GE credit: SE.—I. (I.) Ghiasi

181B. Digital Systems Design Project (2)

Workshop-1 hour; laboratory-4 hours. Prerequisite: courses 180B and either course 170 or Computer Science 122A. Digital-system and computerengineering design course involving architecture, design, implementation and testing of a prototype application-specific processor under given design constraints. This is a team project that includes a final presentation and report. (Deferred grading only, pending completion of sequence.) GE credit: SE.—II. (II.) Ghiasi

183. Testing and Verification of Digital Systems (5)

Lecture—3 hours; laboratory—4 hours. Prerequisite: courses 170 and 180B. Computer aided-testing and design verification techniques for digital systems;

physical fault testing; simulation-based design verification; formal verification; timing analysis. GE credit: SE.—II. (II.) Al-Asaad

189A-V. Special Topics in Electrical Engineering and Computer Science (1-5)

Prerequisite: consent of instructor. Special Topics in (A) Computer Science; (B) Programming Systems; (C) Digital Systems; (D) Communications; (E) Signal Transmission; (F) Digital Communication; (G) Control Systems; (H) Robotics; (I) Signal Processing; (J) Image Processing; (K) High-Frequency Phenomena and Devices; (L) Solid-State Devices and Physical Electronics, (M) Systems Theory, (N) Active and Passive Circuits; (O) Integrated Circuits; (P) Computer Software; (Q) Computer Engineering; (R) Microprocessing; (S) Electronics; (T) Electromagnetics; (U) Opt-Electronics; (V) Computer Networks. May be repeated for credit when topic differs. GE credit: SE. — I, II, III. (I, II, III.)

190C. Research Group Conferences in Electrical and Computer Engineering (1)

Discussion - 1 hour. Prerequisite: upper division standing in Electrical and Computer Engineering; consent of instructor. Research group conferences.
May be repeated for credit. (P/NP grading only.)— 1, 11, 111. (1, 11, 111.)

192. Internship in Electrical and Computer Engineering (1-5)

Internship—3-15 hours. Prerequisite: completion of a minimum of 84 units; project approval before period of internship; consent of instructor. Supervised work experience in electrical and computer engineering. May be repeated for credit if project is different. (P/NP grading only.) GE credit: SE.—I, II, III. (I, II, III.)

193A. Senior Design Project (2)

Project-6 hours. Prerequisite: senior standing in Electrical or Computer Engineering; course 196 (may be taken concurrently); consent of instructor. Team design project for seniors in Electrical or Computer Engineering. Project involves analysis, design, implementation and evaluation of an Electrical Engineering or Computer Engineering system. Project is supervised by a faculty member. (Deferred grading only, pending completion of sequence.) GE credit: SE.—I, II. (I, II.)

193B. Senior Design Project (2)

Project - 1 hour; laboratory - 6 hours. Prerequisite: course 193A. Team design project for seniors in Electrical Engineering or Computer Engineering. Project involves analysis, design, implementation and evaluation of an Electrical Engineering or Computer Engineering system. Project supervised by a faculty member. (Deferred grading only, pending completion of sequence.) GE credit: SE.—II, III. (II,

194A. Micromouse Design Project (2)

Discussion—1 hour; laboratory—3 hours. Prerequisite: Course 70 or Computer Science Engineering 50; Engineering 17 and course 196 (may be taken concurrently); course 100 or Engineering 100 recommended (may be taken concurrently); course 180A recommended (may be taken concurrently). Design of robotic mouse for the IEEE Micromouse competition. May be repeated one time for credit. (Deferred grading only, pending completion of sequence.) Offered irregularly. GE credit: SE.

194B. Micromouse Design Project (2)

Discussion-1 hour; laboratory-3 hours. Prerequisite: course 70 or Computer Science Engineering 50, Engineering 17 (may be taken concurrently); course 100 or Engineering 100 recommended (may be taken concurrently), course 180A recommended (may be taken concurrently). Design of robotic mouse for the IEEE Micromouse competition. Limited enrollment. May be repeated one time for credit. (Deferred grading only, pending completion of sequence.) Offered irregularly. GE credit: SE.

194C. Micromouse Design Project (1)

Discussion - 1 hour. Prerequisite: course 70 or Computer Science Engineering 50, Engineering 17 (may be taken concurrently); course 100 or Engineering 100 recommended (may be taken concurrently), course 180A recommended (may be taken concurrently). Design of robotic mouse for the IEEE Micromouse competition. Limited enrollment. May be repeated one time for credit. (Deferred grading only, pending completion of sequence.) Offered irregularly. GE credit: SE.

195A. NATCAR Design Project (3)

Lecture—1 hour; laboratory—6 hours. Prerequisite: courses 110A, 157A (can be taken concurrently); course 170 recommended (taken concurrently) if student intends to do the project with digital circuits.
Pass one restricted to major. Design and construct an autonomous race car. Students work in groups to design, build and test speed control circuits, track sensing circuits, and a steering control loop. (Deferred grading only pending completion of sequence.) GE credit: SE.-I. (I.) Spencer

195B. NATCAR Design Project (2)

Workshop-1 hours; laboratory-4 hours. Prerequisite: course 195A. Design and construct an autonomous race car. Students work in groups to design, build and test speed control circuits, track sensing circuits, and a steering control loop. (Deferred grading only pending completion of sequence.) GE credit: SE.—II. (II.)

196. Issues in Engineering Design (1)

Seminar-1 hour. Prerequisite: senior standing in Electrical or Computer Engineering. The course covers various electrical and computer engineering standards and realistic design constraints including economic, manufacturability, sustainability, ethical, health and safety, environmental, social, and political. GE credit: SE.—I. (I.)

197T. Tutoring in Electrical and Computer Engineering (1-3)

Discussion—1 hour; discussion/laboratory—2-8 hours. Prerequisite: upper division standing; consent of instructor. Tutoring in Electrical and Computer Engineering courses, especially introductory circuits. For upper-division undergraduate students who will provide tutorial assistance. (P/NP grading only.)—I, İI, III. (I, II, III.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. May be repeated three times for credit. (P/NP grading only.) GE

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

201. Digital Signal Processing (4)

Lecture-4 hours. Prerequisite: course 150B; Statistics 120 or Mathematics 131 or Mathematics 167 recommended. Theory and design of digital filters. Classification of digital filters, linear phase systems, all-pass functions, FIR and IIR filter design methods and optimality measures, numerically robust structures for digital filters. - II. (II.)

202. Advanced Digital Signal Processing (4)

Lecture-4 hours. Prerequisite: courses 201, 260, and 265, and Mathematics 167 are recommended Multirate DSP theory and wavelets, optimal transform and subband coders in data compressions, advanced sampling theory and oversampled A/D converters, transmultiplexers and precoders in digital communication systems, genomic signal processing. Offered in alternate years. — (III.)

205. Computational Methods in Biomedical Imaging (4)

Lecture-4 hours. Prerequisite: Biomedical Engineering 105 or Statistics 120; Biomedical Engineering 108 or course 150A. Analytic tomographic reconstruction from projections in 2D and 3D; modelbased image reconstruction methods; maximum likelihood and Bayesian methods; applications to CT, PET, and SPECT. (Same course as Biomedical Engineering 252.)—II. (II.)

206. Digital Image Processing (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 150B. Two-dimensional systems theory, image perception, sampling and quantization, transform theory and applications, enhancement, filtering and restoration, image analysis, and image processing systems. - (II.)

210. MOS Analog Circuit Design (3)

Lecture - 3 hours. Prerequisite: courses 110B, 111B and 140B. Analysis and design of MOS amplifiers, bias circuits, voltage references and other analog circuits. Stability and compensation of feedback amplifiers. Introduction to noise analysis in MOS circuits.—I. (I.)

211. Advanced Analog Circuit Design (3)

Lecture - 3 hours. Prerequisite: course 210; Statistics 131A and course 112 recommended. Noise and distortion in electronic circuits and systems. Application to communication circuits. Specific applications include mixers, low-noise amplifiers, power amplifiers, phase-locked loops, oscillators and receiver architectures. - II. (II.)

212. Analog MOS IC Design for Signal Processing (3)

Lecture-3 hours. Prerequisite: course 210. Analysis and design of analog MOS integrated circuits. Passive components, single-ended and fully differential op amps, sampled-data and continuous-time filters. — II. (II.)

213. Data-Conversion Techniques and Circuits (3)

Lecture—3 hours. Prerequisite: course 210. Digital-to-analog and analog-to-digital conversion; component characteristics and matching; sample-and-hold, comparator, amplifier, and reference circuits.—III.

214. Computer-Aided Circuit Analysis and Design (3)

Lecture — 3 hours. Prerequisite: courses 110A, 110B and knowledge of FORTRAN or C. Network equation formulations. Nonlinear DC, linear AC, timedomain (both linear and nonlinear), steady-state (nonlinear) and harmonic analysis. DC, AC, and time-domain sensitivities of linear and nonlinear circuits. Gradient-based design optimization. Behavioral simulations. Extensive CAD project.—II. (II.)

215. Circuits for Digital Communications (3)

Lecture - 3 hours. Prerequisite: courses 150B and 210 (may be taken concurrently); course 165, 166 or 265 recommended. Analog, digital, and mixedsignal CMOS implementations of communication-circuit blocks; gain control, adaptive equalizers, sampling detectors, clock recovery. Offered in alternate

216. Low Power Digital Integrated Circuit Design (3)

Lecture — 3 hours. Prerequisite: course 118. IC design for low power and energy consumption. Low power architectures, logic styles and circuit design. Variable supply and threshold voltages. Leakage management. Power estimation. Energy sources, power electronics, and energy recovery. Applications in portable electronics and sensors. Thermodynamic limits. - II. (II.)

219. Advanced Digital Circuit Design (3)

Lecture - 3 hours. Prerequisite: course 118 or 218A. Analysis and design of digital circuits. Both bipolar and MOS circuits are covered. Dynamic and static RAM cells and sense amplifiers. Ádvanced MOS families. Multi-valued logic. — (III.)

221. Analog Filter Design (3)

Lecture - 3 hours. Prerequisite: courses 100 and 150A. Design of active and passive filters including filter specification and approximation theory. Passive LC filter design will cover doubly-terminated reactance two-port synthesis. Active filter design will include sensitivity, op-amp building blocks, cascade, multi-loop, ladder and active-R filter design. Offered in alternate years. — (I.)

222. RF IC Design (3)

Lecture - 3 hours. Prerequisite: course 132C and 210. Radio frequency (RF) solid-state devices, RF device modeling and design rules; non-linear RF circuit design techniques; use of non-linear computeraided (CAD) tools; RF power amplifier design.—III.

228. Advanced Microwave Circuit and **Device Design Techniques (4)**

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 132B. Theory, design, fabrication, analysis of advanced microwave circuits and devices. Wideband transformers, stripline/microstripline broadband couplers. Lumped and distributed filter synthesis. Broadband matching theory applied to microwave devices. Wideband and low noise FET/ HEMT amplifiers. Advanced microwave oscillator theory. Phase noise analysis. Offered in alternate vears. - III.

230. Electromagnetics (3)

Lecture - 3 hours. Prerequisite: course 130B. Maxwell's equations, plane waves, reflection and refraction, complex waves, waveguides, resonant cavities, and basic antennas. - I. (I.)

232A. Advanced Applied Electromagnetics I

Lecture - 3 hours. Prerequisite: course 132B. The exact formulation of applied electromagnetic problems using Green's functions. Applications of these techniques to transmission circuits. Offered in alternate years.—II.

232B. Advanced Applied Electromagnetics II (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 132B. Advanced treatment of electromagnet ics with applications to passive microwave devices and antennas. Offered in alternate years. — (III.)

233. High Speed Signal Integrity (3)

Lecture - 3 hours. Prerequisite: course 130B. Design and analysis of interconnects in high-speed circuits and sub-systems; understanding of high-speed signal propagation and signal integrity concepts; electromagnetic modeling tools and experimental techniques. Offered in alternate years. - III. Pham

235. Photonics (4)

Lecture — 3 hours; project — 1 hour. Prerequisite: course 230 (may be taken concurrently). Optical propagation of electromagnetic waves and beams in photonic components and the design of such devices using numerical techniques. Offered in alternate years.-II.

236. Nonlinear Optical Applications (3)

Lecture - 3 hours. Prerequisite: course 130B, course 230 (may be taken concurrently). Nonlinear optical interactions in optical communication, optical information processing and integrated optics. Basic concepts underlying optical nonlinear interactions in materials and guided media. Not open for credit to students who have completed course 233. Offered in alternate years. - (I.)

237A. Lasers (3)

Lecture — 3 hours. Prerequisite: course 130B or the equivalent and course 235. Theoretical and practical description of lasers. Theory of population inversion, amplification and oscillation using semiclassical oscillator model and rate equations. Description and design of real laser system (Not open for credit to students who have completed course 226A.) Offered in alternate years.—(I.)

237B. Advanced Lasers (3)

Lecture—3 hours. Prerequisite: course 237A. Quantum mechanical description of lasers and interactions of materials with laser light. Relationship to rate equation approach. Optical Bloch equations and coherent effects. Theory and practice of active and passive mode-locking of lasers. Injection locking Not open for credit to students who have completed course 226B. Offered in alternate years. - (II.)

238. Semiconductor Diode Lasers (3)

Lecture — 3 hours. Prerequisite: course 245A. Understanding of fundamental optical transitions in semiconductor and quantum-confined systems are applied to diode lasers and selected photonic devices. The importance of radiative and non-radiative recombination, simulated emission, excitons in quantum wells, and strained quantum layers are considered. Offered in alternate years. - III.

239A. Optical Fiber Communications **Technologies (4)**

Lecture - 4 hours. Prerequisite: course 130B. Physical layer issues for component and system technologies in optical fiber networks. Sources of physical layer impairments and limitations in network scalability. Enabling technologies for wavelength-division-multiplexing and time-division-multiplexing networks. Optical amplifiers and their impact in optical networks (signal-to-noise ratio, gain-equalization, and cascadability). - I. (I.)

239B. Optical Fiber Communications Systems and Networking (4)

Lecture - 4 hours. Prerequisite: course 239A. Physical layer optical communications systems in network architectures and protocols. Optical systems design and integration using optical component technologies. Comparison of wavelength routed WDM, TDM, and NGI systems and networks. Case studies of next generation technologies. Offered in alternate years. — (II.)

240. Semiconductor Device Physics (3)

Lecture - 3 hours. Prerequisite: course 140B. Physical principles, characteristics and models of fundamental semiconductor device types, including P-N and Schottky diodes, MOSFETs and MESFETs Bipolar Junction Transistors, and light emitters/detectors. -1. (1.)

242. Advanced Nanostructured Devices (3)

Lecture - 3 hours. Prerequisite: courses 130A and 140A. Physics of nano-structured materials and device operation. Overview of new devices enabled by nanotechnology; fabrication and characterization methods; applications of nano-structures and devices. Offered in alternate years. — (I.)

243. Silicon-on-Insulator (SOI) Technology

Lecture - 3 hours. Prerequisite: course 140B or 240 recommended. SOI (Silicon-on-Insulator) technology from all major points of view: materials fabrication, processing technology, device physics, and circuit basics. Offered in alternate years. — (III.)

244A. Design of Microelectromechanical Systems (MEMS) (3)

Lecture - 3 hours. Prerequisite: course 140A, 140B or consent of instructor. Theory and practice of MEMS design. Micromechanical fundamentals, CAD tools, and case studies. A MEMS design project is required. The designs will be fabricated in a commercial foundry and tested in course 244B. Offered in alternate years. — (I.)

244B. Microsciences (4)

Lecture/discussion-4 hours. Introduction to the theory of physical and chemical principles at the microscale. Scale effects, surface tension, microfluidic mechanics, micromechanical properties, intermolecular interactions and micro tribology. (Same course as Biomedical Engineering 218.)—I. (I.) Islam, Kiehl, Pan

246. Advanced Projects in IC Fabrication (3)

Discussion - 1 hour; laboratory - 6 hours. Prerequisite: course 146B. Individualized projects in the fabrication of analog or digital integrated circuits. Offered in alternate years. - II.

247. Advanced Semiconductor Devices (4)

Lecture—3 hours; project. Prerequisite: graduate standing in Engineering. Semiconductor devices, including MOSFETs, heterojunction transistors, lightemitting diodes, lasers, sensors, detectors, power and high-voltage transistors, MEMS resonators, organic semiconductors and photovoltaics. All material is from recent literature, encouraging students to utilize search methods and critically assess the latest research. Offered in alternate years. — (I.) Hunt, Islam

249. Microfabrication (3)

Lecture - 3 hours. Prerequisite: course 140B. Theory and practices of several major technologies of microfabrication, used for producing integrated circuits, sensors, and microstructures. Major topics include

sputtering, chemical vapor deposition, plasma processing, micromachining, and ion implantation. Offered in alternate years. - III.

250. Linear Systems and Signals (4)

Lecture - 4 hours. Prerequisite: course 150A. Mathematical description of systems. Selected topics in linear algebra. Solution of the state equations and an analysis of stability, controllability, observability, realizations, state feedback and state estimation. Discrete-time signals and systems, and the Z-transform. - I. (I.)

251. Nonlinear Systems (3)

Lecture—3 hours. Prerequisite: course 250. Nonlinear differential equations, second-order systems, approximation methods, Lyapunov stability, absolute stability, Popov criterion, circle criterion, feedback linearization techniques. Offered in alternate

252. Multivariable Control System Design (3)

Lecture—3 hours. Prerequisite: course 250. Modern control system design, theory, and techniques. Topics will include single-loop feedback design; stability, performance and robustness of multivariable control systems; LQG design; H-infinity design; frequency response methods; and optimization-based design. Offered in alternate years. — (II.)

254. Optimization (3)

Lecture—3 hours. Prerequisite: Mathematics 22A, knowledge of FORTRAN or C. Modeling optimization problems in engineering design and other applications; optimality conditions; unconstrained optimization (gradient, Newton, conjugate gradient and quasi-Newton methods); duality and Lagrangian relaxation constrained optimization. (Primal method and an introduction to penalty and augmented Lagrangian methods.) Offered in alternate years.-

255. Robotic Systems (3)

Lecture - 3 hours. Introduction to robotic systems. Mechanical manipulators, kinematics, manipulator positioning and path planning. Dynamics of manipulators. Robot motion programming and control algorithm design. Offered in alternate years. - (II.)

256. Stochastic Optimization in Dynamic Systems (4)

Lecture - 4 hours. Prerequisite: course 260 or the equivalent. Markov Decision Processes (MDP), dynamic programming, multiarmed bandit, Partially observable MDP, optimal stopping, stochastic scheduling, sequential detection and quickest change detection, competitive MDP and game theory, applications in dynamic systems such as aueueina net works, communication systems, and multi-agent systems. Offered in alternate years. — (II.) Zhao

260. Random Signals and Noise (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Statistics 120, course 150A; course 250 recommended. Random processes as probabilistic models for signals and noise. Review of probability, random variables, and expectation. Study of correlation function and spectral density, ergodicity and duality between time averages and expected values, filters and dynamical systems. Applications. – II. (II.)

261. Signal Processing for Communications (4)

Lecture-4 hours. Prerequisite: course 165, 260 or consent of instructor. Signal processing in wireless and wireline communication systems. Characterization and distortion of wireless and wireline channels. Channel equalization and maximum likelihood sequence estimation. Channel precoding and preequalization. OFDM and transmit diversity. Array processing. Offered in alternate years. -III

262. Multi-Access Communications Theory

Lecture—3 hours; project. Prerequisite: Statistics 120 or equivalent; course 173A or Engineering Computer Science 152A. Maximum stable throughput of Poisson collision channels. Classic collision resolution algorithms. Carrier sensing multiple access and its performance analysis. System stability analysis.

Joint design of the physical/medium access control layers. Capacity region of multi-access channels. Multi-access with correlated sources. Offered in alternate years. — (III.)

263. Optimal and Adaptive Filtering (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 260. Geometric formulation of least-squares estimation problems. Theory and applications of optimum Wiener and Kalman filtering. MAP and maximum likelihood estimation of hidden Markov models, Viterbi algorithm. Adaptive filtering algorithms, properties and applications. Offered in alternate years. — (III.)

264. Estimation and Detection of Signals in Noise (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 260. Introduction to parameter estimation and detections of signals in noise. Bayes and Neyman-Pearson likelihood-ratio tests for signal detec tion. Maximum-likelihood parameter estimation. Detection of known and Gaussian signals in white or colored noise. Applications to communications, radar, signal processing.—III. (III.)

265. Principles of Digital Communications

Lecture-4 hours. Prerequisite: courses 165 and 260, or consent of instructor. Introduction to digital communications. Coding for analog sources. Characterization of signals and systems. Modulation and demodulation for the additive Gaussian channel. Digital signaling over bandwidth-constrained linear filter channels and over fading multipath channels. Spread spectrum signals.—II. (II.)

266. Information Theory and Coding (3)

Lecture-3 hours. Prerequisite: Statistics 120. Information theory and coding. Measure of information. Redundancy reduction encoding of an information source. Capacity of a communication channel, errorfree communications. Offered in alternate years.—II.

269A. Error Correcting Codes I (3)

Lecture-3 hours. Prerequisite: Mathematics 22A and course 160. Introduction to the theory and practice of block codes, linear block codes, cyclic codes, decoding algorithms, coding techniques. - I. (I.)

269B. Error Correcting Codes II (3)

Lecture - 3 hours. Prerequisite: course 165 and 269A. Introduction to convolutional codes, turbo codes, trellis and block coded modulation codes, soft-decision decoding algorithms, the Viterbi algorithm, reliability-based decoding, trellis-based decoding, multistage decoding. Offered in alternate years. — (II.)

270. Computer Architecture (3)

Lecture - 3 hours. Prerequisite: course 170 or Computer Science Engineering 154B. Introduction to modern techniques for high-performance single and multiple processor systems. Topics include advanced pipeline design, advanced memory hierarchy design, optimizing pipeline and memory use, and memory sharing among multiprocessors. Case studies of recent single and multiple processor systems. — II. (II.)

272. High-Performance Computer Architecture and Implementation (3)

Lecture - 3 hours. Prerequisite: course 170 or Computer Science Engineering 154A, 154B and course 270 or Computer Science Engineering 250A. Architectural issues in achieving high-performance via concurrent execution of instructions and associated problems and limitations. Specialized architectures. Offered in alternate years.—150A. Mechanical Design III. (III.)

273. Networking Architecture and Resource Management (4)

Lecture—3 hours; project—1 hour. Prerequisite: Computer Science Engineering 152A or course 173A; Computer Science Engineering 252 recommended. Design and implementation principles of networking architecture and protocols. Internet, ATM, and telephony case studies. Topics: Internet technology; application and services; resource management; Quality of Service (QoS) provisioning; traffic engineering; performance evaluation and future research issues. (Same course as Computer Science Engineering 258.)—II. (II.) Chuah, Mohapatra

274. Internet Measurements, Modeling and Analysis (4)

Lecture-3 hours; project. Prerequisite: Computer Science Engineering 252 or course 273. Advanced topics in the theoretical foundations of network measurements, modeling, and statistical inferencing. Applications to Internet engineering, routing optimization, load balancing, traffic engineering, fault tolerance, anomaly detection, and network security. Individual project requirement. Offered in alternate years. — (III.)

276. Fault-Tolerant Computer Systems: Design and Analysis (3)

Lecture - 3 hours. Prerequisite: courses 170, 180A. Introduces fault-tolerant digital system theory and practice. Covers recent and classic fault-tolerant techniques based on hardware redundancy, time redundancy, information redundancy, and software redundancy. Examines hardware and software reliability analysis, and example fault-tolerant designs. Not open for credit to students who have completed course 276A. Offered in alternate years.—II.

277. Graphics Architecture (3)

Lecture - 3 hours. Prerequisite: Computer Science Engineering 154B or course 170, Computer Science Engineering 175. Design and analysis of the architecture of computer graphics systems. Topics include the graphics pipeline with a concentration on hardware techniques and algorithms, exploiting parallelism in graphics, and case studies of noteworthy and modern graphics architectures. Offered in alternate years. — ĬĬ.

278. Computer Arithmetic for Digital Implementation (3)

Lecture - 3 hours. Prerequisite: courses 170, 180A. The design and implementation of computer arithmetic logic units are studied with particular emphasis on high-speed performance requirements. Addition (subtraction), multiplication and division operations are covered, and fixed and floating-point representations are examined. Offered in alternate years.—III.

281. VLSI Digital Signal Processing (4)

Lecture — 3 hours; project. Prerequisite: courses 150B, 170, 180B or consent of instructor. Digital signal processors, building blocks, and algorithms. Design and implementation of processor algorithms, architectures, control, functional units, and circuit topologies for increased performance and reduced circuit size and power dissipation. - II. (II.) Baas

282. Hardware Software Codesign (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: course 170, 180B. Specification and design of embedded systems; modeling and performance estimation; hardware/software partitioning; co-simulation; design re-use; platform-based design; reconfigurable computing.—III.

283. Advanced Design Verification of Digital Systems (4)

Lecture — 3 hours; project. Prerequisite: courses 170 and 180A. Design verification techniques for digital systems; simulation-based design verification techniques; formal verification techniques, including equivalence checking, model checking, and theorem proving; timing analysis and verification; application of design certification techniques to microprocessors. Offered in alternate years. - II

284. Design and Optimization of Embedded Computing Systems (4)

Lecture - 4 hours. Prerequisite: courses 170 and 180B, or consent of instructor. Computer Science Engineering 122A recommended. Introduction to design and optimization of digital computing systems for embedded applications. Topics include combinatorial optimization techniques, performance and energy optimization in embedded systems, compila-tion and architecture-specific mapping, programmable and reconfigurable platforms; design automation and algorithmic improvements to design process.— II. (II.)

286. Introduction to Digital System Testing

Lecture - 3 hours. Prerequisite: course 180A; Statistics 120 or 131A. A review of several current techniques used to diagnose faults in both combinational and sequential circuits. Topics include path sensitization procedures, Boolean difference, D-algorithm random test generation, TC testing and an analysis of the effects of intermittent faults. Not open for credit to students who have completed course 276A. Offered in alternate years.—II.

289A-V. Special Topics in Electrical and Computer Engineering (1-5)

Lecture/laboratory-1-5 units. Prerequisite: consent of instructor. Special topics in (A) Computer Science, (B) Programming Systems, (C) Digital Systems (D) Communications, (É) Signal Transmission, (F) Digital Communication, (G) Control Systems, (H) Robotics, (I) Signal Processing, (J) Image Processing, (K) High Frequency Phenomena and Devices, (L) Solid-State Devices and Physical Electronics, (M) Systems Theory, (N) Active and Passive Circuits, (O) Integrated Circuits, (P) Computer Software, (Q) Computer Engineering, (R) Microprocessing, (S) Electronics, (T) Electromagnetics, (U) Optoelectronics, (V) Computer Networks. May be repeated for credit when topic differs. — I, II, III. (I, II, III.)

290. Seminar in Electrical and Computer Engineering (1)

Seminar-1 hour. Discussion and presentation of current research and development in Electrical and Computer Engineering. May be repeated for credit. (S/U grading only.)—I, II. (I, II.)

290C. Graduate Research Group Conference in Electrical and Computer Engineering (1)

Discussion-1 hour. Prerequisite: consent of instructor. Research problems, progress, and techniques in electrical and computer engineering. May be repeated for credit. (S/U grading only.)-1, II, III. (I,

291. Solid-State Circuit Research Laboratory Seminar (1)

Seminar - 1 hour. Prerequisite: graduate standing. Lectures on solid-state circuit and system design by various visiting experts in the field. May be repeated for credit. (S/Ŭ grading only.)—III. (III.)

292. Seminar in Solid-State Technology (1)

Seminar - 1 hour. Prerequisite: graduate standing. Lectures on solid-state technology by various visiting experts in the field. May be repeated for credit. (S) U grading only.)—III. (IIÍ.)

293. Computer Engineering Research Seminar (1)

Seminar - 1 hour. Prerequisite: graduate standing or consent of instructor. Lectures, tutorials, and seminars on topics in computer engineering. May be repeated for credit up to four times. (S/U grading only.)—II, III. (II, III.)

294. Communications, Signal and Image **Processing Seminar (1)**

Seminar - 1 hour. Prerequisite: graduate standing. Communications, signal and image processing, video engineering and computer vision. May be repeated for credit. (S/U grading only.)—I, İI, III.

295. Systems, Control and Robotics Seminar (1)

Seminar-1 hour. Prerequisite: graduate standing. Seminars on current research in systems and control by faculty and visiting experts. Technical presentations and lectures on current topics in robotics research and robotics technology. May be repeated for credit. (S/U grading only.)—II. (II.)

296. Photonics Research Seminar (1)

Seminar - 1 hour. Prerequisite: graduate standing. Lectures on photonics and related areas by faculty and visiting experts. May be repeated for credit. (S/ U grading only.)—II, III. (II, III.)

298. Group Study (1-5)

Prerequisite: consent of instructor. (S/U grading

299. Research (1-12)

(S/U grading only.)

Professional Courses

390. The Teaching of Electrical Engineering

Discussion - 1 hour. Prerequisite: meet qualifications for teaching assistant and/or associate-in in Electrical Engineering. Participation as a teaching assistant or associate-in in a designated engineering course. Methods of leading discussion groups or laboratory sections, writing and grading quizzes, use of laboratory equipment, and grading laboratory reports.

May be repeated for credit. (S/U grading only.)—I.

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Engineering: Mechanical and **Aerospace Engineering**

(College of Engineering)

C. P. (Case) van Dam, D. Engr., Chairperson of the Department

Michael R. Hill, Ph.D., Vice Chairperson of the Department

Department Office. 2132 Bainer Hall (530) 752-0580; Fax (530) 752-4158; http://mae.ucdavis.edu

Faculty

Ralph C. Aldredge, III, Ph.D., Professor Hector A. Baldis, Ph.D., Professor Abdul I. Barakat, Ph.D., Professor Jean-Jacques Chattot, Ph.D., Professor Harry H. Cheng, Ph.D., Professor Cristina E. Davis, Ph.D., Associate Professor Roger Davis, Ph.D., Professor Jean-Pierre Delplanque, Ph.D., Professor Raissa D'Souza, Ph.D., Associate Professor (Computer Science; Mechanical and Aerospace Engineering)
Fidelis O. Eke, Ph.D., Professor Paul A. Erickson, Ph.D., Associate Professor Rida T. Farouki, Ph.D., Professor Mohamed M. Hafez, Ph.D., Professor Academic Senate Distinguished Teaching Award Walter M. Harris, Ph.D., Associate Professor Ronald A. Hess, Ph.D., Professor Michael R. Hill, Ph.D., Professor David A. Horsley, Ph.D., Associate Professor Mont Hubbard, Ph.D., Professor Maury L. Hull, Ph.D., Professor David Hwang, Ph.D., Professor Niels G. Jensen, Ph.D. Professor (Chemical Engineering and Materials Science; Mechanical and Aerospace Engineering) Sanjay S. Joshi, Ph.D., Associate Professor Ian M. Kennedy, Ph.D., Professor Valeria La Saponara, Ph.D., Associate Professor Mark Modera, Ph.D., Professor (Civil and Environmental Engineering; Mechanical and Aerospace Engineering) Jae Wan Park, Ph.D., Assistant Professor Bahram Ravani, Ph.D., Professor Stephen K. Robinson, Ph.D., Professor Nesrin Sarigul-Klijn, Ph.D., Professor Benjamin D. Shaw, Ph.D., Professor C. P. (Case) van Dam, D. Engr., Professor Steven A. Velinsky, Ph.D., Professor Anthony S. Wexler, Ph.D., Professor

(Civil and Environmental Engineering; Mechanical and Aerospace Engineering; Land,

Air and Water Resources)

Kazuo Yamazaki, Ph.D., Professor

Emeriti Faculty

Charles W. Beadle, Ph.D., Professor Emeritus James W. Baughn, Ph.D., Professor Emeritus, Academic Senate Distinguished Teaching Award Harry A. Dwyer, Ph.D., Professor Emeritus Wolfgang Kollmann, Dr-Ing, Professor Emeritus Andrew A. Frank, Ph.D., Professor Emeritus Jerald M. Henderson, D.Engr., Professor Emeritus Myron A. Hoffman, Sc.D., Professor Emeritus Dean C. Karnopp, Ph.D., Professor Emeritus John D. Kemper, Ph.D., Professor Emeritus Donald L. Margolis, Ph.D., Professor Emeritus Allan A. McKillop, Ph.D., Professor Emeritus Bruce R. White, Ph.D., Professor Emeritus

Affiliated Faculty

James Schaaf, Ph.D., Lecturer

The Mechanical and Aerospace **Engineering Undergraduate Programs**

The Department of Mechanical and Aerospace Engineering administers three undergraduate programs in the College of Engineering: (1) Mechanical Engineering, (2) Mechanical Engineering/Materials Science and (3) Aerospace Science and Engineering.

For more information about our programs, please see http://mae.ucdavis.edu/ug.php.

Mission. The Department of Mechanical and Aerospace Engineering is committed to educating future engineers so they may contribute to the economic growth and well-being of both the state and the nation and to the advancement of knowledge in the mechanical and aerospace sciences.

Objectives. The objectives of the programs offered in Mechanical and Aerospace Engineering include the following: to prepare its graduates to practice mechanical and/or aerospace engineering in a broad range of industries, to enable interested graduates to pursue graduate education, to prepare its graduates to participate in research and development, and in other creative and innovative efforts in science, engineering, and technology and to allow interested graduates to pursue entrepreneurial endeavors.

Preparatory Requirements. In order to change to any major offered by the Department of Mechanical and Aerospace Engineering, students must:

- · Be a registered student and have completed at least one quarter (minimum of 12 units) at UC
- · Have completed not more than 135 cumulative units (excluding AP units);
- Be in good academic standing and making minimum progress;
- · Have received a letter grade for all courses that satisfy Engineering degree requirements;
- Have completed Mathematics 21A, B, C; Physics 9A and Chemistry 2A each with a grade of C- or better and a GPA in these five courses of 2.800
- Have no grade lower than a C- in any completed engineering course taken at UC Davis
- · Have a UC engineering GPA of 2.800 or better

Mechanical Engineering Undergraduate Program

The Mechanical Engineering program is accredited by the Engineering Accreditation Commission of ABET; http://www.abet.org.

The mechanical engineer uses basic science in the design and manufacture of complex engineering systems, requiring the application of physical and mechanical principles to the development of machines, energy conversion systems, materials, and equipment for guidance and control.

Work in this broad field of engineering requires a thorough knowledge of mathematics, physics, chemistry, material science, applied mechanics, thermodynamics, heat transfer, mass transfer, electricity, manufacturing processes, and economics

The Mechanical Engineering Program is designed to provide knowledge in mechanical engineering and associated applied sciences so that graduates may practice in a broad range of industries, pursue graduate studies, participate in research and develop ment, and/or pursue entrepreneurial endeavors.

Areas of Interest

Students spend their third year in further study of fundamental courses, and in the fourth year they may tailor their studies to their interests by selecting courses in controls and systems analysis, fluid mechanics, heat transfer, mechanical design or thermodynamics. Students can either prepare for graduate study in Mechanical Engineering or obtain a broad background for entering engineering prac-

Students may select elective courses from among the areas of interest listed below.

Mechanical Design. The creation and improvement of products, processes, or systems that are mechanical in nature are the primary activities of a professional mechanical engineer. The development of a product from concept generation to detailed design, manufacturing process selection and planning, quality control and assurance, and life cycle considerations are areas of study and specialization in the area of mechanical design.

Solutions to such major social problems as environmental pollution, the lack of mass transportation, the lack of raw materials, and energy shortages, will depend heavily on the engineer's ability to create new types of machinery and mechanical systems.

The engineer-designer must have a solid and relatively broad background in the basic physical and engineering sciences and have the ability to synthesize the information from such a background in creative problem solving. In addition to having technical competence, the designer must be able to consider the socioeconomic consequences of a design and its possible impact on the environment. Product safety, reliability, and economics are other

Suggested technical electives:

Aerospace Science and Engineering 133, 139 Biological Systems Engineering 114, 120, 165

Biomedical Engineering 118/Electrical and Computer Engineering 147

Engineering 122, 160 (only one unit of credit towards Technical Electives requirement)

Materials Science and Engineering 180, 181,

Mechanical Engineering 121, 134, 150B, 151, 152, 154, 161, 163

Suggested Advisers. H.H. Cheng, R.T. Farouki, M.R. Hill, M.L. Hull, B. Ravani, S. Velinsky, K. Yamazaki

Biomedical and Engineering Fluid Mechan-

ics. This field of study is based on the fundamentals of fluid mechanics and their broad range of applications in the biomedical and engineering areas Areas of current research include blood circulation and its potential role in the regulation of normal physiological function and in the development of disease; groundwater and atmospheric flows and their implications for pollutant transport and environmental concerns; aerodynamic flow around transportation vehicles and its impact on vehicle performance; and flow in combustion engines and other energy systems with considerations of efficiency and envi ronmental impact. These areas are investigated both experimentally and computationally.

Suggested technical electives:

Aerospace Science and Engineering 138

Engineering 160 (only one unit of credit towards technical requirements)

Chemical Engineering 161A, 161B

Civil and Environmental Engineering 144, 149 Mechanical Engineering 161, 163

Suggested Advisers. R.C. Aldredge, A.I. Barakat, J.J. Chattot, M. Hafez, I.M. Kennedy, B.D. Shaw, C.P. van Dam, A.S. Wexler

Combustion and the Environment. Combustion is widely used for energy generation, propulsion, heating, and waste disposal, as well as for many other applications. Mechanical engineers are often heavily involved with the design of combustion systems (internal combustion engines, gas turbines, furnaces, etc.) and deal with aspects of combustion ranging from increasing efficiencies to reducing pollutant emissions. This specialization is for those who would like to work in fields that use combustion, or that deal with pollution related to combustion. With the current increased emphasis on reducing pollutants while maintaining or increasing efficiency, the efforts of mechanical engineers in designing and improving combustion systems are becoming more important

Suggested technical electives:

Mechanical Engineering 161, 163

Civil and Environmental Engineering 149, 150

Suggested Advisers. R.C. Aldredge, R. Davis, P. A. Erickson, I.M. Kennedy, B.D. Shaw

Heat Transfer, Thermodynamics, and Energy Systems. This specialization emphasizes the fundamentals of heat transfer and thermodynamics, and their application to the design of advanced engineering systems. The objective of the program is to introduce students to the fundamental processes of heat transfer and thermodynamics in complex engineering systems so that they are able to design more efficient, cost effective, and reliable systems with less environmental pollution and impact. An understanding of heat transfer and thermodynamics is required for the design of efficient, cost effective systems for power generation, propulsion, heat exchangers, industrial processes, refining, and chemical processing. This area of specialization is important to many industries-aerospace, defense, automotive-as well as to the thermal design of electronic and computer packaaes.

Suggested technical electives:

Aerospace Science and Engineering 138 Mechanical Engineering 161, 163

Suggested Advisers. R.C. Aldredge, R. Davis, P.A. Erickson, I.M. Kennedy, J.W. Park, B.D. Shaw

Manufacturing. Manufacturing is concerned with the conversion of raw materials into finished products by a variety of processes, such as machining, forming, casting, and molding. Modern manufactur-ing technology is increasingly dependent upon integration with computer-aided design systems and precision computer controls. State-of-the-art laboratories offer the opportunity for hands-on experience with a wide spectrum of manufacturing equipment. Manufacturing engineers must have expertise in design, materials, controls, statistical methods, computer software, and microprocessor applications.

Suggested technical electives:

Biomedical Engineering 118/Electrical and Computer Engineering 147

Electrical and Computer Engineering 160 Materials Science and Engineering 180, 181

Mechanical Engineering 150B, 151, 154

Suggested Advisers. H.H. Cheng, R.T. Farouki, D.A. Horsley, V. La Saponara, B. Ravani, K. Yamazaki

Systems Dynamics and Control. Engineers are increasingly concerned with the performance of integrated dynamics systems in which it is not possible to optimize component parts without considering the overall system.

Systems Dynamics and Control specialists are concerned with the modeling, analysis, and simulation of all types of dynamic systems and with the use of automatic control techniques to change the dynamic characteristics of systems in useful ways. The emphasis in this program is on the physical systems that are closely related to mechanical engineering, but the techniques for studying these systems apply to social, economic, and other dynamic systems.

Ongoing research includes projects on continuously variable transmissions, active and semi-active sus-pension systems, modeling and control of vehicle dynamics, electromechanical actuator design, electronically controlled steering, the analysis of fuel management systems, and the design of flight-control systems with humans in the loop.

Suggested technical electives:

Aerospace Science and Engineering 129, 139,

Electrical and Computer Engineering 160 Engineering 122

Mechanical Engineering 121, 134, 154

Suggested Advisers. F.O. Eke, Walter M. Harris, R.A. Hess, M. Hubbard, S. Joshi

Ground Vehicle Systems. An important aspect of mechanical engineering is the design of more environmentally benign surface vehicles that provide efficient individual and public transportation. Innovations in the field require competence in vehicle dynamics, control of vehicle dynamics, power sources and power transmission, lightweight structures and systems, alternatively fueled power systems, including electrical drives and fuel cells, and mechanical systems.

Suggested technical electives:

Aerospace Science and Engineering 127, 129.139

Civil and Environmental Engineering 130, 149,

Engineering 122, 160 (only one unit of credit towards technical electives requirement)

Mechanical Engineering 121, 134, 152

Suggested Advisers. P. A. Erickson, M. Hill, M. Hubbard, J. Park, N. Sarigul-Klijn, S. Velinsky

Transportation Systems. As society recognizes the increasing importance of optimizing transporta-tion systems to minimize environmental degradation and energy expenditure, engineers will need to consider major innovations in the way people and goods are moved. Such innovations will require competence in vehicle dynamics, propulsion and control, and an understanding of the problems caused by present-day modes of transportation. Vehicle control requires an understanding of sensors and actuators, and the integration of yet-to-be-proposed concepts into overall vehicular dynamics. Competence in these areas allows for the development of alternative propulsion concepts, such as electric, hybrid, and fuel cell.

Suggested technical electives:

Aerospace Science and Engineering 127, 129 Biological Systems Engineering 114, 120 Civil and Environmental Engineering 131, 149 Engineering 122, 160 (only one unit of credit towards Technical Electives requirement) Mechanical Engineering 134, 150B, 161, 163

Suggested Advisers. P.A. Erickson, M. Hubbard, J.W. Park, S. Velinsky

Mechanical Engineering Program Requirements

Students are encouraged to carefully adhere to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

Lower Division Required Courses

•	
UI	NITS
Mathematics 21A-21B-21C-21D 16	
Mathematics 22A-22B6	
Physics 9A-9B-9C-9D	
Chemistry 2A-2B or 2AH-2BH	
Engineering 4 3	
Engineering 6 or Mechanical Engineering	
54	
Engineering 17, 35, 45	
Mechanical Engineering 504	
English 3 or University Writing Program 1,	
or Comparative Literature 1, 2, 3, or 4, or	
Native American Studies 54	
Communication 1 or 34	
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Upper Division Required Courses

Engineering 100, 102, 103, 104, 105.. 19 Engineering 100, 102, 103, 103, Mechanical Engineering 106, 107A & B, 150A, 165, 171, 172, Mechanical Engineering 185A &185B (taken in consecutive quarters), or Aerospace Science and Engineering 130A 4 Engineering 190. Select one course from Applied Science Engineering 115; Engineering 180; Mechanical Engineering 115; Mathematics 128C; Statistics 131A 4

Sixteen of the 23 units must be selected from upper division courses in engineering; of these units, one course must be chosen from the following: Engineering 122, Mechanical Engineering 121, 150B, 154

Two additional courses must be chosen from the following design courses: Aerospace Science and Engineering 129, 130B, 138, 139, 141, 189A, 189B; Materials Science and Engineering 180, 182; Mechanical Engineering 134, 151, 152, 161, 162, 163. Students may also choose from Aerospace Science and Engineering 130A, Mechanical Engineering 150B, 154 if these courses are not used in satisfaction of the core design requirement above.

A combined maximum of 4 units may be selected from project/independent study courses 185A, 185B, 192, 199 not used in satisfaction of core degree requirements.

The remaining units (up to 7 units) may be selected from the following technical electives list:

Agricultural and Resource Economics (ARE) 100A, 100B, 112

Applied Biological Systems Technology (ABT) 101, 142, 165

Atmospheric Science (ATM) 149, 160

Biological Sciences (BIS) 2A, 2B, 2C

Chemistry (CHE) 2C, 2CH, 8A, 8B and any upper division course except CHE 195 and 197

Economics (ECN) 100, 101, 102, 103, 122

Engineering (ENG, EAD, EBS, ECH, EMS, ECI, ECS, EEC, EME, EAE) any upper division course except ENG 160, 191, 198 (gearing up for grad school/undergraduate research), ECS 188 or any 197T course

Environmental and Resource Sciences (ERS) 100, 100L, 121, 131, 136, 185, 186, 186L

Exercise Biology (EXB) 102

Fiber and Polymer Science (FPS) 100 (same as EMS 147)

Food Science and Technology (FST) 159, 160 Geology (GEL) 17, 32, 35, 36, 50, 50L, 60, 100, 100L, 101, 101L, 130, 131, 160, 162,

Hydrologic Science (HYD) 110, 124, 134, 141, 142, 143, 144, 146, 151, 182

Management (MGT) 11A, 11B, 100, 120, 140, 150, 160, 170, 180

Mathematics (MAT) any upper division course except MAT 197TC

Physics (PHY) 9HE and any upper division course except PHY 137, 160 (both are restricted to one unit of technical elective), 195, 197T

Statistics (STA) any upper division course except 100, 102, 103, 104, 106, 108

Minimum Units Required for Major 161

The Mechanical Engineering/ **Materials Science Undergraduate Program**

The Mechanical Engineering/Materials Science program is not accredited by the Engineering Accreditation Commission of ABET; http://www.abet.org.

The Mechanical Engineering/Material Science program is a combined major that offers students a unique interdisciplinary experience requiring work with mechanical engineering and material science and engineering students. In addition to performing work in portions of the mechanical engineering program described above, this program provides the background to understand the structure, properties, and behavior of materials and to pursue these fields in industry and/or graduate scholarship.

Students are encouraged to carefully adhere to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

Lower Division Required Courses

	UN	IT.
Mathematics 21A-21B-21C-21D	. 16	
Mathematics 22A-22B	6	
Physics 9A-9B-9C-9D	. 19	
Chemistry 2A-2B or 2AH-2BH		
Engineering 4	3	
Engineering 6 or Mechanical Engineerin	g	
5		
Engineering 17, 35, 45	. 12	
Mechanical Engineering 50	4	
English 3 or University Writing Program	1, or	
Comparative Literature 1, 2, 3, or 4, or		
Native American Studies 5	4	
Communication 1 or 3	4	

Upper Division Required Courses

Engineering 100, 102, 103, 104,
105 19
Mechanical Engineering 106, 107A,
107B, 150A, 165, 171, 172
Mechanical Engineering 185A & 185B
(both courses must be taken in consecutive
quarters), or Materials Science and
Engineering 188A & B (both courses must
be taken in consecutive quarters) 4
Materials Science and Engineering 160,
162, 164, 174 16
One course chosen from Materials Science
and Engineering 172, 180, 181, 182,
188A-B (if not used to satisfy above core
requirement)4
One laboratory course chosen from
Materials Science and Engineering 162L
or 174L 2
Select one course from Applied Science
Engineering 115; Engineering 180;
Mathematics 128C; Mechanical Engineering
115; Statistics 131A 4
Engineering 190
Technical electives10

One course must be chosen from the following: Engineering 122, Mechanical Engineering 121, 150B, 154

Two courses must be chosen from Aerospace Science and Engineering 129, 130A, 130B, 138, 139, 189A, 189B; Materials Science and Engineering 147; Mechanical Engineering 134, 151, 152, 161, 163. Students may also choose from Mechanical Engineering 150B, 154 if these courses are not used for a core technical elective requirement above or Material Science and Engineering 180, 181, 182, if these courses are not used for a Materials Science and Engineering requirement above.

A combined maximum of 4 units of courses Mechanical Engineering 185A & B, Materials Science and Engineering 188A & B or any course numbered 192 or 199 not used in satisfaction of core requirements may be applied to the technical elective degree requirement.

Minimum Units Required for Major 170

Division of Aerospace Science and Engineering

The Division of Aerospace Science and Engineering administers the Aerospace Science and Engineering Program within the Department of Mechanical and Aerospace Engineering.

Faculty

Jean-Jacques Chattot, Ph.D., Professor
Roger Davis, Ph.D., Professor
Jean-Pierre Delplanque, Ph.D., Professor
Fidelis O. Eke, Ph.D., Professor
Mohamed M. Hafez, Ph.D., Professor
Academic Senate Distinguished Teaching Award
Walter M. Harris, Ph.D., Associate Professor
Ronald A. Hess, Ph.D., Professor
Sanjay S. Joshi, Ph.D., Associate Professor
Valeria La Saponara, Ph.D., Assistant Professor
Stephen K. Robinson, Ph.D., Professor
Nesrin Sarigul-Klijn, Ph.D., Professor
C. P. (Case) van Dam, D. Engr., Professor

The Aerospace Science & Engineering Undergraduate Program

The Aerospace Science and Engineering program is accredited by the Engineering Accreditation Commission of ABET; http://www.abet.org.

Aerospace Science and Engineering majors learn to apply the principles of the physical sciences and engineering to the design of aerospace vehicles. Specific objectives include the design, development and manufacture of aerospace vehicles and other transportation systems through the integration of disciplines associated with aerodynamics, propulsion, structures and guidance/control.

Our Bachelor of Science degree in Aerospace Science and Engineering provides a broad background and fundamental education in mathematics, the physical sciences, and the engineering sciences. These fundamentals, when complemented by the required technical courses, prepare students for employment in government or industry, while simultaneously establishing an excellent foundation for graduate studies.

Students are encouraged to carefully adhere to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

Lower Division Required Courses

	OI.	٦
	Mathematics 21A-21B-21C-21D	
	Physics 9A-9B-9C-9D	
	Chemistry 2A-2B or 2AH-2BH	
	Engineering 4	
	Engineering 6 or Mechanical Engineering 54	
	Engineering 17, 35, 45	
	English 3 or University Writing Program 1,	
	or Comparative Literature 1, 2, 3, or 4, or	
	Native American Studies 54	
	Communication 1 or 34	
U	pper Division Required Courses	
	Engineering 100, 102, 103, 104,	
	10519	
	Mechanical Engineering 106, 107A & B,	
	165, 171, 17222	
	Aerospace Science and Engineering 126,	
	127, 129, 130A, 130B, 133, 135,	
	13832	
	100	

Select one course from Applied Science	
Engineering 115; Engineering 180,	
Mathematics 128C, or Mechanical	
Engineering 115	4
Engineering 190	3
Technical electives	7

One course must be chosen from the following: Aeronautical Science Engineering 141, 189A, 189B

The remaining units must be taken from any Upper Division Engineering discipline except Engineering 160, 191, 198 (gearing up for grad school/undergraduate research), Computer Science Engineering 188 or any 197T course

Project/independent study courses 185A, 185B, 192, 199 may be used for this requirement.

Minimum Units Required for Major 165 The Graduate Program in Mechanical and Aeronautical Engineering

M.S. and Ph.D. (530) 752-0581

The defining element of graduate study in the Mechanical and Aeronautical Engineering Program is interdisciplinary design. Research within this Graduate Program advances design in diverse fields such as vehicles, plasma MHD propulsion, biomechanics, aerostructures, sensors, combustion, and energy systems. Graduate students acquire skills to address both fundamental issues in these areas and to design complex, multi-component systems. The highly collaborative environment fosters multidisciplinary research while drawing on the study of mathematics, experimental and space plasma science, electrical engineering, materials science, materials modeling, molecular dynamics and numerical analysis, bioengineering, space physics, and nanotechnology in addition to the core areas. Recruiters from industry are active here, knowing that, in addition to having hands-on design experience, our students are well-grounded in engineering fundamentals. They study with professors who "wrote the book" on their discipline, and work on design projects with researchers who are international authorities in their field. Our graduate students are able to work closely with faculty in a friendly but demanding environment where teamwork and faculty mentoring are impor tant, as is the cross-disciplinary, collaborative culture that is unique to UC Davis.

Research Highlights:

- Aeronautics and Aerostructures
- Spacecraft design and operation
- Space Environmental Studies
- Remote Sensing
- Electrical propulsion
- · Flight Dynamics and Control
- Computational Fluid Dynamics
- Experimental MHD turbulence studies
- Dynamic Systems and Controls
- Robotics

UNITS

- Materials Modeling
- · Manufacturing and Mechanical Design
- Reacting Flows
- Heat Transfer
- Automotive System Dynamics
- Biosensors/Microelectromechanical Systems (MEMS)
- Molecular self-assembly
- Radiation effects in solids
- · Nonlinear dynamics and phase-locking
- Biofluid Mechanics
- Biosolid Mechanics
- Sports Biomechanics

- Energy Systems/Fuel Cell/Hybrid Vehicle Technology
- High Energy Density Science and Applications
- Nuclear fusion energy
- Wind Energy

Research Facilities and Partnerships:

- Center for Computational Fluid Dynamics
- Institute of Transportation Studies
- Center for Advanced Highway Maintenance and Construction Technology
- GATE Center for Hybrid Electric Vehicles
- Aeronautical Wind Tunnel Facility

Complete Information on our website at http://mae.ucdavis.edu/grad_studies/.

Courses in Engineering: Mechanical (EME)

Courses in Mechanical Engineering (EME) are listed below; courses in Aerospace Science and Engineering (EAE) are listed immediately following; graduate courses in Mechanical and Aeronautical Engineering (MAE) follow.

Lower Division Courses

1. Mechanical Engineering (1)

Lecture—1 hour. Description of the field of mechanical engineering with examples taken from industrial applications, discussions of the practice with respect to engineering principles, ethics, and responsibilities. (P/NP grading only.)—I. (I.)

5. Computer Programming for Engineering Applications (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 16A or 21A (may be taken concurrently). Structured programming in C for solving problems in engineering. Introduction to MATLAB and comparison study of C/C++ with MATLAB. Not open for credit to students who have completed course 124. GE credit: QL, SE, SL, VL.—I. (I.) Cheng

50. Manufacturing Processes (4)

Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: Engineering 4, grade of C- or better; Physics 9A. Restricted to Mechanical Engineering, Aeronautical Science and Engineering, and Mechanical Engineering/Materials Science Engineering majors. Modern manufacturing methods, safety, manufacturing instructions, computer-aided manufacturing and their role in the engineering design and development process. GE credit: QL, SE, VL.—I, II. (I, II.) Farouki, Schaaf, Yamazak

92. Internship in Mechanical Engineering (1-5)

Internship. Prerequisite: lower division standing; approval of project prior to period of internship. Supervised work-study experience in engineering. May be repeated for credit. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor; lower division standing. (P/NP grading only.)

Upper Division Courses 106. Thermo-Fluid Dynamics (4)

Lecture—4 hours. Prerequisite: grade of C- or better in Engineering 103 and 105. Restricted to Mechanical Engineering, Aeronautical Science and Engineering, Aerospace Science and Engineering, and Mechanical Engineering/Materials Science Engineering majors. Inviscid incompressible flow, compressible flow, ideal gas mixtures, psychrometrics, reacting mixtures and combustion. GE credit: SE.—I, II, III, (II, III, III.)

107A. Experimental Methods (3)

Lecture—2 hours; laboratory—1.5 hours. Prerequisite: grade of C- or better in Mechanical Engineering 106. Open to Mechanical Engineering, Aeronautical Science & Engineering and Mechanical/Materials Science Engineering Majors only. Experiments to illustrate principles of thermal-fluid systems. Statistical and uncertainty analysis of data; statistical design of experiments; measurement devices; experi-

ments involving thermodynamic cycles, combustion, compressible and incompressible flows. Two units of credit for students who have previously taken Chemical Engineering 155A; one unit of credit for students who have previously taken Chemical Engineering 155B; two units of credit for students who have previously taken Civil and Environmental Engineering 141L. GE credit: QL, SE, VL.—I, II, III, IV. (I, II, III, IV.) Kennedy

107B. Experimental Methods (3)

Lecture—2 hours; laboratory—3 hours. Prerequisite: Engineering 100 and 102. Open to Mechanical Engineering, Aeronautical Science & Engineering and Mechanical/Materials Science & Engineering. Experiments to illustrate principles of mechanical systems. Theory of measurements; Signal analysis; Demonstration of basic sensors for mechanical systems; Experimental project design; Experiments involving voltage measurement; strain gauges, dynamic systems of 0th, 1st and 2nd order. Only two units of credit for students who have previously taken Biomedical Engineering 111. Only one unit of credit for students who have previously taken Biological Systems Engineering 165. GE credit: QL, SE, VL, WE.—I, II, III. (I, II, III.) Frank, Hill, Horsley, La Saponara

121. Engineering Applications of Dynamics (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 102. Open to students in the College of Engineering. Technical elective that revisits dynamic principles with emphasis on engineering applications; stressing importance of deriving equations of motion and setting these into format for computer solution with computer simulation lab, students gain experience with solving complex, real engineering applications. GE credit: QL, SE, SL, VL.—III. (III.) Karnopp, Margolis

134. Vehicle Stability (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 171. Introduction to the static and dynamic stability characteristics of transportation vehicles with examples drawn from aircraft, high-performance automobiles, rail cars and boats. Laboratory experiments illustrate the dynamic behavior of automobiles, race cars, bicycles, etc. GE credit: QL, SE.—III. (III.) Karnopp

150A. Mechanical Design (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45, Mechanical Engineering 50 (may be taken concurrently); grade of C- or better in Engineering 104. Restricted to Mechanical Engineering, Mechanical Engineering and Aeronautical Science and Engineering, Mechanical Engineering/Materials Science and Engineering, Biological Systems Engineering students. Principles of engineering mechanics applied to mechanical design. Theories of static and fatigue failure of metals. Design projects emphasizing the progression from conceptualization to hardware. Experimental stress analysis and mechanical measurements using strain gages. GE credit: QL, SE, VL, WE.—I, III. (I, III.) Ravani

150B. Mechanical Design (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 150A. Principles of engineering mechanics applied to the design and selection of mechanical components. Design projects, which concentrate on conceptual design, engineering analysis, methods of manufacture, material selection, and cost. Introduction to Computer-Aided Design. GE credit: QL, SE, VL.—II. (II.) Farouki, Ravani

151. Statistical Methods in Design and Manufacturing (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 107B, 150A. Methods of statistical analysis with emphasis on applications in mechanical design and manufacturing. Applications include product evaluation and decision making, stress-strength interference, probabilistic design, systems reliability, and fatigue under random loading. GE credit: QL, SE, VL.—II. (II.) Hull

152. Computer-Aided Mechanism Design (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 5 or Engineering 6 and 102. Principles of computer-aided mechanism design. Computer-aided kinematic, static, and dynamic analysis and design of planar mechanisms such as multiple-loop linkages and geared linkages. Introduction to kinematic synthesis of mechanisms. GE credit: QL, SE, VL.—II. (II.) Chena

154. Mechatronics (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 100, 102, course 50. Mechatronics system concept and overview, control system design overview, control software architecture, control hardware architecture, microcontroller and interface technology for mechatronics control, sensor for mechatronics systems, actuator drives. GE credit: QL, SE, VL.—III. (III.) Yamazaki

161. Combustion and the Environment (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: grade of C- or better in Mechanical Engineering 106. Introduction to combustion kinetics; the theory of pre-mixed flames and diffusion flames; turbulent combustion; formation of air pollutants in combustion systems; examples of combustion devices which include internal combustion engines, gas turbines, furnaces and waste incinerators; alternative fuel sources. GE credit: QL, SE, VL.—III. (III.) Kennedy,

163. Internal Combustion Engines and Future Alternatives (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: grade of C- or better in course 106. Fundamentals of internal combustion engine design and performance. Future needs to adapt to environmental concerns, and the feasibility of better alternatives in the future. Offered in alternate years. GE credit: QL, SE, VL.—III. Erickson

165. Heat Transfer (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: grade of C- or better in Mechanical Engineering 5 or Engineering 6, Engineering 103, and 105. Restricted to Mechanical Engineering, Aeronautical Science and Engineering, Mechanical Engineering/Materials Science Engineering, and Biological Systems Engineering majors. Conduction, convection, and radiation heat transfer. Computational modeling of heat transfer in engineering. Applications to engineering equipment with the use of digital computers. GE credit: QL, SE, VL.—I, II, III. (I, II, III.) Aldredge, Shaw

171. Analysis, Simulation and Design of Mechatronic Systems (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 100 and 102, upper division standing. Modeling of dynamic engineering systems in various energy domains. Analysis and design of dynamic systems. Response of linear systems. Digital computer simulation and physical experiments. GE credit: QL, SE, VL.—I, II. (I, II.) Horsley, Karnopp, Margolis

172. Automatic Control of Engineering Systems (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 171, Engineering 100. Classical feedback control; block diagrams; control systems performance specifications; steady state errors; rise and settling times; root locus; PID controllers; control design with Bode and Nyquist plots; stability; phase and gain margin; lead and lag compensators; state variable feedback controllers. GE credit: QL, SE, VL.—II, III. (II, III.) Eke, Farouki, Horsley

185A. Mechanical Engineering Systems Design Project (2)

Lecture—1 hour; laboratory—3 hours. Prerequisite: course 150A, 165 and senior standing in the Department of Mechanical and Aeronautical Science and Engineering. Major mechanical engineering design experience; the mechanical engineering process and its use in the design of engineering systems incorporating appropriate engineering standards and multiple realistic constraints.

(Deferred grading only, pending completion of sequence.) GE credit: OL, QL, SE, VL, WE.—I, II. (I, II.)

185B. Mechanical Engineering Systems Design Project (2)

Lecture—1 hour; laboratory—3 hours. Prerequisite: course 185A and senior standing in the Department of Mechanical and Aeronautical Engineering. Major mechanical engineering design experience; the mechanical engineering design process and its use in the design of engineering systems incorporating appropriate engineering standards and multiple realistic constraints. (Deferred grading only, pending completion of sequence.) GE credit: OL, QL, SE, VL, WE.—II, III. (II, III.)

189A-L. Selected Topics in Mechanical Engineering (1-5)

Prerequisite: consent of instructor. Directed group study of selected topics in separate sections in (A) Energy Systems and the Environment, (B) Engineering Controls; GE credit: SE, (C) Engineering Dynamics, (D) Biomechanics, (E) Fluid Mechanics, (F) Manufacturing Engineering, (G) Mechanical Engineering and Product Design, (H) Mechatronics Systems, (I) MEMS/Nanotechnology, (J) Solid and Structural Mechanics, (K) Thermodynamics, (L) Vehicle and Transportation Systems. May be repeated for credit when the topic is different.

192. Internship in Engineering (1-5)

Internship. Prerequisite: upper division standing; approval of project prior to period of internship. Supervised work experience in mechanical engineering. May be repeated for credit. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Courses in Aerospace Science and Engineering (EAE)

Lower Division Courses

1. Introduction to Aerospace Science Engineering (1)

Lecture—1 hour. Description of the field of aerospace engineering with examples from industry, government, and research. Aerospace engineering principles, ethics, and responsibilities. (P/NP grading only.)—I. (I.)

99. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor and lower division standing. (P/NP grading only.)

Upper Division Courses 126. Theoretical and Computational Aerodynamics (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: grade of C- or better in course 127 and Engineering 180, Applied Science Engineering 115, or Mathematics 128C. Development of general equations of fluid motion. Study of flow field kinematics and dynamics. Flow about a body. Thin airfoil theory. Viscous effects. Applications of numerical methods to wing analysis and design.—III. (III.) Hafez

127. Applied Aircraft Aerodynamics (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: grade of C- or better in Mechanical Engineering 106. Experimental characteristics of wing sections. High-lift devices. Lift and drag at high Mach numbers. Drag aerodynamics. Total aircraft drag estimation. Aerodynamic design procedures. GE credit: QL, SE, SL, WE.—1. (I.) Chattot

129. Stability and Control of Aerospace Vehicles (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: grade of C- or better in Engineering 102. Restricted to upper division standing. Aircraft and spacecraft stability and control. Derivation of fundamental equations of motion for aircraft/spacecraft. Special-

ization of equations for aircraft. Fundamentals of feedback. Aircraft flight control systems. Specialization of equations of motion for orbiting spacecraft. Spacecraft attitude control systems. GE credit: QL, SE.—II. (II.) R. Hess

130A. Aircraft Performance and Design (4)

Lecture — 2 hours; discussion — 1 hour; laboratory — 3 hours. Prerequisite: grade of C- or better in course 127; course 129 (may be taken concurrently). Major aircraft design experience with multiple realistic constraints including aerodynamics, performance analysis, weight estimation, stability and control, and appropriate engineering standards. GE credit: QL, VL.—II. (II.) van Dam

130B. Aircraft Performance and Design (4)

Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: grade of C- or better in course 130A. Restricted to upper division standing. Major aircraft design experience incorporating multiple realistic constraints including: refinement and iteration of initial design; cost analysis, detailed design, and analysis of aircraft structure; propulsion system; aerodynamics, stability, and control/handling qualities; manufacturing; or appropriate engineering standards. GE credit: OL, SE, SL, VL, WE.—III. (III.) van Dam

133. Finite Element Methods in Structures (4)

Lecture — 3 hours; laboratory — 3 hours. Prerequisites: grade of C- or better in Engineering 104. Open to College of Engineering Students. Introduction to the aerospace structural design process. History of aircraft and spacecraft materials. Effects of loading beyond elastic limit. Deflections and stresses due to combined loading. Virtual work principles, and finite element methods. Applications to aerospace structures. GE credit: SE.—I. (I.) Sarigul-Klijn

135. Aerospace Structures (4)

Lecture—4 hours. Prerequisite: grade of C- or better in Engineering 104 and course 126 or 127. Analysis and design methods used in aerospace structures. Shear flow in open, closed and multicell beam cross-sections, buckling of flat and curved sheets, tension field beams, local buckling. GE credit: QL, SE.—II. (II.) La Saponara

137. Structural Composites (4)

Lecture—3 hours; laboratory—1 hour. Prerequisite: grade of C- or better in Engineering 104. Overview of materials and technology for creating structures from fiber reinforced resin matrix composite material systems. Elementary design analysis and case studies emphasizing aeronautical applications. GE credit: SE.—La Saponara

138. Aircraft Propulsion (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: grade of C- or better in Engineering 45 and Mechanical Engineering 106. Analysis and design of modern aircraft gas turbine engines. Development and application of cycle performance prediction techniques for important engine configurations. Introduction to the operation and design of inlets, compressors, burners, turbines, and nozzles. Cycle design studies for specific applications. GE credit: QL, SE.—II. (II.) R. Davis

139. Structural Dynamics and Aeroelasticity (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: grade of C- or better in Engineering 102 and 103. Structural dynamics of flexible structures. Introduction to fluid-structure interaction. Design of subsystems or systems under aeroelastic constraints. Dynamics instabilities. Control effectiveness. Unsteady aerodynamics. Flutter. Aeroelastic tailoring in design, Applications to aerospace, mechanical and biomedical systems. GE credit: SE.—III. (III.) Sariaul-Kliin

141. Space Systems Design (4)

Lecture — 2 hours; discussion — 1 hour; laboratory — 3 hours. Prerequisite: grade of C- or better in Engineering 102 and Mechanical Engineering 106. Introduction to space systems design including space project organization, requirements definition and specification, concepts formulation, system tradeoffs, subsys-

tem design. Prototype space mission concepts are presented and a multidisciplinary mission design is developed that considers all relevant architecture elements. Offered in alternate years. GE credit: SE.—(I.) Joshi

189A. Rocket Propulsion (4)

Lecture—4 hours. Prerequisite: grade of C- or better in Engineering 103 and 105. Restricted to upper division standing. Fluid and thermodynamics of rocket engines, liquid and solid rocket propulsion. Space propulsion concepts and space mission requirements. GE credit: SE.—IV. (IV.) Hafez

189B. Orbital Mechanics (4)

Lecture—4 hours. Prerequisite: grade of C- or better in Engineering 102. Restricted to upper division standing. Satellite orbits, multistage rockets, current global boosters, and new technologies. Design application problems include satellites, trajectory optimizations, and interplanetary trajectories. GE credit: SE.—IV. (IV.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Courses in Mechanical and Aeronautical Engineering (MAE)

(Formerly courses in Aeronautical Science and Engineering and Mechanical Engineering.)

Graduate Courses

207. Engineering Experimentation and Uncertainty Analysis (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Mechanical Engineering 107A and 107B. Design and analysis of engineering experiments with emphasis on measurement standards, data analysis, regressions and general and detailed uncertainty analysis, including statistical treatment of experimental data intervals, propagation of bias and precision errors, correlated bias approximations, and using jitter programs.—(II.) C. Davis

208. Measurement Methods in Fluid Mechanics and Combustion (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 165 and Engineering 103. Application of shadow, schlieren and other flow visualization methods. Introduction to optics and lasers. Measurement of velocity and concentrations in reacting and non-reacting flows with laser diagnostic techniques including LDV, Rayleigh, Raman and fluorescence scattering and CARS. Offered in alternate years.

210A. Advanced Fluid Mechanics and Heat Transfer (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103, 105 and Mechanical Engineering 165. Development of differential equations governing continuity, momentum and energy transfer. Solutions in laminar flow for exact cases, low and high Reynolds numbers and lubrication theory. Dynamics of inviscid flow.—I. (I.) Aldredge, Barakat, White

210B. Advanced Fluid Mechanics and Heat Transfer (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 210A. Study of stability and transition to turbulence. Introduction to the physics of turbulence. Modeling of turbulence for numerical determination of momentum and heat transfer.—(II.) Aldredge, Kenzely.

211. Fluid Flow and Heat Transfer (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103, 105 and Mechanical Engineering 165 or the equivalent. Design aspects of selected topics; heat conduction, fins; heat transport in ducts, boundary layers and separated flows; heat exchangers.—1. (l.) Erickson, Park

212. Biomedical Heat and Mass Transport Processes (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Mechanical Engineering 165, Biological Systems Engineering 125, Chemical Engineering 153 or the equivalent. Application of principles of heat and mass transfer to biomedical systems related to heat exchange between the biomedical system and its environment, mass transfer across cell membranes and the design and analysis of artificial human organs. (Same course as Biomedical Engineering 212.) Offered in alternate years.—(II.) Aldredge

213. Advanced Turbulence Modeling (4)

Lecture—4 hours. Prerequisite: course 210B. Methods of analyzing turbulence; kinematics and dynamics of homogeneous turbulence; Reynolds stress and heat-flux equations; second order closures and their simplification; numerical methods; application to boundary layer-type flows; two-dimensional and three-dimensional hydraulic and environmental flows. Offered in alternate years.—(III.) Aldredge

215. Biomedical Fluid Mechanics and Transport Phenomena (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103 or Chemical Engineering 150B or Civil and Environmental Engineering 141. Application of fluid mechanics and transport to biomedical systems. Flow in normal physiological function and pathological conditions. Topics include circulatory and respiratory flows, effect of flow on cellular processes, transport in the arterial wall and in tumors, and tissue engineering. (Same course as Biomedical Engineering 215.)—(III.) Barakat

216. Advanced Thermodynamics (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 105. Study of topics important to energy conversion systems, propulsion and other systems using high temperature gases. Classical thermodynamics and quantum statistical mechanics of nonreacting and chemically reacting gases, gas mixtures, and other substances.—(III.) Shaw

217. Combustion (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103 and 105. Review of chemical thermodynamics and chemical kinetics. Discussions of reacting flows, their governing equations and transport phenomena; detonations; laminar flame structure and turbulent combustion. Offered in alternate years.—II. Aldredge, Kennedy, Shaw

218. Advanced Energy Systems (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103 and 105, or the equivalent. Review of options available for advanced power generation. Detailed study of basic power balances, component efficiencies, and overall powerplant performance for one advanced concept such as a fusion, magnetohydrodynamic, or solar electric powerplant. Offered in alternate years.—(I.)

219. Introduction to Scientific Computing in Solid and Fluid Dynamics (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 103 and 104. Scientific calculations with finite element and finite difference methods for multi-dimensional problems in solid and fluid dynamics are performed with examples in C, C++, FOR-TRAN, and MATLAB script files. Derivation of the basic equations of motion in finite volume form with applications to elasticity, waves. Offered in alternate years.—(III.) Delplanque

220. Mechanical Vibrations (4)

Lecture—4 hours. Prerequisite: Engineering 122. Multiple degrees of freedom; damping measures; Rayleigh's method; vibration absorbers; eigenvalues and modeshapes; modal coordinates; forced vibrations; random processes and vibrations; autocorrelation; spectral density; first passage and fatigue failure; nonlinear systems; phase plane.—III. (III.) Hubbard

222. Advanced Dynamics (4)

Lecture—4 hours. Prerequisite: Engineering 102.
Dynamics of particles, rigid bodies and distributed systems with engineering applications; generalized coordinates; Hamilton's principle; Lagrange's equa-

tions; Hamilton-Jacobi theory; modal dynamics orthogonality; wave dynamics; dispersion.—I. (I.)

223. Multibody Dynamics (4)

Lecture - 4 hours. Prerequisite: Engineering 102. Coupled rigid-body kinematics/dynamics; reference frames; vector differentiation; configuration and motion constraints; holonomicity; generalized speeds; partial velocities; mass; inertia tensor/theorems; angular momentum; generalized forces; comparing Newton/Euler, Lagrange's, Kane's methods; computer-aided equation derivation; orientation; Euler; Rodrigues parameters. (Same course as Biomedical Engineering 223.)—II. (II.) Eke, Hubbard

225. Spatial Kinematics and Robotics (4)

Lecture—3 hours, laboratory—3 hours. Prerequisite: C Language and course 222. Spatial kinematics, screw theory, spatial mechanisms analysis and synthesis, robot kinematics and dynamics, robot workspace, path planning, robot programming, real-time architecture and software implementation. (Same course as Biomedical Engineering 225.) Offered in alternate years.—III. Ravani

226. Acoustics and Noise Control (4)

Lecture-4 hours. Prerequisite: Engineering 122. Description of sound using normal modes and waves; interaction between vibrating solids and sound fields; sound absorption in enclosed spaces; sound transmission through barriers; applications in design, acoustic enclosures and sound walls, room acoustics, design of quiet machinery. Offered in alternate years. — (III.) Karnopp, Sarigul-Klijn

227. Research Techniques in Biomechanics (4)

Lecture-2 hours; laboratory-4 hours; term paper or discussion - 1 hour. Prerequisite: Mathematics 22B and consent of instructor; Exercise Science 115 recommended. Experimental techniques for biomechanical analysis of human movement. Techniques evaluated include data acquisition and analysis by computer, force platform analysis, strength assessment, planar and three-dimensional videography, data reduction and smoothing, body segment parameter determination, electromyography, and biomechanical modeling. (Same course as Biomedical Engineering 227/Exercise Science 227.)—II. (II.) Williams, Hawkins

229. Design & Analysis of Micro-Electromechanical Systems (4)

Lecture - 4 hours. Prerequisite: consent of instructor; Engineering 45, 100, 104; Engineering 122 recommended. Mechanical design of micro-electronme-chanical systems (MEMS). Device modeling: lumped parameter models; energy methods; nonlinearities; electrical and mechanical noise sources. Actuation and measurement methods: capacitive, piezoresistive, thermal, piezoelectric, and optical techniques. Review of basic electronics: bridge circuits, amplitude modulation; lock-in detection.—(III.) Horsley

231. Musculo-Skeletal System **Biomechanics (4)**

Lecture — 4 hours. Prerequisite: Engineering 102. Mechanics of skeletal muscle and mechanical models of muscle, solution of the inverse dynamics problem, theoretical and experimental methods of kinematic and kinetic analysis, computation of intersegmental load and muscle forces, applications to gait analysis and sports biomechanics. (Same course as Biomedical Engineering 231.)—(III.) Hull

232. Skeletal Tissue Mechanics (3)

Lecture - 3 hours; laboratory - 1 hour. Prerequisite: Engineering 104B. Overview of the mechanical properties of the various tissues in the musculoskeletal system, the relationship of these properties to anatomic and histologic structure, and the changes in these properties caused by aging and disease. The tissues covered include bone, cartilage and synovial fluid, ligament and tendon. (Same course as Biomedical Engineering 232.)—III. (III.) Fyhrie

234. Design and Dynamics of Road Vehicles (4)

Lecture-4 hours. Prerequisite: Mechanical Engineering 134. Analysis and numerical simulation of road vehicles with on design applications. Offered in alternate years. —(III.) Velinsky

236. Aerodynamics in Nature and Technology (4)

Lecture — 4 hours. Prerequisite: Engineering 103. Introduction to aerodynamics in nature, fundamentals of turbulence in atmospheric flows, planetary boundary layers, pedestrian-level winds in urban areas. Criteria for laboratory modeling of atmospheric flows, wind-tunnel testing. Offered in alternate years. - (III.) White

237. Analysis and Design of Composite Structures (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Aeronautical Science and Engineering 137. Modeling and analysis methodology for composite struc-tures including response and failure. Laminated plate bending theory. Introduction to failure processes. Offered in alternate years. — (III.) La Saponara

238. Advanced Aerodynamic Design and Optimization (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: consent of instructor. Application of aerodynamic theory to obtain optimum aerodynamic shapes. Both analytic solutions and solutions obtained with numerical optimization techniques will be examined. Includes introduction to the calculus of variations and numerical optimization techniques. Offered in alternate years. — (I.) van Dam

239. Advanced Finite Elements and Optimization (4)

Lecture - 4 hours. Prerequisite: Engineering 180 or Applied Science 115 or Mathematics 128C. Introduction to advanced finite elements and design optimization methods, with application to modeling of complex mechanical, aerospace and biomedical systems. Application of states of the art in finite elements in optimum design of components under realistic loading conditions and constraints. Offered in alternate years. (Same course as Biomedical Engineering 239.)—(II.) Sarigul-Klijn

240. Computational Methods in Nonlinear Mechanics (4)

Lecture—4 hours. Prerequisite: Applied Science Engineering 115 or Mathematics 128B or Engineering 180. Deformation of solids and the motion of fluids treated with state-of-the-art computational methods. Numerical treatment of nonlinear dynamics; classification of coupled problems; applications of finite element methods to mechanical, aeronautical, and biological systems. Offered in alternate years. (Same course as Biomedical Engineering 240.)—(II.) Sarigul-Klijn

242. Stability of Thin-Walled Structures (4)

Lecture-4 hours. Prerequisite: Engineering 104 or equivalent. Static stability of thin-walled aerospace structures treated from both theoretical and practical design perspectives. Both monolithic and composite construction considered. Buckling of stiffened panels, shells, and thin-walled beams, experimental methods and failure/crippling processes. Offered in alternate years.—III. La Saponara

248. Advanced Turbomachinery (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Engineering 103 and 105. Preliminary aerodynamic design of axial and radial flow compressors and turbines. Design of diffusers. Selection of turbomachine and configurations and approximations to optimum dimensions and flow angles. Introduction to through flow analysis. Rotating stall and surge, and aeromechanical considerations. Offered in alternate years.—I. R. Davis

250A. Advanced Methods in Mechanical Design (4)

Lecture — 4 hours. Prerequisite: Mechanical Engineering 150A and 150B or the equivalents, or consent of instructor. Applications of advanced techniques of solid mechanics to mechanical design problems. Coverage of advanced topics in stress analysis and

static failure theories with emphasis in design of machine elements. Design projects emphasizing advanced analysis tools for life cycle evaluation. -1. (I.) Ravani

250B. Advanced Methods in Mechanical Design (4)

Lecture — 4 hours. Prerequisite: course 250A. Applications of advanced techniques of solid mechanics to mechanical design problems. Advanced topics in variational methods of mechanics with emphasis in design of machine elements. Design projects emphasizing advanced analysis tools.—II. (II.) Hill

250C. Mechanical Performance of Materials (4)

Lecture-4 hours. Prerequisite: undergraduate course in stress analysis and mechanical behavior of materials. Occurrence, mechanisms, and prediction of fatigue and fracture phenomenon. Use of stress and strain to predict crack initiation. Use of fracture mechanics to predict failure and crack propagation. Effects of stress concentration, manufacturing, load sequence, irregular loading, and multi-axial loading. Offered in alternate years. — (III.) Velinsky

251. Mechatronics System Design (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Mechanical Engineering 154 and 172 or Electrical and Computer Engineering 157A, 157B. Motion mechanism design, electric actuator, power electronics motion control, sensor technologies, personal computer-based control systems design, motion control general operating system and real time operating systems, motion control software design, discrete event control software design. Offered in alternate years.—II. Yamazaki

252. Information Processing for **Autonomous Robotics (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 6, Mechanical Engineering 5, or equivalent programming experience, Mechanical Engineering 154, 171, or consent of instructor. Computational principles for sensing, reasoning, and navigation for autonomous robots. Offered in alternate years. — (II.) Joshi

254. Engineering Software Design (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Mechanical Engineering 5, Engineering 180. Principle and design of engineering software. Advanced topics in engineering software design, applications of object-oriented programming, very high-level languages, real-time multi-thread computing and sensor fusion, Web-based network computing, graphics, and GUI in engineering. Offered in alternate years. — (III.) Cheng

255. Computer-Aided Design and Manufacturing (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: proficiency in a high level programming language such as Fortran, Pascal, or C. Representation and processing of geometrical information in design and manufacturing. Numeric and symbolic computations. Coordinate systems and transformations. Bezier and B-spline curves and surfaces. Interpolation and approximation methods. Intersections, offsets, and blends. Path planning for machining, inspection, and robotics applications. Offered in alternate years. — (III.) Farouki

258. Hybrid Electric Vehicle System Theory and Design (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Mechanical Engineering 150B, graduate standing in Mechanical and Aeronautical Engineering. Advanced vehicle design for fuel economy, performance, and low emissions, considering regulations, societal demands and manufacturability. Analysis and verification of computer design and control of vehicle systems in real vehicle tests. Advanced engine concepts. Offered in alternate years. — (II.) Frank

261. Gas Dynamics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Engineering 103 or the equivalent. Flow of compressible fluids. Isentropic flow. Flow with friction, heat transfer, chemically reacting gas and particle

mixtures. Normal and oblique shock waves, combustion, blast and expansion waves. Method of characteristics. Offered in alternate years. - II. Chattot

262. Advanced Aerodynamics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Aeronautical Engineering 126. Study of invicid and viscous flows about aerodynamic shapes at subsonic, transonic and supersonic conditions. Application of aerodynamic theory to design for reduced drag and increased lift. Offered in alternate years.— II Hafez

263. Introduction to Computational Aerodynamics and Fluid Dynamics (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103 or consent of instructor. Introduction to numerical methods for solution of fluid flow problems. Discretization techniques and solution algorithms. Finite difference solutions to classical model equations pertinent to wave phenomena, diffusion phenomena, or equilibrium. Application to the incompressible Navier-Stokes equation. Offered in alternate years. — (II.) Chattot

264. Computational Aerodynamics (4)

Lecture - 4 hours. Prerequisite: Aeronautical Science and Engineering 126, Engineering 180, or consent of instructor. Numerical methods for aerodynamics flow simulation in the transonic regime. Solutions of steady and unsteady potential and compressible boundary layer equations. Numerical schemes for mixed type equations and shock waves/numerical grid generation. Viscous/inviscid interaction and coupling procedures. Offered in alternate years. — (II.) Hafez

266. Advanced Wind-Tunnel Testing (4)

Lecture - 2 hours; discussion - 1 hour; laboratory - 3 hours. Prerequisite: undergraduate course in fluid dynamics. Aspects of low-speed wind-tunnel testing for solving aeronautical and non-aeronautical problems including tunnel corrections, scale effects, force and moment measurements, and flow visualization. Offered in alternate years. — (III.) van Dam

267. Parallel Computations in Fluid/ Thermal Sciences (4)

Lecture - 2 hours; discussion - 2 hours. Prerequisite: Mechanical Engineering 106, 165, Engineering 180 or equivalent; or consent of instructor. Programming languages and constructs for engineering analysis on parallel computers including MPI (distributed), OpenMP (shared), and Fortran95. Graduate or junior/senior undergraduate as a technical elective - (I.) R. Davis

268. Wind Power Engineering (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Engineering 102 and 103, or equivalent, or consent of instructor. Fundamentals for understanding the conversion of wind power to mechanical power and electricity. Related engineering, economic and societal issues. Offered in alternate years.—I. van Dam

269. Fuel Cell Systems (4)

Lecture - 2 hours; discussion - 2 hours. Prerequisite: Mechanical Engineering 106, 107, 165, or equivalent, or consent of instructor; graduate or junior/ senior undergraduate as a technical elective. Basics of electrochemistry and fuel cell engines in mobile and stationary applications. Aspects of fuel cell energy converters and their subsystems including practice with existing fuel cell and hydrogen systems on campus. Limited enrollment. Offered in alternate years.—I. Erickson

271. Advanced Modeling and Simulation of Mechatronic Systems (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Mechanical Engineering 172 or the equivalent. Multiport models of mechanical, electrical, hydraulic, and thermal devices; bond graphs, block diagrams and state space equations; modeling of multiple energy domain systems; three-dimensional mechanics; digital simulation laboratory.—I. (I.) Karnopp, Margolis

272. Theory and Design of Control Systems

Lecture - 4 hours. Prerequisite: Mechanical Engineering 172 or the equivalent. Mathematical representations of linear dynamical systems. Feedback principles; benefits and cost of feedback. Analysis and design of control systems based on classical and modern approaches, with emphasis on applications to mechanical and aeronautical systems.—II. (II.) Horsley, Karnopp

274. Analysis and Design of Digital Control Systems (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Mechanical Engineering 172. Discrete systems analysis; digital filtering; sample data systems; state space and transform design techniques; quantization effects; multi-input, multi-output systems. Offered in alternate years. - (III.) Hess

275. Advance Aircraft Stability and Control

Lecture—3 hours; discussion—1 hour. Development and analysis of aircraft equations of motion. Flexible modes. Response to control actuation. Random inputs and disturbances. Stability and control augmentation system design. Handling qualities. Offered in alternate years. - III. Hes

276. Data Acquisition and Analysis (4)

Lecture - 3 hours; discussion - 1 hour. Application of computers for data acquisition and control. Topics include computer architecture, characteristics of transducers, hardware for laboratory applications of computers, fundamentals of interfaces between computers and experimental equipment, programming techniques for data acquisition and control, basic data analysis. Offered in alternate years.—II. Hill

290C. Graduate Research Conference (1)

Discussion - 1 hour. Prerequisite: consent of instructor. Individual and/or group conference on problems, progress, and techniques in mechanical and aeronautical engineering research. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

297. Seminar (1)

Discussion - 1 hour. Prerequisite: consent of instructor. Current topics in engineering including developments in mechanical and aeronautical engineering with presentations by students, faculty, and visitors. May be repeated for credit. (S/U grading only.)-I, 11, 111. (1, 11, 111.)

298. Group Study (1-5) 299. Research (1-12)

Prerequisite: consent of instructor. (S/U grading

Professional Courses

390. The Teaching of Aeronautical Science and Engineering (1)

Discussion — 1 hour. Prerequisite: meet qualifications for teaching assistant and/or associate-in in Aeronautical Science and Engineering. Methods of leading discussion groups or laboratory sections, writing and grading quizzes, use of laboratory equipment, and grading laboratory reports. May be repeated for credit. (\tilde{S}/U grading only.)—I, II, III. (I, II, III.)

396. Teaching Assistant Training Practicum (1-4)

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

English

(College of Letters and Science) Scott Simmon, Ph.D., Chairperson of the Department Department Office. 176 Voorhies Hall

(530) 752-2257; http://english.ucdavis.edu

Don P. Abbott, Ph.D., Professor Gina Bloom, Ph.D., Associate Professor Nathan Brown, Ph.D., Assistant Professor Seeta Chaganti, Ph.D., Associate Professor Joshua Clover, M.F.A., Professor Lucy Corin, M.F.A., Associate Professor Gregory Dobbins, Ph.D., Associate Professor Frances E. Dolan, Ph.D., Professor Margaret W. Ferguson, Ph.D., Professor Kathleen Frederickson, Ph.D., Assistant Professor Lynn R. Freed, Ph.D., Professor Élizabeth S. Freeman, Ph.D., Professor Danielle Heard, Ph.D., Assistant Professor W. Jack Hicks, Ph.D., Senior Lecturer Pam Houston, B.A., Professor Hsuan Hsu, Ph.D., Associate Professor Mark Jerng, Ph.D., Assistant Professor Alessa Johns, Ph.D., Associate Professor Richard A. Levin, Ph.D., Professor

Academic Senate Distinguished Teaching Award Yiyun Li, M.F.A., Associate Professor Christopher Loar, Ph.D., Assistant Professor Desirée Martín Ph.D., Assistant Professor John Marx, Ph.D., Associate Professor Colin Milburn, Ph.D., Associate Professor Elizabeth Miller, Ph.D., Associate Professor Timothy Morton, D. Phil., Professor Parama Roy, Ph.D., Professor Scott C. Shershow, Ph.D., Professor Scott Simmon, Ph.D., Professor David Simpson, Ph.D., Professor Matthew Stratton, Ph.D., Assistant Professor Evan Watkins, Ph.D., Professor Joe Wenderoth, M.F.A., Professor Alan B. Williamson, Ph.D., Professor Michael Ziser, Ph.D., Associate Professor

Emeriti Faculty

Max Byrd, Ph.D., Professor Emeritus Peter Dale, Ph.D., Professor Emeritus Joanne F. Diehl, Ph.D., Professor Emerita Sandra M. Gilbert, Ph.D., Professor Emerita Thomas A. Hanzo, Ph.D., Professor Emeritus John O. Hayden, Ph.D., Professor Emeritus Peter L. Hays, Ph.D., Professor Emeritus Michael J. Hoffman, Ph.D., Professor Emeritus Robert H. Hopkins, Ph.D., Professor Emeritus Clarence Major, Ph.D., Professor Emeritus Sandra J. McPherson, B.A., Professor Emerita Linda A. Morris, Ph.D., Professor Emerita James J. Murphy, Ph.D., Professor Emeritus Marijane Osborn, Ph.D., Professor Emerita David A. Robertson, Ph.D., Professor Emeritus

Academic Senate Distinguished Teaching Award Winfried Schleiner, Ph.D., Professor Emeritus Gwendolyn Schwabe, M.S., Senior Lecturer Emerita Gary Snyder, B.A., Professor Emeritus David Van Leer, Ph.D., Professor Emeritus

Academic Senate Distinguished Teaching Award Raymond B. Waddington, Ph.D., Professor Emeritus Karl F. Zender, Ph.D., Professor Emeritus

The Major Program

The study of English develops skills in reading analytically and perceptively and in writing clearly and effectively

The Program. The English department offers three kinds of courses: composition courses, undergraduate courses, and graduate courses. Composition courses develop skills in reading analytically and in writing persuasively. Undergraduate and graduate courses cover the entire range of English and American literature, as well as creative writing. Students majoring in English may elect a creative writing emphasis or a literature, criticism, and theory

emphasis. All majors take courses introducing them to the literatures of various periods and places, to critical theory, and to frontiers of literary expression, such as the relationship of literature to environmentalism or the emergence of new media. The creative writing emphasis focuses on fiction, poetry, and article writing. The literature, criticism, and theory emphasis focuses on advanced critical analysis and research. All majors have the opportunity to work with distinguished writers, critics, scholars, and

Career Alternatives. Graduates have found the major excellent pre-professional training for graduate study in English, as well as for careers in teaching, writing, law, medicine, and library work. Many graduates are employed in journalism, publishing, advertising, and public information. Others have worked in local, state, and federal government agencies, as well as in industry and agriculture. Some have established their own businesses.

Preparatory Subject Matter 20

UNITS

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A.B. Major Requirements:

English 3 or University Writing

Day and 1
Program 1
English 10A, 10B, 10C12
Depth Subject Matter
English 110A or 110B
Requirements 20
Three courses focusing on literature written in English before 1800, at least one of which must be on literature written primarily before 1500:
<i>Before 1500</i> English 111, 113A, 113B
1500-1800 English 115, 117, 122, 123, 142, 150A, 155A
One course focusing on literature written in English between 1800 and 1900: English 130, 133, 143, 144, 155B, 158A, 181A
One course focusing on literature written in English between 1900 and present: English 137N, 138, 146N, 147, 150B, 155C, 156, 158B, 166, 167, 168, 181B
Non-Historical Distribution
Requirements 8
One course on literature and ethnicity, literature and gender, or literature and
sexuality: English 125, 139, 166, 167, 178, 179, 181A, 181B, 185A, 185B, 185C, 186
One course in film and media studies,
language studies, cultural studies and
contexts, literature and science/technology,
or literature and the environment:
English 105, 106, 107, 160, 161A, 161B,
162, 164/Science and Technology Studies
164, 171A, 171B, 173, 175, 180, 182, 183, 184; Linguistics 106; Science and
Technology Studies 173
Please note that while some courses are
identified as fulfilling more than one
distribution requirement, a given course can
only fulfill one such requirement.
Area of Emphasis (choose one) 12
Literature, Criticism, and Theory

Total Units for the Major......64

English Majors. Up to four upper division units in a national literature other than English or American,

One upper division English elective

187A, 188A, 189, 194H, 195H

Three sections of English 100F, 100P,

Creative Writing

100NF, 100FA, 100PA

Two advanced courses, one of which can be

English 149, 153, 159, 163, 165, 177,

or in Comparative Literature, may count toward the requirements of the major.

Major Advisers. D. P. Abbott, G. Bloom, N. Brown, S. Chaganti, J. Clover, L. Corin, G. Dobbins, F. Dolan, M. Ferguson, K. Frederickson, L. Freed, E. Freeman, D. Heard, W.J. Hicks, P. Houston, H. Hsu, M. Jerng, A. Johns, R.A. Levin, Y. Li, C. Loar, D. Martín, J. Marx, C. Milburn, E. Miller, T. Morton, P. Roy, S. Shershow, S. Simmon, D. Simpson, M. Stratton, E. Watkins, J. Wenderoth, A.B. Williamson, M. Ziser

Major Advising. All new and prospective English majors are encouraged to see the undergraduate staff adviser, individually, once per year, at mini-

Foreign Languages. Students who contemplate advanced study in English should prepare for foreign language requirements for higher degrees and should consult with the graduate adviser.

Undergraduate Adviser. See Department website at http://english.ucdavis.edu or the Departmental Advising Office in 177 Voorhies Hall.

Minor Program Requirements:

UNITS

Five upper division courses, at least four of

Honors and Honors Program. A Senior Honors Program is available to an invited group of English majors, who prepare and write a Senior Thesis (either a research paper or creative writing) in their final year. The critical honors program consists of four units of 194H and four units of 195H, normally taken during Winter and Spring quarters of the senior year. The creative writing honors program consists of four units of 100FA or 100PA, normally taken during Spring quarter of the junior year, and four units of 195H, normally taken Winter quarter of the senior year. Completion of the program is a prerequisite for High or Highest Honors at graduation. Eligibility criteria and application materials may be obtained at the Undergraduate Advising office in 177 Voorhies Hall or by accessing the Department website at http://english.ucdavis.edu. For more details, see Graduation Honors, on page 83.

Education Abroad Options. The department strongly encourages interested students to pursue their studies abroad. It is possible for students to complete significant portions of the English major provided that the course is evaluated as at least four UC Davis units; the course is considered upper division by the standards set forth by the Education Abroad Center; the student presents copies of the coursework, syllabus, and writing assignments to the department's advising staff.

Teaching Credential Subject Representative. See the Teacher Education program.

Graduate Study. The Department of English offers programs of study and research leading to the M.A. in literature and creative writing and the Ph.D. in literature. Detailed information may be obtained from the graduate adviser or the Chairperson of the

The department's affiliation with the Critical Theory Program also provides the opportunity for students in English to prepare for the designated emphasis in Critical Theory (an interdisciplinary program in theories and methodologies in the humanities and social

Graduate Director. John Marx, Ph.D.

Entry Level Writing. Students must have met the Entry Level Writing requirement before taking any course in English. C. Bates, Director

Prerequisites. English 3 or University Writing Program 1 is required for admission into all preparatory courses (40, 43, 44, 45, 10A, 10B, 10C), and all upper division courses, unless otherwise stated in the course listings. Comparative Literature 1, 2, 3, or 4 or Native American Studies 5 may normally be substituted for English 3 or University Writing Program 1.

Courses in English (ENL) Lower Division Courses

3. Introduction to Literature (4)

Lecture/discussion-4 hours. Prerequisite: completion of Entry Level Writing requirement. Introductory study of several genres of English literature, emphasizing both analysis of particular works and the range of forms and styles in English prose and poetry. Frequent writing assignments will be made. GE credit: ArtHum, Wrt | AH, WE.—I, II, III. (I, II,

4. Critical Inquiry and Literature: Freshman Seminar (4)

Seminar-4 hours. Prerequisite: completion of Subject A requirement and consent of instructor; enrollment limited to freshmen. Critical inquiry into significant literary texts. Emphasis on close reading, classroom dialogue, and the writing of several papers or a longer seminar paper. GE credit: ArtHum, Wrt | AH, WE.

5F. Introduction to Creative Writing: Fiction

Lecture/discussion-4 hours. Prerequisite: completion of Entry Level Writing requirement. Elementary principles of writing fiction. Write both in prescribed forms and in experimental forms of their own choosing. No final examination. GE credit: Wrt | AH, WE.-I, II, III. (I, II, III.)

5P. Introduction to Creative Writing: Poetry

Lecture/discussion—4 hours. Prerequisite: completion of Entry Level Writing requirement. Elementary principles of writing poetry. Write both in prescribed forms and in experimental forms of their own choosing. No final examination. GE credit: AH.-I, II, III. (1, 11, 111.)

10A. Literatures in English I: To 1700 (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or equivalent. Historical introduction to English language and literature from 800-1700. Linguistic borrowing, innovation, and change. Emergence of key literary genres. Colonial America as a new site of English literary production and consumption. GE credit: AH. – I, II, III. (I, II, III.)

10B. Literatures in English II: 1700-1900 (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 10A. Historical introduction to English language and literature from 1700-1900. Linguistic borrowing, innovation, colonization, and change. Emergence and development of key literary genres. America, Britain, Ireland, Scotland, and India as important sites of English literary production and consumption. GE credit: AH.—I, II, III. (I, II, III.)

10C. Literatures in English III: 1900 to Present (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 10B. Historical introduction to English language and literature from 1900-present. Linguistic borrowing, innovation, and change. Emergence and development of key literary genres. Formal experimentation. Modernism as transnational phenomenon. GE credit: AH.-I, II, III. (I, II, III.)

30A. Survey of American Literature (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 3 or University Writing Program 1 or the equivalent. American literature from the seventeenth century to 1865. GE credit: ArtHum, Div, Wrt | ACGH, AH, WE.

30B. Survey of American Literature (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 3 or University Writing Program 1 or the equivalent. American literature from 1865 to the present. GE credit: ArtHum, Div, Wrt | ACGH, AH,

40. Introductory Topics in Literature (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or equivalent. Study of a special topic. Literature written in English in any period or place or genre.

Thematic, formal, or temporal focus. May be repeated two times for credit if content differs. GE credit: Wrt | AH, WE.-II.

42. Approaches to Reading (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Close reading and interpretation of literature from a variety of traditional and contemporary approaches. Topics include textual and historical approaches; new criticism; formalism; psychological criticism; feminism and gender; reader-response; materialist approaches. Frequent written assignments. GE credit: Wrt | AH, WE.

43. Introductory Topics in Drama (4)

Lecture/discussion—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or equivalent. Close reading of selected works of British and American drama. Range of historical periods. Focused on a topic. Frequent written assignments. GE credit: Wrt | AH, WE.-II.

44. Introductory Topics in Fiction (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or equivalent. Close reading of British and American Fiction. Short stories, novellas, novels. Focused on a topic. Frequent written exercises. GE credit: Wrt | AH, WE.-I.

45. Introductory Topics in Poetry (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or equivalent. Close reading of selections from English and American poetry. Focused on a topic. Frequent written exercises. GE credit: Wrt | AH, WE.—

46A. Masterpieces of English Literature (4)

Lecture—3 hours; discussion—I hour. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Selected works of principal writers to 1640. History of literary conventions and backgrounds in religious thought, intellectual and social history, and related art forms. GE credit: Wrt | AH, WC, WE.

46B. Masterpieces of English Literature (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Selected works of principal writers from 1640 to 1832. History of literary conventions and backgrounds in religious thought, intellectual and social history, and related art forms. GE credit: Wrt | AH, WC, WE.

46C. Masterpieces of English Literature (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Selected works of principal writers from 1832 to present. The history of literary conventions and backgrounds in religious thought, intellectual and social history, and related art forms. GE credit: Wrt | AH, WC, WE.

92. Internship in English (1-12)

Internship - 3-36 hours. Prerequisite: course 3 or University Writing Program 1. Internships in fields where students can practice their skills. May be repeated for credit for a total of 12 units. (P/NP grading only.)

98. Directed Group Study (1-5)

Prerequisite: course 3 or University Writing Program 1. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) (P/NP grading only.)

Upper Division Courses 100F. Creative Writing: Fiction (4)

Discussion - 4 hours; development and evaluation of written materials, and conferences with individual students. Prerequisite: course 5F or 5P, or consent of instructor; priority given to English (Creative Writing) majors. Writing of fiction. May be repeated for credit with consent of instructor. No final examination. - I, II, III. (I, II, III.)

100FA. Creative Writing Advanced Fiction

Discussion — 4 hours. Prerequisite: course 100F. Development and evaluation of students' work in prose, primarily in the workshop format. Some reading and discussion of published novels and short stories. Conferences with individual students once per quarter. Priority to English majors. Admission by application only. May be repeated one time for credit with consent of instructor. - III

100NF. Creative Writing: Non-Fiction (4)

Discussion - 4 hours; development and evaluation of written materials, and conferences with individual students. Prerequisite: course 3 or University Writing Program 1, or consent of instructor; priority given to English (Creative Writing) majors. Writing of non-fiction. May be repeated for credit with consent of instructor. No final examination. - III.

100P. Creative Writing: Poetry (4)

Discussion - 4 hours; development and evaluation of written materials, and conferences with individual students. Prerequisite: course 5F or 5P, or consent of instructor; priority given to English (Creative Writing) majors. Writing of poetry. May be repeated for credit with consent of instructor. No final examination.-II., III.

100PA. Creative Writing Advanced Poetry (4)

Discussion—4 hours. Prerequisite: course 100P. Development and evaluation of students' work in poetry, primarily in the workshop format. Some reading and discussion of published works of poetry. Conferences with individual students once per quarter. Priority to English majors. Admission by application only. - III.

105. History of the English Language (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. History of the English language. Examination of the language as recorded from Old English to present-day English. Relationship of English to other languages; development of vocabulary, phonology, and grammatical patterns. GE credit: ArtHum, Wrt | AH, WE.

106. English Grammar (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or Linguistics 1 or consent of instructor. Survey of present day English grammar as informed by contemporary linguistic theories. The major syntactic structures of English; their variation across dialects, styles, and registers, their development, and their usefulness in describing the conventions of English. (Same course as Linguistics 106.) Not open for credit to students who have completed Linguistics 104. GE credit: ArtHum | AH, WE.-I

106P. English Grammar Practicum (2)

Discussion - 2 hours. Prerequisite: course 106/Linguistics 106 (may be taken concurrently). Practice in teaching the principles of grammar to the kinds of audiences teachers encounter in California. Discussions with teachers who teach in these areas. Examination of pedagogical research on teaching grammar. (P/NP grading only.)

107. Freedom of Expression (4)

Lecture — 3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historical development of fundamental issues and contemporary controversies about freedom of expression, with emphasis on literary and artistic censorship. Not open for credit to students who have completed Rhetoric and Communication 125 or Communication 107. (Former course Rhetoric and Communication 125.) GE credit: ArtHum, Wrt | AH, WE.-III.

110A. Introduction to Literary Theory (4)

Lecture/discussion-3 hours; extensive writing or discussion - 1 hour. Prerequisite: course 3 or University Writing Program 1. Key theoretical terms, concepts, and thinkers from the Greeks to the modern era. GE credit: Wrt | AH, WE.-I.

110B. Introduction to Modern Literary and Critical Theory (4)

Lecture/discussion-3 hours; discussion-1 hour. Prerequisite: course 3 or University Writing Program 1. History of literary criticism in the modern era, with emphasis on the ties with the past and the special problems presented by modern literary theory. GE credit: Wrt | AH, WE.-I, II, III.

100FA. Creative Writing Advanced Fiction

Discussion-4 hours. Prerequisite: course 100F. Priority given to English majors. Admission by application only. Development and evaluation of students' work in prose, primarily in the workshop format. Some reading and discussion of published novels and short stories. Conferences with individual students once per quarter. May be repeated one time for credit with consent of instructor. - III. (III.)

100P. Creative Writing: Poetry (4)

Discussion - 4 hours. Prerequisite: course 5F or 5P, or consent of instructor; priority given to English (Creative Writing) majors. Writing of poetry. May be repeated for credit with consent of instructor. No final examination. — II., III.

100PA. Creative Writing Advanced Poetry (4)

Discussion-4 hours. Prerequisite: course 100P. Priority to English majors. Admission by application only. Development and evaluation of students' work in poetry, primarily in the workshop format. Some reading and discussion of published works of poetry. Conferences with individual students once per quarter. May be repeated one time for credit with consent of instructor. - III. (III.)

111. Topics in Medieval Literature (4)

Lecture - 3 hours; extensive writing or discussion - 1 hour. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically focused intensive examination of selected topics in Medieval British literature. May be repeated one time for credit when topic differs. GE credit: ArtHum, Wrt | AH, WC, WE.-I, II.

113A. Chaucer: Troilus and the "Minor" Poems (4)

Lecture – 3 hours; extensive writing or discussion – 1 hour. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Development of the poet's artistry and ideas from his first work to his masterpiece, "Troilus and Criseyde." GE credit: ArtHum, Wrt | AH, WC, WE. - I.

113B. Chaucer: The Canterbury Tales (4)

Lecture — 3 hours; extensive writing or discussion — 1 hour. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Literary analysis of the complete "Canterbury Tales." Courtly love, literary forms, medieval science and astrology, theology and dogma as they inform the reading of Chaucer work. GE credit: ArtHum, Wrt | ĂH, WC, WE.—III.

115. Topics in Sixteenth and Seventeenth Century Literature (4)

Lecture/discussion-3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1. Historically, generically, or thematically focused study of works of the sixteenth or seventeenth centuries. May be repeated for credit when content differs. GE credit: Wrt | AH, WC, WE.-III.

117. Shakespeare (4)

Lecture - 3 hours; extensive writing or discussion - 1 hour. Prerequisite: course 3 or University Writing Program 1 or equivalent. Historically, generically, or thematically focused study of Shakespeare's works. May be repeated two times for credit. GE credit: ArtHum, Wrt | AH, WC, WE.-I, II, III.

122. Milton (4)

Lecture/discussion-3 hours; extensive writing or discussion-1 hour. Prerequisite: course 3 or University Writing Program 1. Selected major works, including Paradise Lost. GE credit: ArtHum, Wrt | AH, WC, WE.-III.

123. 18th-Century British Literature (4)

Lecture - 3 hours; extensive writing or discussion - 1 hour. Prerequisite: course 3 or University Writing Program 1. Historically or thematically focused study of 18th-century English literature. May be repeated for credit when content differs. GE credit: Wrt | AH, WC, WE.-III.

125. Topics in Irish Literature (4)

Lecture - 3 hours; extensive writing or discussion - 1 hour. Prerequisite: course 3 or University Writing Program 1 or equivalent. Study of emergence, invention, and re-invention of Irish literature. GE credit: Div, Wrt | AH, WC, WE.-III.

130. British Romantic Literature (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Historically or thematically focused study of works of Romantic English literature. May be repeated for credit when content differs. GE credit: Wrt | AH, WC. WE.-II.

133. 19th-Century British Literature (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Historically or thematically focused study of works of 19th-century English literature. May be repeated for credit when content differs. GE credit: Wrt | AH, WC, WE.-I.

137N. British Literature, 1900-1945 (4)

Lecture - 3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1. Historically or thematically focused study of works of British literature (drama, poetry, prose fiction) from the period between 1900 and the end of World War II. May be repeated two times for credit when topic differs. Only 2 units of credit to students who have completed course 137. GE credit: Wrt | AH, WC, WE.—I.

138. British Literature: 1945 to Present (4)

Lecture-3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1. Historically or thematically focused study of works of British literature (drama, poetry, prose fiction) from the period between 1945 and the present. May be repeated two times for credit when topic differs. Only 2 units of credit to students who have completed course 137. GE credit: Wrt | AH, WC,

139. Topics in Global Literatures and Cultures (4)

Lecture — 3 hours; extensive writing or discussion. Prerequisite: course 3 or University Writing Program 1 or equivalent. Historically or thematically orga nized study of Anglophone literature at the global scale. Possible emphases: globalization of English and its literatures; the history of "world literature"; literatures of British imperialism; questions of translation. May be repeated two times for credit when content differs. GE credit: ArtHum, Div, Wrt | AH, WC, WE.-II.

140. Topics in Postcolonial Literatures and Cultures (4)

Lecture/discussion-3 hours; extensive writing or discussion-1 hour. Prerequisite: course 3 or University Writing Program 1 or equivalent. Study of postcolonial literature of Anglophone colonies. Specific emphases may include literature from and about Anglophone India, the Caribbean, the Middle East, South Asia, Africa, and/or South America. May be repeated two times for credit when topic differs. GE credit: Div, Wrt.-III.

141. Topics in Postcolonial Literatures and Migration (4)

Lecture/discussion-3 hours; extensive writing or discussion-1 hour. Prerequisite: course 3 or University Writing Program 1 or equivalent. Study of literatures, histories, and cultures of one or more diasporic groups. May be repeated for credit when topic differs. GE credit: Div, Wrt.

142. Early American Literature (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Historically or thematically focused study of American

literature of the 17th and 18th centuries. May be repeated for credit when content differs. GE credit: Wrt | ACGH, AH, WE.-II.

143. 19th-Century American Literature to the Civil War (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Historically or thematically focused study of works of 19th-century American literature. May be repeated for credit when content differs. GE credit: Wrt | ACGH, AH, WE.-I.

144. Post-Civil War American Literature (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Historically or thematically focused study of works of post-Civil War American literature. May be repeated for credit when content differs. GE credit: Wrt | ACGH, AH, WE.

146N. American Literature: 1900-1945 (4)

Lecture - 3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1. Histori cally or thematically focused study of American literature (drama, poetry, prose fiction) from the period between 1900 and the end of World War II. May be repeated two times for credit when topic differs. Only 2 units of credit to students who have completed course 146. GE credit: Wrt | ACGH, AH,

147. American Literature, 1945 to the Present (4)

Lecture — 3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1. Historically or thematically focused study of American literature (drama, poetry, prose fiction) from the period between 1945 and the present. May be repeated two times for credit when topic differs. Only 2 units of credit to students who have completed course 146. GE credit: Wrt | ACGH, AH, WE.-I.

149. Topics in Literature (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Intensive examination of literature considered in topical terms, not necessarily historically. May be repeated for credit when content differs. GE credit: Wrt | AH,

150A. British Drama to 1800 (4)

Lecture/discussion-3 hours; extensive writing or discussion - 1 hour. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically focused study of works of English drama prior to 1800. May be repeated for credit one time when content differs. GE credit: Wrt | AH, WC, WE.

150B. Drama from 1800 to the Present (4)

Lecture/discussion-3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically focused study of works of anglo phone drama from 1800 to the present. May be repeated for credit when topic differs. GE credit: Wrt | AH, WC, WE.—II.

153. Topics in Drama (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Historical or thematic study of drama. May be repeated for credit when topic differs. GE credit: Wrt | AH, WE.-I.

155A. 18th-Century British Novel (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically organized examination of the 18th-century British novel, with particular emphasis on its evolution, including the epistolary novel, the picaresque novel, and the Gothic novel: Richardson, Fielding, Sterne, Austen. GE credit: Wrt | AH, WC, WE.—I.

155B. 19th-Century British Novel (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically organized examination of 19th-century British novelists, with

emphasis on the historical novel, the social novel, and novels by women: Scott, Dickens, the Brontes, Eliot, Hardy. GE credit: Wrt | AH, WC, WE.-II.

155C. 20th-Century British Novel (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically organized examination of the 20th-century British novel, with emphasis on impressionism; the revolt against naturalism; the experimental novel; the anti-modernist reaction: Conrad, Joyce, Woolf, Lawrence, Drabble, Rhys. GE credit: Wrt | AH, WC, WE.

156. The Short Story (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. The short story as a genre; its historical development, techniques, and formal character as a literary form. European as well as American writers. GE credit: ArtHum, Wrt | AH, WE.-II.

158A. The American Novel to 1900 (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically organized examination of the rise and development of the American novel from its beginnings; Hawthorne, Melville, Twain, James, and others. GE credit: Wrt | ACGH, AH, WE.-III.

158B. The American Novel from 1900 to the Present (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically organized examination of American novelists of the twentieth century; Faulkner, Hemingway, Fitzgerald, Morrison, and others. GE credit: Wrt | ACGH, AH, WE.—III.

159. Topics in the Novel (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Examination of major novels arranged thematically. Topics might include Bildungsroman, stream-of-consciousness novel, Gothic novel, historical novel. May be repeated for credit when topic differs. GE credit: Wrt | AH, WE.-III.

160. Film as Narrative (4)

Lecture - 3 hours; film viewing: 3 hours. Prerequisite: course 3 or University Writing Program 1. A study of modern film (1930 to present) as a storytelling medium. Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL.-III.

161A. Film History I: Origins to 1945 (4)

Lecture-3 hours; film viewing-3 hours. Prerequisite: course 3 or University Writing Program 1. Cultural and aesthetic history of filmmaking from its origins in the 1890's through 1945. (Courses 161A and 161B need not be taken in sequence.) Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL.

161B. Film History II: 1945 to present (4)

Lecture - 3 hours; film viewing - 3 hours. Prerequisite: course 3 or University Writing Program 1. Cultural and aesthetic history of filmmaking from 1945 through the present. (Courses 161A and 161B need not be taken in sequence.) Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL.

162. Film Theory and Criticism (4)

Laboratory—3 hours; discussion—2 hours; lecture— 1 hour. Prerequisite: course 3 or University Writing Program 1. Film theory and criticism, with a study of ten major works of international film art. Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL.-

163. Literary Study in the British Isles (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: Course 3 or University Writing Program 1. Restriction on enrollment: by application only through the Education Abroad Center. Literary Study in the British Isles: On-site study of the literature, film, and/or performance of the British Isles. May be repeated two times if subject matter differs. GE credit: ArtHum, Wrt | AH, WC, WE.

164. Writing Science (4)

Lecture/discussion—3 hours; extensive writing. Prerequisite: course 3 or Science and Technology Studies 1, or equivalent. Texts and writing practices in the production of scientific knowledge. Surveys the literary structure of scientific arguments; history of scientific genres; rhetoric and semiotics in scientific culture; graphical systems in the experimental laboratory; narratives of science, including science fiction. (Same course as Science & Technology Studies 164.) GE credit: Wrt | AH, SL, WE.-III. Milburn

165. Topics in Poetry (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 and course 45. Intensive examination of various topics expressed in poetry from all periods of English and American literature. May be repeated for credit when topic covers different poets and poems. GE credit: Wrt | AH, WE.-I.

166. Love and Desire in Contemporary American Poetry (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Close reading of contemporary American poems on the theme of love and desire by poets of diverse ethnicities and of gay, lesbian, and heterosexual orientations. Offered in alternate years. GE credit: Div, Wrt | ACGH, AH, WE.-III.

167. Twentieth-Century African American Poetry (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Twentieth-century African American poetry, including oral and literary traditions. Authors covered may include Gwendolyn Brooks, Countee Cullen, Robert Hayden, and Langston Hughes. GE credit: Div, Wrt | ACGH, AH, WE

168. 20th Century American Poetry (4)

Lecture - 3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1. Historical Study of American poetry since 1900, with thematic and formal focus at the instructor's discretion. May be repeated two times for credit if content differs. GE credit: Wrt | ACGH, AH, WE.-I, II.

171A. The Bible as Literature: The Old Testament (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. May be taken independently of course 171B. Selected readings from the Old Testament illustrating various literary forms. Emphasis on the Pentateuch, the Historical Books, and the Wisdom Books. GE credit: ArtHum, Div, Wrt | AH, WC, WE.-II.

171B. The Bible as Literature: Prophets and New Testament (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. May be taken independently of course 171A. Selected readings from the Old Testament prophets and the New Testament. GE credit: ArtHum, Div, Wrt | AH, WC, WE.

173. Science Fiction (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 3 or Science and Technology Studies 1, or equivalent. The literary modes and methods of science fiction. Representative texts, authors, and themes of the genre—e.g., time travel, alternative universes, and utopias. Relations of science fiction to science, philosophy, and culture. (Same course as Science and Technology Studies 173.) GE credit: ArtHum, Wrt | AH, WE.-II.

175. American Literary Humor (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1, or standing above freshman level. American humorous vision of man, nature, and the supernatural. Includes one or more of the following: colonial humor; southwestern and New England humor; pre- and post-Civil War masters; local colorists; journalistic gadflies; anti-provincialists; modernist poets and prose writers; black humor. GE credit: ArtHum, Wrt | ACGH, AH, WE.

177. Study of an Individual Author (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 110A or 110B. In-depth study of an author's works; historical context; relation to predecessors and contemporaries; critical reception; influence. May be repeated one time if author differs. GE credit: Wrt | AH, WE.-I, II, III.

178. Topics in Nations, Regions, and Other Cultural Geographies (4)

Lecture — 3 hours; extensive writing or discussion — 1 hour. Prerequisite: course 3 or University Writing Program 1 or equivalent. Literary productions of a local, regional, national, transnational, or other geographical formation; e.g., the global South; literature of Hawaii; literature of Australia. May be repeated two times for credit. GE credit: Div, Wrt | AH, WE.

179. Topics in Comparative American Literatures (4)

Lecture - 3 hours; extensive writing or discussion - 1 hour. Prerequisite: course 3 or University Writing Program 1 or equivalent. Comparative study of what constitutes "American" literature. Possible emphases: North American or Latin American literature; Pacific Rim or Circum-Atlantic approaches; interrelations among different modes of racialization within and beyond U.S. borders. May be repeated two times for credit when topic differs. GE credit: ArtHum, Div, Wrt | ACGH, AH, DD, WE.—II.

180. Children's Literature (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Historical backgrounds and development of types of children's literature, folklore and oral tradition, levels of interest, criticism and evaluation, illustration and bibliography. GE credit: ArtHum, Wrt | AH, WE.-

181A. African American Literature to 1900 (4)

Lecture/discussion-3 hours; term paper. Prerequi site: course 3 or University Writing Program 1. African American literature from the colonial period to 1900. Particular attention to the rapid development of the African American literary culture from a primarily oral tradition to various literary genres, including the slave narrative. GE credit: Div, Wrt | ACGH, AH, DD, WE.-I.

181B. African American Literature 1900-Present (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Major African American writers in the context of cultural history from 1900 to the present. Writers may include Richard Wright, Ann Petry, James Baldwin, Ralph Ellison, Paule Marshall, Toni Morrison, Alice Walker, Clarence Major. GE credit: Div, Wrt | ACGH, AH, DD, WE.—II.

182. Literature of California (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. California literature in the context of California's social, political, and intellectual history. Reading of poetry, fiction, and essays. Emphasis on nineteenth- and twentieth-century naturalists, turn of the century novelists, the Beats, and writers of the last two decades. GE credit: ArtHum, Div, Wrt | ACGH, AH, WE.-II.

183. Adolescent Literature (4)

Lecture - 3 hours; term paper. Prerequisite: course 3 or University Writing Program 1, or equivalent. Theoretical, critical, and literary issues informing the study and teaching of American adolescent literature. GE credit: AH, WE.—II.

184. Literature and the Environment (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Historical and/or thematic survey of topics in writing about the environment. GE credit: ArtHum, Wrt | AH, WE.-I.

185A. Women's Writing I (4)

Lecture/discussion-3 hours; extensive writing or discussion-1 hour. Prerequisite: course 3 or University Writing Program 1. Women's Writing in English before 1800; organized by period, place, genre, or theme. GE credit: Div, Wrt | AH, WE.

185B. Women's Writing II (4)

Lecture/discussion-3 hours; extensive writing or discussion-1 hour. Prerequisite: course 3 or University Writing Program 1. Women's Writing in English from 1800 to 1900; organized by period, place, genre, or theme. GE credit: Div, Wrt | AH, WE.—III.

185C. Women's Writing III (4)

Lecture/discussion-3 hours; extensive writing or discussion - 1 hour. Prerequisite: course 3 or University Writing Program 1. Women's Writing in English after 1900; organized by period, place, genre, or theme. GE credit: Div, Wrt | Div, Wrt.

186. Literature, Sexuality, and Gender (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Historically or thematically focused intensive examinations of gender and sexuality in British and American literature. May be repeated for credit when content differs. GE credit: Div, Wrt | AH, WE.

187A. Topics in Literature and Media (4)

Seminar-3 hours; film viewing-3 hours. Prerequisite: course 110A or 110B; consent of instructor. Group study of a topic centered on the relationships between literature and film or other moving-image media. GE credit: Wrt | AH, WE.-III.

188A. Topics in Literary and Critical Theory (4)

Seminar—3 hours; term paper. Prerequisite: course 110A or 110B; consent of instructor. Intensive examination of theories addressing a particular problem, topic, or question. GE credit: Wrt.—I.

189. Seminar in Literary Studies (4)

Seminar—3 hours; term paper. Prerequisite: junior or senior standing; a major in English or consent of instructor. Intensive, focused study of literature at an advanced level. May be organized by topic, author, period, movement, or genre. High participation. May be repeated one time if topic differs. GE credit: Wrf | AH, WE.-II, III.

192. Internship in English (1-12)

Internship - 3-36 hours. Prerequisite: course 3 or University Writing Program 1. Internships in fields where students can practice their skills. A maximum of four units is allowed toward the major in English. May be repeated for credit for a total of 12 units. (P/NP grading only.)

194H. Seminar for Honors Students (4)

Seminar—3 hours; term paper. Prerequisite: course 110A or 110B; one advanced study course; admission to English Department Senior Honors Program in Literature, Criticism, and Theory. Preparation for writing an honors thesis in course 195H. Limited enrollment; high level of participation expected. GE credit: AH, WE.-II. (II.)

195H. Honors Thesis (4)

Independent study - 12 hours. Prerequisite: course 194H. Preparation of a thesis, under the supervision of an instructor. Students satisfying requirements for the general major or the teaching emphasis write on a scholarly or critical subject; creative writing students submit a volume of poems or fiction. GE credit: AH, WE.

197T. Tutoring in English (1-5)

Tutoring — 1-5 hours. Prerequisite: upper division standing and consent of Chairperson. Leading of small voluntary discussion groups affiliated with one of the department's regular courses. Does not fulfill requirement for major. May be repeated for credit for a total of 8 units. (P/NP grading only.)

197TC. Community Tutoring in English (1-4)

Tutoring — 1-4 hours. Prerequisite: upper division standing and a major in English; consent of chairper-son. Field experience, with individuals or in classroom in instruction of English language, literature,

and composition. Does not fulfill requirement for major. May be repeated for credit. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: one course from English 3, 5F, 5P or University Writing Program 1. (P/NP grading only.)

1985. Directed Group Study (4)

Lecture/discussion-4 hours. Prerequisite: course 163S concurrently. Group study will be closely tied to the texts and periods studied in course 163S. Investigations of historical sites, museums, galleries, and performances. To be taught in London. (P/NP grading only.)—III. (III.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

200. Introduction to Graduate Studies in English (4)

Seminar-3 hours; term paper or discussion-1 hour. Prerequisite: graduate standing. Introduction to literary scholarship with special attention to the elements of professionalism and to different modes of literary investigation. (S/U grading only.)—I. (I.)

205. Anglo-Saxon Language and Culture

Lecture - 3 hours; conference and term paper. The language and culture of Anglo-Saxon England; readings in Old English prose and poetry.

206. Beowulf (4)

Discussion-3 hours; oral and written reports; conferences with students. Prerequisite: course 205 or the equivalent. A study of the poem and the Heroic Age of Germanic literature.

207. Middle English (4)

Discussion—3 hours; term paper. Study of the phonology, morphology, syntax, and lexicon between 1100 and 1500 with investigation of the regional dialects; pertinent facts on both the internal and external linguistic history; intensive reading of texts.

210. Readings in English and American Literature (4)

Seminar — 3 hours; conference — 1 hour. Prerequisite: upper division course in area studied. Content varies according to specialty of instructor. May be repeated if topic differs.—I, II.

225. Topics in Irish Literature (4)

Seminar — 3 hours; conference — 1 hour. Prerequisite: graduate standing. Varied topics, including the nine-teenth-century novel, contemporary Irish poetry, rise of the drama, or a study of a major author. May be repeated for credit if topic differs.

230. Study of a Major Writer (4)

Seminar-3 hours; conferences with individual students-1 hour; research papers. Artistic development of one major writer and his intellectual and literary milieu. May be repeated for credit when a different writer is studied. - I.

232. Problems in English Literature (4)

Seminar-3 hours; conferences with individual students-1 hour. Selected issues in the current study and critical assessment of a limited period or topic in English literature. May be repeated for credit when different period or topic is studied. - II

233. Problems in American Literature (4)

Seminar-3 hours; conferences with individual students-1 hour; research papers. Selected topics for intensive investigation. May be repeated for credit when different topic or period is studied. - I, II.

234. Dramatic Literature (4)

Lecture—3 hours; conference—1 hour. Historical introduction to dramatic theory; the genres of tragedy, comedy, and tragicomedy. May be repeated for credit if topic differs. - III.

235. Theory of Fiction (4)

Seminar—3 hours; conference—1 hour. Prerequisite: graduate standing. Theories of fiction as they relate to the professional writer's practice of the craft. For students in the Creative Writing Program. May be repeated for credit when focus differs.

236. Poetics (4)

Seminar - 3 hours; conference - 1 hour. Prerequisite: graduate standing. Theories of poetry as revealed in structure, prosody, and idiom of British and American poems, variably approached—through intensive study of a single poet, historically, or theoreticallyat the instructor's discretion. For students in the Creative Writing Program. May be repeated for credit when focus differs. - II.

238. Special Topics in Literary Theory (4)

Seminar-3 hours; term paper. Prerequisite: course 237 or the equivalent. Advanced topics in literary theory and criticism. Preparation and evaluation of research paper. May be repeated for credit when topic and/or reading list differs. Offered in alternate

240. Medieval Literature (4)

Seminar-3 hours; conference-1 hour. Studies of Medieval literature. Course materials to be selected by the instructor. Preparation and evaluation of résearch papers. May be repeated for credit when a different topic is studied. - III.

242. Sixteenth-Century Literature (4)

Seminar-3 hours; conference-1 hour. Studies in sixteenth-century literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.—1.

244. Shakespeare (4)

Seminar-3 hours; conference-1 hour. Studies in Shakespeare. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.

246. Seventeenth-Century Literature (4)

Seminar-3 hours; conference-1 hour. Studies in seventeenth-century literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.

248. Eighteenth-Century Literature (4)

Seminar - 3 hours: conference - 1 hour Studies in eighteenth-century literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.

250. Romantic Literature (4)

Seminar-3 hours; conference-1 hour. Studies in Romantic literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.

252. Victorian Literature (4)

Seminar—3 hours; conference—1 hour. Studies in Victorian literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied. - I, II.

254. Twentieth-Century British Literature

Seminar-3 hours; conference-1 hour. Studies in twentieth-century British literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.

256. Early American Literature (4)

Seminar—3 hours; conference—1 hour. Studies in Early American literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.

258. American Literature: 1800 to the Civil War (4)

Seminar—3 hours; conference—1 hour. Studies in American literature from 1800 to Civil War. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.

260. American Literature: Civil War to 1914

Seminar—3 hours; conference—1 hour. Studies in American literature from the Civil War to 1914. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is stud-

262. American Literature after 1914 (4)

Seminar—3 hours; conference—1 hour. Studies in American literature after 1914. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied. - II, III.

264. Studies in Modern British and American Literature (4)

Seminar-3 hours; conference-1 hour. Studies in modern British and American literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.

270. Studies in Contemporary World Literature (4)

Seminar—3 hours; conference—1 hour. Prerequisite: graduate standing, consent of instructor, with preference given to those enrolled in the masters program in Creative Writing. Emerging global, international or transnational techniques, theories, and individual works of contemporary world prose or poetry. Discussion, seminar reports, research papers. May be repeated for credit when topic differs.—III.

285. Literature by Women (4)

Seminar-3 hours; conference-1 hour. Studies in literature by women and the theoretical approaches to literature by women. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when topic and/or reading list differs. -1.

287. Topics in Literature and Media (4)

Seminar-3 hours; film viewing-3 hours. Prerequisite: graduate standing. Study of a topic centered on film or other moving-image media. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when topic differs.

288. Prospectus Workshop (2)

Conference - 2 hours. Must have passed Departmental Preliminary Exam. Training in writing the dissertation prospectus. Participation in group discussions of preparatory assignments and final proposal. (S/U grading only.)—III.

289. Article Writing Workshop (2)

Conference - 2 hours. Prerequisite: consent of instructor. Class size limited to 12 students; nomination for admission by Dissertation Director. Training in preparing an article for publication. Participation in group discussions of article drafts. May be repeated one time for credit. (S/U grading only.)—II.

290F. Seminar in Creative Writing of Fiction

Seminar - 3 hours; 1 additional hour of writing. Prerequisite: consent of instructor; graduate standing, with preference given to those enrolled in master's program in Creative Writing. Writing of prose. Evaluation of written materials and individual student conferences. May be repeated for credit. - I, II, III. (I,

290NF. Seminar in Creative Writing of Non-Fiction (4)

Seminar — 3 hours; term paper. Prerequisite: consent of instructor, graduate standing, preference given to those enrolled in the master's program in Creative Writing. The writing of literary non-fiction, with emphasis on autobiography, biography, memoir, the occasional or nature essay, or other non-fiction prose narratives. May be repeated for credit.—II

290P. Seminar in Creative Writing of Poetry

Seminar-3 hours; 1 additional hour of writing. Prerequisite: consent of instructor; graduate standing, with preference given to those enrolled in master's program in Creative Writing. Writing of poetry.

Evaluation of written materials and individual student conferences. May be repeated for credit.—I, II, III. (I,

298. Directed Group Study (1-5)

(S/U grading only.)

299. Individual Study (1-12)

(S/U grading only.)

299D. Special Study for the Doctoral Dissertation (1-12)

(S/U grading only.)

Professional Courses

391. Teaching Creative Writing (2)

Discussion - 2 hours. Prerequisite: graduate standing; appointment as Teaching Assistant in the English. Designed for new instructors of English 5F or 5P; discussion of ways to facilitate creative writing workshops and to respond to student manuscripts. (S/U grading only.)—III. (III.)

393. Teaching Literature and Composition (2)

Discussion — 2 hours. Prerequisite: graduate standing; appointment as Teaching Assistant in the English Department. Designed for new instructors of English 3 or the equivalent courses; discussion of problems related to teaching literature and composition to lower division students. (S/U grading only.)—III. (III.)

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Entomology

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(Entomology, Nematology) Fumio Matsumura, Ph.D., Professor (Entomology,

Environmental Toxicology) Michael P. Parrella, Ph.D., Professor (Entomology, Plant Sciences)

Jay Rosenheim Professor

Academic Senate Distinguished Teaching Award Thomas W. Scott, Ph.D., Professor

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Penelope J. Gullan, Ph.D., Professor Emeritus
Charles L. Judson, Ph.D., Professor Emeritus Harry K. Kaya, Ph.D., Professor Emeritus (Entomology, Nematology)

Donald L. McLean, Ph.D., Professor Emeritus Robert E. Page Jr., Ph.D., Professor Emeritus Christine Y. S. Peng, Ph.D., Professor Emeritus Robbin W. Thorp, Ph.D., Professor Emeritus Robert K. Washino, Ph.D., Professor Emeritus

Affiliated Faculty

Anthony Cornel, Ph.D., AES Entomologist Mary L. Flint, Ph.D., Specialist in Cooperative Extension Larry Godfrey, Ph.D., Specialist in Cooperative Extension, AES Entomologist Robert Kimsey, Ph.D. Lecturer

Eric C. Mussen, Ph.D., Specialist in Cooperative Extension

The Major Program

The Entomology major is a general biological science program. The curriculum is designed to develop an understanding of fundamental biological concepts by studying insects. Insects offer unique opportunities to study biological systems and are model experimental animals. Many insects are either pests, or beneficial species that have great importance to the economy, environment or public health. Students may focus on specific areas of interest including agricultural entomology, insect systematics and evolution; behavior and ecology; medical entomology; and insect molecular biology, physiology and toxicology.

The Program. Students begin their study in entomology with selected insect biology courses. After completing these courses, students may enroll in courses in their particular area of interest. The Entomology Faculty encourages students to do research internships in their laboratories.

Career Alternatives. Entomology graduates find careers in many different areas of applied or basic biology. Graduates have the opportunity to continue in professional graduate programs such as veterinary or human medicine, or get advanced degrees leading to careers in biotechnology, conservation biology, or academic teaching and research. Many graduates have participated in internship programs with the California Department of Food and Agriculture and found careers in insect diagnostic laboratories, conducting insect surveys, and/or developing entomological collections. Other graduates have worked in agriculture in the area of insect pest management. Graduates are prepared for managerial and technical positions with state and federal agencies and in agricultural production and supporting industries. Some entomology graduates pursue careers in primary, secondary, and college level science education.

B.S. Major Requirements:

Preparatory Subject Matter	45-46
Biological Sciences 1A, 1B, 1C; or	
2A, ŽB, 2C	14
Chemistry 2A, 2B, 8A, 8B	16
Mathematics 16A	3
Physics 1A, 1B	6
Statistics 13, 32, or Plant Sciences	
120	3-4
Plant Sciences 21, Engineering 5, or	
Mathematics 16B	3
B	0.5.50
Depth Subject Matter	34-40
	34-40
Microbiology 102, Plant Biology 118, 148, Plant Pathology 120 or Pathology,	34-40
Microbiology 102, Plant Biology 118, 148, Plant Pathology 120 or Pathology,	
Microbiology 102, Plant Biology 118,	3-5
Microbiology 102, Plant Biology 118, 148, Plant Pathology 120 or Pathology, Microbiology, and Immunology 128	3-5 4
Microbiology 102, Plant Biology 118, 148, Plant Pathology 120 or Pathology, Microbiology, and Immunology 128 Biological Sciences 101	3-5 4 or
Microbiology 102, Plant Biology 118, 148, Plant Pathology 120 or Pathology, Microbiology, and Immunology 128 Biological Sciences 101	3-5 4 or 4 4
Microbiology 102, Plant Biology 118, 148, Plant Pathology 120 or Pathology, Microbiology, and Immunology 128 Biological Sciences 101 Environmental Science and Policy 100 c Evolution and Ecology 101 Evolution and Ecology 100 Biological Sciences 102 and 103 or An	3-5 4 or 4 4 imal
Microbiology 102, Plant Biology 118, 148, Plant Pathology 120 or Pathology, Microbiology, and Immunology 128 Biological Sciences 101	3-5 4 or 4 4 imal

Restricted Electives......34 Upper division entomology courses 14

Upper division electives related to student's interest with approval of adviser.....20 Note: No more than a total of 6 units from Entomology 192, 197T and 199 may count toward fulfilling depth subject matter or restricted elective units.

Total Units for the Major114-120 Major Adviser. S. Lawler

Minor Program Requirements:

The Department of Entomology has five minor programs open to students in other disciplines who are interested in rounding out their academic study with a concentration in the area of entomology.

UNIIS)
Insect Biology19-23	š
Entomology 100, 100L	
Agricultural Pest Management21-23	•
Entomology 100, 100L, 110, 13515 At least two courses from Nematology 100, Plant Sciences 176, Plant Pathology 1206-8	
Insect Ecology and Evolution20)
Entomology 100, 100L, 104	
Medical-Veterinary Entomology19	,
Entomology 100, 100L, 104, 153, 156	
Forensic Entomology22	2
Entomology 100, 100L, 102, 15813 Biological Science 2A	

Graduate Study. The Department of Entomology offers a program of study and research leading to the M.S. and Ph.D. degrees. See Graduate Studies, on page 111 and the Graduate Announcement, for further details.

Graduate Advisers. See

UNITS

Minor Adviser. S. Lawler

http://entomology.ucdavis.edu/grad/.

Related Courses. See courses in Nematology.

Courses in Entomology (ENT) **Lower Division Courses**

1. Art, Science and the World of Insects (3)

Lecture-3 hours; laboratory-3 hours. Fusion of entomology and art to create an appreciation of insect biology, ecology, interactions with humans and importance in human culture. Multidisciplinary approaches in education and career paths in ento mology and art. GE credit: ArtHum or SciEng | AH, OL, ŠÉ or SS, VL, WE.—I. (I.) Ullman

2. Biodiversity (3)

Lecture-2 hours; lecture/discussion-1 hour. Introduction to nature, scope and geographical distribu-tion of biodiversity (the diversity of life, with emphasis on plants and animals, especially insects). Humans and biodiversity—domestication, aesthetics, ethics and valuation. Species richness and "success." Biodiversity through time; monitoring, evalua-tion and conservation. Biomes—global, continental and Californian. (Same course as Evolution and Ecology 2.) GE credit: SciEng, Wrt | SE, SL, WE. -

10. Natural History of Insects (3)

Lecture — 3 hours. Designed for students not specializing in entomology. Not open for credit to students who have had course 100, but students who have

taken this course may take course 100 for credit. An introduction to the insects detailing their great variety, structures and functions, habits, and their significance in relation to plants and animals including man. GE credit: SciEng | SE, SL.-II. (II.) R. Kimsey, Parrella

90X. Special Topics in Entomology (2)

Seminar - 2 hours. Freshman seminar course for indepth examination of a special topic within the subject area. May be repeated two times for credit. (P/ NP grading only.)—I, II, III.

92. Internship (1-12)

Internship - 3-36 hours. Prerequisite: consent of instructor. Work-learn experience on and off campus in all subject areas offered by the department, supervised by a member of the faculty. May be repeated up to 12 units of credit. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) (P/NP grading only.)

Upper Division Courses 100. General Entomology (4)

Lecture - 3 hours; term paper. Prerequisite: Biological Sciences 1B. Biology, anatomy, physiology, development, classification, ecology and relation of insects to human welfare. GE credit: SciEng, Wrt | WE.-I. (I.) L. Kimsey

100L. General Entomology Laboratory (2)

Laboratory-6 hours. Prerequisite: course 100 (may be taken concurrently). Anatomy, development, population ecology, methods of collecting, classification and identification of insects of all orders and of major families. GE credit: Wrt | VL.-I. (I.) Kimsey

101. Functional Insect Morphology (3)

Lecture—2 hours; laboratory—3 hours. Prerequisite: course 100. Study of the basic external and internal structures, organs and tissues of insects, with emphasis on functional systems. Functional anatomy, histology and fine structures of important organs and tissues will be discussed. GE credit: SciEng.—II. (II.)

102. Insect Physiology (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 100 or course in physiology or invertebrate zoology. Processes by which insects maintain themselves, reproduce, and adapt to environment. Insects as models for basic/applied research through detailed analysis of metabolic, physiological, and behavioral processes. Emphasis on analysis of methodology, fact, and theory. GE credit: SciEng | SE, WE.-II. (II.) Leal, Hammock

103. Insect Systematics (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: introductory course in zoology or entomology. Principles and methods of systematics, with particular reference to insects. Emphasis on different theories of classification, and analysis of phylogenetic relationships. Offered in alternate years. GE credit: SciEng,

104. Behavioral Ecology of Insects (3)

Lecture—3 hours. Prerequisite: introductory biology or zoology. Basic principles and mechanisms of insect behavior and ecology. An evolutionary approach to understanding behavioral ecology of insects. GE credit: SciEng.—II. (II.) Lewis

105. Insect Ecology (4)

Lecture/discussion-3 hours; term paper. Prerequisite: Biological Sciences 2A-C. Introduction to insect ecology combining fundamental concepts and questions in ecology with ideas, hypotheses and insights from insects. Integrates aspects of individual, population, community and ecosystem ecology. Emphasis on the scientific process: observing nature, asking testable questions, and communication. GE credit: OL, SE, SL, WE.-I. (I.) Yang

107. California Insect Diversity (5)

Lecture-1 hour; laboratory-6 hours; fieldwork-6 hours. Prerequisite: an introductory course in entomology. Survey of the diversity of insects from selected ecological zones in California with emphasis on collection, identification, and natural history. Offered in alternate years. GE credit: SciEng, Wrt | SE.—III. Ward

109. Field Taxonomy and Ecology (7)

Lecture - 2 hours; laboratory - 36 hours; five-week course. Prerequisite: an introductory course in entomology or consent of instructor. The study of insects in their natural habitats; their identification and ecology. Offered in alternate years. GE credit: SciEng, Wrt | SE.—(IV.) Ward

110. Arthropod Pest Management (5)

Lecture — 3 hours; laboratory — 6 hours. Prerequisite: Biological Science 1B. Development of the ecological basis for the integrated pest management paradigm with emphasis on agriculture. Ecological and practical aspects of control tactics. Laboratory emphasizes identification of pests and beneficials of agriculture and urban situations. GE credit: SciEng, Wrt | SE, WE.-II. (II.) Godfrey

116. Freshwater Macroinvertebrates (3)

Lecture - 2 hours; laboratory - 3 hours. Prerequisite: Biological Sciences 2B or equivalent. Biology, ecology and taxonomy of freshwater macroinvertebrates, including insects, crustaceans, molluscs, worms, leeches, flatworms and others. Adaptations to life in freshwater. Aquatic food webs. Uses of macroinvertebrates in water quality monitoring. Field trips during regular lab hours. Limited enrollment. GE credit: SE, SL.—III. (III.) Lawler

116L. Aquatic Insect Collection (2)

Laboratory-4 hours; field work-2 hours. Prerequisite: high school biology recommended. Students will learn to collect aquatic insects and to identify them to Family and Genus levels. Collections will require two, one-day weekend field trips (by arrangement). Collection requirement is 40 Families, with 20 identified to Genus level. Limited enrollment. May not be taken for credit if students have completed the 5-unit option for Entomology 116.—III. (III.) Lawler

117. Longevity (4)

Lecture - 3 hours; term paper. Prerequisite: upper division standing or consent of instructor. Nature, origin, determinants, and limits of longevity with particular reference to humans; emphasis on implications of findings from non-human model systems including natural history, ecology and evolution of life span; description of basic demographic techniques including life table methods. (Same course as Human Development 117.) GE credit: SciEng, Wrt | SE, SL, WE.—I. Carey

119. Apiculture (3)

Lecture — 3 hours; papers. Prerequisite: Biological Sciences 1C recommended. Biology and behavior of honeybees; communication, orientation, social organization, foraging activities, honey production, pollination activities. GE credit: SciEng, Wrt | OL, VL, WE.—III. (III.)

123. Plant-Virus-Vector Interaction (3)

Lecture - 3 hours. Prerequisite: Biological Sciences 1A, 1C, 101; Plant Biology 105, Plant Pathology 120, and course 100 recommended. Analysis of the interactions necessary for viruses to infect plants. Interactions among insect vectors and host plants involved in the plant-virus life cycle. Evolutionary aspects of the molecular components in viral infection and modern experimental approaches to the interdiction of viral movement. Offered alternate years. (Same course as Plant Biology 123/Plant Pathology 123.)—(I.) Lucas, Gilbertson, Ullman

135. Introduction to Biological Control (4)

Lecture - 3 hours; laboratory - 3 hours. Prerequisite: course 100 or 110. Principles of biological control of arthropod pests and weeds. Biology of pathogens, entomopathogenic nematodes, parasitoids, and predators. Implementation in classical and augmentative biological control. Role of biological control in pest management. Offered in alternate years—I. Kaya, Parrella

153. Medical Entomology (3)

Lecture — 3 hours. Prerequisite: Biological Sciences 1A, 1B, upper division standing in one of the biological sciences, or consent of instructor. Basic biology and classification of medically important arthropods with special emphasis on the ecology of arthropodborne diseases and principles of their control. Relationships of arthropods to human health. GE credit: SciEng, Wrt | SE, SL, WE. - II. (II.) Scott

156. Biology of Parasitism (3)

Lecture — 3 hours. Prerequisite: Biological Sciences 1A or consent of instructors. Lectures on the biological and ecological aspects affecting host-parasite relationships using selected examples from protozoan and metazoan fauna. GE credit: SciEng | SE.-III. (III.) Kimsey, Theis, Nadler

156L. Biology of Parasitism Laboratory (1)

Laboratory-3 hours. Prerequisite: course 156 (concurrently) or consent of instructor. Laboratory demonstrations using selected examples of protozoan and metazoan organisms along with various techniques used in parasitology to exemplify concepts presented in the lecture course. GE credit: Wrt | SE.— III. (III.) R. Kimsey

158. Forensic Entomology (3)

Lecture – 2 hours; laboratory – 4 hours. Prerequisite: Biological Sciences 1B or Entomology 100, upper division standing. Arthropods, their general biology, succession, developmental cycles and population biology in matters of criminal prosecution and civil litigation. Emphasis on basic arthropod biology, ecological and developmental concepts and methods, development of reasoning abilities, implication, development of opinions and evidence. GE credit: SciEng or SocSci, Wrt | WE.—III. (III.) R. Kimsey

192. Internship (1-12)

 $Internship - 3\text{-}36 \ hours. \ Prerequisite: completion of}$ 84 units and consent of instructor. Laboratory experience or fieldwork off and on campus in all subject areas offered in the Department of Entomology Internships supervised by a member of the faculty. (P/NP grading only.)

197T. Tutoring in Entomology (1-3)

Discussion — 1-3 hours. Leading small discussion groups. Preview assignments and prepare guidelines for discussion. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

212. Molecular Biology of Insects and Insect Viruses (3)

Lecture—3 hours. Prerequisite: consent of instructor. A molecular biological analysis of insect systematics, physiology, and defense mechanisms. Molecular biology of insect viruses. Baculovirus expression vectors and post-translation modification of expressed polypeptides. Biological control of using neuropeptides and toxin genes in insect viruses. Offered in alternate years.—II. (II.)

214. Vector-borne Infectious Diseases: Changing Patterns (2)

Lecture/discussion - 2 hours. Prerequisite: consent of instructor required. Restrictions: open to graduate students, MPVM and MPH students, DVM and medical students with second- or third-year standing. Open to upper division undergraduate students with consent of instructor(s). Vector-borne infectious diseases especially as they relate to changing patterns associated with climatic changes, trade and population movement. Same course as PMI 214.—I. (I.) Lanzaro, Reisen

225. Terrestrial Field Ecology (4)

Seminar — 1 hour; field work — 12 hours. Prerequisite: introductory ecology and introductory statistics or consent of instructor. A field course conducted over spring break and four weekends at Bodega Bay, emphasizing student projects. Ecological hypothesis testing, data gathering, analysis and written and oral presentation of results. (Same course as Ecology 225/Population Biology 225.)—III. (III.)

230. Advanced Biological Control (4)

Lecture - 2 hours; laboratory - 6 hours. Prerequisite: graduate or upper division standing in biological science or consent of instructor. Principles and current issues in biological control of arthropod pests and weeds; laboratory devoted to identification and life history of the major groups of parasitic and predaceous arthropods. Offered in alternate years. —(I.)

253. Advanced Medical Entomology (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: one upper division course in entomology (other than course 153) and one course in microbiology: course 153 strongly recommended. An analysis of several anthropod-borne human diseases with emphasis on the relationships of the biology of the vector to the ecology of the disease. Discussion includes demonstration of vectors and techniques. Offered in alternate years. - (III.)

290. Exploratory Topics in Entomology (2)

Seminar - 2 hours. Interdisciplinary topics in entomology, including innovative applications of entomological concepts to other fields of research and human endeavor (e.g. medicine, technology, art, criminology). May be repeated for up to 8 units of credit when topic differs.—I, II, III.

291. Current Topics in Medical and Veterinary Entomology (2)

Seminar-2 hours. Prerequisite: course 153. Discussion of parasitology, ecology and epidemiology related to vectors of pathogens causing disease in humans and animals. May be repeated one time for credit. Not offered every year. - I, II, III. R. Kimsey,

292. Current Topics in Insect Physiology and Behavior (2)

Seminar-2 hours. Prerequisite: course 102 if topic is physiology, a course in behavior if topic is behavior, or either if topic bridges both. Analysis of contemporary advances in insect physiology, biochemistry and/or behavior. Interpretation and description of physiological and behavioral mechanisms and functions. Application of general principles to solution of problems in the laboratory and field. May be repeated for up to 8 units of credit if topic differs. Not offered every year. - I, II, III. Hammock, Leal

293N. Current Topics in Insect Biotechnology and Genomics (2)

Seminar—2 hours. Prerequisite: course 212. Discussion of advances in insect biotechnology, including genetic engineering and genomics. May be repeated for up to 6 units of credit if topic differs. Not offered every year. - I, II, III. Hammock, Leal

294. Current Topics in Insect Ecology, Evolution, and Systematics (2)

Seminar-2 hours. Prerequisite: course 103, general course in ecology or evolution. Discussions of advanced topics in ecology, evolution and systematics with emphasis on analysis of factors influencing the distribution, abundance, adaptations and evolutionary relationships of insects. Includes consideration of applications of basic theory (e.g. biological control). May be repeated for credit up to eight units if topics differs. Not offered every year. - I, II, III.

295. Current Topics in Agricultural Entomology and Bee Biology (2)

Seminar - 2 hours. Prerequisite: course 110 if topic covers pests and beneficial predators, course 119 if topic is bee biology, or either if topic bridges both. Discussion of advanced topics about the biology, ecology, behavior, and management of pest and beneficial insects. May be repeated for up to 8 units of credit if topic differs. Not offered every year.—I, II, III. Parrella, Rosenheim

297N. Seminar in Entomology (1)

Seminar — 1 hour. Weekly entomology seminar. May be repeated up to 9 units of credit if topic differs. (S/U grading only.)—I, II, III. (I, II, III.)

298. Group Study (1-5) (S/U grading only.)

299. Research (1-12)

(S/U grading only.)

Environmental Biology and Management

(College of Agricultural and Environmental Sciences) This major was discontinued as of Fall 2008; see Environmental Science and Management, on page

Environmental Geology

(College of Letters and Science)

The minor in Environmental Geology examines the multidisciplinary factors of geology and related earth science fields, and planning and resources oriented programs. Students in the minor are encouraged to participate in internship programs that assist them in solidifying the Environmental Geology minor with their Geology major or other major field areas that include geologic components.

The minor is sponsored by the Department of Geology in 2119 Earth and Physical Sciences Building.

Minor Program Requirements:

UNITS

Environmental Geology22-24

Geology 130, 134, and Environmental Science and Management 186 9 Soil Science 118 4 Hydrologic Science 141 or Civil and Environmental Engineering 142......
Two courses chosen from Environmental Science and Policy 160, 171, 179, Geology 135, Hydrologic Science 144, 1466-8

Minor Adviser. K. Verosub (Geology); 3133 Earth and Physical Sciences Building; (530) 752-6911

Environmental Horticulture

(College of Agricultural and Environmental Sciences) Faculty. See Plant Sciences, on page 467.

The Program. Students of Environmental Horticulture learn how plants improve the environment and the quality of our lives. Plants are used to revegetate and restore disturbed landscapes, control erosion, and reduce energy and water consumption. The ornamental use of plants to improve the aesthetic quality of urban and rural landscapes, recreational areas, and commercial sites is an important aspect of the study of environmental horticulture.

Students interested in Environmental Horticulture can obtain a B.S. degree in Environmental Horticulture and Urban Forestry and may specialize in Floriculture/Nursery Management, Urban Forestry, Landscape Management/Turf or Plant Biodiversity/ Restoration. Students can develop an individual major with the help of an Environmental Horticulture faculty adviser and approval of the College's Individual Major Committee. A minor in Environmental Hor-ticulture or Landscape Restoration is available to students in other majors.

Career Alternatives. Opportunities in this field include growing and/or managing plants in a variety of settings, including nurseries, golf courses and arboreta, consulting as an urban, landscape, or restoration horticulturist, business ownership, working for public agencies or private landscape firms/corporations, park management and landscape contracting. Students are encouraged to develop internships on or off campus to augment their activities in the classroom and laboratory.

Minor Program Requirements:

UNITS

Environmental Horticulture......23-25 Environmental Horticulture 6 and 105......8 Horticulture 100, 120, 125, 130,

Minor Advisers. J.A. Harding or D.W. Burger

Related Undergraduate Programs. See the undergraduate majors in Ecological Management and Restoration, on page 223, Environmental Hortiogy, on page 462, **and** Plant Sciences, on page 467. culture and Urban Forestry, on page 294, Plant Biol-

Graduate Study. For graduate study related to this field, see the M.S. and Ph.D. degree programs in the graduate groups of Horticulture and Agronomy, Plant Biology, Ecology, and Genetics. Also see Graduate Studies, on page 111.

Related Courses. See Plant Biology and Plant Sci-

Courses in Environmental Horticulture (ENH)

Questions pertaining to the following courses should be directed to the instructor or to the Plant Sciences Advising Office in 1224 Plant and Environmental Sciences Building (530) 752-7738.

Lower Division Courses

1. Introduction to Environmental Horticulture/Urban Forestry (3)

Lecture - 3 hours. Introduction to the use of plants to enhance the physical, visual and social environment. The use of ecological principles in developing sus tainable, low maintenance landscape systems will be presented. Career opportunities will be discussed. GE credit: SciEng, Wrt | SE, SL, WE.—I. (I.)

6. Introduction to Environmental Plants (4)

Lecture - 1 hour; discussion - 2 hours; laboratory hours. Classification, nomenclature and variation of environmental plants. The use of floral and vegetative characteristics and terminology to key unknown plants. Characteristics of plant groups and basics of climate, soils and plant selection. Identification of 150 common landscape plants. GE credit: SE, VL.— I. (I.) Young

Upper Division Courses 100. Urban Forestry (4)

Lecture — 2 hours; laboratory — 3 hours; term paper. Prerequisite: Biological Sciences 1C or Plant Sciences 2. Principles and practices of planning and managing urban vegetation. Basics of tree appraisal, natural resource inventory, and development of long term urban forest management plans. GE credit: SE.—I. (I.) Harding

101. Trees of the Urban Forest (2)

Lecture-1 hour; laboratory-2 hours. Prerequisite: course 6 or consent of instructor. Identification and evaluation of 200 tree species of the urban forest on campus, in the Arboretum, and in the city of Davis; appraised and aesthetic values, condition, and branch structure; contribution of trees to this ecosystem. Bicycle required. GE credit: VL, SE.-I. (I.) Hardina

102. Physiological Principles in Environmental Horticulture (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: Biological Sciences 1C. Physiological principles and processes essential to floriculture, nursery crop production, turfculture and landscape horticulture. Emphasis on the control of vegetative and reproductive development for a broad species range in greenhouse and extensive landscape environments. GE credit: SE.—I. (I.) Burger

105. Taxonomy and Ecology of Environmental Plant Families (4)

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 6 or consent of instructor. Classification and identification of introduced and native species used in urban forests, with emphasis on floral and vegetative characteristics of the prominent families of angiosperms and gymnosperms, adaptations to environmental variations in western landscapes, and horticultural classification. GE credit: VL, SE.—III. (III.) Harding

120. Management of Container Media (3)

Lecture—2 hours; laboratory—3 hours. Prerequisite: Soil Science 10. Principles of soil science and practices related to management of container media are taught, emphasizing appropriate use of soils and amendments, irrigation, and fertilizers. Physical and chemical properties are tested and effects of management on crops are evaluated in the laboratory. GE credit: QL, SE, WE.—I. (I.) Evans

125. Greenhouse and Nursery Crop Production (5)

Lecture—3 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: Plant Sciences 2 or Biological Sciences 1C. Principles and techniques for the production of ornamental greenhouse and nursery crops. Hands-on experience producing greenhouse crops. Optional weekend field trip. GE credit: SE, WE.—II. (II.) Lieth

129. Analysis of Horticultural Problems (4)

Lecture—1 hour; laboratory—6 hours. Prerequisite: course 102, Entomology 110, Plant Pathology 120, and Soil Science 100 or the equivalents. Methods of analysis of common plant disorders seen in the land-scape, greenhouse, and nursery. Diagnosis of plant disorders caused by soil, water, insects, disease, chemical agents, climatic conditions or cultural practices. Approaches to diagnosis that emphasize acquisition and integration of information. GE credit: SE.—III. (III.) Durzan

130. Turfgrass and Amenity Grassland Utilization and Management (4)

Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: Biological Sciences 1C or Plant Sciences 2. Utilization and management of amenity and landscape grassland systems. Emphasis on biology of grass species, ecology and culture practice of sports turf and landscape grassland systems, social and environmental benefits, environmental impacts, and integrated management systems. GE credit: SE.—III. (III.) Burger

133. Woody Plants in the Landscape: Growth, Ecology and Management (4)

Lecture—3 hours; laboratory—2 hours; discussion—1 hour. Prerequisite: Biological Sciences 1C or the equivalent preparation in plant biology. Principles and practices of managing trees and shrubs in the urban landscape and other managed environments. Topics include woody plant form; growth response and adaptation; tree management in relation to soil, moisture, climate; plant problems. GE credit: SE.—II. (II.) Berry

150. Genetics and Plant Conservation: The Biodiversity Crisis (3)

Lecture/discussion—3 hours. Prerequisite: Biological Sciences 1C or the equivalent. Conservation of genic diversity, measurement of diversity, threats to diversity and reasons for protection, the process of extinction, distribution of diversity, determination of what to conserve and means of conservation. Examples drawn largely from forest tree species. GE credit: SE, SL.—I. (I.) Neale

160. Restoration Ecology (3)

Lecture — 3 hours. Prerequisite: Plant Biology/Evolution and Ecology 117 or Evolution and Ecology 121 or Plant Biology 147 or the equivalent. Conceptual bases of restoration ecology; tools used by restora-

tion ecologists to solve practical problems; scope and success of actual restoration projects. GE credit: SE, SL, WE.—III. (III.) Eviner

160L. Restoration Ecology Laboratory (1)

Laboratory/discussion—3 hours. Prerequisite: course 160 (may be taken concurrently). Companion field course to course 160. A series of part-day and all day visits to various field sites, involving site evaluations, guest field presentations by local restorationists, and actual restoration activities. Not open for credit to students who completed course 160 prior to spring 2004. GE credit: SE, SL.—III. (III.)

Graduate Course

229. Analysis of Horticultural Problems (5)

Lecture—1 hour; laboratory—8 hours; discussion—1 hour; project. Prerequisite: equivalent of B.S. degree in Environmental Horticulture and Urban Forestry, Plant Biology, Agricultural Systems and Environment, or related major, or consent of instructor. Methods of analysis of common plant disorders seen in the land-scape, greenhouse, and nursery. Diagnosis of plant disorders caused by soil, water, insects, disease, chemical agents, climactic conditions or cultural practices. Approaches to diagnosis that emphasize acquisition and integration of information. Not open for credit to students who have completed course 241.

Environmental Horticulture and Urban Forestry

(College of Agricultural and Environmental Sciences)

Faculty. See Department of Plant Sciences, on page 467.

The Major Program

Students majoring in Environmental Horticulture and Urban Forestry learn how plants improve the environment and the quality of our lives. The major focuses on the biological and physical concepts and horticultural principles of plant production, management of plants and plant ecosystems in landscape settings and sociological aspects of plant/people interactions in the urban environment. Plants are used to revegetate and restore disturbed landscapes, control erosion and reduce energy and water consumption. The ornamental use of plants to improve the aesthetic quality of urban and rural landscapes, recreational areas, interiorscapes and commercial sites is an important aspect of this major. Students may select one of the following four areas of specialization: Urban Forestry, Floriculture/Nursery, Landscape Management/Turf, or Plant Biodiversity/

Internships and Career Opportunities. Students are encouraged to develop internships on or off campus to augment their activities in the classroom and laboratory. Internships are available with the department's greenhouse facility, the UC Davis Arboretum, landscape designers, government agencies or regional nurseries. Career opportunities in his field include growing and/or managing plants in a variety of settings, including nurseries, golf courses and arboreta, consulting as an urban, landscape, or restoration horticulturist; business ownership; working for public agencies or private landscape firms/corporations; park management and landscape contracting.

B.S. Major Requirements:

UNITS

Communications 1 recommended as part of the College English Composition Requirement or the Words and Images Core Literacy Component.

Environmental Horticulture 1 and 6 7
Landscape Architecture 304
Biological Sciences 1A, 1B, 1C, or Biological Sciences 2A, 2B, and Plant
Biological Sciences 2A, 2B, and Plant
Sciences 2 13-15
Environmental Science and Policy 1 or
10 or 303-4
Chemistry 2A-2B 10
Physics 1A-1B.
Physics 1A-1B6 Plant Sciences 21 and either Mathematics
16A or Statistics 136-7
Select two lower division resource science
courses and two lower division social
science/humanities courses in consultation
with adviser12-17
Depth Subject Matter32-37
Environmental Horticulture 102 4
Soil Science 100 5
Plant Sciences 1714
Environmental Horticulture 105 or Plant
Biology 102 or 1084-5
Plant Sciences 192 (minimum of 3 units) 3
Select two upper division resource science
courses and two upper division social
science/humanities courses in consultation
with adviser12-16
Areas of Specialization (choose one)
No course may be used to satisfy more than
one requirement.
·
Urban Forestry Option27
Environmental Horticulture 100, 101, 130,
133 14
Entomology 1105
Plant Biology 1474
Plant Pathology 1204
Floriculture/Nursery Option27
Environmental Horticulture 120, 125 8
Applied Biological Systems Technology
165 2
Entomology 110, 1359
Plant Sciences 142 4
Plant Pathology 1204
1 dill ramology 120
Landscape Management/Turf Option 27
Environmental Horticulture 129, 130,
133 12
Applied Biological Systems Technology
Applied Biological Systems Technology
Applied Biological Systems Technology 165 2
Applied Biological Systems Technology 165 2 Entomology 110 5 Plant Biology 117 4
Applied Biological Systems Technology 165 2 Entomology 110 5 Plant Biology 117 4
Applied Biological Systems Technology 165 2 Entomology 110 5 Plant Biology 117 4 Plant Pathology 120 4
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Applied Biological Systems Technology 165

Preparatory Subject Matter......61-69

Advising Center for the major is located in 1224 Plant and Environmental Sciences (530) 752-7738.

Environmental Policy Analysis and Planning

(College of Agricultural and Environmental Sciences)

The Major Program

The major in environmental policy analysis and planning develops an understanding of governmental policy-making and skills for analyzing policy in fields related to environmental quality.

Any student in good standing is eligible to transfer to the major; to do so, please see the major adviser, Joan Ogden in 2011 Academic Surge or Min Yu in 1001 Wickson Hall.

The Program. This major provides students with a general background in the natural sciences relevant to environmental policy. It also provides sufficient training in mathematics, statistics, and research methodology to quantitatively analyze environmental problems and policy options. A strong background in policy analysis, including the evaluation of policy alternatives and the study of factors affecting policy formulation and implementation is included. In addition, students are encouraged to develop sub-stantive knowledge in a specific field of environmental policy, such as urban and regional planning, water pollution control, or energy.

Career Alternatives. Environmental policy analysis and planning graduates are prepared for employment in public agencies, consulting firms, and businesses concerned with environmental affairs. The major is also excellent preparation for students who want to go on to graduate work in law, planning, public policy, or management.

B.S. Major Requirements:

UNITS

English Composition and Public Speaking Requirement...... 7-8

University Writing Program 101, 102A, 104A, 104B, 104C, 104D, or 104E 4 Communication 1 or 3 or Dramatic Art 10 3-4

Preparatory Subject Matter.....48-55

n. l l
Biological Sciences 1A or 2A or 10
or 10V
Chemistry 2A, 2B
Plant Sciences 21, or Science &
Society 18 3
Economics 1A, 1B 8
Animal Science 1, Biological Sciences 1B
or 2B, Geology 1, Hydrologic Science 124,
Plant Biology 12, Soil Science 100 3-5
Environmental Science and Policy 1 4
Mathematics 16A-16B or 21A-21B 6-8
Physics 1A or 7A 3 or 4
Political Science 1 4
Statistics 13, 32, 102
Jidiisiics 13, 32, 102

Satisfaction of General Education requirement.

Depth Subject Matter 43-44

(Students must take these units on a letter grade basis, and must attain an overall grade point average of 2.000 or higher in the Depth Subject Matter courses.) Environmental Science and Policy 110, Environmental Science and Policy 161 4
Environmental Science and Policy 161 4
Environmental Science and Policy 171 or
179 3-4
Environmental Science and Policy 178 4 Select one course from Sociology 106, Statistics 100, 103, 108, or Agricultural and Resource Economics 106 Economics 100 or Agricultural and Resource Environmental Science & Policy 175 or Agricultural and Resource Economics 176...... 4

Students must select courses in the Areas of Specialization that have not been taken in the Depth Subject Matter.

Areas of Specialization (choose one)......16-21

Advanced Policy Analysis Option

Select one course from Political Science 100, 104, 105, 120, 122, 155 or Environmental Science and Policy 169 ... 3-4 Select one course from Political Science 124, 126, or American Studies 101G 4 Select one course from Applied Biological Systems Technology 180, 185 or Environmental and Resource Sciences 186, 186L..... Select one course from Civil and Environmental Engineering 153, Agricultural and Resource Economics 106, or Economics 130 4

City and Regional Planning Option

Select one course from Applied Biological Systems Technology 180, 185, or Environmental and Resource Sciences 186, Environmental Engineering 165, Environmental Science and Policy 163 ... 3-4 Select one course from Soil Science 118 or Environmental Science and Policy 169 Environmental Science and Policy 171 100, Community and Regional Development 152, 156, or 171 or Art History 168 4

Energy Policy Option

Environmental Science and Policy 167 4 Engineering 160 and Civil and Environmental

Environmental Science Option

Students choosing the Environmental Science area of specialization must consult with a faculty adviser to identify an emphasis within this specialization and to select suitable courses. Possible areas of emphasis are biological conservation, pollutants in the environment, ecology, planning in the presence of environmental hazards. If you are considering this area of specialization, please contact the major adviser as soon as possible.

Transportation Planning Option

Select either Civil and Environmental	
Engineering 165 or Environmental Scien-	се
and Policy 163	.3-4
Select either Environmental Science and	
Policy 167 or 171	4
Applied Biological Systems Technology	
180	4
Environmental and Resource Sciences	
131	3
Economics 145	4

Vater Quality Option
Environmental Science and Policy 169 3
Select either Environmental and Resource
Science 121, or Hydrologic Science
150 3
Select one course from Hydrologic Science
141, 143, Geology 134, Soil Science
1183-4
Select one course from Environmental Science
and Policy 151, 155, Environmental and
Resource Sciences 100, Wildlife, Fish, and
Conservation Biology 1203-4
Select one course from Applied Biological
Systems Technology 180, 185, or
Environmental Resource Sciences 186,
186L4-5

Total Units for the Degree...... 114-128

Major Adviser. J. Ogden (Environmental Science and Policy)

Minor Program Requirements:

The faculty for environmental policy analysis and planning offers the following minor. The Énvironmental Policy Analysis minor is for natural and social science students desiring basic training in policy analysis theory and methods.

Environmental Policy Analysis......23-24

Preparation: Economics 1A; basic course in political science. Environmental Science and Policy 1.. Environmental Science and Policy 160, 161, 168A......13 Environmental Science and Policy 163, 169, 171, 172, 17968

Minor Adviser. J. Ogden (Environmental Science

Environmental and Resource Sciences

(College of Agricultural and Environmental Sciences) This major was discontinued as of Fall 2008; see Environmental Science and Management, on page

Environmental Science and Management

(College of Agricultural and Environmental Sciences)

The Major Program

The Environmental Science and Management (ESM) major is designed for students who are interested in solving environmental problems from an interdisciplinary perspective linking the natural and social sci-

Students who choose this major will study the interaction of physical, biological, and social components of environmental problems. Students completing the program will understand the scientific basis for environmental decision making and the legal, economic, and political issues involved in management of the environment.

The Program. Courses in biology, chemistry, physics, economics, and calculus form the lower-division foundation of the curriculum. These are then tied together with Environmental Science and Policy 1, "Environmental Analysis" which provides an interdisciplinary analysis of several environmental problems. The upper-division core consists of foundation courses in physical, biological, and social sciences, as well as applied courses in environmental monitoring, GIS, impact reporting, and statistical analysis. In their junior year, students must choose a specialized track from the following six options:

- (a) Ecology, Biodiversity, and Conservation (b) Natural Resource Management
- (c) Climate Change and Air Quality
- (d) Geospatial Information Science
- (e) Watershed Science
- (f) Soils and Biogeochemistry

A capstone course is required for all seniors and serves to integrate the science, policy/management and biology aspects of the ESM major. All students gain practical experience through field courses and a required internship. Selected students may also pursue an honors thesis in their senior year.

The ESM major is jointly administered by the Departments of Environmental Science and Policy (ESP) and Land, Air and Water Resources (LAWR). Any student in good standing is eligible to transfer to the major; to do so, please see the student affairs officers in 1001 Wickson Hall or in 1152 Plant and Environmental Sciences Building.

Career Alternatives. Graduates from this program are prepared to pursue careers as practicing environmental scientists, resource analysts and planners working for public agencies and private firms specializing in environmental quality, natural resources or ecological research. The major is also an excellent preparation for graduate or professional training in physical and/or biological environmental science graduate programs, as well as in environmental law, administration and environmental policy.

B.S. Major Requirements:

English Composition and Public Speaking requirement 7-8 University Writing Program 102G or 102B or 101 or 104E 4 Communication 1, 3 or Dramatic Art 10	UNI	TS
102B or 101 or 104E	English Composition and Public Speaking	
102B or 101 or 104E	requirement	8
Biological Sciences 2A, 2B, 2C	102B or 101 or 104E	
Geology 1 or 50	Preparatory Subject Matter 44-5	2
See General Education requirement. Core Subject Matter	Geology 1 or 50	_
Environmental Science and Management 120		24
Environmental Science and Management 120		
120		12
	120	

Track 36-45 Select one course from Atmospheric Science 60, 116, 133, Environmental Science and Management 121, 131, Environmental Science and Policy 152, Geology 134 or Soil Science 100, 118......3-5 Select one course from Environmental Science and Policy 170, 171, 172 or 1794 Evolution and Ecology 100 Select one course from Environmental Science and Policy 127 or Wildlife, Fish, and Conservation Biology 154.....4 Select one course from Environmental Science and Policy 123, 124 or Wildlife, Fish, and Conservation Biology 100......3-4 Select one course from Environmental Science and Policy 121 or Wildlife, Fish, and Conservation Biology 122.... Evolution and Ecology 104, 115, Environmental Science and Policy 151, 155, Plant Biology 117 or Wildlife, Fish, and Conservation Biology 155..... Select one course from Evolution and Ecology 147 or Plant Sciences 162 or Environmental

nagement
Select one biome level course on wetlands, forests, or water (See adviser for list) and one organismal biology course on birds, mammals, or plants (See adviser for list). Must also take one lab associated with courses
Natural Resource Management
Track34-41
Select three courses from Environmental Science and Policy 160, 167, 168A, 169, 171, 172 or 179
(or equivalent)4
Climate Change and Air Quality
Track33-40
Atmospheric Science 60

Track...... 33-42

Science and Management 131 or Geology

Environmental Science and Policy 116N, Hydrology 143 or Soil Science 100..... 6-9

Select one course from Environmental Science

Science and Management 100, 121,

and Management 144, Environmental

Select three courses from Applied Biological Systems Technology 181N, Environmental Science and Management 185, 186, 186L or Hydrology 182 9-12 Select two courses from Environmental Science and Policy 163, 169, 171, 172 or Science and Policy 121, Plant Sciences 121, Statistics 104, 106, 108, 130A, 130B or Other applicable information technology courses from the Engineering department including database management, digital library science and network and Web technologies may be substituted for spatial information with approval. Select three courses from the following options. Must cover both physical and biological courses from Atmospheric Science 110, 116, 133, Soil Science 100, 112 or 118, Environmental Science and Policy 124, 150C, 151, 152, 155, Geology 136, Plant Sciences 101 or Plant Biology 117 9-14

Soil Science 1005
Select four courses from Environmental
Science and Management 100, Hydrology
134, Soil Science 105, 107, 109, 111, 112
or 120 17-21
Select two courses from Environmental
Science and Management 121,

Matorchad Scianco Track	36-
or Plant Sciences 130	6-8
150A, 150C, 151, 155, Plant Biology	117
Environmental Science and Policy 116	
Science and Management 144,	
Select two courses from Environmental	
Soil Science 118	3-4
Hydrology 147, Landscape Design 15	
and Management 185, Geology 134,	
Select one course from Environmental S	cience
Environmental Science and Policy 171 or 179	7-8

Watershed Science Track	36-42
Hydrology 10	3
Environmental Science and Managemer	
or 121	4
Hydrology 143	3
Geology 35	3
Soil Science 100	
Select two courses from Environmental	
Science and Policy 168A, 169, 179 or	r
Hydrology 150	6-8
Select one course from Atmospheric Sci	ence
115, 116 or 133	3-4
Select one pair from Environmental Scie	ence
and Policy 151 & 151L or 155 & 155L	7
Select one course from Entomology 116	
Evolution and Ecology 115, 134 or Wi	ldlife,
Fish, and Conservation Biology 120	3-5

Total Units for the Major 113-138

Major Advisers. Marcel Holyoak (Environmental Science and Policy) and Randal Southard (Land, Air and Water Resources)

Advising centers for the major, including peer advising, are located in both the Environmental Science and Policy and Land, Air and Water Resources departments.

Students whose last names begin with the letters A-L, please see Kimberly Mahoney in 1001 Wickson Hall.

Students whose last names begin with the letters M-Z, please see Elizabeth Shull in 1150 Plant and Environmental Sciences.

Courses in Environmental Science and Management (ESM)

Lower Division Courses

6. Map Reading and Remote Sensing (3)

Lecture/discussion—3 hours. Restricted to 30 students. Basic skills in map reading, map grid systems, projections, aerial photography, photogrammetry, remote sensing sensors and platforms; the role of cartography and remote sensing in environmental analysis. Not open to students who have successfully completed Environmental Resources Sciences 6. (Formerly Environmental Resources Sciences 6.) GE credit: SE.—I. (I.) Bahre

8. Water Quality at Risk (3)

Lecture—2 hours; discussion—1 hour. Natural and human threats to water quality. Balance of science and policy in all aspects of attaining, maintaining, and managing water quality, water contamination. Decoding popular media coverage of water quality and water contamination. (Same course as Science and Society 8.) Not open to students who have successfully completed Environmental and Resource Sciences 8. (Formerly Environmental and Resource Sciences 8.) GE credit: SciEng or SocSci, Wrt | SE, SL, SS, WE.—II. (II.) Hernes

30. World Ecosystems & Geography (3)

Lecture—3 hours. Introduction to the earth's major geographic regions and associated ecosystems, such as deserts, temperate forests, and oceans with an examination of how climate, vegetation regimes, ecological processes, agriculture and other human activities interact in different regions of the world. (Same course as Environmental Science and Policy 30.) Not open to students who have successfully completed Environmental and Resource Sciences 30. (Formerly Environmental and Resource Sciences 30.) GE credit: SciEng | SE, SL, WC.—II. (II.) Jackson

47. Watershed Processes and Water Quality in the Tahoe Basin (2)

Lecture/laboratory-21 hours; fieldwork-9 hours; discussion—3 hours; term paper. Prerequisite: basic knowledge of environmental, soil, or hydrologic sciences. Watershed processes, runoff water-quality management, restoration in Lake Tahoe Basin. Soils, precipitation-runoff, revegetation and adaptive management related to erosion control, effective solutions, development of restoration strategies. Students develop field restoration. Course involves 3 days of instruction in Tahoe City. (Same course as Hydrologic Science 47.) Not open to students who have successfully completed Environmental and Resource Sciences 47. (Formerly Environmental and Resource Sciences 47.) GE credit: QL, SE, SL.-IV. (IV) Gris-

92. Internship (1-12)

Internship—3-36 hours. Prerequisite: lower division standing and consent of instructor. Work experience off and on campus in resource sciences. Internship supervised by a member of the faculty. (P/NP grad-

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor. Primarily for lower

division students. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

Upper Division Courses 100. Principles of Hydrologic Science (4)

Lecture-4 hours. Prerequisite: Chemistry 2B, Mathematics 16B, and Physics 7A or 9A. Topics include hydrology (surface and ground water), hydraulic flow through porous media, water in the soil-plantatmosphere continuum, water quality, flow through open channels, and representative water-resource problems. Not open to students who have successfully completed Environmental and Resource Sciences 100. (Formerly Environmental and Resource Sciences 100.) GE credit: SciEng | QL, SE, SL.-I. (I.) Grismer

108. Environmental Monitoring (3)

Lecture/discussion-2 hours; laboratory-2 hours; fieldwork. Prerequisite: entry level course work in student's major; specifically, Evolution and Ecology 101 (Evolution and Ecology), Environmental Science and Policy 100 (Environmental Biology and Management), Environmental Toxicology 101 (Environmental Toxicology), Wildlife, Fish, and Conservation Biology 100 (Wildlife, Fish, and Conservation Biology), Environmental and Resource Sciences 100 (Hydrologic Science), Soil Science 100 (Soil Science, Environmental Horticulture 100 (Environmental Horticulture and Urban Forestry), Landscape Architecture 50 (Landscape Architecture) or the equivalent for any of these courses. Instrumentation and methods for environmental and ecological monitoring; GPS, sensors, datalogging, and GIS. Wide range of measurement techniques for environmental parameters. Not open to students who have successfully completed Environmental and Resource Sciences 108. (Formerly Environmental and Resource Sciences 108.) GE credit: SE, SL.—III. (III.) Hopmans

120. Global Environmental Interactions (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: one college level chemistry course; one college level biology course. Limited to 25 students per discussion section. Relationships among climate, hydrology, biogeochemical cycles, soils and vegetation distribution in diverse landscapes and biomes. Emphasis on physical, chemical, and biological processes affecting ecosystems from the poles to the equator, and human impacts on the environment. Not open to students who have successfully completed Environmental Resources Sciences 60 or 120. (Formerly Environmental Resources Sciences 60 and 120.)— II. (II.) Houlton

121. Water Science and Management (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: Physics 10 or Geology 1. Role of water as an essential natural resource in contemporary society. Aspects of the scientific method, including descriptions of natural phenomena and underlying physical causes. Water for cities, agriculture, industry, wildlife and recreation; case studies of water manage ment. Not open to students who have successfully completed Environmental and Resource Sciences 121. (Formerly Environmental and Resource Sciences 121.) GE credit: SciEng | QL, SE, SL.-I. (I.)

131. Air as a Resource (3)

Lecture—2 hours; discussion—1 hour. Prerequisite: Chemistry 10. Degradation of the atmospheric resource, historical aspects and effects of air pollution examined. Evaluation of primary gaseous and particulate pollutants and discussion of their impact. Not open to students who have successfully completed Environmental and Resource Sciences 131. Formerly Environmental and Resource Sciences 131.) GÉ credit: QL, SE, SL.—II. (II.)

140. Culinary and Medicinal Herbs (3)

Lecture/discussion - 3 hours. Prerequisite: Plant Sciences 2, Biological Sciences 1C, or Biological Sciences 2C. Growth, identification, cultivation and use of common culinary and medicinal herbs; herbal plant families; effects of climate and soils on herbs; herbal medicine; ecology and geography of herbs; herbs garden design; secondary chemistry of active compounds. (Same course as Plant Sciences 140.) Not open for credit to students who have successfully completed Environmental and Resource Science 140 or Plant Biology 140. (Formerly Environmental and Resource Science or Plant Biology 140.) GE credit: SE.—III. (III.) Saltveit

141. Role of Fire in Natural Ecosystems (4)

Lecture—3 hours; term paper. Prerequisite: basic biological concepts: Biological Sciences 2A or Plant Sciences 2; ecology/evolution: Biological Sciences 2B or 2C. Fire regimes and roles in major North American vegetation types, especially in the west. Physics of fire, fire effects on organisms and ecosystem functioning, reconstructing fire histories, fire in resource management, and fire use by indigenous people. Not open to students who have successfully completed Environmental and Resource Sciences 141. (Formerly Environmental and Resource Sciences 141.) GE credit: SE, SL, WE.-II. (II.) Latimer

144. Trees and Forests (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Plant Sciences 2 or Biological Sciences 1C or 2C. Biological structure and function of trees as organisms; understanding of forests as communities and as ecosystems; use of forests by humans; tree phenology, photosynthesis, respiration, soil processes, life histories, dormancy, forest biodiversity, and agroforestry. (Same course as Plant Sciences 144.) Not open for credit to students who have completed Plant Biology 144 or Environmental Horticulture 144 or Environmental and Resource Science 144. (Former course Plant Biology/Environmental Horticulture/ Environmental and Resource Science 144.) GE credit: VL, SE.-I. (I.) Berry, Dahlgren, Rice

185. Aerial Photo Interpretation and Remote Sensing (4)

Lecture — 2 hours; laboratory — 4 hours. Prerequisite: upper division standing. Basics of remote sensing and photogrammetry, grids and map projections, aerial photo interpretation, sensors and platforms for aerial and space photography and non-photographic imaging systems, aerial thermography, microwave sensing, and introduction to remote sensing applications. Not open to students who have successfully completed Environmental Resource Science 185. (Formerly Environmental Resource Science 185.)—1. (1.)

186. Environmental Remote Sensing (3)

Lecture - 3 hours. Prerequisite: Mathematics 16B and Physics 7C or 9B; upper division standing. Overview of satellite, airborne, and ground-based remote sensing. Building on properties of EM Radiation, isotropic and non-isotropic scattering and absorption, examines applications in hydrologic processes, weather and climate, ecology and land use, soils, geology, forestry, and agriculture. Not open to students who have successfully completed Hydrologic Science 186 or Environmental and Resource Sciences 186. (Formerly Hydrologic Science 186 and formerly Environmental and Resource Sciences 186.) GE credit: QL, SE, VL.—III. (III.) Ustin

186L. Environmental Remote Sensing Lab

Laboratory-6 hours. Prerequisite: course 186 with a C or better, or concurrent enrollment in course 186. Computer based analysis and visualization of digital images and image processing techniques. Continuation of course 186 providing theory and direct experience in digital image processing. Not open to students who have successfully completed Environmental Resource Sciences 186L. (Formerly Environmental Resource Sciences 186L.) GE credit: QL, SE, SL, VL.-III. (III.) Ustin

192. Internship (1-12)

Internship-3-36 hours. Prerequisite: completion of 84 units; consent of instructor. Work experience off and on campus in resource sciences. Internship supervised by a member of the faculty. (P/NP grading only.) — I, II, III. (I, II, III.)

194H. Senior Honor Thesis (2-6)

Independent study - 2-6 hours. Prerequisite: senior standing, overall GPA of 3.50 or higher and consent of master adviser. Independent study, guided research on an environmentally related subject of special interest to the student. GE credit: SE, WE.

195. Integrating Environmental Science and Management (2)

Lecture/discussion-2 hours. Prerequisite: senior status in Environmental Science and Management major or other environmental science major (e.g Environmental Resource Science; Environmental Biology and Management; Environmental Toxicology Environmental Policy Analysis and Planning, Wildlife, Fish, and Conservation Biology; Hydrologic Science.); consent of instructor. Practical aspects of environmental improvement through integrated analyses of contemporary issues or problems associated with advocacy, regulation, science and resource management from the perspectives of the physical and ecological sciences and current policy/management. May be repeated two times for credit. GE credit: SS, SE.-II. (II.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only). - I, II, III. (I, II, III.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only).—I, II, III. (I, II, III.)

Environmental **Science and Policy**

(College of Agricultural and Environmental Sciences) Susan Handy, Ph.D., Chairperson of the Department Department Office. 2132 Wickson Hall

(530) 752-3026

Faculty

Marissa L. Baskett, Ph.D., Assistant Professor Howard V. Cornell, Ph.D., Professor Edwin D. Grosholz, Ph.D., Professor, Specialist in Cooperative Extension

Susan L. Handy, Ph.D., Professor Susan P. Harrison, Ph.D., Professor Alan M. Hastings, Ph.D., Professor Robert Hijmans, Ph.D., Associate Professor Marcel Holyoak, Ph.D., Professor John L. Largier, Ph.D., Professor

C.-Y. Cynthia Lin, Ph.D., Assistant Professor
(Environmental Science and Policy, Agricultural
and Resource Economics)
Mark N. Lubell, Ph.D., Professor
Steven G. Morgan, Ph.D., Professor
Joan M. Ogden, Ph.D., Professor
James F. Quinn, Ph.D., Professor
Eliska Rejmankova, Ph.D., Professor
James N. Sanchirico, Ph.D., Professor
Mark W. Schwartz, Ph.D., Professor
Academic Senate Distinguished Teaching Award
Andrew Sih, Ph.D., Professor

Daniel Sperling, Ph.D., Professor (Environmental Science and Policy, Civil and Environmental Engineering)

Michael Springborn, Ph.D., Assistant Professor Thomas P. Tomich, Ph.D., Professor (Environmental Science and Policy, Human and Community Development)

Emeriti Faculty

Charles R. Goldman, Ph.D., Professor Emeritus
Distinguished Graduate Mentoring Award
Robert A. Johnston, M.S., Professor Emeritus
Benjamin S. Orlove, Ph.D., Professor Emeritus
Paul A. Sabatier, Ph.D., Professor Emeritus
Seymour I. Schwartz, Ph.D., Professor Emeritus
Academic Senate Distinguished Teaching Award
Peter J. Richerson, Ph.D., Professor Emeritus

The Program of Study

Environmental Science and Policy is a teaching and research department offering courses, workshops, and directed group study classes that focus on the complex problems of human-environment relations. The department offers Bachelor of Science degrees in Environmental Science and Management and in Environmental Policy Analysis and Planning. Courses in Environmental Science and Policy also supplement major programs in a wide variety of established disciplines.

Current Information. Through its continuing contacts with many other departments and teaching divisions on the campus, the department develops a variety of special courses and workshops each year that cannot be listed here. Check with the Department office and with the expanded course description handbook of the College of Agricultural and Environmental Sciences for up-to-date information about courses.

Graduate Study. The Graduate Group in Ecology which is housed in Environmental Science & Policy offers a M.S. and Ph.D. degree program. Further information about graduate programs in ecology should be obtained from the chairperson of the Graduate Group in Ecology.

Group Office. 1005 Wickson Hall 530) 752-6752; http://ecology.ucdavis.edu/

Courses in Environmental Science and Policy (ESP)

Lower Division Courses

1. Environmental Analysis (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: University Writing Program 1 or English 3 or equivalent; sophomore standing; Economics 1A and Biological Sciences 2B recommended. Analysis of the physical, biological, and social interactions which constitute environmental problems. Emphasis on analysis of environmental problems, the consequences of proposed solutions, and the interaction of environmental science and public policy in creating solutions. GE credit: SE, SL, SS.—I. (I.) Baskett, Sanchirico

10. Current Issues in the Environment (3)

Lecture—3 hours. Prerequisite: elementary biology recommended. The science behind environmental issues, and policies affecting our ability to solve domestic and international environmental problems. Resources, environmental quality, regulation, environmental perception and conservation. Integrative

case studies. Not open for credit to students who have completed course 1. GE credit: SciEng | SE or SS, SL., WE.—II. (II.) Holyoak

30. World Ecosystems & Geography (3)

Lecture—3 hours. Introduction to the earth's major geographic regions and associated ecosystems, such as deserts, temperate forests, and oceans with an examination of how climate, vegetation regimes, ecological processes, agriculture and other human activities interact in different regions of the world. (Same course as Environmental Science and Management 30.) Not open to students who have successfully completed Environmental and Resource Sciences 30. (Formerly Environmental and Resource Sciences 30.) GE credit: SciEng | SE, SL, WC.—II, III. [II, III, III.]

92. Internship (1-12)

Internship—3-36 hours. Prerequisite: lower division standing and consent of instructor. Work experience off and on campus in all subject areas offered in the College of Agricultural and Environmental Sciences. Internship supervised by member of the faculty. (P/NP grading only.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

Upper Division Courses 100. General Ecology (4)

Lecture—3 hours; discussion—1 hour. Prerequisites: Biological Sciences 1A, 1B, 1C, Mathematics 16A, 16B; Statistics 13 recommended. Theoretical and experimental analysis of the distribution, growth and regulation of species populations; predator-prey and competitive interactions; and the organization of natural communities. Application of evolutionary and ecological principles to selected environmental problems. GE credit: SE, SL.—I, II. (I, II.) Cornell, Sih

101. Ecology, Nature, and Society (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Anthropology 1 or 2 or course 30 or Evolution and Ecology 100 or Biological Sciences 101. Interdisciplinary study of diversity and change in human societies, using frameworks from anthropology, evolutionary ecology, history, archaeology, psychology, and other fields. Topics include population dynamics, subsistence transitions, family organization, disease, economics, warfare, politics, and resource conservation. (Same course as Anthropology 101.) GE credit: SocSci, Div, Wrt | SS, WC, WE.—II. (II.)

105. Evolution of Societies and Cultures (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Anthropology 1 or 2 or course 30 or Evolution and Ecology 100 or Biological Sciences 101. Interdisciplinary study of social and cultural evolution in humans. Culture as a system of inheritance, psychology of cultural learning, culture as an adaptive system, evolution of maladaptations, evolution of technology and institutions, evolutionary transitions in human history, coevolution of genetic and cultural variation. Only 2 units of credit to students who have completed course 101 or Anthropology 101 prior to fall 2004. (Same course as Anthropology 105.) GE credit: SocSci, Wrt | SS, WC, WE.—III. (III.)

(a) Environmental Science

110. Principles of Environmental Science (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Physics 1A or 7A, Mathematics 16B or 21B, and Biological Sciences 1A. Application of physical and chemical principles, ecological concepts, and systems approach to policy analysis of atmospheric environments, freshwater and marine environments, land use, energy supplies and technology, and other resources. GE credit: QL, SE, SL.—II. (II.) Largier

111. Marine Environmental Issues (1)

Discussion—1 hour; seminar—2 hours. Prerequisite: upper division standing or consent of instructor; concurrent enrollment in at least one course from courses 124, 152, Evolution and Ecology 106, 110, 114; residence at or near Bodega Marine Laboratory required. Student must complete the application

available at http://www.bml.ucdavis.edu. An examination of critical environmental issues occurring in coastal waters. Course links together material from concurrent courses at BML to develop an integrative understanding of marine environments and their conservation. Includes readings, group discussions, and interaction with visiting speakers. May be repeated two times for credit. (Same Course as Evolution and Ecology 111.) GE credit: SE, SL.—IV. (IV.) Gaylord, Largier, Morgan, Sanford

116N. Oceanography (3)

Lecture—2 hours; laboratory—3 hours; field work. Prerequisite: one of Geology 1, 2, 16 or 50. Advanced oceanographic topics: Chemical, physical, geological, and biological processes; research methods and data analysis; marine resources, anthropogenic impacts, and climate change; integrated earth/ocean/atmosphere systems; weekly lab and one weekend field trip. Offered in alternate years. (Same course as Geology 116N.) GE credit: SE, SL.—II. (II.)

(b) Ecological Analysis 121. Population Ecology (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 1B, 1C, Mathematics 16A-16B. Development of exponential and logistic growth models for plant and animal populations, analysis of age structure and genetic structure, analysis of competition and predator-prey systems. Emphasis is on developing models and using them to make predictions and solve problems. Offered in alternate years. GE credit: SciEng, Wrt | QL, SE, SL.—II. (II.) Baskett, Hastings

123. Introduction to Field and Laboratory Methods in Ecology (4)

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 100 or the equivalent, Statistics 102 or the equivalent. Introduces students to methods used for collecting ecological data in field and laboratory situations. Methods used by population ecologists and community ecologists; emphasis on experimental design, scientific writing and data analysis. GE credit: SE, SL.—(III.) Grosholz

124. Marine and Coastal Field Ecology (3)

Lecture — 2 hours; discussion — 1 hour; laboratory — 3 hours; fieldwork — 3 hours. Prerequisite: upper division standing or consent of instructor. Introductory animal biology (Biological Sciences 1B) recommended; residence at or near Bodega Marine Lab required. Student must complete the application available at http://www.bml.ucdavis.edu. Ecology of marine populations and communities living in diverse habitats along the California coast. Handson learning using scientific process and tools of the biological trade to address ecological questions arising during field trips. Critical thinking through discussing scientific literature. GE credit: SE, SL.—IV. (IV.) Morgan

127. Plant Conservation Biology (4)

Lecture/discussion—3 hours; discussion—1 hour; term paper. Prerequisite: Environmental Science and Policy 100 or equivalent upper division general ecology. Principles governing the conservation of plant species and plant communities, including the roles of fire, exotic species, grazing, pollination, soils, and population genetics; analytic and practical techniques for plant conservation; and introduction to relevant legal, ethical, and policy issues. Limited enrollment. GE credit: SE, SL.—II. (II.) Harrison

(d) Aquatic Ecosystems Analysis 150A. Physical and Chemical Oceanography (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Environmental Science and Policy/Geology 116, Physics 9B, Mathematics 22C, Chemistry 1C; or upper division standing in a natural science and consent of instructor. Physical and chemical properties of seawater, fluid dynamics, air-sea interaction, currents, waves, tides, mixing, major oceanic geochemical cycles. (Same course as Geology 150A.) GE credit: QL, SE.—I. (I.) McClain, Spero, Largier

150B. Geological Oceanography (3)

Lecture - 3 hours. Prerequisite: Geology 50 or 116. Introduction to the origin and geologic evolution of ocean basins. Composition and structure of oceanic crust; marine volcanism; and deposition of marine sediments. Interpretation of geologic history of the ocean floor in terms of sea-floor spreading theory. (Same course as Geology 150B.) GE credit: SE.—II. (II.) McClain

150C. Biological Oceanography (4)

Lecture-3 hours; discussion-1 hour; fieldworkone weekend field trip required. Prerequisite: Biological Sciences 1A and a course in general ecology of consent of instructor. Ecology of major marine habitats, including intertidal, shelf benthic, deep-sea and plankton communities. Existing knowledge and contemporary issues in research. Segment devoted to human use. (Same course as Geology 150C.) GE credit: SE, SL.-IV. (IV.)

151. Limnology (4)

Lecture - 3 hours; discussion - 1 hour; special project. Prerequisite: Biological Sciences 1A and junior standing. The biology and productivity of inland waters with emphasis on the physical and chemical environment. GE credit: SE.

151L. Limnology Laboratory (3)

Laboratory—6 hours; two weekend field trips. Prerequisite: course 151 (may be taken concurrently); junior, senior, or graduate standing. Limnological studies of lakes, streams, and reservoirs with interpretation of aquatic ecology. GE credit: SE.

152. Coastal Oceanography (3)

Lecture - 2 hours; discussion - 1 hour; laboratory - 3 hours; fieldwork-3 hours. Prerequisite: upper division standing or consent of the instructor; physics (Physics 9B), calculus (Mathematics 21B) and exposure to physical and chemical oceanography (Geology/Environmental Science and Policy 150A) are recommended; residence at or near Bodega Marine Laboratory required. Student must complete the application available at http:// www.bml.ucdavis.edu. The oceanography of coastal waters, including bays, river plumes, nearshore and estuaries; focus on transport patterns, how they are forced and implications for ecological and environmental problems. Pertinent for students in oceanography, ecology, environmental engineering, geology and hydrology. GE credit: SE, SL.—IV. (IV) Largier

155. Wetland Ecology (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or Plant Biology 117 required; course 110 or 151 recommended. Introduction to wetland ecology. The structure and function of major wetland types and principles that are common to wetlands and that distinguish them from terrestrial and aquatic ecosystems. GE credit: SE. – I. (I.) Rejmankova

155L. Wetland Ecology Laboratory (3)

Lecture - 1 hour; laboratory - 6 hours; field-work two 1-day weekend field trips. Prerequisite: course 155 required (may be taken concurrently). Modern and classic techniques in wetland field ecology. Emphasis on sampling procedures, vegetation analysis, laboratory analytical procedures, and examples of successful wetland restoration techniques. GE credit: SE, SL.—I. (I.) Rejmankova

(e) Environmental Policy Analysis 160. The Policy Process (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Political Science 1; Economics 1A; intermediate statistics; course 172. Alternative models of public policymaking and application to case studies in the U.S. and California. GE credit: SS.—III. (III.) Lubell

161. Environmental Law (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: upper division standing and one course in environmental science (course 1, 10, 110, Biological Sciences 1A, Environmental Toxicology 10, or Resource Sciences 100); Political Science 1 and University Writing Program 1 recommended. Introduction for non-Law School students to some of the principal

issues in environmental law and the judicial interpretation of some important environmental statutes e.g., NEPA. GE credit: SocSci, Wrt | SS.-III. (III.)

162. Environmental Policy (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Economics 1A. Compares economic with socio-cultural approaches to understanding the causes of environmental problems and strategies for addressing them. Includes different approaches to the policy process, policy instruments, and environmental behavior. Applies these principles to several problems. GE credit: SS.—II. (II.) Springborn

163. Energy and Environmental Aspects of Transportation (4)

Lecture — 3 hours; extensive writing. Prerequisite: Economics 1A and Civil and Environmental Engineering 162. Engineering, economic, and systems planning concepts. Analysis and evaluation of energy, air quality and selected environmental attributes of transportation technologies. Strategies for reducing pollution and petroleum consumption in light of institutional and political constraints. Evaluation of vehicle emission models. (Same course as Civil and Environmental Engineering 163.) Offered in alternate years. GE credit: Wrt | SE, SL, SS, WE.-I. Sperling

164. Ethical Issues in Environmental Policy (3)

Lecture - 3 hours. Prerequisite: courses 160, 168A; seniors only in Environmental Policy Analysis and Planning or by consent of instructor. Basic modes of ethical reasoning and criteria of distributive justice applied to selected topics in environmental policymaking. GE credit: SS.-III. (III.)

167. Energy Policy (4)

Lecture-4 hours; term paper. Prerequisite: Economics 1A, Mathematics 16B, or consent of instructor. Survey of primary energy resources (fossil, renewable, nuclear), energy conversion methods, future energy demand scenarios, and environmental impacts of energy. Overview of energy policy in the U.S. Analysis of policy alternatives for addressing energy-related environmental and national security issues. Offered in alternate years. GE credit: SS.-(III.) Ogden

168A. Methods of Environmental Policy Evaluation (5)

Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: Statistics 13; Economics 100 or Agricultural and Resource Economics 100A; Mathematics 16B or 21B; course 1; upper division standing. Evaluation of alternatives for solution of complex environmental problems; impact analysis, benefitcost analysis, distributional analysis, decision making under uncertainty, and multi-objective evaluation. GE credit: SS.—I. (I.) Ogden

168B. Methods of Environmental Policy Analysis (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 168A. Continuation of course 168A, with emphasis on examination of the literature for applications of research and evaluation techniques to problems of transportation, air and water pollution, land use, and energy policy. Students will apply the methods and concepts by means of a major project.

169. Water Policy and Politics (3)

Lecture - 3 hours. Prerequisite: Economics 1A or Political Science 1. The governance of water, including issues of water pollution/quality and water supply. The politics of water decision-making and effectiveness of water policy. Broad focus on federal water policy, with case examples from nationally significant U.S. watersheds. GE credit: SocSci | SS.-(III.) Lubell

(f) Environmental Planning 170. Conservation Biology Policy (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 1 and Economics 1A; Economics 100 or Agricultural and Resource Economics 100A recommended. Analysis of policies designed to conserve species and their habitats. Emphasis on how individual incentives affect the success of conservation policies. Valuation of endangered species and biodiversity. Criteria for deciding conservation priorities. GE credit: SE, SS. — (III.) Schwartz

171. Urban and Regional Planning (4)

Lecture - 3 hours; discussion - 1 hour; term paper. Prerequisite: course 1; a course in social science and a course in environmental science. How cities plan for growth in ways that minimize environmental harm. Standard city planning tools (general plan, zoning ordinance) and innovative new approaches. Focus on planning requirements and practices in California. Relationships between local, regional, state, and federal policy. GE credit: SS, WE.—III. (III.) Handy

172. Public Lands Management (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A. Investigation of alternative approaches to public lands management by Federal and state agencies. The role each agency's legislation plays in determining the range of resource allocations. GE credit: SocSci | ACGH, SS.-I. (I.)

173. Land Use and Growth Controls (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Political Science 1, Economics 1A, intermediate statistics (Sociology 106 or Statistics 102 or the equivalent), and local government (Applied Behavioral Science 157, 158 or Political Science 100, 102 or 104.) Exposes students to the economic, political, and legal factors affecting land use and growth controls, and helps students critically evaluate written materials in terms of their arguments and supporting data. GE credit: SS.

175. Natural Resource Economics (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: Agricultural and Resource Economics 100B or Economics 100 or the equivalent. Economic concepts and policy issues associated with natural resources, renewable resources (ground water, forests, fisheries, and wildlife populations) and non-renewable resources (minerals and energy resources, soil). (Same course as Agricultural and Resource Economics 175.) GE credit: SocSci | SS.-III. (III.) Lin

178. Applied Research Methods (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Statistics 103 or Sociology 106 or the equivalent. Research methods for analysis of urban and regional land use, transportation, and environmental problems. Survey research and other data collection techniques; demographic analysis; basic forecasting, air quality, and transportation models. Collection, interpretation, and critical evaluation of data. GE credit: QL, SS.—II. (II.) Handy

179. Environmental Impact Assessment (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: upper division standing and one course in environmental science (course 100, 110 or the equivalent). Introduction to the information resources and methods typically used in environmental impact analysis. Emphasis on how environmental information is applied to planning, environmental regulation, and public policymaking, with case studies from California land use and natural resource policy. GE credit: SS.-II. (II.) Quinn

179L. Environmental Impact Reporting Using Geographic Information (2)

Laboratory/discussion-2 hours; laboratory hours. Prerequisite: course 179 concurrently. Introduction to Geographic Information Systems (GIS) by using ArcView for assessment and environmental planning. Not open for credit to students who have completed Applied Biological Systems Technology 180, 181 or Agricultural Systems and Environment 132. GE credit: SE.

(g) Other Courses 190. Workshops on Environmental Problems (1-8)

Laboratory-2-16 hours. Prerequisite: consent of instructor. Workshops featuring empirical analyses of contemporary environmental problems by multidisciplinary student teams. Guided by faculty and lay

professionals, the teams seek to develop an integrated view of a problem and outline a series of alternative solutions. Open to all upper division and graduate students on application. (P/NP grading only.) GE credit: SE. - I, II, III. (I, II, III.)

191A. Workshop on Food System Sustainability (3)

Lecture—2 hours; laboratory—3 hours. Prerequisite: upper-division standing; Plant Sciences 15, Community and Regional Development 20, Agricultural and Resource Economics 121, Plant Sciences 150 or consent of the instructor. Priority enrollment for seniors in the sustainable agriculture and food systems major; limited to 25 students per section. First in a two-quarter senior capstone course sequence. Identify projects addressing specific problems and opportunities of sustainable agriculture and food systems, form multidisciplinary teams, and identify and consult with key stakeholders to understand their needs and concerns. GE credit: SE.-I. (I.) Tomich

191B. Workshop on Food System Sustainability (3)

Lecture - 2 hours; laboratory - 3 hours. Prerequisite: course 191A. Priority enrollment for seniors in the sustainable agriculture and food systems major; limited to 25 students per section. Continuation of course 191A. Student teams conduct analyses of a specific issue in sustainable agriculture or food systems, prepare a critical assessment of technological, economic, environmental, and social dimensions of options for action and present their results to stake-holders. GE credit: SE.—II. (II.) Tomich

192. Internship (1-12)

Internship - 3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience off and on campus in all subject areas offered in the College of Agricultural and Environmental Sciences. Internships supervised by a member of the faculty. (P/NP grading only.)

198. Directed Group Study (1-5)

(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading

Graduate Courses

212A. Environmental Policy Process (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course in public policy (e.g., Environmental Science and Policy 160); environmental law (e.g., Environmental Science and Policy 161); course in bureaucratic theory (e.g., Political Science 187 or Environmental Science and Policy 166); course in statistics (e.g., Sociology 106 or Agricultural and Resource Economics 106). Introduction to selected topics in the policy process, applications to the field of environmental policy. Develops critical reading skills, understanding of frameworks of the policy process and political behavior, and an ability to apply multiple frameworks to the same phenomena. Offered in alternate years. (Same course as Ecology 212A.)—III. Lubell

212B. Environmental Policy Evaluation (4)

Lecture-1 hour; discussion-1 hour; seminar-2 hours. Prerequisite: intermediate microeconomics (e.g., Economics 100); Statistics 108 or Agricultural and Resource Economics 106; policy analysis (e.g., Environmental Science and Policy 168A or the equivalent); Agricultural and Resource Economics 176. Methods and practices of policy analysis; philosophical and intellectual bases of policy analysis, pilo osophical and intellectual bases of policy analysis and the political role of policy analysis. (Same course as Ecology 212B.) Offered in alternate years. — (III.) Springborn

220. Tropical Ecology (3)

Lecture — 2 hours; discussion — 1 hour. Prerequisite: advanced introductory ecology course—course 100, Evolution and Ecology 101, 117; Evolution and Ecology 138 recommended. Open to graduate and undergraduate students who meet requirement subject to consent of instructor. An overview of present status of knowledge on structure and processes

of major tropical ecosystems. Differences and similarities among tropical and temperate systems stressed. Offered in alternate years. - (III.) Rejmank-

228. Advanced Simulation Modeling (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: courses 128-128L; Statistics 108 or Agricultural and Resource Economics 106. Advanced techniques in simulation modeling; optimization and simulation, dynamic parameter estimation, linear models, error propagation, and sensitivity testing. Latter half of course will introduce model evaluation in ecological and social system models.

252. Sustainable Transportation Technology and Policy (3)

Lecture -2 hours; discussion -1 hour. Prerequisite: course 160 or the equivalent. Role of technical fixes and demand management in creating a sustainable transportation system. Emphasis on technology options, including alternative fuels, electric propulsion, and IVHS. Analysis of market demand and travel behavior, environmental impacts, economics and politics. (Same course as Civil and Environmental Engineering 252.)—III. Sperling

275. Economic Analysis of Resource and **Environmental Policíes (4)**

Lecture/discussion-4 hours. Prerequisite: Agricultural and Resource Economics 204/Economics 204. Development of externality theory, market failure concepts, welfare economics, theory of renewable and non-renewable resource use, and political eco-nomic models. Applications to policy issues regarding the agricultural/environment interface and managing resources in the public domain. (Same course as Agricultural and Resource Economics 275.)—III. (III.)

278. Research Methods in Environmental Policy (3)

Lecture/discussion-3 hours. Prerequisite: Agricultural and Resource Economics 106 or the equivalent. Introduction to scientific research in environmental policy. Major issues in the philosophy of the social sciences. How to design research that acknowledges theoretical assumptions and that is likely to produce evidence in an intersubjectively reliable fashion with explicit recognition of its uncertainties.

298. Directed Group Study (1-5) 299. Research (1-12)

Prerequisite: graduate standing. (S/U grading only.)

Environmental Sciences

See Agricultural Management and Rangeland Resources, on page 141; Atmospheric Science, on page 170; **Environmental and Resource** Sciences, on page 295; Environmental Biology and Management, on page 293; **Environmental Horticulture and** Urban Forestry, on page 294; Environmental Policy Analysis and Planning, on page 295; Environmental Toxicology, on page 300; Hydrology, on page 347; Landscape Architecture, on page 362; Soil and Water Science, on page 501; and Wildlife, Fish, and Conservation Biology, on page 530.

Environmental **Toxicology**

(College of Agricultural and Environmental Sciences) Ronald S. Tjeerdema, Ph.D., Chairperson of the Department

Department Office. 4138 Meyer Hall (530) 752-1142; http://www.envtox.ucdavis.edu

Gary N. Cherr, Ph.D., Professor (Environmental Toxicology, Nutrition) Michael S. Denison, Ph.D., Professor Fumio Matsumura, Ph.D., Professor (Environmental Toxicology, Entomology) Nilesh Gaikwad, Ph.D., Assistant Professor Patricia Oteiza, Ph.D., Professor (Environmental Toxicology, Nutrition) Robert H. Rice, Ph.D., Professor Takayuki Shibamoto, Ph.D., Professor Ronald S. Tjeerdema, Ph.D., Professor Barry W. Wilson, Ph.D., Professor (Ánimal Science, Environmental Toxicology) Andrew Whitehead, Ph.D., Assistant Professor Matthew J. Wood, Ph.D., Associate Professor Qi Zhang, Ph.D., Associate Professor

Emeriti Faculty

Arthur Craigmill, Ph.D., Specialist in Cooperative Extension, Emeritus Donald G. Crosby, Ph.D., Professor Emeritus Dennis P. H. Hsieh, Sc.D., Professor Emeritus James N. Seiber, Ph.D., Professor Emeritus Michael W. Stimmann, Ph.D., Lecturer Emeritus Dorothy E. Woolley, Ph.D., Professor Emertus

Affiliated Faculty

George V. Alexeeff, Ph.D., Adjunct Professor Ruth Ballard, Ph.D., Assistant Adjunct Professor Deborah Bennett, Ph.D., Associate Professor (Public Health Sciences, School of Medicine) Mari Golub, Ph.D., Adjunct Professor (CNPRC) Matt Hengel, Ph.D., Assistant Adjunct Professor Dirk Holstege, Ph.D., Assistant Adjunct Professor Norman Kado, Ph.D., Adjunct Professor Sree Kanthaswamy, Ph.D., Associate Adjunct Professor

John Knezovich, Ph.D., Adjunct Professor Melanie Marty, Ph.D., Associate Adjunct Professor Alyson E. Mitchell, Ph.D., Professor (Food Science and Technology) Cecilia Von Beroldingen, Ph.D., Lecturer (UC Davis Extension Forensics Program and Department of Justice) Zachary A. Wong, Ph.D., Adjunct Professor

The Major Program

Toxic agents found in the environment include pesticides, food additives, industrial waste, and metals as well as chemicals produced by animals, plants, fungi and bacteria. Students in the Environmental Toxicol ogy major learn how toxicants produce adverse effects by understanding both their environmental fates and biological activities. They learn about monitoring concentrations and the distribution and persistence of agents found in water, soil, air and foods. Toxicity testing procedures and exposure assessments are used to help evaluate potential for harm to humans and other species. By understanding the cellular targets and biochemical mechanisms of perturbation by toxicants, toxicologists can better estimate adverse effects. Overall, students learn mechanisms by which toxic agents act, their origin and fate and how toxicologists evaluate the risk of adverse effects and balance them against the benefits of us.

The Program. Preparatory courses in biology, chemistry, mathematics, and physics are required to provide fundamental principles which underlie toxi cology. Students in the major are expected to understand the environmental fates and biological activities of different classes of toxic substances, and the legislative issues which arise from chemical use.

Opportunities are available to develop in-depth understanding in areas of emphasis through selec-

Specializations/Emphases. Elective course work in many disciplines can complement the required core courses. Providing a framework for selecting restricted electives, the major offers specializations in (1) Environmental Toxicology and Chemistry, (2) Forensic Science and Regulatory Toxicology, and (3) Molecular and Biomedical Toxicology. The first category includes topics in chemical fate, transport and degradation, as well as ecology, wildlife, and aquatic toxicology. The second category includes forensic science, environmental policy and management, and public health. The third category includes pharmacology, biotechnology, medicine, veterinary medicine, and food toxicology. Students are encouraged to select course work from these specializations and beyond to match their interests.

Internships and Career Alternatives. Occupations that use environmental toxicology include risk assessment, pharmaceutical development, food additive toxicity testing, managing regulatory compliance, residue or forensic analysis, pest control, monitoring and field sampling, industrial hygiene, and environmental health and safety. A substantial proportion of graduates elect to pursue advanced training in graduate or professional schools. Others with the B.S. degree have gone on to law, medical, pharmacy, or veterinary medical school, as well as to graduate degrees in pharmacology, toxicology, agricultural and environmental chemistry, or public health. During undergraduate study, optional internships or research projects are recommended to provide training and work experience to help students pursue future goals.

B.S. Major Requirements:

UNITS Preparatory Subject Matter......72-73

Biological Sciences 2A, 2B, 2C 14-15

Note: Students transferring from community college with the equivalent of the Biological Sciences 1 series would receive credit on a case-by-case

Chemistry 2A-2B-2C or 2AH-2BH-2CH, and 118A-118B-118C or 128A-128B-128C, 129A Mathematics 17A-17B-17C or Statistics 100, 102, 103, 104, 106, or

Preferably, the course should be taken prior to enrollment in Environmental Toxicology 102B and

Satisfaction of the General Education requirement to include courses selected with adviser's approval to complement the major; courses in agricultural economics, environmental studies, political science, psychology, and sociology are particularly

Depth Subject Matter 37-47

Biological Sciences 101 and 102 or 102 and

Restricted Electives......24-26

Electives selected for area of specialization/ emphasis with faculty adviser's approval with 6 unit combined maximum of 190, 192, 198, and 199 with advisor approval; see department website for details.

Total Units for the Major......133-146

Major Adviser. Takayuki Shibamoto

Advising Center for the major is in 4111 Meyer Hall. Contact the Academic Program Adviser at (530) 752-1042.

Minor Program Requirements:

UNITS

Environmental Toxicology 18-26

Environmental Toxicology 101, 102A, 103A Completion of two upper division Environmental Toxicology elective courses 6 units minimum, selected from the following list: Environmental Toxicology 104, 120, 127, 128, 130, 131, 135, 138, and 1466-14

Minor Adviser. M.S. Denison

Graduate Study. Programs of study leading to M.S. and Ph.D. degrees are available through related Graduate Groups such as Pharmacology and Toxicology; Biochemistry, Molecular, Cellular, and Developmental Biology; Agricultural and Environmental Chemistry; and the Forensic Science Masters Degree Program. For information on graduate study, contact the Advising Office or the appropriate graduate adviser; see Graduate Studies, on page

Graduate Advisers. Matthew Wood (Pharmacology and Toxicology), Matt Hengel (Agricultural and Environmental Chemistry)

Courses in Environmental Toxicology (ETX)

Lower Division Courses

10. Introduction to Environmental Toxicology (3)

Lecture-3 hours. Hazardous substances, their effects on humans and their actions and movement in the environment. Emphasis on substances of current concern. GE credit: SciEng | SE, SL.—I. (I.)

20. Introduction to Forensic Science (3)

Lecture - 3 hours. Basic principles of forensic science, types of information on which investigations focus, how information is obtained and used in criminal investigations, types of scientific skills required to practice forensic science, guidance on training. Real cases discussed; demonstrations of methods provided. GE credit: SciEng, Wrt | SE, SL, VL.-II. (II.) Kanthaswamy

30. Chemical and Drug Use and Abuse (3)

Lecture—3 hours. An overview of chemical use and abuse in our society. The effects of chemicals (therapeutic drugs, pesticides, food additives, herbal remedies, environmental contaminants, and recreational drugs) on humans and other living systems. GE credit: SciEng | SE.-III. (III.) Miller

92. Internship (1-12)

Internship - 3-36 hours. Prerequisite: lower division standing and consent of instructor. Work experience off and on campus in all subject areas offered in the College of Agricultural and Environmental Sciences. Internships supervised by a member of the faculty. (P/NP grading only.) GÉ credit: SE.

99. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.

Upper Division Courses 101. Principles of Environmental Toxicology (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: Chemistry 8B, 118B, or 128B and Biological Sciences 1A. Principles of toxicology with a focus on environmental, industrial, and natural chemicals. Topics include fate and effects of chemicals in organisms and the environment, air pollutants, insecticides, aquatic toxicology, endocrine disruptors, biomarkers and bioassays, and risk assessment. GE credit: SE, SL.—I. (I.) Denison

102A. Environmental Fate of Toxicants (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Chemistry 8B, 118B, 128B or consent of instructor. Properties of toxic chemicals influencing their distribution and transformations; action of environmental forces affecting toxicant breakdown, movement, and accumulation; sources and occurrence of major classes of environmental toxicants. Not open for credit to students who have completed course 112A. GE credit: QL, SE, SL, VL, WE.—II. (II.) Tjeerdema

102B. Quantitative Analysis of Environmental Toxicants (5)

Lecture - 3 hours; laboratory - 3 hours; discussion -1 hour. Prerequisite: course 102A. Sample preparation methods for trace analysis of environmental toxicants. Concept and techniques of advanced analytical instrumentation. Interpretation and use of analytical data. Not open for credit to students who have completed course 112B. GE credit: SE, VL.— III. (III.) Shibamoto

103A. Biological Effects of Toxicants (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Biological Sciences 102; course 101 and Neurobiology, Physiology, and Behavior 101 recommended. Biological effects of toxic substances in living organisms. Metabolism, cellular and tissue targets, mechanisms of action, and pathological effects. Not open for credit to students who have completed course 114A. GE credit: SE.—II. (II.) Rice

103B. Biological Effects of Toxicants: **Experimental Approaches (5)**

Lecture—3 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: course 103A. Experimental approaches for assessing the biological effects of toxicants. Not open for credit to students who have completed course 114B. GE credit: SE, VL, WE.—III. (III.) Miller

104. Environmental and Nutritional Factors in Cellular Regulation and Nutritional Toxicants (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 101; Biological Sciences 103 or Animal Biology 103. Cellular regulation from nutritional/toxicological perspective. Emphasis: role of biofactors on modulation of signal transduction pathways, role of specific organelles in organization/ regulation of metabolic transformations, major cofactor functions, principles of pharmacology/toxicology important to understanding nutrient/toxicant metabolism. (Same course as Nutrition 104.) GE credit: OL, SE, SL. — I. (I.) Oteiza, Rucker

110. Toxic Tragedies and Their Impact on Society (2)

Lecture — 2 hours. Prerequisite: Biological Sciences 10 or the equivalent or consent of instructor; Chemistry 118A recommended. Examination of toxic tragedies, their origins, consequences, and effects on toxic regulation. GE credit: Wrt | OL, SE, SL, WE.-

111. Introduction to Mass Spectrometry (3)

Lecture - 3 hours. Prerequisite: Chemistry 118C Introduction to mass spectrometry, including ionization techniques, mass analyzers, interpretation of mass spectra, and applications of mass spectrometry. Emphasis on fundamental concepts of mass spectrometry necessary to identify and quantify organic molecules. GE credit: SE.

120. Perspectives in Aquatic Toxicology (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 8B, 118B or 128B, Biological Sciences 1A, or consent of instructor. Toxic substances, their fate in marine and freshwater systems, and their effects on aquatic organisms, populations, and ecosystems. Emphasis on substances and issues of current concern. Offered in alternate years. GE credit: OL, SE, SL, VL, WE.—II. Cherr, Tjeerdema

127. Environmental Stress and **Development in Marine Organisms (10)**

Lecture-4 hours; laboratory-12 hours; discussion-2 hours. Prerequisite: course 101 or Biological Sciences 102 or 104 or the equivalent; course 114A or Nutrition 114 recommended. Course taught at Bodega Marine Laboratory. Effects of environmental and nutritional stress, including pollutants, on development and function in embryos and larvae of marine organisms. Emphasis on advanced experimental methods. (Same course as Nutrition 127.) GE credit: SciEng | OL, QL, SE, SL, VL, WE.—IV. Cherr

128. Food Toxicology (3)

Lecture—3 hours. Prerequisite: Biological Sciences 102 and 103. Chemistry and biochemistry of toxins occurring in foods, including plant and animal toxins, intentional and unintentional food additives. The assessment of food safety and toxic hazards. (Same course as Food Science and Technology 128.) GE credit: SciEng | SE.—III. (III.) Shibamoto, Mitchell

130. The Role and Applications of Toxicology in Modern Industry (3)

Lecture—3 hours. Prerequisite: course 101 required; course 103A recommended. Role of toxicology in industry research and development, human health and environmental protection, hazard and risk evaluations, risk management and communications, product stewardship, and regulatory compliance. Scientific principles and methods of toxicology in chemical, energy, pharmaceutical, pesticide, biotechnology industries. GE credit: OL, SE, SL, VL, WE.—III. (III.) Wong

131. Environmental Toxicology of Air Pollutants (3)

Lecture—3 hours. Prerequisite: Chemistry 8B (may be taken concurrently) or the equivalent; Biological Sciences 102 recommended. Field trip required. Toxicology of air pollutants in the ambient, indoor, and occupational environments. Health effects, sources, environmental fates, pulmonary responses, sampling and analyses, and air-quality criteria and standards. GE credit: SE, VL.—I. (I.) Kado

135. Health Risk Assessment of Toxicants (3)

Lecture—3 hours. Prerequisite: course 101; course 114A recommended. Current practices of health risk assessment of environmental chemicals using toxicological principles and their application to regulatory control of these chemicals. GE credit: SciEng | QL, SE, SL, VL.—I. (I.) Marty

138. Legal Aspects of Environmental Toxicology (3)

Lecture—3 hours. Prerequisite: course 10 or 101 recommended. Federal and California legislation concerning air and water pollution, pesticide use, food and feed additives, consumer protection, and occupational exposure to toxic substances; roles of federal regulatory agencies; alternatives to government control. GE credit: SE, VL, WE.—II. (II.) Alexelff

146. Exposure and Dose Assessment (3)

Lecture—3 hours. Prerequisite: course 112A; course 135 recommended. The exposure component of risk assessment; specifically, the presence and/or formation of toxic substances in environmental media, their movement within and between contaminated media, and the contacts of human populations with those media. Offered in alternate years. GE credit: SciEng | QL, SE, SL, VL.—III. (III.) Bennett

190. Seminar (1)

Seminar—1 hour. Prerequisite: consent of instructor. Selected topics presented by students, faculty, or outside speakers covering current research and instructional activities within environmental toxicology. Reports and discussion concerning oral and written presentations, literature sources, and career opportunities. (P/NP grading only.) GE credit: SE.—I, II, III. (I. II. III.)

190C. Research Group Conference (1)

Discussion — 1 hour. Prerequisite: consent of instructor. Weekly conference of advanced research methods and the interpretation of research results. (P/NP grading only.) GE credit: SE.—I, II, III. (I, II, III.)

190S. Environmental Toxicology Career Seminar (1)

Seminar—1 hour. Careers in environmental toxicology; discussions with graduates from the Department of Environmental Toxicology and other experts in the field. (P/NP grading only.) GE credit: SE.—I. (I.)

192. Internship (1-12)

Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience off and on campus in all subject areas offered in the College of Agricultural and Environmental Sciences. Internships supervised by a member of the faculty. (P/NP grading only.) GE credit: SE.

194HA-194HB. Honors Research (3-3)

Discussion—1 hour; laboratory—6 hours. Prerequisite: senior standing, minimum GPA of 3.250, consent of instructor. Specific research project conducted under the supervision of a faculty sponsor. Experience to include experimental design, learning new techniques, data analysis and interpretation of findings. (P/NP grading only; deferred grading pending completion of sequence.) GE credit: SE.

194HC. Honors Research (3)

Laboratory—6-9 hours; discussion—1 hour. Prerequisite: senior standing, minimum GPA of 3.250, and consent of instructor. Continuation of course 194HA-194HB. (P/NP grading only.) GE credit: SE.

197T. Tutoring in Environmental Toxicology (1-5)

Hours and duties will vary depending upon course being tutored. Prerequisite: advanced standing in Environmental Toxicology, a related major, or the equivalent experience and consent of instructor. Teaching toxicology including conducting discussion groups for regular departmental courses under direct guidance of staff. May be repeated for credit up to a total of 5 units. (P/NP grading only.) GE credit: SE.

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.) GE credit: SE.

Graduate Courses

203. Environmental Toxicants (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 128C (or the equivalent), or Chemistry 8B and consent of instructor. Toxic chemicals: selected topics illustrating their occurrence, structure, and the reactions underlying detection, toxicity, fate, and ecological importance. Offered in alternate years.—II. Matsumura

214. Mechanisms of Toxic Action (3)

Lecture—3 hours. Prerequisite: Biological Sciences 102, 103, and consent of instructor. Chemical, biochemical, and molecular mechanisms underlying the adverse effects of toxic chemicals. Students are required to write a grant proposal and participate in a grant review panel. Offered in alternate years.— (III.) Denison, Hammock

220. Analysis of Toxicants (3)

Lecture—3 hours. Prerequisite: coursework in organic chemistry. Principles of microanalysis of toxicants. Theoretical considerations regarding separation, detection and quantitative determination of toxicants using chemical and instrumental techniques. (Same course as Forensic Science 220.)—I. (I.) Zhang

220L. Analysis of Toxicants Laboratory (2)

Laboratory—6 hours. Prerequisite: course 220 (may be taken concurrently) and consent of instructor. Laboratory techniques for microanalysis of toxicants. Separation, detection, and quantitative determination of toxicants using chemical and instrumental methods.—1. (I.) Wood

228. Gas Chromatography/Mass Spectrometry of Toxic Chemicals (3)

Lecture—1 hour; discussion—1 hour; laboratory—3 hours. Prerequisite: course 220 and Chemistry 129C; or consent of instructor. Application of GC/MS techniques to investigate toxic chemicals. Mass spectral fragmentations and their application to the structural elucidation. Practical application of GC/MS in current research. Preference given to environmental toxicology graduate students. Offered in alternate years.—II. (II.) Holstege

234. Current Topics in Neurotoxicology (3)

Lecture - 3 hours. Prerequisite: core courses in one of the following graduate programs: Pharmacology and Toxicology, Agricultural and Environmental Chemistry, Biochemistry and Molecular Biology, Cell and Developmental Biology, Immunology, Molecular Cellular and Integrative Physiology or Neuroscience. Restricted to upper level undergraduate students must obtain permission from the course coordinator. General principles of neurotoxicology, the cell and molecular mechanisms and health impacts of specific neurotoxicants and the contribution of neurotoxic compounds to complex neurodevelopmental disorders and neurodegenerative diseases. (Same course as Molecular Biosciences 234 and Molecular, Cellular, and Integrative Physiology 234.) Offered in alternate years. - II. P. Lein

240. Ecotoxicology (3)

Lecture—3 hours. Prerequisite: elementary course in toxicology and ecology or the equivalent, or consent of instructor. Principles of toxicology as applied to chemical action on natural populations, communities, and ecosystems. Physical, chemical, and biological characteristics which influence ecotoxic effects, modeling, and field research. Selected case histories are analyzed and presented in class.—III. (III.)

250. Reproductive Toxicology (3)

Lecture—1.5 hours; lecture/discussion—1.5 hours. Prerequisite: Physiology 220 or Pharmacology—Toxicology 203. Application of toxicological principles in reproductive studies. Effects of toxicants on the male, female, and developing embryo/fetus. Critical evaluation of reproductive toxicity studies and development of mechanistic approaches to understanding how chemical exposure can adversely affect reproduction. Offered in alternate years.—(II.) Cherr, Golub

260. Immunotoxicology (3)

Lecture—3 hours. Prerequisite: undergraduate or graduate introduction to immunology coursework recommended, but not required; graduate standing or consent of instructor. Provides students with skills and knowledge for evaluating and applying research on the impact of environmental toxicants on immunological function in human and wildlife populations. Offered in alternate years.—Golub

270. Toxicology of Pesticides (3)

Lecture—3 hours. Prerequisite: one course each in (a) Organic Chemistry, (b) Biochemistry, (c) Toxicology (course 101 or equivalent), or consent of instructor; graduate standing. Classification and chemical properties of pesticides, their mode of action, metabolism and disposition, pesticide resistance, effects on human health and ecological health and methods of risk benefit analyses. Offered in alternate years.—II. Matsumura

278. Molecular Techniques (3)

Lecture—3 hours. Prerequisite: graduate standing or consent of instructor. Recombinant DNA technology and its applications. (Same course as Forensic Science 278.) Offered in alternate years.—(I.) Denison, Rice

280. Forensic DNA Analysis (3)

Lecture—3 hours. Prerequisite: coursework in genetics and molecular biology. Foundation in theory and practice of forensic DNA analysis; past, present, and emerging technologies; legal and quality assurance issues. DNA extraction, DNA quantitation, multiplex amplification of STR loci, capillary electrophoresis of amplified products, and analysis of STR typing data. (Same course as Forensic Science 280.)—Von Beroldingen

281. Principles and Practice of Forensic Serology and DNA Analysis (3)

Lecture - 2 hours: lecture/discussion - 3 hours. Prerequisite: Forensics/course 278 or Forensics/course 280, or equivalent: consent of instructor, Restricted to students enrolled in the M.S. in Forensic Science Program or by consent of Forensic Science Program Director. Comprehensive overview of forensic serology and DNA typing techniques and technologies. Strong emphasis on real-world applications, including preservation and tracking of biological evidence, detection and identification of bodily fluids, and methods to extract, quantify, and type human DNA. (Same course as Forensic Science 281.)—III. (III.) Ballard

284. Non-Human Forensic DNA-Theory and Casework Application (2)

Lecture - 2 hours. Prerequisite: consent of instructor required for all students not enrolled in the MS Forensics program; upper division Molecular Biology and Genetics or its equivalent. Restricted to graduate standing. Provides a comprehensive understanding of plant and animal forensic biology in terms of sample collection, preservation, analytical methods, and of the invaluable lines of inquiry these forensic evidence may permit. (Same course as Forensic Science 284.) Offered in alternate years.—I. Kanthaswamy

290. Seminar (1)

 $Seminar-1\ hour.\ Current\ topics\ in\ environmental$ toxicology. (S/U grading only.)—I, II, III. (I, II, III.)

290C. Advanced Research Conference (1)

Lecture/discussion-1 hour. Prerequisite: consent of instructor. Presentation and critical discussion of advanced research methods and interpretation of research results. Designed primarily for graduate students. (S/U grading only.)—I, II, III. (I, II, III.)

297T. Tutoring in Environmental Toxicology (1-5)

Hours and duties will vary depending upon course being tutored. Prerequisite: graduate standing in Environmental Toxicology, a related major, or the equivalent experience, and consent of instructor. Teaching toxicology including conducting discussion groups for regular departmental courses under direct guidance of staff. May be repeated for credit up to a total of 5 units. (S/Ú grading only.)

298. Group Study (1-5) 299. Research (1-12)

(S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)-I, II, III. (I, II, III.)

Epidemiology

See Medicine and Epidemiology (VME), on page 523.

Epidemiology (A Graduate Group)

David R. Gibson, Ph.D., Chairperson of the Group Group Office. 5215 VM3A

(530) 752-2657; Fax (530) 754-0225

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Faculty

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Rahman Azari, Ph.D., Lecturer (Statistics) Heejung Bang, Ph.D., Associate Professor (Public Health Sciences)

Christopher M. Barker, Ph.D. (Center for Vectorborne Diseases)

Laurel A. Beckett, Ph.D., Professor (Public Health Sciences)

Deborah Bennett, Associate Professor (Department of Public Health Sciences) Walter Boyce, D.V.M., Ph.D., Professor

(Population Health & Reproduction) Kenneth Brown, M.D., Professor (Nutrition)

Diana Cassady, Dr.P.H., Associate Professor (Department of Public Health Sciences)

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(Public Health Sciences) Beate Crossley, Ph.D., Assistant Professor (California Animal Health and Food Safety Laboratory)

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Lorien Dalrymple, M.D., M.P.H., Assistant Professor (Internal Medicine)

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(Department of Public Health Sciences)

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(Population Health and Reproduction) Danielle Harvey, Ph.D., Associate Professor (Public Health Sciences, Biostatistics)

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(Public Health Sciences)
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(Physical Medicine and Rehabilitation)
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Paul Leigh, Ph.D., Professor

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(Family and Community Medicine) Danh Nguyen, Ph.D. Professor

(Public Health Sciences)
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(Public Health Sciences)

Thomas Scott, Ph.D., Professor (Entomology) Chin-Shang Li, Ph.D., Professor (Department of Public Health Sciences)

Christine Stewart, M.P.H, Ph.D., Assistant Professor

(Department of Nutrition)
Robert Szabo, M.D., Professor (Orthopedic Surgery) Daniel Tancredi, Ph.D., Assistant Professor (Pediatrics)

Elisa Tong, M.D., Assistant Professor

(Internal Medicine) Xiaowei Yang, Ph.D., Assistant Professor (Department of Public Health Sciences)

Michael Ziccardi, Ph.D., Professor (Wildlife Health Center)

Emeriti Faculty

Robert Bondurant, D.V.M., Professor Emeritus James Case, D.V.M., Ph.D., Professor Emeritus Nancy East, M.P.V.M., D.V.M., Professor Emeritus Bruce Eldridge, Ph.D., Professor Emeritus Neil Flynn, M.D., M.P.H., Professor Emeritus Sharon Hietala, Ph.D., Professor Emeritus David Hird, D.V.M., M.P.V.M., Ph.D., Professor

John Robbins, M.D., M.H.S., Professor Emeritus Robert Shumway, Ph.D., Professor Emeritus Mark Thurmond, D.V.M., M.P.V.M., Ph.D., Professor

Alvin Wiggins, Ph.D., Professor Emeritus

Graduate Study. The Graduate Group in Epidemiology offers programs of study and research leading to the M.S. and Ph.D. degrees. Areas of emphasis include environmental/occupational epidemiology; infectious disease epidemiology; epidemiologic methods and biostatistics; health services and economics; nutritional epidemiology; reproductive, perinatal, developmental and pediatric epidemiology; and wildlife epidemiology. For detailed information regarding the program, address the chairperson of the group or see the website.

Graduate Advisers. Janet Foley (Medicine and Epidemiology), Danielle Harvey (Public Health Sciences), and William Reisen (Center for Vectorborne

Required Courses for the Program

Prerequisite Courses. Prerequisites may be taken concurrently with required courses below.

Mathematics 16A-16B or 21A-21B Statistics 102, 106, and 108, or Preventive Veterinary Medicine 402, 403

Required Courses. These courses are required of all students in the program; M.S. and Ph.D. degrees. These requirements cannot be waived and must be met before a student's Qualifying Examination.

Epidemiology 204A, 204B, 205A, 205B, 206, 207, 208 and 290 Statistics 130A-130B One course from Population Health and Reproduction 202 or Statistics 144

Related Courses. For additional course work in Epidemiology, please see Medicine and Epidemiology, Preventive Veterinary Medicine, Population Health and Reproduction, Public Health Sciences, and Statistics.

Courses in Epidemiology (EPI)

Graduate Courses

204. Statistical Models, Methods, and Data Analysis for Scientists (4)

Lecture—3 hours; laboratory/discussion—1 hour. Prerequisite: Statistics 130B or 131B, or 133; Statistics 108 recommended. Development of broad statistical skills useful for the analysis of scientific data. Special emphasis given to determining factors associated with characteristics like disease and time-toevent. Analysis of data that can be modeled as generalized linear and generalized linear mixed models, parametric and non-parametric survival models, and models for correlated, clustered, longitudinal data. - III. Johnson

204A. Foundation of Statistical Models, Methods, and Data Analysis for Scientists

Lecture—3 hours; laboratory/discussion—1 hour. Prerequisite: Statistics 130A, or Statistics 131A, or Statistics 133, course 228 recommended. Provides the mathematical statistics foundation for statistical models, methods, and data analysis. — II. (II.) Bang

204B. Statistical Models, Methods, and Data Analysis for Scientists (4)

Lecture—3 hours; laboratory/discussion—1 hour. Prerequisite: course 204A; Statistics 108 recommended. Introduces statistical models, methods, and data analysis in the areas of generalized linear, survival, and correlated data methodology.—III. (III.) Li

205A. Principles of Epidemiology (4)

Lecture-4 hours. Prerequisite: Preventive Veterinary Medicine 402 or consent of instructor. Basic epidemiologic concepts and approaches to epidemiologic research, with examples from veterinary and human medicine, including outbreak investigation, infectious disease epidemiology, properties of tests, and an introduction to epidemiologic study design and surveillance. (Same course as Preventive Veterinary Medicine 405.)—I. (I.) Gold

205B. Integration of Epidemiologic Concepts (2)

Discussion - 2 hours. Prerequisite: Preventive Veterinary Medicine 405/course 205A can be taken concurrently. In-depth analysis and integration of basic epidemiologic concepts and approaches to epidemiologic research presented in Preventive Veterinary Medicine 405/course 205A, with more mathematical and theoretical basis and examples from veterinary and human medicine, including outbreak investigation, infectious disease epidemiology, properties of diagnostic tests, study design, and surveillance. - II. (II.) Hertz-Piccioto

206. Epidemiologic Study Design (3)

Lecture - 20 sessions; discussion - 6 sessions; laboratory-4 sessions. Prerequisite: course 205A and 205B or consent of instructor. Builds on concepts presented in course 205. Concepts of epidemiologic study design-clinical trials, observational cohort studies, case control studies-introduced in course 205A are covered in more depth, using a problem-based format. Discussion of published epidemiologic studies. (Same course as Preventive Veterinary Medicine 406A.)—II. (II.) Gold

207. Advanced Concepts in Epidemiologic Study Design (4)

Lecture/discussion-4 hours. Prerequisite: course 205B and 206. In-depth integration of advanced concepts in study design, with theory and examples, including confounding, effect modification under additive and multiplicative models, internal and external validity, bias, misclassification, alternate designs, source populations, statistical power and sample size, causation, and genetic epidemiology.—III. (III.) Kass

208. Analysis and Interpretation of Epidemiológic Data (3)

Lecture—16 sessions; laboratory—21 sessions; project. Prerequisite: course 204 (may be taken concurrently) and 207, and either Statistics 144 or Population Health and Reproduction 202 and entry level skill in standard statistical software (e.g., SPSS,

BMDP, SAS, Stata, MinTab, S-Plus). Application of theory and concepts of statistics and epidemiology to analysis and interpretation of data typically found in veterinary and human epidemiologic research.-

210A. Analytic Epidemiology I: Case-Control Studies (3)

Lecture - 2 hours; laboratory/discussion - 3 hours. Prerequisite: Statistics 130B and Preventive Veterinary Medicine 406 (or the equivalent), or consent of instructor. Theory and practice of epidemiologic data analysis. Topics include confounding, stratification, matching, interaction, and logistic regression. (Same course as Population Health and Reproduction 210A.)—II. (II.) Kass

210B. Analytic Epidemiology II: Cohort Studies (3)

Lecture — 3 hours. Prerequisite: course 210A. Theory and practice of epidemiologic data analysis. Topics include rates, rate standardization, cohort analysis, Poisson regression, and survival/failure-time methods. (Same course as Population Health and Reproduction 210B.)—III. (III.) Kass

220. Problems in Epidemiologic Study Design (4)

Lecture - 3 hours; term paper. Prerequisite: Preventive Veterinary Medicine 405 and 406 or the equivalent; Population Health and Reproduction 207 concurrently; Statistics 102 and 106 or the equivalent. Design and development of research protocols and funding applications for peer review. Application of research methods data collection and management and statistical analysis in research proposals. Methods of evaluating research proposals, mechanisms of funding, specifying human subjects considerations.—III. (III.) Gold

222. Epidemiological Modeling (3)

Lecture — 2 hours; laboratory — 3 hours. Prerequisite: Preventive Veterinary Medicine 405. Techniques of model building and simulation of infectious diseases will be explored. Epidemiologic modeling philoso phy, construction and validation will be emphasized. Offered in alternate years.—II.

223. Spatial Epidemiology (3)

Lecture - 2 hours; laboratory - 3 hours. Prerequisite: Preventive Veterinary Medicine 405 or Environmen tal Studies 126 or Veterinary Medicine 409. Geographic Information Systems (GIS) and spatial statistics. Students are expected to complete a term project based on their graduate research. Offered in alternate years.—II.

224. Health and Ecological Risk Analysis

Lecture - 2 hours; laboratory - 3 hours. Prerequisite: Preventive Veterinary Medicine 406 or consent of instructor; background in statistics, including multivariable techniques; a course in differential equations. A methodological approach to risk analysis for human and animal-related health and ecological issues. Basic principles of risk analysis, including perception, communication, assessment and management. Emphasis on the assessment of risk.—III.

225. Advanced Topics in Epidemiology Methods (2)

Discussion - 2 hours. Prerequisite: courses 205B, 206, and 207 (or equivalents, with consent of instructor). An in-depth study of topics in epidemiology theory and methods, selected from: causal inference, confounding, study design, or other related areas, with year to year variation. Readings are assigned and students are expected to lead discussions on them. May be repeated for credit when topic differs. Not offered every year.—III. Hertz-Pic-

226. Methods for Longitudinal and Repeated Measurement Data (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: course 204 or consent of instructor. Mixed models for longitudinal data (LD)/repeated measurements; Mean and covariance models; General linear LD models; Random coefficients models; Linear mixed effects models for continuous outcome; Generalized linear mixed effects model for discrete outcome including binary, ordinal and count data. - I. (I.) Nguyen

228. Quantitative Methods for **Epidemiology (4)**

Lecture - 3 hours; lecture/discussion - 1 hour. Prerequisite: Mathematics 16A-B or Mathematics 17A-B or Mathematics 21A-B or equivalent; basic knowledge of the principles of linear algebra, such as those taught in mathematics 22A or the equivalent, is assumed. The application of calculus and linear algebra techniques to epidemiological problems. Topics include applications of derivatives, integration, exponentials and logarithms, multivariable calculus, infinite series, and vector and matrix algebra, with examples and problems taken from epidemiology and related subjects.—I. (I.) Harvey

229. Geographic Information Systems for Health Professionals (4)

Lecture - 2 hours; laboratory - 6 hours. Emphasis on basic geographic and data management principles. Focus on software proficiency in application to analyzing/solving health-related problems. For graduate and professional students in epidemiology, public health, preventive veterinary medicine, health informatics with interest in spatial techniques in research. - III. (III.)

240. Principles of Injury Epidemiology (3)

Lecture/discussion-3 hours. Overview of the epidemiology of human injury, including general principles, surveillance methods, behavioral factors, environmental factors, treatment issues and engineering and legal interventions related to vehicular injuries, drownings, falls, fires and burns, poisonings, firearm injuries, and other intentional injuries. —II. (II.) Romano

250. Introduction to Clinical Research Design and Epidemiology (1)

Lecture - 1 hour. Prerequisite: graduate standing or medical/nursing personnel. For medical personnel who are or will be involved in medical research. Review of basics of clinical study design and analysis of clinical data. (S/U grading only.)-I. (I.) McCurdy, Romano

251. Environmental Epidemiology (3)

Lecture — 3 hours. Prerequisite: Preventive Veterinary Medicine 405 (may be taken concurrently); upper division undergraduates who have completed Environmental Studies 126; or the equivalent. Examination of the human health effects and the risk of disease from community, occupational, and personal exposure to toxic substances. Offered in alternate years. - I. Schenker

252. Social Epidemiology (2)

Lecture/discussion – 2 hours. Prerequisite: course 205A; consent of instructor. Social determinants of health; psychosocial and physiological pathways; health and social inequality; gender and racial/ethnic disparities in health; social support, social cohesion and health; social gradient in behavioral risk factors; social ecological approaches to health intervention; interventions addressing social determinants. (Same Course as Public Health Sciences 252.) - III. (III.)

260. Epidemiology of Chronic Diseases and Aging (3)

Lecture/discussion-3 hours. Overview of the epidemiology of chronic disease in old age. Topics include biology of aging, epidemiology of cardiovascular disease, neoplasms, osteoporosis and fractures, psychosocial factors and health in old age, dementias, functional status and prevention of dis-

270. Research Methods in Occupational Epidemiology (3)

Laboratory/discussion-3 hours. Prerequisite: Environmental Studies 126 or Preventive Veterinary Medicine 405; and Statistics 102 or Epidemiology and Preventive Medicine 402. Methods used in epidemiologic research on occupational hazards. Topics include design and analysis of cohort and case-control studies, sample size, measuring dose, choosing

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a control group, validation of employment and health data, interpreting negative studies, and analysis software. Offered in alternate years. - III

272. Cancer Epidemiology (2)

Recitation — 1 hour; discussion — 1 hour. Prerequisite: must have basic understanding of epidemiologic and statistical concepts that are covered in courses 205A, 205B, 206 (may be taken concurrently), and Statistics 102. We will cover the underlying concepts essential to understanding cancer epidemiology, such as trends in incidence and survival, epidemiologic methods used to assess cancer etiology, prevention and control, and an introduction to the cancerinitiation and progression multi-stage model. - II. (II.) Cress

290. Seminars in Epidemiology (1)

Seminar - 1 hour. Students will actively participate in presentation and discussion of ongoing or published research projects in epidemiology. (S/U grading only.)—III. (İİI.)

291. Seminars in Human Health Services Research and Clinical Epidemiology (1)

Seminar-1 hour. Critical review, evaluation, and discussion of research in health services and clinical epidemiology. Presentation of statistical, epidemiologic, and econometric methods. Students present their own research and critique the work of others. May be repeated for credit. (Same course as General Medicine 291.) (S/U grading only.)-I, II, III. (I,

298. Group Study (1-5)

Seminar - 1-5 hours. Group study in selected areas of epidemiology

299. Research (1-12)

Research in selected areas of epidemiology. (S/U grading only.)

Evolution and Ecology

(College of Biological Sciences)

Peter Wainwright, Ph.D., Chairperson of the Depart-

Department Office. 2320 Storer Hall (530) 752-1272; http://www.eve.ucdavis.edu

Faculty

David J. Begun, Ph.D., Professor Graham Coop, Ph.D., Associate Professor James A. Doyle, Ph.D., Professor Jonathan A. Eisen, Ph.D., Professor (Medical Microbiology and Immunology) Brian P. Gaylord, Ph.D., Associate Professor Richard K. Grosberg, Ph.D., Professor Academic Senate Distinguished Teaching Award, UC Davis Prize for Teaching and Scholarly Achievement Susan L. Keen, Ph.D., Senior Lecturer, SOE Artyom V. Kopp, Ph.D., Professor Charles H. Langley, Ph.D., Professor Harris A. Lewin, Ph.D., Professor (Vet Med: Population Health and Reproduction)
Brian R. Moore, Ph.D., Assistant Professor Gail L. Patricelli, Ph.D., Associate Professor Bruce H. Rannala, Ph.D., Professor Marcel Reimanek, Ph.D., Professor Eric D. Sanford, Ph.D., Associate Professor Thomas W. Schoener, Ph.D., Professor Sebastian Schreiber, Ph.D., Professor Arthur M. Shapiro, Ph.D., Professor Academic Senate Distinguished Teaching Award John J. Stachowicz, Ph.D., Professor Academic Senate Distinguished Teaching Award Maureen L. Stanton, Ph.D., Professor UC Davis Prize for Teaching and Scholarly Achievement Sharon Y. Strauss, Ph.D., Professor

Donald R. Strong, Ph.D., Professor Michael Turelli, Ph.D., Professor Peter C. Wainwright, Ph.D., Professor Academic Senate Distinguished Teaching Award Susan Williams, Ph.D., Professor

Emeriti Faculty

John H. Gillespie, Ph.D., Professor Emeritus Milton Hildebrand, Ph.D., Professor Emeritus Academic Senate Distinguished Teaching Award Peter R. Marler, Ph.D., Professor Emeritus Robert W. Pearcy, Ph.D., Professor Emeritus Judy A. Stamps, Ph.D., Professor Emeritus Kenneth E. F. Watt, Ph.D., LL.D, Professor Emeritus

Affiliated Faculty

Carole Hom, Ph.D., Academic Coordinator R. Pat Randolph, Ph.D., Academic Coordinator/

The Evolution, Ecology and **Biodiversity Major Program**

The major in Evolution, Ecology and Biodiversity offers the student a broad background in the theoretical and empirical basis of our understanding of the diversity and distribution of living organisms.

The Program. The program of study for the major begins with a core of introductory courses in mathe matics, physical sciences, and biology. These are followed by survey courses in biodiversity, evolution and ecology and various more specialized courses that focus the student on particular disciplines or organisms, with an emphasis on problem-solving and critical thinking. Evolution, Ecology and Biodiversity majors may earn either a Bachelor of Science or a Bachelor of Arts degree. The requirements for the B.S. degree program include more science courses, such as biochemistry, whereas those for the A.B. degree program allow room for more electives within the humanities and social sciences. The A.B. degree is especially appropriate for those students who wish to combine arts or languages with evolution and ecology for career preparation in such areas as scientific writing, translating or illustration.

Career Alternatives. A degree in Evolution, Ecology and Biodiversity prepares the student for career opportunities in research, teaching, health professions, veterinary medicine, agriculture, environmental management, and industry. Many students gain some research experience while at ÚC Davis and choose to continue their training at the graduate level. This track offers careers in academics, government, environmental organizations, or business.

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A.B. Major Requirements:

Preparatory Subject Matter.....40-44 Biological Sciences 2A-2B-2C......14 Mathematics* 17A-17B (17C recommended) or 21A-21B (21C recommended) or Statistics requirement only for transfer students admitted prior to fall 2013. Depth Subject Matter36 Biological Sciences 101 4 One course from Evolution and Ecology 100; Geology 107; Anthropology 151.....3-4 One course from Evolution and Ecology 101; Environmental Science and Policy 100; Wildlife, Fish, and Conservation Biology Additional upper division course work in biological science to achieve a total of 36 or more units24-25 Include at least one course from each of the areas of study below. Areas of Study: (1) Biodiversity: Entomology 103; Evolution and Ecology 105, 108, 112, 134, 140; Microbiology 105; Nematology 110; Plant

Biology 116, 118, 147, 148; Wildlife, Fish, and Conservation Biology 110, 111, (2) Advanced Evolution and Ecology: Evolution and Ecology 102, 103, 104, 107, 115, 117, 119, 120, 131, 138, 141, 147, 149, 150, 180A and 180B, Note: A maximum of 4 units of variable-unit courses (numbered 192, 198, 199) may be applied to upper division elective unit requirements. Courses numbered 197T are not applicable to the upper division elective unit requirement.

Total Units for the Major76-80 **B.S. Major Requirements:**

Preparatory Subject Matter......55-65 Biological Sciences 2A-2B-2C14 Chemistry 8A-8B or 118A-118B-118C 6-Mathematics* 17A-17B-17C or 21A-21B (21C recommended) 8-12 fulfill this requirement only for transfer students admitted prior to fall 2013.

Depth Subject Matter49 Biological Sciences 101, 105 (or 102 + Additional upper division course work in biological science to achieve a total of 49 or more units, including at least 2 units (6 hours per week) of laboratory or Include at least one course from the Biodiversity and two courses from the

Advanced Evolution and Ecology areas of study below.

Areas of Study:

(1) Biodiversity: Entomology 103; Evolution and Ecology 105, 108, 112, 134, 140; Microbiology 105; Nematology 110; Plant Biology 116, 118, 147, 148; Wildlife, Fish, and Conservation Biology 110, 111, 120

(2) Advanced Evolution and Ecology Evolution and Ecology 102, 103, 104, 107, 115, 117, 119, 120, 131, 138, 141, 147, 149, 150, 180A and 180B,

Note: A maximum of 4 units of variable-unit courses (numbered 192, 198, 199) may be applied to upper division elective unit requirements, but not to the upper division laboratory requirement. Courses numbered 197T are not applicable to the upper division elective unit requirement.

Total Units for the Major104-114 **Biological Sciences Electives**

The following courses are acceptable toward the fulfillment of the upper division biological sciences requirement in the A.B. and B.S. major programs and may be selected without adviser approval Other elective courses are approved on an individual basis by petition through an adviser.

Anatomy, Physiology and Cell Biology 100 Anthropology 151, 152, 153, 154A, 154B, 155, 156 Biological Sciences, all upper division courses

Chemistry 107A, 107B Entomology, all upper division courses except

Environmental Science and Policy 110, 116, 121, 123, 150C, 151, 151L Evolution and Ecology 190 Geology 107, 107L, 150C Microbiology, all upper division courses

Molecular and Cellular Biology, all upper division courses Nematology 110 Neurobiology, Physiology, and Behavior, all upper division courses Nutrition 101, 111 Pathology, Microbiology, and Immunology 101, 126, 126L, 128 Philosophy 108 Plant Biology, all upper division courses Psychology 121, 122, 127, 129 Wildlife, Fish, and Conservation Biology 120, 120L, 121

Minor Program Requirements:

Evolution, Ecology and Biodiversity 18

Evolution and Ecology 100, 101.....8 One course in Biodiversity..... Entomology 103; Evolution and Ecology 105*, 108*, 112, 112L*‡, 114*, 134, 134L*‡, 134F*‡, 140*; Plant Biology 116*, 118*, 147*, 148*; Wildlife, Fish and Conservation Biology 110, 110L*‡, 111, 111L*‡, 120, 120L*‡; Microbiology 105, 105L*‡; Nematology 110 Two courses in Advanced Ecology or Evolution Evolution and Ecology 102, 103, 107, 115, 117*, 119*, 120, 131, 138, 141, 147, 149, 150, 180A* and 180B*, 181 Laboratory or field course: At least one of the courses taken to fulfill these requirements must include a laboratory or field component. Appropriate courses from the above lists are indicated with an asterisk. *‡These courses cannot be taken without the corresponding lecture course. Additional

Major Advisers. Students transferring to UC Davis from another institution and majoring in Evolution, Ecology and Biodiversity must consult an adviser immediately upon matriculation so that their transfer credits can be applied to the major requirements. All new students in the major should contact the Department of Evolution and Ecology office for adviser assignment. Substitutions of courses not on the above list for major requirements are arranged through the adviser.

courses, if necessary, from above course lists

to reach 18 units.

Advising Center for the major is located in 2320 Storer Hall (530) 752-8523. Pre-professional students should establish contact with the Health Sciences Advising office in 111 South Hall, to learn what specific courses are required on their tran-

Teaching Credential Subject Representative.

Students planning for a teaching career should consult the School of Education in regard to preparation for certification; see the Teaching Credential/M.A. Program on page 115.

Courses in Evolution and Ecology (EVE)

Lower Division Courses

2. Biodiversity (3)

Lecture - 2 hours; lecture/discussion - 1 hour. Introduction to nature, scope and geographical distribution of biodiversity (the diversity of life, with emphasis on plants and animals, especially insects). Humans and biodiversity—domestication, aesthetics, ethics and valuation. Species richness and "success." Biodiversity through time; monitoring, evaluation and conservation. Biomes-global, continental and Californian. (Same course as Entomology 2.) GE credit: SciEng, Wrt | SE, SL, WE.

10. Evolution for Non-Biologists (4)

Lecture - 3 hours; discussion - 1 hour. Introduction to evolutionary biology for the general population. Offered in alternate years. GE credit: QL, SE, SL.— (I.) Begun

11. Principles of Ecology (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: elementary biology recommended. Ecological principles with emphasis on humans and their interactions with the environment; how humans affect and depend on natural ecosystems; the future of the Earth's biosphere. GE credit: SciEng | OL, SE, SL,

12. Life in the Sea (3)

Lecture — 3 hours. Diversity of life in the sea; adaptations to physical/chemical ocean environment; marine science research methods; utilization of living marine resources by humans; factors and processes that influence diversity of sea life, including humans. Limited enrollment. GE credit: SciEng, Wrt | SE, SL, WE.-III. Williams

92. Internship (1-12)

Internship - 3-36 hours. Prerequisite: lower division standing; consent of instructor. Work experience off and on campus in all subject areas offered in the Department of Evolution and Ecology. Internships supervised by a member of the faculty. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, 11. 111.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.

99. Special Study for Lower Division Students (1-5)

(P/NP grading only.) GE credit: SE.

Upper Division Courses 100. Introduction to Evolution (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C; Biological Sciences 101; Mathematics 16A, 16B, 16C or the equivalent; Statistics 13 or 100 (Statistics 100 recommended). A general survey of the origins of biological diversity and evolutionary mechanisms. GE credit: QL, SE, SL.—I, II, III. (I, II, III.) Begun, Coop

101. Introduction to Ecology (4)

Lecture - 3 hours; lecture/discussion - 1 hour. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C; Mathematics 16A, 16B, 16C or the equivalent. A general survey of the principles of ecology. GE credit: QL, SE, SL, VL.—I, II, III. (I, II, III.) Gaylord, Sanford, Schoener, Schreiber, Shapiro, Strong

101Q. Introduction to Computer Models in Ecology (1)

Autotutorial - 1.5 hours; extensive problem solving-1.5 hours. Prerequisite: concurrent enrollment in course 101. Computational methods and mathematical models used to study ecological phenom-

102. Population and Quantitative Genetics

Lecture — 3 hours; discussion — 1 hour. Prerequisite: Biological Sciences 101, and Statistics 100 or 102, and course 100. Evolution as caused by random mating, genetic drift, natural selection, inbreeding, migration, and mutation in theory and actuality. The resemblance between relatives and consequences of selection for quantitative traits. Application of these ideas to topics such as the evolution of sex. GE credit: SE. - I. Langley

103. Phylogeny, Speciation and Macroevolution (4)

Lecture - 3 hours; laboratory/discussion - 3 hours. Prerequisite: course 100. Statistical inference of evolutionary patterns and processes above the species level. Topics include estimation of phylogenies and divergence times, character evolution, biogeographic history, and rates and patterns of lineage diversification, with an emphasis on the origin of species. Offered in alternate years. GE credit: QL, SE, SL. — (II.) Moore, Turelli

104. Community Ecology (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 101 or Environmental Science and Policy 100. Population growth and density dependence;

predation; exploitative, interference and apparent competition; coexistence mechanisms; niches, spatial and temporal variation; stability, diversity, and productivity of food webs; applications to conservation and biological control. Emphasis on quantitative understanding through models, concepts, and empirical evidence. GE credit: SE, SL, VL.

105. Phylogenetic Analysis of Vertebrate Structure (4)

Lecture — 2 hours; laboratory — 6 hours. Prerequisite: Biological Sciences 1A and 1B, or 2B and 2C. The structure of the classes and subclasses of vertebrates is described and interpreted in terms of phylogeny. GE credit: SE.—II. Wainwright

106. Mechanical Design in Organisms (3)

Lecture—2 hours; discussion—1 hour; laboratory—3 hours; fieldwork—3 hours. Prerequisite: upper division standing or consent of instructor; introductory animal biology (Biological Sciences 1B or 2B), invertebrate zoology (course 112), and/or ecology (course 101) are recommended; residence at or near Bodega Marine Lab required. Student must complete the application available at http:// www.bml.ucdavis.edu. Explores fundamental principles in the form and function of organisms, examining how basic properties of size, shape, structure, and habitat constrain ways in which plants and animals interact and cope with their physical surroundings. Offered in alternate years. GE credit: QL, SE, VL, WE. - IV. (IV.) Gaylord

107. Animal Communication (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Biological Sciences 2B. How animals use songs, dances, colors, chemicals, electricity and vibrations to communicate. Mechanisms of signal production and detection (sensory systems), theory of information transfer and signal design, and the role of natural selection in shaping communication. Offered in alternate years. GE credit: QL, SE, VL.—(I.) Patricelli

108. Systematics and Evolution of Angiosperms (5)

Lecture—3 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C. Diversity and classification of angiosperms (flowering plants) on a world scale, and current understanding of the origin of angiosperms and evolutionary relationships and trends within them based on morphological and molecular evidence. (Same course as Plant Biology 108.) GE credit: SciEng.—III. (III.)

110. Running, Swimming and Flying (3)

Lecture - 2 hours; discussion - 1 hour; laboratory - 3 hours; fieldwork—3 hours. Prerequisite: upper division standing or consent of instructor; introductory animal biology (Biological Sciences 1B or 2B), invertebrate zoology (course 112), and/or ecology (course 101) are recommended; residence at or near Bodega Marine Lab required. Student must complete the application available at http:// www.bml.ucdavis.edu. Examines the bases of organism movement in terrestrial, aquatic, and aerial environments, emphasizing both the unifying principles underlying locomotion, as well as a range of strategies employed across diverse groups of organisms. GE credit: QL, SE, VL, WE.

111. Marine Environmental Issues (1)

Discussion - 1 hour; seminar - 2 hours. Prerequisite: upper division standing or consent of instructor. Concurrent enrollment in at least one course from Environmental Science and Policy 124, 152, course 106, 110, 114; residence at or near Bodega Marine Laboratory required. Student must complete the application available at http:// www.bml.ucdavis.edu. An examination of critical environmental issues occurring in coastal waters. Course links together material from concurrent courses at BML to develop an integrative understanding of marine environments and their conservation. Includes readings, group discussions, and interaction with visiting speakers. May be repeated two times for credit. (Same course as Environmental Science and Policy 111.) GE credit: SE, SL.—IV. (IV.) Gaylord, Sanford

112. Biology of Invertebrates (3)

Lecture - 3 hours. Prerequisite: Biological Sciences 1B, or 2B and 2C; courses in systematics, ecology, and evolution recommended. Survey of the invertebrate phyla, emphasizing aquatic forms, and focusing on morphology, development, natural history, ecology, and phylogenetic relationships. Limited enrollment. — (II.) Grosberg, Sanford

112L. Biology of Invertebrates Laboratory

Laboratory-6 hours. Prerequisite: Biological Sciences 1B, or 2B and 2C; course 112 concurrently. Field and laboratory experience with representative members of the major invertebrate phyla discussed in course 112. Emphasis on comparative morphology, natural history, ecology, and behavior of living invertebrates. Two field trips required. - (II.) Grosberg, Sanford

114. Experimental Invertebrate Biology (3)

Lecture - 2 hours; discussion - 1 hour; laboratory - 3 hours; fieldwork—3 hours. Prerequisite: upper division standing or consent of instructor; introductory cell, animal and plant biology (Biological Sciences 1A, 1B and 1C), invertebrate zoology (Evolution and Ecology 112), ecology (Evolution and Ecology 101), and/or evolution (Evolution and Ecology 100) are recommended; residence at or near Bodega Marine Lab required. Student must complete the application available at http:// www.bml.ucdavis.edu. The biology, ecology, and evolution of local marine invertebrates with a focus on adaptations to environmental and biological factors encountered on the California coast. Hands-on field and laboratory learning with an emphasis on generating and testing hypotheses. GE credit: QL, SE, VL, WE. - IV. (IV.) Sanford

115. Marine Ecology (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 101 or Environmental Science and Policy 100 or Biological Sciences 2B, or consent of instructor. Processes affecting the distribution, abundance, and diversity of plant and animal life in the sea. Introduction to marine habitat diversity and human impacts on marine ecosystems. GE credit: SE, SL, VL, WE.-II. Stachowicz

117. Plant Ecology (4)

Lecture - 3 hours; fieldwork - 3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C; Plant Biology 111 recommended. The study of the interactions between plants, plant populations or vegetation types and their physical and biological environment. Special emphasis on California. Four full-day field trips and brief write-up of class project required. (Same course as Plant Biology 117.)—I. (I.) Latimer, Rejmanek

119. Population Biology of Invasive Plants and Weeds (3)

Lecture—2 hours; laboratory—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C; introductory statistics recommended. Origin and evolution of invasive plant species and weeds, reproduction and dispersal, seed ecology, modeling of population dynamics, interactions between invasive species, native species, and crops, biological control. Laboratories emphasize design of competition experiments and identification of weedy species. (Same course as Plant Biology 119.) GÉ credit: SE. — III. (III.) Rejmanek

120. Global Change Ecology (3)

Lecture/discussion-3 hours. Prerequisite: course 100 and 101 or equivalents. Treatment of historical evolution of the biosphere resulting from physical, chemical, and biological influences. Special focus upon changes caused by humans. Topics pertain to biodiversity, resources, conservation, and ecosystem services. Offered in alternate years.—II. (II.) Strong

131. Human Genetic Variation and **Evolution (3)**

Lecture—3 hours. Prerequisite: Biological Sciences 1B or 2B. Introduction to genome-wide nucleotide sequence variation in human populations and computational methods for its analysis. Topics to include forensics, disease gene mapping, and studies of

human evolutionary history. Misuses, such as eugenics, and ethical/legal issues will be discussed.—III.

134. Herpetology (3)

Lecture — 2 hours; term paper. Prerequisite: Biological Sciences 1A, 1B, or 2A, 2B, 2C; Evolution and Ecology 100 recommended. The world-wide diversity of amphibians and reptiles with emphasis on behavior, ecology, functional morphology, and evolutionary history. Offered in alternate years.

134F. Field Herpetology (2)

Fieldwork-5 hours; lecture/discussion-1 hour. Prerequisite: Biological Sciences 1A, 1B, or 2A, 2B, 2C; concurrent enrollment in course 134 and 134L. Multi-day field trips to major California habitats focus on identification of, and ecological experiments on, amphibian and reptile species. Students work in teams to plan experiments, collect and analyze data, write up results and give oral presentations to the class. Offered in alternate years.

134L. Herpetology Laboratory (2)

Laboratory-6 hours. Prerequisite: Biological Sciences 1A, 1B, or 2A, 2B, 2C; course 134 concurrently. The diagnostic characteristics and functional attributes of amphibians and reptiles, emphasizing ecological, biogeographic and phylogenetic patterns. Field experience with common species of reptiles and amphibians in the Davis area. Offered in alternate vears.

138. Ecology of Tropical Latitudes (5)

Lecture - 3 hours; discussion - 1 hour; extensive writing. Prerequisite: one course in Biological Sciences, Entomology, Wildlife, Fish, and Conservation Biology, Geography, or tropical experience, or consent of instructor. Biological, physical, and human-related aspects of the ecology of low latitudes. Distribution, numbers, and relationships of tropical organisms Problems of development and conservation in the context of ecological and evolutionary theory. Offered in alternate years. GE credit: SciEng, Wrt | SE, SL, WE.—III. Shapiro

140. Paleobotany (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C. Introduction to plant fossil record, beginning with invasion of land in the Silurian, emphasizing origin and evolution of major groups and adaptations and changing composition and distribution of floras in relation to plate tectonics and climatic change. - II. Dovle

141. Principles of Systematics (3)

Lecture — 2 hours; independent study. Prerequisite: Biological Sciences 1B or 1C or 2B; course 100 recommended. Historical background, philosophical rationale, contemporary approaches, and working rules of biosystematics, including International Code of Zoological Nomenclature. Offered in alternate years. GE credit: SciEng, Wrt | OL, QL, SE, SL, VL, WE.—(III.) Shapiro

147. Biogeography (4)

Lecture — 3 hours; term paper. Prerequisite: Biological Sciences 1A and 1B, or 2B. Movements of terrestrial organisms. The role of geologic, climatic, and biologic changes in the geographic distribution of organisms. Offered in alternate years. GE credit: QĽ, SE, SL, VL, WE. — (I.) Shapiro

149. Evolution of Ecological Systems (4)

Lecture — 3 hours; term paper. Prerequisite: course 101 or Environmental Studies 100 (or the equivalent), and course 100 (or the equivalent). Evolution as an organizing force in natural communities. Coadaptation in trophic and competitive relationships. Ecology of polymorphisms, clines, and speciation. Offered in alternate years. GE credit: SE, SL, WE. – I. Shapiro

150. Evolution of Animal Development (3)

Lecture—3 hours. Prerequisite: Biological Sciences 101; and course 100 (may be waived for graduate students with consent of instructor). Comparative analysis of animal development and the genetic basis of morphological diversification. Offered in alternate years. GE credit: SE, WE.-II. Kopp

175. Computational Genetics (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: Biological Sciences 101 and Statistics 100 or 102. The use of computers to solve problems in genetics and evolution. Introduction to a general purpose computer language (Python), computational statistical methods, and applications such as QTL mapping, linkage detection, estimation of rates of evolution, and gene finding

180A. Experimental Ecology and Evolution in the Field (4-4)

Lecture/laboratory-3 hours; fieldwork-3 hours. Prerequisite: course 100; course 101 or Environmental Science and Policy 100. Experimental design in field ecology. Students will critique primary literature, design project, gather and analyze data. Students required to write original research paper based on field experiments. Offered in alternate years. (Deferred grading only pending completion of sequence.) GE credit: QL, SE, VL.

180B. Experimental Ecology and Evolution in the Field (4-4)

Lecture/laboratory-3 hours; fieldwork-3 hours. Prerequisite: course 100; course 101 or Environmental Science and Policy 100. Experimental design in field ecology. Students will critique primary literature, design project, gather and analyze data. Students required to write original research paper based on field experiments. Offered in alternate years. (Deferred grading only pending completion of sequence.) GE credit: QL, SE, VL, WE.—III. Yang

181. Ecology and Evolution of Animal-Plant Interactions (4)

Lecture - 1.5 hours; lecture/discussion - 1.5 hours; term paper; extensive writing or discussion. Prerequisite: Biological Sciences 2B and 2C required; Bio logical Sciences 2C may be taken concurrently. Animal adaptations for eating plants, pollinating flowers, dispersing seeds. Plant adaptations to herbivore defense, attraction of mutualists; role of coevolutionary arms race, mutualists and cheaters in plant/animal speciation. Exploration through lectures, original scientific literature, discussions and term paper. Offered in alternate years. GE credit: OL, QL, SE, SL, WE.-I. Strauss

189. Introduction to Biological Research (1)

Discussion - 1 hour. Prerequisite: upper division standing in Evolution and Ecology or related biological science; consent of instructor. Introduction to research methods in biology. Presentation and discussion of research by faculty, graduate, and undergraduate students. May be repeated for credit up to a total of 6 units. (P/NP grading only.) GE credit: SE.—I, II, III. (I, II, III.)

190. Undergraduate Seminar (2)

Seminar — 2 hours. Prerequisite: upper division standing in the biological sciences or a related discipline. Student reports on current topics with emphasis on integration of concepts, synthesis, and state-ofthe-art research approaches. Reviews of literature and reports of undergraduate research may be included. May be repeated for credit. (P/NP grading only.) GE credit: SE.—I. (I.) Shapiro

192. Internship (1-12)

Internship - 3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience off and on campus in all subject areas offered in the Department of Evolution and Ecology. Internships supervised by a member of the faculty. (P/NP grading only.)

194HA-194HB-194HC. Research Honors

Laboratory-6 hours. Prerequisite: Students who have completed 135 units and qualify for the honors program (as defined by the current catalog). Students pursue intensive research under the guidance of a faculty adviser. Students are expected to complete the full three-quarter sequence culminating in the writing of an honors thesis. (Deferred grading only, pending completion of sequence.) GE credit: SE, WE.

197T. Tutoring in Biological Sciences 2B (1-2)

Tutorial—3-6 hours. Prerequisite: Biological Sciences 1B or Biological Sciences 2B with a grade of B or better. Assisting the instructor by tutoring students in a Biological Sciences 2B laboratory. Tutoring is voluntary and is supervised by a Laboratory Teaching Assistant and the Biological Sciences 2B Laboratory Coordinator. May be repeated three times for credit. (P/NP grading only.) GE credit: SE.—I, II, III. (I, II, III.)

198. Directed Group Study (1-5)

(P/NP grading only.

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.) GE credit: SE.

Graduate Courses

210. Molecular Phylogenetic Analysis (3)

Lecture—2 hours; laboratory—3 hours. Theory and practice of inferring phylogenetic trees using molecular sequence data. Practical techniques for obtaining sequence data, advantages and disadvantages of common approaches for inferring trees, statistical methods for comparing alternative hypotheses. (Same course as Nematology 210.) Offered in alternate years.—II. Nadler

211. Applied Phylogenetics (3)

Lecture—2 hours; laboratory—3 hours. Prerequisite: course 103 or 210 or Population Biology 200C or the equivalent, graduate standing. Applications of phylogenetic methods to fields outside of systematics. Core lectures/labs in remedial phylogenetics, phylogeography, conservation and comparative morphology. Special topics vary yearly. May be repeated one time for credit.—II. (II.) Moore, Wainwright

220. Species and Speciation (3)

Lecture — 2 hours; discussion — 1 hour. Prerequisite: course 100, Philosophy 108 or the equivalent; History and Philosophy of Science 130B recommended. Current status of species concepts, models of speciation, current research on speciation, and relevance of species to conservation biology. Offered in alternate years. — II. Shapiro

231. Principles of Biological Data Analysis (3)

Lecture—2 hours; laboratory—3 hours. Introduction to the principles of data analysis, experimental design, statistical modeling, inference, and hypothesis tests. Statistical methods of particular importance in biological applications will be emphasized. Examples will be presented from the fields of ecology and evolutionary genetics. (S/U grading only.)

240. Paleobotany and Angiosperm Evolution (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Plant Biology 108, 116, or course 140. Critical analysis of the plant fossil record as a source of evidence on origin, evolution, and phylogeny of the angio-sperms, Cretaceous and Tertiary climates, geographic history of modern taxa, and origin of modern vegetation types. Offered in alternate years.

290C. Research Conference (1)

Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Presentation and discussion of faculty and graduate student research in biology. May be repeated for credit. (S/U grading only.)—1, II, III. (I, II, III.)

298. Group Study (1-5)

(S/U grading only.)

299. Research (1-12)

(S/U grading only.)

Professional Course

390. Methods of Teaching (2)

Lecture—1 hour; discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Practical experience in the methods and problems of

teaching. Includes analyses of texts and supporting material, discussion of teaching techniques and preparing and conducting of laboratory and discussion sections. May be repeated for credit for a maximum of 8 units. (S/U grading only.)—I, II, III. (II, II, III.)

Exercise Biology

See Neurobiology, Physiology, and Behavior, on page 436.

Exercise Science (A Graduate Group)

The Exercise Science program is not currently accepting new students.

Charles L. Stebbins, Ph.D., Chairperson of the Group

Group Office. 311 Life Sciences (530) 752-9092

Graduate Adviser. C. Stebbins

Courses in Exercise Science (EXS) Graduate Courses

200. Introduction to Research in Exercise Science (3)

Discussion—2 hours; seminar—1 hour. Prerequisite: graduate standing in Exercise Science or consent of instructor. Principles of scientific research in Exercise Science: scientific method, literature review, experimental design, hypotheses formulation, data collection, analysis, inferences, biases, human subject and animal protocols, ethics.—I. Jue

201. Exercise Cardiorespiratory Physiology (3)

Lecture/discussion—3 hours. Prerequisite: undergraduate course in systemic physiology, exercise physiology, and biochemistry (intermediary metabolism). Advanced course on integrated responses of the cardiovascular and respiratory systems to exercise. Includes hemodynamic, neurohormonal, and autonomic aspects of cardiac and vascular function, principles of myocardial metabolism, and mechanisms underlying changes in pulmonary function and gas transport.—1. Stebbins

206. Exercise Metabolism (3)

Lecture/discussion—3 hour. Prerequisite: undergraduate course in metabolism (Biological Sciences 103, Nutrition 101) or consent of instructor. The integrated metabolic response to exercise. Includes bioenergetics and metabolic regulation of skeletal muscle, and role of cardiovascular, respiratory, hemodynamic, and neurohormonal control.—III. Jue

210. Introduction to Human Performance Testing (2)

Discussion—1 hour; laboratory—3 hours. Introduction to human exercise testing and measurement. Safety procedures and measurement capabilities of the Human Performance Laboratory at UC Davis. Potential areas for graduate research.—I. (I.) Shaftersh

221. Anthropometry in Physical Activity (3)

Lecture — 2 hours; laboratory — five 3-hour sessions to alternate weekly with five 1-hour discussion sessions. Prerequisite: Exercise Biology 101 and 102. Consideration of physical constitution, body proportions, and body composition in man as they affect physical performance, and of body structural and compositional changes accompanying prolonged, systematic physical conditioning.

222. Metabolic Functions in Exercise (4)

Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: Exercise Biology 102, Neurobiology, Physiology, and Behavior 101. Review of the current research literature on the metabolic responses to exercise in man; a laboratory survey of respiratory response, metabolic and water balances, blood gas adjustments and acid-base balance with particular reference to the effect of environmental conditions.

224. Exercise Electrocardiography (2)

Lecture—2 hours. Prerequisite: Exercise Biology 112 or consent of instructor. Physiological bases and clinical implications of normal and abnormal exercise electrocardiograms (ECG) are treated in detail. Exercise prescription is considered as is the predictive significance of normal and abnormal ECG.

225. Seminar in Cardiac Rehabilitation (2)

Seminar—2 hours. Prerequisite: Exercise Biology 112 or graduate standing and consent of instructor. Critical examination of literature dealing with the causes, prevention and treatment of cardiovascular disease with particular emphasis on intervention through cardiac rehabilitation. Both the theoretical bases and practical approaches to cardiac rehabilitation will be examined.

227. Research Techniques in Biomechanics (4)

Lecture—2 hours; laboratory—4 hours; term paper/discussion—1 hours. Prerequisite: consent of instructor, Mathematics 22B; Exercise Biology 115 recommended. Experimental techniques for biomechanical analysis of human movement are examined. Techniques evaluated include data acquisition and analysis by computer, force platform analysis, strength assessment, planar and three-dimensional videography, data reduction and smoothing, body segment parameter determination, electromyography, and biomechanical modeling. (Same course as Biomedical Engineering 227/Mechanical and Aeronautical Engineering 227.)—II. (II.) K. Williams

228. Skeletal Muscle Mechanics: Form, Function, Adaptability (4)

Lecture—4 hours. Prerequisite: basic background in biology, physiology, and engineering; Engineering 35 and 45, Mathematics 21D; and Neurobiology, Physiology, and Behavior 101 recommended. Basic structure and function of skeletal muscle examined at the microscopic and macroscopic level. Muscle adaptation in response to aging, disease, injury, exercise, and disuse. Analytic models of muscle function. (Same course as Biomedical Engineering 228.)—(I.) Hawkins

290. Seminar in Exercise Science (1)

Seminar—1 hour. Prerequisite: graduate standing; required of all first year students for first two quarters. Presentation and discussion of topics of interest, and the analysis of research in exercise science. Not open for credit to students who have taken Physical Education 290. (S/U grading only.)—(II, III.)

290C. Research Conference (1)

Discussion—1 hour. Prerequisite: graduate standing. Student presentations of research in Exercise Science and discussions among participating students and faculty. May be repeated for credit. (S/U grading only.)—I, II, III.

298. Group Study (1-5)

Prerequisite: graduate standing; consent of instructor.

299. Research (1-12)

Prerequisite: graduate standing; consent of instructor and Department Chairperson. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)

Family and **Community Medicine**

See Medicine, School of, on page

Feminist Theory and Research

Amina Mama Ph.D., Program Director

Program Office. 2222 Hart Hall (530) 752-4686;

http://wms.ucdavis.edu/wgssite/

Graduate Study. The Woman and Gender Studies Program at UC Davis offers a Designated Emphasis in Feminist Theory & Research with graduate programs in: Anthropology, Comparative Literature, Cultural Studies, Education, English, French, German, Geography, History, Native American Studies, Performance Studies, Psychology, Sociology, and

The Designated Emphasis in Feminist Theory & Research allows graduate students to receive a Ph.D. in the field of their choice while completing a special emphasis in feminist theory & scholarship. The courses listed for the Designated Emphasis are open to all graduate students in good standing. Completed undergraduate level studies in Feminist Theory and Methodology or the equivalent are required. Graduates in affiliated departments who complete the Designated Emphasis requirements will receive official credit on their transcripts for a Ph.D. with "Special Emphasis in Feminist Theory & Research.

Students must complete all the requirements for the Ph.D. in their home department. The requirements for the Designated Emphasis in Feminist Theory and Research are the successful completion of the two core courses, Women's Studies 200A and Women's Studies 200B, and two additional courses focusing on women and gender, one in the student's home department and one outside their home department. A member of the DE affiliated faculty must be a member of the student's qualifying examination. Analysis of gender is expected to be a central component of both the student's qualifying examination and doctoral research.

Students should consult with the Chair of the Designated Emphasis in Feminist Theory & Research before enrolling in a graduate course for which they wish to receive credit to ensure that it will count toward fulfilling the requirements of the Designated Emphasis. If possible, please bring a copy of the syllabus or an expanded course description to your

Graduate Adviser. Contact Maxine Craig in 164 Kerr Hall (530) 752-8642; mbcraig@ucdavis.edu.

Fiber and Polymer Science

(College of Agricultural and Environmental Sciences) Faculty. See under Textiles and Clothing, on page

The Major Program

The Fiber and Polymer Science major is concerned with the physical, chemical, and structural properties of fibers and polymers and how these relate to fiber and polymer performance and end-use.

The Program. All students in this major take a common core of course work in chemistry, physics, and mathematics, and depth subject matter in fiber and polymer science, organic and physical chemistry, and technical writing. In the restricted electives, students select courses from areas such as computer science and mathematics, chemistry, marketing and management, material and advanced fiber and polymer science, and textiles.

Career Alternatives. The major prepares the student for a career in a wide range of industries in the areas of research and development, technical marketing and management, production, quality control, and science teaching (on completion of an additional year in the teaching credential program). The companies employing Fiber and Polymer Science graduates are in the fiber, polymer, industrial product, textile and/or chemical business. Graduates are prepared to enter the graduate program in textiles or agricultural and environmental chemistry with a specialization in fiber and polymer chemistry, and fiber and polymer science programs at other universities.

B.S. Major Requirements:

o.o. Major Requirements.	
• •	UNITS
Preparatory Subject Matter	52-55
Chemistry 2A-2B-2C	15
Computer Science Engineering 15 or	
30	. 4
Mathematics 16A-16B-16C or 21A-21B-	
21C9-	
Physics 7A-7B-7C or 9A-9B-9C	
Statistics 13 or Plant Sciences 120	. 4
Textiles and Clothing 6 and 8 or	
Engineering 45	. 8
Depth Subject Matter	37-39

I	
Textiles and Clothing 163, 163L 4	
Fiber and Polymer Science 100, 150, 161,	
161L, 180A, 180B 14	
Chemistry 128A, 128B, 128C, 129A,	
129B, 110A and 110C or 107A and	
107B19-21	

Restricted Electives......30

Select courses from the following: Computer Science and Mathematics: Plant Sciences 21; Applied Science Engineering 115, 116; Mathematics 22A, 22B Chemistry: Chemistry 108, 115, 120, 121, 124A, 124B, 124C, 131, 140 Marketing/Management: Agricultural and Resource Economics 100A, 100B, 113, 136, 157, Economics 1A, 1B, Statistics

Material and Advanced Fiber/Polymer Science: Aeronautical Science Engineering 137, Engineering 104, 104L, Textiles and Clothing 250A-F, 290, 293 Textiles: Textiles and Clothing 162, 162L, 164, 165, 173, 174

Total Units for the Degree 119-124 Major Adviser. Y. L. Hsieh (Textiles and Clothing)

Advising Center for the major is located in 129B Everson Hall (530) 754-8368.

UNITS

Minor Program Requirements:

Fiber and Polymer Science 18 Textiles and Clothing 6 or Engineering 180A and 180B; and Textiles and Clothing

Minor Adviser. Y. L. Hsieh

Courses in Fiber and Polymer Science (FPS)

Upper Division Courses 100. Principles of Polymer Materials Science (3)

Lecture - 3 hours. Prerequisite: Chemistry 2A-2B; Chemistry 8A-8B or Engineering 45; introductory physics. The basic principles of polymer science are presented including polymer structure and synthesis; polymerization mechanisms, polymer classes, properties, and reactions; polymer morphology, rheology, and characterization; polymer processing. (Same course as Materials Science Engineering 147.) GE credit: QL, SE.—II. (II.) Pan

110. Plastics in Society and the **Environment (4)**

Lecture — 3 hours; discussion — 1 hour. Prerequisite: Chemistry 10 or introductory course in physical sciences. Basic concepts and methodologies in the study of plastics. Formation, classification, structure, properties, processing, and formulation. Their application to societal needs, and their impact on society and the environment. GE credit: SciEng or SocSci, Wrt | SE, SL, SS, WE.

150. Polymer Syntheses and Reactions (3)

Lecture-3 hours. Prerequisite: Chemistry 128B or 8B, and Chemistry 107Å. Organic and physical chemistry aspects of polymer syntheses and reactions including polymerization mechanisms, kinetics and thermodynamics for major types of organic high polymers. GÉ credit: OL, QL, SÉ, SL, VL, WE.-III. (III.) Hsieh

161L. Textile Chemical Analysis Laboratory

Laboratory—3 hours. Prerequisite: course 161 (may be taken concurrently). Laboratory methods and procedures employed in qualitative and quantitative analysis of textile fibers and auxiliaries. GE credit: OL, QL, SE, SL, VL, WE.—I. (I.) Hsieh

180A-180B. Introduction to Research in Fiber and Polymer Science (2)

Laboratory/discussion-6 hours. Prerequisite: senior standing in major related to Fiber and Polymer Science, and consent of instructor. Senior thesis on independent problems. Research begun in course 180A will be continued and completed in course 180B. (Deferred grading only, pending completion of sequence.) GE credit: QL, SE, VL, WE.—I, II, III. (I,

192. Internship in Fiber and Polymer Science (1-12)

Internship - 3-36 hours. Prerequisite: consent of instructor. Work experience off campus in a fiber and polymer science related area. Supervision by a member of the Textiles and Clothing faculty. (P/NP grading only.)

197T. Tutoring in Fiber and Polymer Science (1-5)

Tutorial - 3-15 hours. Prerequisite: upper division fiber and polymer science related major and consent of instructor. Tutoring of students in Fiber and Polymer Science courses. Assistance with discussion groups and laboratory sections under supervision of instructor. May be repeated for credit if tutoring in another Fiber and Polymer Science course. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

Graduate Courses

250A-F. Special Topics in Polymer and Fiber Science (3)

Lecture—3 hours. Prerequisite: Fiber and Polymer Science 100 or consent of instructor. Selected topics of current interest in polymer and fiber science. Topics will vary each time the course is offered. (Same course as Materials Science and Engineering 250A-F.)—I, III. (I, III.) Hsieh, Pan, Sun

299. Research (1-12)

Independent study - 3-36 hours. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Film Studies

See Cinema and Technocultural Studies, on page 193.

Fisheries

See Animal Science, on page 150; Biological and Agricultural Engineering, on page 176; and Wildlife, Fish, and Conservation Biology, on page 530.

Food Science

(College of Agricultural and Environmental Sciences)

The Major Program

Food science applies chemical, physical, biological, engineering, and social sciences to processing, preservation, development, packaging, storage, evaluation, identity and utilization of foods.

The Program. Students majoring in food science spend the first two years of study developing the scientific and general background necessary for upper division study. The science courses include chemistry, biology, physics, and mathematics. General background is provided by courses in the social science/ humanities area and by optional courses in introductory food science. At the upper division level, students take courses in nutrition, food microbiology, food chemistry, food analysis, food commodities, food processing, and food engineering, and may choose to specialize in one of seven career-oriented options. The major, including all seven options, is accredited by the Institute of Food Technologists. Students enrolled in the program are eligible for various scholarships, including scholarships from the Institute of Food Technologists.

Career Alternatives. Opportunities for employment include positions in the food and allied industries, local, state, and federal government agencies, and educational and research institutions. Graduate study for the food science student may lead to the M.S. or Ph.D. degree in food science, or in related fields such as agricultural chemistry, biochemistry, engineering, microbiology, and nutrition.

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 54-74
University Writing Program 102F, 104A, or
104E (if not already taken to satisfy college
FILE A A

104E (if not already taken to satisty college
English requirement)4
Communication 1 (if not already taken to
satisfy college English Requirement) 4
Mathematics 16A-16B-16C9
Biological Sciences 1A, 1C or
2A, 2B, 2C 10-14
Chemistry 2A-2B-2C

Organic chemistry (see option for	
requirement)	
Physics 7A-7B-7C	
Food Science and Technology 1 and /or	

Select one of the following five options: Food Technology Option

The Food Technology option provides a broad exposure to food chemistry, food microbiology, food engineering and food processing. Students find positions in quality assurance, product development, and food processing in the food industry.

109......5 Selected additional courses......15

Select courses from a master list available from the department Advising Center. Food Business and Management Option

The Food Business and Management option allows students to integrate study of the science and technology of food with that of business and economics in a unique program. Students prepare for positions of management in small food companies, and research-and-development oriented marketing or technical sales opportunities in corporate food industries

Specific course requirements......24

Chemistry 8A-8B
Economics 1A 4
Agricultural and Resource Economics 112,
1 1 3 8
Management 100
Food Science and Technology 109 3

from the department Advising Center. Consumer Food Science Option

The Consumer Food Science option prepares students for jobs in food product formulation, research-and-development oriented marketing and sensory analysis, quality assurance, extension service, creative writing, and community service. Students who fulfill the requirements for the teaching credential teach elementary or secondary school home economics.

Selected additional courses...... 10

Select courses from a master list available from the department Advising Center.

Brewing Science Option

The Brewing Science option prepares students for careers in production or quality assurance within the brewing industry or other food fermentation industries (e.g., other alcoholic beverages, vinegar and cheese). The option also prepares students for graduate study in food science. The option exposes the students to a diversity of coursework, including chemistry, biochemistry, microbiology and engineering as they pertain to the malting and brewing processes. Issues of quality assurance, plant sanitation and packaging are also key. Of course, there is a thorough grounding in malting and brewing.

Specific course requirements 26-29 Chemistry 8A, 8B 6 Food Science and Technology 3 (recommended but not required) Food Science and Technology 102A, 102B, 108, 109, 123, 131 20

Selected additional courses......9

Select courses from a master list available from the department Advising Center

Food Biology/Microbiology Option

The Food Biology/Microbiology option is for students interested in research and development careers with food companies or government laboratories, in teaching and research at academic institutions, or in professional [medical, veterinary, pharmacy, optometry or dental] school. This option prepares students for graduate study and research in several areas, including food science, biochemistry, biotechnology, microbiology, and post-harvest biology.

Biological Sciences 1B or 2B 5
Chemistry 8A-8B or 118A-118B-
118C6-12
Microbiology 102, 102L 7

Selected additional courses......10

Select courses from a master list available from the department Advising Center.

Food Biochemistry Option

The Food Biochemistry option prepares students for graduate study and research in food science, biochemistry, biotechnology, microbiology, pharmacology, post-harvest biology, and commodity emphasis. The program is designed for students interested in graduate or professional school, leading to careers in research in universities, food companies or government laboratories or in teaching at academic institutions. The option can also serve to prepare students for professional schools such as pharmacy, optometry, dentistry, public health or medicine.

Specific course requirements......31 Riclogical Sciences 18 or 28 5

Biological Sciences 1B or 2B 5	
Biological Sciences 104 3	
Chemistry 118A-118B-118C 12	
Chemistry 107A, 107B	,
Food Science and Technology 123,	
123L5	

Food Chemistry Option

The Food Chemistry option prepares students for graduate study and research in such areas as flavor chemistry, food additive chemistry, biotechnology, biochemistry and toxicology. This option is for students interested in research and development careers with food companies or government laboratories, in teaching and research at academic institutions, or in professional (medical, veterinary, or dentall school.

Specific course requirements......20-21

Chemistry 118A-118B-118C or 128A-128B-	
128C, 129A11-12	
Chemistry 107A-107B, 124A	

Selected additional courses...... 10

Select courses from a master list available from the department Advising Center

Unrestricted Electives varies by option Total Units for the Degree 180

Major Adviser. C. F. Shoemaker (Food Science and Technology)

Advising Center for the major is located in 1208 RMI South Building (530) 754-8368.

Graduate Study. A program of study and research leading to the M.S. and Ph.D. degrees in Food Science is available (see below). For further information on graduate study, contact the graduate

Food Science (A Graduate Group)

Gary M. Smith, Ph.D., Chairperson of the Group

Group Office. 1204 RMI South Building (530) 752-8035; Fax (530) 752-0382; www.foodscience.ucdavis.edu

Faculty. Includes members from twelve departments in the Colleges of Agricultural and Environmental Sciences and Engineering, and the Schools of Medicine and Veterinary Medicine.

Graduate Study. The interdepartmental Graduate Group in Food Science offers programs of study leading to the M.S. degree and to the Ph.D. degree. Graduate studies stress the application of the biolog ical, chemical, physical, and behavioral sciences to the processing, preservation, quality evaluation, public health aspects, and utilization of foods. For the M.S. degree, there are four areas of specialization: chemistry-biochemistry, microbiology, engineering-technology and sensory science. Individually designed programs are also acceptable. For the Ph.D., there are four areas of emphasis: biochemistry, chemistry, microbiology/fermentation, and sensory science. Detailed information regarding graduate study is available through the Group Chairperson or the Group office.

Graduate Advisers. Contact the Food Science Graduate Group office at ilblevins@ucdavis.edu.

Food Science and Technology

(College of Agricultural and Environmental Sciences) Michael J. McCarthy, Ph.D., Chairperson of the

Department Office. 1136 RMI North Building (530) 752-1482; http://foodscience.ucdavis.edu

Faculty

Charles W. Bamforth, Ph.D. D.Sc., Professor Daniela Barile, Ph.D., Assistant Professor Charlotte Biltekoff, Ph.D., Assistant Professor (Food Science and Technology, American Studies)

Stephanie R. Dungan, Ph.D., Professor (Food Science and Technology, Chemical Engineering and Materials Science) J. Bruce German, Ph.D., Professor Jean-Xavier Guinard, Ph.D., Professor Maria L. Marco, Ph.D., Assistant Professor Kathryn L. McCarthy, Ph.D., Professor (Food Science and Technology, Biological and Agricultural Engineering)

Michael J. McCarthy, Ph.D., Professor (Food Science and Technology, Biological and Agricultural Engineering)

David A. Mills, Ph.D., Professor (Food Science and Technology, Viticulture and Enology)

Alyson Mitchell, Ph.D., Professor Nitin N. Nitin, Ph.D., Assistant Professor (Food Science and Technology, Biological and

Agricultural Engineering)
Michael A. O'Mahony, Ph.D., Professor
Robert Powell, Ph.D., Professor
[Food Science and Technology, Chemical Engineering and Materials Science)
William L. Ristenpart, Ph.D., Assistant Professor

(Food Science and Technology, Chemical Engineering and Materials Science) Moshe Rosenberg, Ph.D., Professor and Specialist in Cooperative Extension

Charles F. Shoemaker, Ph.D., Professor R. Paul Singh, Ph.D., Professor (Food Science and Technology, Biological and Agricultural Engineering)
Carolyn L. Slupsky, Ph.D., Assistant Professor

(Food Science and Technology, Nutrition) Gary M. Smith, Ph.D., Professor Glenn M. Young, Ph.D., Professor

Emeriti Faculty

Everett Bandman, Ph.D., Professor Emeritus Ericka L. Barrett, Ph.D., Professor Emeritus John C. Bruhn, Ph.D., Specialist in Cooperative Extension Emeritus

Dieter W. Gruenwedel, Ph.D., Professor Emeritus Norman F. Haard, Ph.D., Professor Emeritus Jerald M. Henderson, D.Engr., Professor Emeritus Walter G. Jennings, Ph.D., Professor Emeritus John M. Krochta, Ph.D., Professor Emeritus (Food Science and Technology, Biological and Agricultural Engineering)

Michael J. Lewis, Ph.D., Professor Emeritus Academic Senate Distinguished Teaching Award R. Larry Merson, Ph.D., Professor Emeritus David M. Ogrydziak, Ph.D., Professor Emeritus Chester W. Price, Ph.D., Professor Emeritus David S. Reid, Ph.D., Professor Emeritus Gerald F. Russell, Ph.D., Senior Lecturer Emeritus Barbara O. Schneeman, Ph.D., Professor Emeritus (Food Science and Technology, Internal

Medicine, Nutrition)
Howard G. Schutz, Ph.D., Professor Emeritus Lloyd M. Smith, Ph.D., Professor Emeritus Aloys L. Tappel, Ph.D., Professor Emeritus John R. Whitaker, Ph.D., Professor Emeritus

Major Program and Graduate Study. See the major in Food Science, on page 310; and for graduate study, see Graduate Studies, on page 11

Related Courses. See courses in Consumer Science, Engineering, Molecular and Cellular Biology, Nutrition, Viticulture and Enology, Environmental Toxicology, Population Health and Reproduction,

Courses in Food Science and Technology (FST)

Lower Division Courses

1. Principles of Food Science (3)

Lecture - 2 hours; discussion - 1 hour. Food science fundamentals. Fresh and processed food technologies; world food problems; food composition; food microbiological and toxicological safety; food laws; evaluation of acceptability and nutritional value. Not open for credit to students who have completed any Food Science and Technology course except course 10. GE credit: SE, VL. - II. (II.)

3. Introduction to Brewing and Beer (3)

Lecture—3 hours. Basic description of brewing and associated processes, from raw materials to final product; history of brewing and brewing science; types of beer worldwide; world beer markets; basics of beer quality, including wholesomeness; role of scientist in brewing. GE credit: SciEng | SE, SL.-I, II, III. (I, II, III.) Bamforth

10. Food Science, Folklore and Health (3)

Lecture - 3 hours. Ancient and modern food folklore in relation to health and well-being. Food safety, organic food, herbalism, food preservation, and nutritional enhancement. Not open for credit to students who have completed course 2. GE credit: Sci-Eng or SocSci | SE, SL, SS, VL, WC.—I, II, III. (I, II, III.) Mitchell, Shoemaker, Smith

47. Food Product Development Field Study (1)

Discussion-6 hours; fieldwork-2 days (course given between winter and spring quarters). Prerequisite: advance enrollment required in winter quarter with instructor; background knowledge in foods from such courses as Food Science and Technology 1. Commercial aspects of the large-scale development, distribution, and evaluation of food products intended for human consumption. (Former course Consumer Science 47.) (P/NP grading only.) GE

50. Introduction to Food Preservation (3)

Lecture—2 hours; laboratory—2 hours. Prerequisite: Chemistry 2A, Biological Sciences 2A, Statistics 13. Restricted to Food Science Majors. Introduction to modes of fresh food preservation including use of chemicals and microbes, heat and energy, control of water and atmosphere, and by indirect approaches such as packaging, hygienic design and sanitation. GE credit: QL, SE.—I. (I.) McCarthy

99. Special Study for Undergraduates (1-5) (P/NP grading only.)

Upper Division Courses 100A. Food Chemistry (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Chemistry 8B; Biological Sciences 1A recommended. Chemical aspects of food composition. Emphasis on the functional properties and chemical reactions of the major components of foods: carbohydrates, lipids, proteins, and water. GE credit: SE, VL.—I. (I.) Dungan

100B. Food Properties (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 100A or consent of instructor. Sensory quality, chemical and microbial safety, and nutritional properties of foods. Effects of food processing and preparation on these properties. Selected properties of food commodities. GE credit: QL, SE, VL.—II. (II.)

101A. Food Chemistry Laboratory (2)

Lecture/laboratory-4 hours. Prerequisite: course 100A (may be taken concurrently). Chemical aspects of food composition described in course 100A. GE credit: QL, SE, VL, WE.-I. (I.) Slupsky

101B. Food Properties Laboratory (2)

Lecture/laboratory-1 hour/3 hours. Prerequisite: course 100B (may be taken concurrently). Study of properties of food described in course 100B. GE credit: QL, SE, VL, WE.-II. (II.) Shoemaker

102A. Malting and Brewing Science (4)

Lecture — 4 hours. Prerequisite: Biological Sciences 102, 103; senior standing recommended. The technology of the malting, brewing and fermentation processes is integrated with the chemistry, biochemistry and microbiology that determine industrial practices and product quality. Not open for credit to students who have taken course 102. GE credit: SE.—II. (I.) Bamforth

102B. Practical Malting and Brewing (4)

Lecture/discussion-2 hours; laboratory-6 hours. Prerequisite: course 102A and analytical experience beyond Chemistry 2C, such as Viticulture and Enology 123, Food Science and Technology 103, 123L, Molecular and Cellular Biology 120L. Open to seniors only in Fermentation Science or Food Science and Technology. Provides practical working knowledge of analytical methods used in malting and brewing and experience with brewing materials and processes, by analysis of samples that illustrate the range of values experienced in practice and pilot scale brewing. GE credit: QL, SE.-III. (II.) Bamforth

103. Physical and Chemical Methods for Food Analysis (4)

Lecture - 2 hours; discussion - 1 hour; laboratory - 3 Sciences or Animal Biology 102 (may be taken con-currently), courses 100A, 101A (may be taken concurrently). Theory and application of physical and chemical methods for determining the constituents of foods. Modern separation and instrumental analysis techniques are stressed. GE credit: QL, SE, WE.-II. (II.) Mitchell

104. Food Microbiology (3)

Lecture—3 hours. Prerequisite: Biological Sciences 1A, 102. Microorganisms in food safety, spoilage, and production. Food-borne disease agents and their control. Growth parameters of food spoilage agents. Destruction of microbes in food. Food fermentations. The development of microbes as a resource for the food industry. GE credit: QL, SE, VL.—II. (II.) Marco

104L. Food Microbiology Laboratory (4)

Lecture—1 hour; discussion—1 hour; laboratory—6 hours. Prerequisite: Biological Sciences 1A, course 104. Cultural and morphological characteristics of microorganisms involved in food spoilage, in foodborne disease, and food fermentation. Analysis of microbiological quality of foods. GE credit: QL, SE, VL, WE.—III. (III.) Young

107. Food Sensory Science (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Agricultural Management and Rangeland Resources 120 or course 117 (may be taken concurrently). Critical examination of techniques and theories of sensory measurement of food; measures of consumer perception and acceptance. An introduction to the sensory and cognitive systems associated with the perception of food. Not open for credit to students who have completed course 107A. GE credit: QL, SE, WE.-I. (I.) O'Mahony

108. Food Processing Plant Sanitation (2)

Lecture - 2 hours. Prerequisite: Chemistry 8B, Biological Sciences 1A, course 104 (may be taken concurrently) or consent of instructor. Sanitary control of food processing, including water treatment, chemical and physical sanitizing agents; principles of cleaning and hard surface detergency, metal corro-sion, pest control, and waste disposal; role of regulatory agencies. GE credit: SE.

109. Principles of Quality Assurance in Food Processing (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: Statistics 13 or Agricultural Management and Rangeland Resources 120. Quality assurance measurement techniques applied to selected food processed products emphasized. Rationale for establishing valid quality assurance programs including selection of samples at critical points. Statistical problems in quality assurance programs used by the food industry. GE credit: QL, SE, SL, VL.—III. (III.)

110A. Physical Principles in Food Processing (3)

Lecture—2 hours; laboratory—2 hours. Prerequisite: Physics 5A and 5B or 7A-7B-7C or the equivalent; calculus recommended. Not open for credit to students enrolled in College of Engineering. Applications of the conservation of mass and energy to food processing. Elements of engineering thermodynamics, fluid mechanics, and problem solving. GE credit: QL, SE, VL.—I. (I.) M. McCarthy

110B. Heat and Mass Transfer in Food Processing (3)

Lecture — 2 hours; laboratory — 2 hours. Prerequisite: course 110A or the equivalent; Applied Biological Systems Technology 110L recommended (may be taken concurrently). Rate processes: conduction, convection, and radiation heat transfer; microwave heating, refrigeration, freezing, psychrometrics; mass transfer during drying and storage. GE credit: QL, SE. - III. (III.) Singh

117. Design and Analysis for Sensory Food Science (3)

Lecture - 3 hours. Prerequisite: Statistics 13 or consent of instructor. Methods of design and analysis for sensory food science. Experimental design strategies. Use of taste panels and consumer testing. Data analysis and computation including the relative merits and limitations of parametric and nonparametic approaches. Modifications for quality assurance. GE credit: QL, SE.—I. (I.) O'Mahony

119. Chemistry and Technology of Milk and Dairy Products (4)

Lecture-4 hours; demonstrations and a field trip. Prerequisite: Biological Sciences 1A and 102, or consent of instructor. Composition, structure and properties of milk and products derived from milk. Relates chemical, microbiological, and technological principles to commercial practices in processing of milk and its products. GE credit: QL, SE, VL.—III.

120. Principles of Meat Science (3)

Lecture - 3 hours. Prerequisite: Biological Sciences 1A. Anatomical, physiological, developmental and biochemical aspects of muscle underlying the conversion of muscle to meat. Includes meat processing, preservation, microbiology and public health issues associated with meat products. (Same course as Animal Science 120.) GÉ credit: SciEng.

120L. Meat Science Laboratory (2)

Discussion-1 hour; laboratory-3 hours. Prerequisite: Biological Sciences 1A; course 120 (may be taken concurrently). Laboratory exercises and student participation in transformation of live animal to carcass and meat, structural and biochemical changes related to meat quality, chemical and sensory evaluation of meat, and field trips to packing plant and processing plants. (Same course as Animal Science 120L.)

123. Introduction to Enzymology (3)

Lecture - 3 hours. Prerequisite: Biological Sciences 103. Principles of physical, chemical and catalytic properties of enzymes and their importance. Purification, characterization, and quantitative evaluation of reaction conditions on activity are stressed. Specificity and mechanism of action illustrated by use of selected enzymes. (Former course Biochemistry and Biophysics 123.) GE credit: QL, SE, VL.—III. (III.) G.

123L. Enzymology Laboratory (2)

Lecture - 1 hour; laboratory - 3 hours. Prerequisite: Biological Sciences 103, course 123 (concurrently). Laboratory procedures involved in detection, purification and characterization of enzymes. (Former course Biochemistry and Biophysics 123L.) GE credit: QL, SE, VL, WE.—III. (III.) G. Smith

127. Sensory Evaluation of Foods (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Agricultural Management and Rangeland Resources 120 or course 117. A critical examination of methods of sensory measurement applied to food and beverage systems; descriptive analysis and consumer tests and their application to quality assurance, product development and optimization. GE credit: QL, SE, WE.—II. (II.)

128. Food Toxicology (3)

Lecture - 3 hours. Prerequisite: Biological Sciences 102, 103. Chemistry and biochemistry of toxins occurring in foods, including plant and animal toxins, intentional and unintentional food additives. The assessment of food safety and toxic hazards. (Same course as Environmental Toxicology 128.) GE credit: SCiEng | SE.—III. (III.) Mitchell, Shibamoto

131. Food Packaging (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Chemistry 8B, Biological Sciences 1A, Physics 7C. Principles of food packaging. Functions of packaging. Properties of metal, glass, paper and plastic materials and packages. Design, fabrication, and applications of food packaging. Packaging of fresh and processed foods, including fruits and vegetables, dairy foods, beer and wine. GE credit: SE.

151. Food Freezing (1)

Discussion — 1 hour; online lecture. Prerequisite: course 110A or the equivalent. Mechanisms of ice crystallization, interpretation of freezing diagrams, and modes of heat transfer. Food properties at subfreezing temperatures, refrigeration requirements, and estimation of freezing times. Industrial systems used in freezing foods. GE credit: QL, SE.-III. (III.) Singh

159. New Food Product Ideas (3)

Lecture/discussion - 3 hours. Prerequisite: Upper division standing with background course work in food science (course 50 or 100A), biological sciences (Biological Sciences 1A, 1B, 1C), or the physical sciences (Physics 5A, 5B, 5C or Chemistry 2A, 2B, 2C). Create, refine, test and present viable ideas for new food products. Activities include trend monitoring, consumer research, idea generation, concept screening, and new product concept presentations. GE credit: AH or SS, OL, WE.-I. (I.)

160. Food Product Development (4)

Lecture - 1 hour; discussion - 1 hour; laboratory - 6 hours. Prerequisite: upper division standing with background course work in food science (course 50 or 100A), biological sciences (Biological Sciences 1A, 1B, 1C), or the physical sciences (Physics 5A, 5B, 5C or Chemistry 2A, 2B, 2C). Product implementation stage of food product development including preliminary product description, prototype development, product testing, and formal presenta-tion of a new product development. GE credit: OL, SE, VL.-III. (III.)

190. Senior Seminar (1)

Seminar - 1 hour. Prerequisite: senior standing or consent of instructor. Selected topics presented by students on recent advances in food science and technology. Reports and discussions concerning oral and written presentations, literature sources and career opportunities. GE credit: OL, SE.-II. (II.) Shoemaker

192. Internship for Advanced Undergraduates (1-12)

Internship - 3-36 hours. Prerequisite: consent of instructor. Work experience on or off campus in the practical application of food science. (P/NP grading only.) GE credit: SE.

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.) GE credit: SE.

Graduate Courses

201. Food Chemistry and Biochemistry (4)

Lecture-4 hours. Prerequisite: undergraduate courses in organic chemistry and biochemistry; undergraduate course in food chemistry is recommended. Advanced topics in food chemistry and biochemistry, emphasizing the application of the basic principles of chemistry and biochemistry to food composition, properties, preservation and processing. Chemical structures, interactions, reaction mechanisms and experimental methods are stressed. - I. (I.) G. Smith, Shoemaker

202. Chemical and Physical Changes in Food (4)

Lecture - 3 hours; term paper. Prerequisite: Biological Sciences 103; Chemistry 107B. Fundamental principles of chemistry and physics are applied to a study of changes in water binding properties and activity, changes in proteins, nutrients, toxic constituents, and other compounds during storage, heating, freezing, dehydrating, and concentrating of food materials. — III. (III.) Dungan

203. Food Processing (3)

Lecture - 3 hours. Prerequisite: course 110A, Physics 5C or 7C, Chemistry 107B, and one undergraduate food processing course. Principles of food engineering applied to food processing. Relationship of Newtonian and non-Newtonian fluid properties to heat and momentum transfer. Application of mass transfer in controlling kinetics and quality changes of foods. - II. (II.) K. McCarthy, M. McCarthy

204. Advanced Food Microbiology (3)

Lecture - 3 hours. Prerequisite: Biological Sciences 1C, 103, course 104 or a course in microbiology. Principles of and recent developments in food microbiology, including food pathogen virulence and detection, parameters of microbial growth in food, and the microbiology of food and beverage fermentations. - III. (III.) Marco, Young

205. Industrial Microbiology (3)

Lecture — 3 hours. Prerequisite: Biological Sciences 1A, 102, 103; Microbiology 130A-130B or Biological Sciences 101 recommended. Use of microorganisms for producing substances such as amino acids, peptides, enzymes, antibiotics and organic acids. Emphasis on metabolic regulation of pathways leading to fermentation products, on yeast fermentations, and on genetic manipulations (including recombinant DNA techniques) of industrial microorganisms. Offered in alternate years.

207. Advanced Sensory-Instrumental Analyses (3)

Lecture – 2 hours; laboratory – 3 hours. Prerequisite: course 107 and consent of instructor. Basic principles of measurement of color, texture, and flavor of foods by sensory and instrumental methods. Advanced statistical analysis of relation of colorimetry, texturometry, and chemistry of volatile compounds to perception of appearance, texture, flavor. Offered in alternate years.

210. Proteins: Functional Activities and Interactions (3)

Lecture—3 hours. Prerequisite: Biological Sciences 103. The relationships of structure of proteins to their biological functions. Structural proteins, complexing proteins, and catalytic proteins in plant and animal materials and products

211. Lipids: Chemistry and Nutrition (3)

Lecture — 3 hours. Prerequisite: Biological Sciences 103, Chemistry 107B, 128B. Chemistry of lipids as it pertains to research in food and nutrition. Relations between lipid structure and their physical properties in tissues and foods. Regulation of absorption, transport, and metabolism of lipids. Implications of dietary fats and health.—II. (II.) German

213. Flavor Chemistry of Foods and Beverages (3)

Lecture/discussion-3 hours. Prerequisite: Chemistry 8B, Viticulture and Enology 123, Viticulture and Enology 123L or course 103 or consent of instructors. Students will become familiar with basic principles of flavor chemistry, analysis, and formation in fresh and processed foods. Students will be required to read and critically evaluate flavor chemistry literature. (Same course as Viticulture and Enology 213).—III. (III.) Ebeler, Heymann

217. Advanced Food Sensory Science (3)

Lecture—3 hours. Prerequisite: course 107 (may be taken concurrently) or consent of instructor. Advanced study of the techniques and theory of the sensory measurement of food as an analytical tool and as a measure of consumer perception and acceptance. Advanced examination of the sensory and cognitive systems associated with the perception of food. —I. (I.) O'Mahony

219. Biochemistry, Microbiology and Technology of Cheeses of the World (4)

Lecture-4 hours. Prerequisite: course 119 and Biological Sciences 103 or course 100A, 123, Biological Sciences 103, Chemistry 107B, 128B or consent of instructor. Restricted to graduate level students or senior undergraduate students with appropriate background in biochemistry and microbiology. Compositional and physico-chemical aspects of milk and their implications on cheesemaking; enzymatic, microbiological and physical aspects of cheesemaking; cheese as a biological composite; designing cheese quality attributes; cheese aging. Cheese from all over the world will be tasted and discussed. Offered in alternate years.—(III.) Rosenberg

227. Food Perception and the Chemical Senses (2)

Lecture - 2 hours. Prerequisite: course 107B (may be taken concurrently), or consent of instructor. Examination of the anatomy and physiology of the chemical senses (taste, smell, and the trigeminal senses) and how they are involved in the perception of food and food intake.—II. Guinard

290. Seminar (1)

Seminar - 1 hour. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

290C. Advanced Research Conference (1)

Discussion - 1 hour. Prerequisite: graduate standing and consent of instructor. Critical presentation and evaluation of original research by graduate students. Planning of research programs and proposals. Discussion led by individual major instructors for their research group. (S/U grading only.)-I, II, III. (I, II,

291. Advanced Food Science Seminar (1)

Seminar - 1 hour. Prerequisite: completion of at least one quarter of course 290. Oral presentation of student's original research, discussion, and critical evaluation. (S/U grading only.)—III. (III.)

298. Group Study (1-5)

(S/U grading only.)

299. Research (1-12)

Prerequisite: graduate standing. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)-I, II, III. (I, II, III.)

Food Service Management

(College of Agricultural and Environmental Sciences) Faculty. See under the Department of Nutrition, on page 445.

The Major Program and Graduate Study.

Food Service Management is incorporated within the major of Clinical Nutrition. If you are interested in preparing for a career in commercial organizations such as hotels, restaurants, industrial cafeterias, or contract food services, as well as in public or private institutions such as hospitals, correctional institutions, schools, or colleges, consult the Department of Nutrition

Related Courses. See Nutrition.

Courses in Food Service Management (FSM)

Questions pertaining to the following courses should be directed to the instructor or to the Nutrition Department Advising office in 3202 Meyer Hall (530) 752-2512.

Upper Division Courses 120. Principles of Quantity Food Production (4)

Lecture—3 hours; independent study—1 hour. Pre-requisite: Food Science and Technology 100B and 101B. Restricted to upper division Clinical Nutrition students only. Fundamental principles of food service management, including quantity food preparation, institutional equipment, receiving and storage, service, menu planning, merchandising, and safety. Students will earn food safety certification.—III. (III.) Frank

120L. Quantity Food Production Laboratory

Laboratory-6 hours. Prerequisite: course 120. Laboratory experience in quantity food production and service. —I, III. (I, III.) Frank

122. Food Service Systems Management

Lecture—3 hours. Prerequisite: Agricultural and Resource Economics 112, courses 120, 120L, 121. Principles of quantity food production management: production schedules, portion control, financial management, layout and equipment planning, evaluation of alternative systems, and computer applications.—II. (IÍ.) Frank

192. Internship (1-12)

Internship - 3-36 hours. Prerequisite: one upper division course in Food Service Management and consent of instructor. Work experience on or off campus in practical aspects of food service management, supervised by a faculty member. (P/NP grading only.) - Steinberg

197T. Tutoring in Food Service Management (1-2)

Discussion/laboratory-3 or 6 hours. Prerequisite: Dietetics or related major; completion of the Food Service Management course in which tutoring is done. Tutoring of students in food service management, assistance with discussion groups or laboratory sections; weekly conference with instructor in charge of course; written evaluations. May be repeated if tutoring a different course. (P/NP grading only.) - Steinberg

198. Directed Group Study (1-5)

(P/NP grading only.)—Steinberg

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)—Steinberg

Forensic Science (A Graduate Group)

Robert H. Rice, Ph.D., Chairperson of the Group Group Office. 1909 Galileo Ct., Suite B Davis, CA 95618 (530-757-8699); http://forensicscience.ucdavis.edu

Faculty

Faculty members are listed on the website.

Graduate Study. The Forensic Science Graduate Group offers the degree of MS in Forensic Science. This program, offering a Plan I-Thesis or a Plan II-Capstone Project option, has two tracks, DNA or Criminalistics, enabling the student to take core courses emphasizing the physical or biological sciences. Each track requires the student to take six core courses, totaling 18 units, three units of seminar, and the appropriate number of elective/ research units, depending on the selection of Plan I or Plan II, for a total of $4\bar{8}$ units. Students can take courses outside their specializations, but they must complete the courses required for their own track. The FOR seminar course in the fall quarter is required for new students. The FOR spring seminar can be taken in any spring quarter before graduation. Students must also take one additional Seminar course in another department.

Preparation. Appropriate preparation is an undergraduate degree in physical or natural sciences, engineering or a closely related field with a GPA of 3.000 or higher. Examples include Biochemistry, Chemistry, Molecular Biology, Biology, Genetics, and Engineering. Applicants must have completed at least one year each of general chemistry, organic chemistry, general physics and math through calculus. Other recommended courses include general biology, biochemistry, genetics and statistics.

Graduate Advisors. Ralph Aldredge (Mechanical and Aerospace Engineering), Ruth Ballard (Environmental Toxicology), Paul Gepts (Plant Sciences), Ed Imwinkelried (School of Law), Sree Kanthaswamy (Anthropology), Don Land (Chemistry), Leslie Lyons (Population Health & Reproduction), Bahram Ravani (Mechanical & Aeronautical Engineering), Moshe Rosenberg (Food Science and Technology)

Courses in Forensic Science (FOR) Graduate Courses

200. Fundamental Concepts in Forensic Science (3)

Lecture—2 hours; fieldwork—0.25 hours; lecture/laboratory—0.25 hours; seminar—0.5 hours. Overview of forensic science. Problem definition, strategies for problem solving, analytical tools, and professional and ethical considerations.—II. (II.) Sensabaugh

205. Microscopy and Microanalytical Methods in Forensic Science (3)

Lecture—2 hours; seminar—1 hours. Prerequisite: consent of instructor. Introduction to optical and electron microscopy. Transmission, diffraction, reflection and absorption; polarized light and polarizing crystals; phase contrast. radiography; image recording, SEM analysis of gunshot residues, paints, glass. EDS, XRF analysis, signal-to-noise ratios, minimum detectable levels and homogeneity. Restricted to students enrolled in the M.S. in Forensic Science Program. As a minimum, year each of the following chemistry, organic chemistry, calculus, & physics. Offered in alternate years.—(III.) van Benthem

210. Personal Identification Methods in Forensic Science (3)

Lecture—3 hours. Prerequisite: restricted to students enrolled in the M.S. Forensic Science Program or consent of instructor. Methods for identifying individuals from evidence collected at crime scenes, suspects or victims, crime scene examination and analytical methods used to support such investigations. Topics include forensic anthropology and odontology; latent prints; shoe prints; facial reconstruction/recognition; eyewitness identifications; biometric systems. Offered in alternate years.—II. (II.)

212. Scientific Evidence and Courtroom Testimony (3)

Lecture—2 hours; discussion—1 hours. Prerequisite: graduate students enrolled in the MS Forensic Science program or by consent of instructor. Explores the relationship between science and the criminal justice system. Admissibility of scientific testimony and documentary proof during the trial, concepts of relevancy, hearsay and opinion rule, examination of expert witnesses, impact of Kelley-Fry and Daubert decisions & court testimony.—II. (II.) Harmon, Maucieri

215. Forensic Fire and Arson Investigation (3)

Lecture—3 hours. Prerequisite: open only to students enrolled in the M.S. Forensic Science program or by consent of the Forensic Science Program Director. Principles and techniques of scientific investigation of fires and related crimes; offer peer-reviewed protocols for processing fire and explosion scenes; discuss recognition, collection, analysis of physical evidence, and describe the scientific method for decision-making in fire/arson investigation. Offered in alternate years—(III.) DeHaan

218. Technical Writing in Forensic Science (3)

Lecture—2 hours; extensive writing or discussion—1 hour. Prerequisite: consent of the instructor required for all students not enrolled in the Forensic Science program. Restricted to graduate standing in the Forensic Science program. How to write clear, credible forensic science reports and scientific articles, that (a) serve the ends of the justice system, (b) meet their readers' varying needs and (c) reflect well on the author.—I. (I.)

220. Analysis of Toxicants (3)

Lecture—3 hours. Prerequisite: coursework in organic chemistry. Principles of microanalysis of toxicants. Theoretical considerations regarding separation, detection and quantitative determination of toxicants using chemical and instrumental techniques. (Same course as Environmental Toxicology 220.)—1. (I.) Zhang

221L. Forensic Science Analytical Instrumentation (2)

Lecture/discussion—1 hour; laboratory—3 hours. Methodology and instruments used for the analysis of substances of interest in the discipline of Forensic Science. Practical experience with modern instrumental techniques & methodologies used in the advanced forensic science laboratory. Limited to students accepted in the Forensic Science Graduate program or subject to the approval of the instructor if the student has the appropriate chemistry, calculus and physics courses required of students in the graduate forensic science program. Offered in alternate years.—(I.) Land

240. Homicide Crime Scene Investigation (3)

Lecture—2 hours; laboratory—3 hours. Processing and evaluating complex homicide scenes. Functions and activities of police agencies. Recognition, documentation, identification, and collection of evidence. Event sequence reconstruction. Evidence collection, preservation, report writing. Courtroom presentation.—1. III. (I.) (III.) Springer

268. Statistics in Forensic Science (3)

Lecture—3 hours. Prerequisite: consent of instructor. Restricted to students enrolled in the M.S. in Forensic Science Program or by consent of Forensic Science Program Director. Statistics that are used by the forensic scientist, their limitations/applications in presenting evidential results in such areas as DNA-STR results, trace evidence correlation, fingerprint statistics, population sampling and the Bayes method. Offered in alternate years.—II. Land

278. Molecular Techniques (3)

Lecture—3 hours. Prerequisite: graduate standing or consent of instructor. Recombinant DNA technology and its applications. (Same course as Environmental Toxicology 278.) Offered in alternate years.—(I.) Denison, Rice

280. Forensic DNA Analysis (3)

Lecture—3 hours. Prerequisite: coursework in genetics and molecular biology. Foundation in theory and practice of forensic DNA analysis; past, present, and emerging technologies; legal and quality assurance issues. DNA extraction, DNA quantitation, multiplex amplification of STR loci, capillary electrophoresis of amplified products, and analysis of STR typing data. (Same course as Environmental Toxicology 280.)—II. (II.) Von Beroldingen

281. Principles and Practice of Forensic Serology and DNA Analysis (3)

Lecture—2 hours; lecture/discussion—3 hours. Prerequisite: course/Environmental Toxicology 278 or course/Environmental Toxicology 280, or equivalent; consent of instructor. Restricted to students enrolled in the M.S. in Forensic Science Program or by consent of Forensic Science Program Director. Comprehensive overview of forensic serology and DNA typing techniques and technologies. Strong emphasis on real-world applications, including preservation and tracking of biological evidence, detection and identification of bodily fluids, and methods to extract, quantify, and type human DNA. (Same course as Environmental Toxicology 281.)—III. (III.)

283. Forensic Biology (3)

Lecture—2 hours; discussion—1 hour. Prerequisite: consent of instructor. Restricted to students enrolled in the M.S. in Forensic Science program or by consent of the Forensic Science Program Director. Overview of the foundational concepts in forensic biology: chemistry and molecular biology of biological evidence, genetic basis of biological uniqueness, evolutionary basis of species differences, patterns and dynamics of evidence deterioration, and the legal/ professional considerations associated with biological evidence.—II. (II.) Sensabaugh

284. Non-Human Forensic DNA—Theory and Casework Application (2)

Lecture—2 hours. Prerequisite: consent of instructor required for all students not enrolled in the MS Forensics program; upper division Molecular Biology and Genetics or its equivalent. Restricted to graduate

standing. Provides a comprehensive understanding of plant and animal forensic biology in terms of sample collection, preservation, analytical methods, and of the invaluable lines of inquiry these forensic evidence may permit. (Same course as Environmental Toxicology 284.) Offered in alternate years.—I. Kanthaswamy

289. Survey in Forensic Science (3)

Lecture—3 hours. Analytical methods in contemporary forensic science. Clandestine laboratories in California, crime scene management, examination and analysis of human hair, forensic ballistics/trajectory reconstruction, shoe/fire print impressions, serial number restoration, forensic aspects of alcohol impairment, bloodstain pattern interpretation, microscopy of building materials, biological aspect of forensic science. May be repeated for credit when topic differs.—I, II, III. Howitt

290. Seminar in Forensic Science (1)

Seminar—3 hours. Students will be exposed to topical areas in Forensic Science by presentations conducted by expert guest speakers. The seminar will also serve as a medium whereby the exiting students will present the research conducted as part of their thesis requirement. May be repeated for credit when topic differs. Restricted to students enrolled in the M.S. in Forensic Science Program. (S/U grading only.)—I, III. (I, III.)

290C. Graduate Research Conference in Forensic Science (1)

Independent study—1 hour. Individual and/or group conference on problems, progress and techniques in forensic science and research. May be repeated for credit when topic differs. (S/U grading only.)—I, II, III

293. Forensic Science Research Methodology (2)

Lecture — 1.5 hour; extensive writing or discussion — 0.5 hours. Prerequisite: graduate students enrolled in the MS Forensic Science program or by consent of instructor. Introduction to identification, formulation, and solution of meaningful scientific problems encountered in the Forensic Science area including experimental design and/or theoretical analysis of new and prevailing techniques, theories and hypotheses. Students will present and defend their thesis research/journal article proposals. Limited enrollment. (S/U grading only.)—III. (III.)

298. Group Study in Forensic Science (1-5) (S/U grading only.)

299. Research in Forensic Science (1-12) Prerequisite: consent of instructor. (S/U grading only.)

French

(College of Letters and Science)

Julia Simon, Ph.D., Chairperson of the Department

Department Office. 213 Sproul Hall (530) 752-1219; http://french.ucdavis.edu

Faculty

Jeff Fort, Ph.D., Assistant Professor Noah Guynn, Ph.D., Associate Professor Eric Russell Webb, Ph.D., Associate Professor Julia Simon, Ph.D., Professor

Emeriti Faculty

Claude Abraham, Ph.D., Professor Emeritus
Edward M. Bloomberg, Ph.D., Professor Emeritus
Gerald Herman, Ph.D., Senior Lecturer Emeritus
Margo R. Kaufman, M.A., Senior Lecturer Emeritus
Manfred Kusch, Ph.D., Senior Lecturer Emeritus
(Comparative Literature, French and Italian)
Marshall Lindsay, Ph.D., Professor Emeritus
Maria I. Manoliu, Ph.D., Professor Emerita
Michèle Praeger, Ph.D., Professor Emerita
Leslie Rabine, Ph.D., Professor Emerita
(French and Italian, Women and Gender Studie.)

(French and Italian, Women and Gender Studies) Ruth B. York, Ph.D., Senior Lecturer Emerita

The Major Program

The major program assures proficiency in all four of the language skills-speaking, understanding, reading, and writing-and acquaints students with the intellectual and cultural contributions of the Frenchspeaking world through the study of its literature, traditions, and institutions.

The Program. The department encourages its students to work closely with the academic adviser in designing a major tailored to their needs and interests within the broad requirements prescribed by the program and to avail themselves of the guidance of an excellent teaching faculty. The department sponsors an active French Club and a chapter of Pi Delta Phi, the National French Honor Society. Each year, a substantial number of students with good preparation in French participate in the university's very popular Education Abroad Program, which maintains centers at seven French universities.

Career Alternatives. Foreign language teachers, a cardiologist, a veterinarian, a naval commander at the Pentagon, a professor of Political Science, lawyers, sales representatives, journalists, an anesthesiologist, a law professor, translators, a senior applications programmer, travel agents, independent business owners, a senior museum curator, nurses, financial managers, stock brokers, and an industrial attaché for a French Trade Commission, all graduated with an A.B. in French from UC Davis and represent only a small fraction of the career choices documented in a recent survey of department graduates.

UNITS

UNITS

A.B. Major Requirements:

Preparatory Subject Matter.....4-34 French 1, 2, 3 (or the equivalent) 0-15 French 21, 22, 23 0-15 Linguistics 1 or 4......4 Depth Subject Matter44 Three French literature courses from among the following (at least one course must cover pre-revolutionary literature; such courses are marked with an asterisk): 101, 102, 103, *115, *116, *117A, *117B, *118A, *118B, 119A, 119B, 119C, 120, 121, 124, 125, 130, 140, 141......12 Two French culture courses from among the following: 107, 108, 127, 128......8 Two French linguistics and language science courses from among the following: 105, 109, 160, 161, 162..... Elective courses in French literature, language, or culture, to be chosen in consultation with an undergraduate adviser From among the following: 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 115, 116, 117A, 117B, 118A, 118B, 119A, 119B, 119C, 120, 121, 124, 125, 127, 128, 130, 133, 140, 141, 160, 161, 162......12

Total Units for the Major......48-78 Recommended

French 107, 108, 109, 160 and 161 in addition to other upper division courses, for a total of 45 units for students interested in obtaining a "single subject" teaching credential in California.

Major Adviser. J. Fort

Minor Program Requirements:

French 1004 One French literature course from among the following: 101, 102, 103, 115, 116, 117A, 117B, 118A, 118B, 119A, 119B, 119C, 120, 121, 124, 125, 130, 140, 141.....4 One French culture course from among the following: 107, 108, 127, 128......4

One French linguistics and language science course from among the following: 105, 109, 160, 161, 162 Two elective courses in French literature,

language, or culture from among the following: 101, 102, 103, 104, 105, 106, following: 101, 102, 103, 104, 103, 104, 107, 108, 107, 108, 109, 110, 115, 116, 117A, 117B, 118A, 118B, 119A, 119B, 119C, 120, 121, 124, 125, 127, 128, 130, 133, 140, 141, 160, 161, 162

Honors Program. Candidates for high or highest honors in French must write a senior thesis under the direction of a faculty member. For this purpose, honors candidates must enroll in French 194H (4 units) and French 195H (4 units). Normally, a student will undertake the honors project during the first two quarters of the senior year; other arrangements must be authorized by the department chair. Only students who, at the end of the junior year (135 units), have attained a cumulative grade-point average of 3.500 in courses required for the major will be eligible for the honors program. The requirements for earning high and highest honors in French are in addition to the regular requirements for the major in

Education Abroad Program. The department of French and Italian encourages students to study abroad in the Summer Abroad program, the Quarter Abroad program, or the Education Abroad program. With the approval of a major adviser, applicable courses taken abroad may be accepted in the major or minor programs.

Teaching Credential Subject Representative. See the Teaching Credential/M.A. Program on page 115.

Graduate Study. The Department offers programs of study and research leading to the Ph.D. degree in French. Candidates for the Ph.D. have the option of enriching their degree program by preparing a designated emphasis in African American and African Studies, Critical Theory, Feminist Theory and Research, Classics and Classical Reception, Second Language Acquisition, or Studies in Performance and Practice. Detailed information may be obtained from the graduate adviser or the department chair-

Graduate Adviser. N. Guynn

Prerequisite Credit. Credit will not normally be given for a course if it is the prerequisite of a course already successfully completed. Exceptions can be made by the department chairperson only.

Courses in French (FRE)

Students offering high school language preparation as a prerequisite must take a placement test.

Course Placement. Students with two years of high school French normally take French 2, those with three years take French 3 and those with four years take French 21.

Lower Division Courses

1. Elementary French (5)

Discussion - 5 hours; laboratory - 1 hour. Students who have successfully completed French 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student's P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed. GE credit: WC.-I, II, III. (I, II, III.)

1A. Accelerated Intensive Elementary French (15)

Lecture/discussion-15 hours. Prerequisite: placement exam required. Special 12 week accelerated, intensive summer session course that combines the work of courses 1, 2, and 3. Introduction to French grammar and development of all language skills in a cultural context with emphasis on communicative ability. Not open for credit to students who have completed courses 1, 2, or 3.—IV. (IV.)

2. Elementary French (5)

Discussion - 5 hours; laboratory - 1 hour. Prerequisite: course 1. Continuation of course 1. GE credit: WC.-I, II, III. (I, II, III.)

3. Elementary French (5)

Discussion-5 hours; laboratory-1 hour. Prerequisite: course 2. Continuation of course 2. GE credit: WC.-I, II, III. (I, II, III.)

21. Intermediate French (5)

Lecture/discussion-5 hours. Prerequisite: course 3. Grammar, oral practice, composition. Initiation to French institutions; reading and discussion of short literary texts. GE credit: AH, OL, WC, WE.-I, II, III. (I, II, III.)

22. Intermediate French (5)

Lecture/discussion-5 hours. Prerequisite: course 21. Continuation of course 21. Grammar, oral practice, composition. Contemporary French culture; reading and discussion of a play. GE credit: AH, OL, WC, WE.-I, II, III. (I, II, III.)

23. Intermediate French (5)

Lecture/discussion-5 hours. Prerequisite: course 22. Continuation of course 22. Grammar, oral practice, composition. Current topics in French politics and culture; reading and discussion of a novel. GE credit: AH, OL, WC, WE.—I, II, III. (I, II, III.)

50. French Film (4)

Lecture-1 hour; discussion-2 hours; term paper. Introduction to the tradition of French cinema from its invention by Méliès and the Lumière brothers through New Wave (especially the works of Truffaut and Godard) and more recent developments in French and Francophone film. Taught in English. Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WC, WE. - (I, II, III.)

51. Major Works of French Literature in Translation (4)

Lecture - 2 hours; discussion - 1 hour; term paper. Readings in English translation of key works of French and Francophone literature from the Middle Ages to the present. Particular attention is given to the long-standing interest of French writers in issues of social, regional, gender, sexual, and ethnic identity. GE credit: ArtHum, Div, Wrt | AH, WC, WE.— II. (II.) Fort, Guynn

52. France and the French-Speaking World

Lecture - 2 hours; discussion - 1 hour; term paper. Taught in English. A survey of the history and culture of France and the French-speaking world, especially Canada, the Caribbean and Africa. Study of social, historical and cultural issues that occupy the Frenchspeaking world, with particular attention to mass media. ĞE credit: ArtHum, Div, Wrt | AH, WC, WE.-III. (III.)

53. French as a World Language (4)

Lecture/discussion-3 hours; term paper. The linguistic status of French and its function in multilingual societies and international arenas. Linguistico-political landscape of communities in Euroasia, Africa, and the Americas. Sociolinguistic concepts and emergence of French as a world language. Offered in alternate years. GE credit: SocSci, Div, Wrt | AH, OL, WC, WE.—(II.) Russell Webb

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading

Upper Division Courses

Course 100 is the prerequisite for the majority of the upper division literature courses.

100. Composition in French (4)

Lecture—3 hours; term paper. Prerequisite: course 23. Instruction and practice in expository writing in French, with emphasis on organization, correct syntax, and vocabulary building. GE credit: AH, WC, WÉ.—I, II, III. (I, II, ÎII.)

101. Introduction to French Poetry (4)

Lecture-3 hours. Prerequisite: course 100 or consent of instructor. Analysis and evaluation of works representing the main types of French poetry. Study of French poetic conventions and versification. GE credit: ArtHum | AH, WC, WE.-II. (I.)

102. Introduction to French Drama (4)

Lecture - 3 hours. Prerequisite: course 100 or consent of instructor. Analysis and evaluation of plays representing the main types of French drama, with emphasis on dramatic structure and techniques. GE credit: ArtHum | AH, WC, WE.-I. (II.) Guynn

103. Introduction to French Prose (4)

Lecture—3 hours; short papers. Prerequisite: course 100 or consent of instructor. Analysis and evaluation of works representing main types of French prose, with emphasis on narrative structure and techniques. GE credit: ArtHum | WC.-III. (III.) Simon

104. Translation (4)

Lecture — 3 hours; extensive writing. Prerequisite: course 100 or the equivalent. Practice in English-to-French and French-to-English translation using a variety of non-literary materials, illustrating different problems and styles.—III. (III.) Russell Webb

105. Advanced French Grammar (4)

Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 23 or the equivalent. Understanding of, and extensive practice with, various grammatical structures in French. Lexical-semantic, morphological, and syntactic analysis. GE credit: WE.—II. (II.) Russell Webb

106. French in Business and the Professions (4)

Lecture - 1 hour; discussion - 2 hours. Prerequisite: course 100 or consent of instructor. The French language as used in the commercial sphere. Emphasis on proper style and form in letter-writing, and in nonliterary composition. Technical terminology in such diverse fields as government and world business. GE credit: WE.-I. (I.)

107. The Making of Modern France (4)

Lecture—3 hours; term paper. Prerequisite: course 100 or consent of instructor. Introduction to French culture through a historical approach to topics such as the citizen and the state (politics, justice, social security), the nation and centralization, the rise of public education, colonization, class and social relationships. Offered in alternate years. GE credit: ArtHum | WE. — (I.) Simon

107A. Pre and Early Modern France (4)

Lecture-3 hours; term paper. Prerequisite: course 100 or consent of instructor. Introduction to pre- and early modern French culture through a historical approach to topics such as the feudal system, the rise of the monarchy, the Reformation and religious wars. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC, WE. - (I.) Simon

107B. The Making of Modern France (4)

Lecture-3 hours; term paper. Prerequisite: course 100 or consent of instructor. Introduction to French culture through a historical approach to topics such as the absolute monarchy, the role of the parlements, the French revolution, and the political regimes of the nineteenth century. Offered in alternate years. GE credit: ArtHum, Wrt.—(I.) Simon

108. Modern French Culture (4)

Lecture—3 hours; extensive writing. Prerequisite: course 100 or consent of instructor. Survey of modern French culture from the Dreyfus affair to the present day. Topics mayex include women and French culture, decolonialization and modernization, education, social welfare and immigration. GE credit: WE.-Simon

109. French Phonetics (4)

Lecture/discussion-3 hours; laboratory-1 hour. Prerequisite: course 23 or the equivalent. Introduction to the sound-inventory of French and practice in phonetic transcription, with a focus on ways in which phonetic contrasts signal grammatical contrasts; spoken forms and spelling; formal differences

between the 'Standard' and other varieties across the French-speaking world. Offered in alternate years. GE credit: SS.-III. Russell Webb

110. Stylistics and Creative Composition (4)

Lecture—3 hours; frequent papers. Prerequisite: course 100 or consent of instructor. Intensive course in creative composition using a variety of techniques and literary styles, patterned on Queneau's Exercices de style. Practice in such stylistic modifications as inversion, antithesis, changes in tense, mood, tonality, etc. The writing of poetry. GE credit: WC.—II.

115. Medieval French Literature and Society (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 100. Social and cultural life of medieval France as studied through its representation in such literary works as La Chanson de Roland, courtly love lyric, the Arthurian romances of Chrétien de Troyes, Áucassin et Nicolette, selected fabliaux and farces. Offered in alternate years. GE credit: ArtHum | AH, WC, WE.-I. Guynn

116. The French Renaissance (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 100. Overview of major works and writers with particular attention to the historical context of the turbulent 16th century. Writers to be read may include Rabelais, Marot, Ronsard, Du Bellay, Labé, Marguerite de Navarre, Montaigne, and D'Aubigné. Öffered in alternate years. ĞE credit: ArtHum | AH, WC, WE. - (III.)

117A. Baroque and Preclassicism (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 100. The literature and intellectual culture of the period between the Renaissance and French classicism. Offered in alternate years. GE credit: ArtHum | AH, WC, WE. - (II.) Śimon

117B. The Classical Moment (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 100. Literature, culture, and politics in the Age of Louis XIV. May be repeated one time for credit when topic differs. Offered in alternate years. GE credit: ArtHum | AH, WC, WE. - (III.) Guynn,

118A. The Age of Reason and Revolution (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 100. Literature and philosophy of the French Enlightenment. Readings from such authors as Bayle, Fontenelle, Montesquieu, Voltaire, Rousseau and Diderot. Offered in alternate years. GE credit: ArtHum | AH, OL, WC, WE. - (II.) Simon

118B. Private Lives and Public Secrets: The Early French Novel (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 100. History of the French roman from the Middle Ages to the Revolution with particular emphasis on the novels of the 18th century. Offered in alternate years. GE credit: ArtHum | AH, WC, WE.—II. Simon

119A. The Romantic Imaginary (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 100. Major concepts and themes of French Romanticism, such as dream and the supernatural, impossible love, exoticism, revolution, individualism, nature, the mal du siècle, Romantic irony, the creative imagination, the cult of ruin. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC,

119B. Realism, History and the Novel (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 100. Narrative and historical codes of French realist fiction, with emphasis on the representation of history in the realist novel, its depiction of social "realities" such as class and gender, and its relation to the historical situation of post-revolutionary society. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC, WE.—(III.)

119C. From Baudelaire to Surrealism (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 100. Study of the main poets and poetic movements from the mid-19th to the early 20th century, including Baudelaire, the Symbolists, and the Surrealists. Offered in alternate years. GÉ credit: ArtHum | AH, WC, WE. - (I.)

120. Modern French Thought (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 100. Overview of post-Second World War French intellectual currents from existentialism to structuralism and deconstructionism. Readings will include Sartre and de Beauvoir, Camus, Lévi-Strauss, Lacan, Barthes, Foucault, Derrida, Kristeva, Sollers, Cixous, and Irigaray. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC, WE.-(I.) Fort

121. Twentieth Century French Novel (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 100. Novels and theories of the novel, from Proust to the Nouveau Roman and beyond. Readings from among Gide, Sartre, de Beauvoir, Camus, Breton, Beckett, Robbe-Grillet, Sarraute, Simon, Barthes, Duras, Tournier, Perec, Modiano, Guibert, Toussaint. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC, WE. - (II.) Fort

122. French and Francophone Film (4)

Lecture/discussion-4 hours; extensive writing; fieldwork-3 hours. Prerequisite: course 100 or consent of instructor. French and Francophone film from the Lumière Brothers to the present. Topics may include analysis of film form and narrative, major filmmakers and filmic traditions, and film theory. May be repeated one time for credit. Offered in alternate years. GE credit: ArtHum | AH, VL, WC, WE.—(I.)

124. Post-Colonialist and Francophone Literature (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 100. Post-Independence Black African and/or Caribbean and/or North African literatures written in French. Selected topics include: identity and subjectivity, the role of the intellectual, women's voices, languages and oral literatures, cultural syn cretism, theories of post-colonialism. May be repeated one time for credit. Offered in alternate years. GE credit: ArtHum, Div | AH, VL, WC, WE. — (III.) Adejunmobi

125. French Literature and Other Arts (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 100. Relationship between French literature and other arts-painting, music, cinema, architecture, opera-from different periods. May be repeated one time for credit when topic differs. Offered in alternate years. GE credit: ArtHum, Wrt | WC.-II. Guynn

127. Paris: Modernity and Metropolitan

Lecture/discussion—3 hours; term paper. Prerequisite: course 100. Representation of Paris in 19th and 20th century texts and its importance in defining the experience and art of modernity. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC, WE. - (III.) Simon

128. Topics in French Culture (4)

Lecture — 3 hours; extensive writing. Prerequisite: course 100 or consent of instructor. In-depth study of a particular topic in French culture. Topics may include the Court of Louis XIV, the French Revolution and Immigration. May be repeated one time for credit when topic differs. Offered in alternate years. GE credit: WE.-Guynn, Simor

130. From Page to Stage: Theatre and Theatricality (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 100. French theater as literature and performance. May be repeated one time for credit when topic differs. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC, WE.—I. Guynn

133. Gender and Politics in French Literature and Culture (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 100. Thematic, theoretical and political tendencies in contemporary French fiction. Barthes, Foucault, Duras, Guibert, considered in terms of

their writing on identity and gender. Offered in alternate years. GE credit: ArtHum, Div | AH, WC,

140. Study of a Major Writer (4)

Lecture—3 hours; term paper. Prerequisite: course 100; consent of instructor. Concentrated study of works of a single author. May be repeated one time for credit if author-subject changes. GE credit: AH, WC, WE.-II. (II.)

141. Selected Topics in French Literature (4)

Lecture—3 hours; term paper. Prerequisite: courses course 100; consent of instructor. Subjects and themes such as satiric and didactic poetry of the Middle Ages, poetry of the Pléiade, theater in the eighteenth century, pre-romantic poetry, autobiography, literature and film, etc. May be repeated two times for credit when topic differs. GE credit: AH, WC, WE.-II. (II.)

160. Linguistic Study of French-Sound and Form (4)

Seminar—3 hours; term paper. Prerequisite: course 109 and Linguistics 1, or consent of instructor. Introduction to the linguistic study of modern French, with focus on sound structure and form, inflection and derivation. GE credit: AH or SS, WE.-II. (II.) Russell Webb

161. Linguistic Study of French-Form and Meaning (4)

Seminar — 3 hours; term paper. Prerequisite: one of course 104, 105, 160, 162 and Linguistics 1, or permission of instructor. Introduction to the linguistic study of modern French, with focus on sentence construction and constituency, meaning and discourse functions. GE credit: AH or SS.-III. (III.) Russell Webb

162. History of French Language (4)

Lecture - 3 hours; term paper. Prerequisite: course 160. Main periods in development of the French language, from Latin to contemporary popular aspects, with emphasis on relationship between socio-cultural patterns and evolution of the language. GE credit: ArtHum | AH or SS, WC, WE.—II. (II.) Russell Webb

192. Internship (1-12)

Internship - 3-36 hours; term paper. Prerequisite: upper division standing and consent of instructor. Practical application of the French language through work experience in government and/or business, culminating in an analytical term paper on a topic approved by the sponsoring instructor. (P/NP grading only.)

194H. Special Study for Honors Students

Independent study-4 hours. Prerequisite: open only to French majors of senior standing who qualify for honors program. Guided research, under the direction of a faculty member, leading to a senior honors thesis on a topic in French literature, civilization, or language studies. (P/NP grading only.) GE credit: AH, WC, WE.

195H. Honors Thesis (4)

Independent study-4 hours. Prerequisite: course 194H. Writing of an honors thesis on a topic in French literature, civilization, or language studies under the direction of a faculty member. (P/NP grading only.) GE credit: AH, WC, WE.—I, II, III. (I, II,

1977. Tutoring in French (1-4)

Seminar - 1-2 hours; laboratory - 1-2 hours. Prerequisite: upper division standing and consent of Chairperson. Tutoring in undergraduate courses including leadership in small voluntary discussion groups affiliated with departmental courses. May be repeated for credit for a total of 6 units. (P/NP grading only.)

197TC. Tutoring in the Community (2-4)

Seminar - 1-2 hours; laboratory - 1-2 hours. Prerequisite: upper division standing and consent of Chairperson. Tutoring in public schools under the

guidance of a regular teacher and supervision by a departmental faculty member. May be repeated for credit for a total of 6 units. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

200. Introduction to Graduate Study in French (2)

Seminar - 2 hours. Prerequisite: graduate standing. An introduction to a range of methodologies and critical practices in the field of French Studies, including literature, culture, and linguistics. The course will cover basic principles of bibliographic research in the humanities. (S/U grading only.)—I. (I.)

201. History of French (4)

Seminar—3 hours; term paper. Presentation of the main changes in the grammatical structures of French, from Latin to contemporary usage, involving textual analysis and sociolinguistic description. $-\mathsf{I}$ (I.) Guynn, Russell Webb

202. Topics in French Civilization (4)

Seminar—3 hours; term paper. Prerequisite: graduate standing. Interdisciplinary approach to the study of French and Francophone civilization from the Middle Ages to the present. Course content will vary by instructor. May be repeated for credit. - I. (I.)

204. Topics in Medieval Literature (4)

Seminar-3 hours; term paper. Study of Medieval French literature, focusing on a particular period, milieu, literary movement, genre, or theoretical approach. May be repeated for credit when topic differs. - I. (I.) Guynn

205A. Sixteenth-Century Literature: The Humanists (4)

Seminar—3 hours. French humanism in its most varied forms. Although at different times Rabelais and Montaigne will be primarily studied, other leading intellectuals and religious writers will also receive attention. May be repeated for credit when different topic is studied.—I. (I.)

206A. Seventeenth-Century Literature: Theater (4)

Seminar-3 hours. Works of Corneille, Racine, Molière, and minor dramatists. One or more authors may be covered. May be repeated for credit with consent of instructor when different topics are studied.-II. (II.) Guynn

206B. Seventeenth-Century Literature: Prose (4)

Seminar – 3 hours; term paper and/or exposé. Works of authors such as Pascal, Descartes, Mme de Lafayette. One or more authors may be covered. May be repeated for credit with consent of instructor as different topics are studied from quarter to quarter. - I. (I.)

206C. Seventeenth-Century Literature: Poetry (4)

Seminar-3 hours; term paper and/or exposé. Studies of the works of one or more poets of the period. May be repeated for credit with consent of instructor. - III. (IIÍ.)

207A. Eighteenth-Century Literature: Philosophies (4)

Seminar-3 hours; term paper. Not a course in philosophy, but an examination of the role of philosophy in the design and context of literary works. Study of one or more authors. May be repeated for credit. - II. (II.) Simon

207B. Eighteenth-Century Literature: Novel (4)

Seminar - 3 hours. Rise of the novel. Study of narrative experiments in the context of the philosophical climate and new literary values. Course may treat

one or more novelists of the period. May be repeated for credit when different topics are studied. - III. (III.) Simon

208A. Nineteenth-Century Literature: Fiction (4)

Seminar-3 hours. Study of the works of one or several novelists and/or short-story writers of the period. May be repeated for credit with consent of instructor when different topics are studied.—I. (I.)

208B. Nineteenth-Century Literature: Poetry (4)

Seminar-3 hours. Study of the works of one or several poets of the period. May be repeated for credit with consent of instructor when different topics are studied. — III. (III.)

209A. Twentieth-Century: Prose (4)

Seminar — 3 hours; term paper. Study of the works of one or several writers of the period. - II. (II.) Fort

209B. Twentieth-Century: Theater (4)

Seminar — 3 hours; term paper. Study of the works of one or several dramatists of the period. May be repeated for credit with consent of instructor. - II. (II.)

209C. Twentieth-Century: Poetry (4)

Seminar — 3 hours; term paper. Study of the works of one or several poets of the period. May be repeated for credit with consent of instructor. - III. (III.)

210. Studies in Narrative Fiction (4)

Seminar – 3 hours. May be repeated for credit with consent of instructor when different topic is studied. — I. (I.)

211. Studies in Criticism (4)

Seminar-3 hours. May be repeated for credit with consent of instructor when different topic is studied. - II. (II.)

212. Studies in the Theater (4)

Seminar - 3 hours. May be repeated for credit with consent of instructor when different topic is studied. - I. (I.)

213. Studies in Poetry (4)

Seminar - 3 hours. May be repeated for credit with consent of instructor when different topic is studied. - II. (II.)

214. Study of a Literary Movement (4)

Seminar—3 hours. May be repeated for credit with consent of instructor when different topic is studied. - III. (III.)

215. Topics in French and Francophone Film (4)

Seminar—3 hours; term paper. Prerequisite: graduate standing. Aspects of French and Francophone film from the Lumière Brothers through the present. Topics may include a specific historical period of filmmaking, film theories and the analysis of film form and narrative, and major filmmakers and filmic traditions. May be repeated two times for credit. -III. (III.)

224. Francophone Literatures (4)

Seminar-3 hours; term paper. Study of cultural productions (literature, film, visual arts) by Francophone peoples such as found in North Africa, West Africa, the Caribbean, South-East Asia, the Americas, and Metropolitan France. May be repeated for credit when topic differs and with consent of instructor. -Adejunmobi

250A. French Linguistics I (4)

Seminar—3 hours; term paper. Theoretical approach to the forms and functions of French, with emphasis on phonology and morphology. Overview of current linguistic theories and their application to French. Offered in alternate years. — (II.) Russell

250B. French Linguistics II (4)

Seminar — 3 hours; term paper. Theoretical approach to the forms and functions of French, with emphasis on syntax and semantics. Overview of current linguistic theories and their application to French. Offered in alternate years. - (II.) Russell Webb

251. Topics in the Linguistic Study of French

Seminar—3 hours; term paper. Prerequisite: course 201, 250A or 250B, or consent of the instructor. Questions relevant to the linguistic study of French, such as language acquisition, sociolinguistics, or theoretical examination of structure. Intended for students in French Linguistics and those applying linguistic models to literature or teaching. May be repeated for credit when topic differs.—III. (III.) Russell Webb

291. Foreign Language Learning in the Classroom (4)

Seminar - 3 hours; project. Overview of approaches to university-level foreign language instruction and the theoretical notions underlying current trends in classroom practices across commonly taught foreign languages. (Same course as German 291 and Spanish 291.)—I, II. (I, II.)

297. Individual Study (1-5)

(S/U grading only.)

298. Group Study (1-5)

Seminar - 1-5 hours. May be repeated for credit with consent of instructor.

299. Research (1-12)

(S/U grading only.)

299D. Dissertation Research (1-12)

(S/U grading only.)

Professional Courses

300. Teaching of a Modern Foreign Language (3)

Lecture/discussion-3 hours. Prerequisite: senior or graduate standing; a major or minor in a modern foreign language.—III. (III.)

390A. The Teaching of French in College (2)

Lecture/discussion-2 hours. Prerequisite: graduate standing or consent of instructor. Course designed for graduate teaching assistants with emphasis on problems and procedures encountered by teachers of lower division classes at the university. May be repeated for credit with consent of instructor. (S/U grading only.)—I. (I.) Russell Webb

390B. The Teaching of French in College (2)

Lecture/discussion-2 hours. Prerequisite: graduate standing or consent of instructor. Course designed for graduate teaching assistants with emphasis on problems and procedures encountered by teachers of lower division classes at the university. (S/U grading only.) - II. (II.) Russell Webb

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

First-Year Seminar Program

Formerly Freshman Seminar Program

Winder McConnell, Ph.D., Program Director

Program Office. 1350 Surge III (Center for Excellence in Teaching and Learning); (530) 752-6050;

http://cetl.ucdavis.edu/first-year-seminars/

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(East Asian Languages & Cultures) Yuuko Uchikoshi, Ph.D. (School of Education) W. Jeffrey Weidner, Ph.D.

(Neurobiology, Physiology and Behavior)

Courses in First-Year Seminar (FRS)

Questions pertaining to the following course should be directed to the instructor or to the Center for Excellence in Teaching and Learning.

Lower Division Courses

1. First-Year Seminar (1)

Seminar-1 hour. Open only to: students who have completed fewer than 45 quarter units; transfer students in their first academic year at UC Davis. Investigation of a special topic through shared readings, discussions, written assignments, term papers, and special activities (such as fieldwork, site visits, laboratory work, etc.). Emphasis placed upon student participation in learning. Students may take more than one First-Year Seminar, but may not take more than one in any given quarter. May be repeated for credit if topic differs.—I, II, III. (I, II, III.)

2. First-Year Seminar (2)

Seminar-2 hours. Open only to: students who have completed fewer than 45 quarter units; transfer students in their first academic year at UC Davis. Investigation of a special topic through shared readings, discussions, written assignments, term papers, and special activities (such as fieldwork, site visits, laboratory work, etc.). Emphasis placed upon student participation in learning. Students may take more than one First-Year Seminar, but may not take more than one in any given quarter. May be repeated for credit if topic differs.—I, II, III. (I, II, III.)

3. First-Year Seminar (1)

Seminar-1 hour. Open only to: students who have completed fewer than 45 quarter units; transfer students in their first academic year at UC Davis. Investigation of a special topic through shared readings, discussions, written assignments, term papers, and special activities (such as fieldwork, site visits, laboratory work, etc.). Emphasis placed upon student participation in learning. Students may take more than one First-Year Seminar, but may not take more than one in any given quarter. May be repeated for credit if topic differs. (P/NP grading only.)—I, II, III. (1, 11, 111.)

4. First-Year Seminar (2)

Seminar-2 hours. Open only to: students who have completed fewer than 45 quarter units; transfer students in their first academic year at UC Davis. Investigation of a special topic through shared readings, discussions, written assignments, term papers, and special activities (such as fieldwork, site visits, laboratory work, etc.). Emphasis placed upon student participation in learning. Students may take more than one First-Year Seminar, but may not take more than one in any given quarter. May be repeated for credit if topic differs. (P/NP grading only.)—I, II, III.

Fungal Biology and Ecology

(College of Agricultural and Environmental Sciences)

The minor in Fungal Biology and Ecology is open to all students interested in a concentrated exposure to and knowledge of the fungi and allied organisms.

The minor is sponsored by the Plant Pathology

Minor Program Requirements:

Fungal Biology and Ecology...... 18-20

Plant Pathology 130, 148, 150......10 Select 7-9 units from Food Science and Technology 104, Plant Pathology 40, 135, 185, Science and Society 30, Soil Science 111; Plant Pathology 224 (available to advanced students with consent of

Minor Adviser. T. Gordon

Genetics

See Molecular and Cellular Biology, on page 423; and Genetics (A Graduate Group), on page 318.

Genetics (A Graduate Group)

David Neale, Ph.D., Chairperson of the Group Group Office. 310 Life Sciences

(530) 752-4863; http://biosci3.ucdavis.edu/GradGroups/GGG/

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(Pediatrics, M.I.N.D. Institute)

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Alan Rose, Ph.D., Associate Project Scientist (Molecular and Cellular Biology)

Lesilee Rose, Ph.D., Associate Professor

(Molecular and Cellular Biology)

John Roth, Ph.D., Professor (Microbiology) Benjamin Sacks, Ph.D.Adjunct Assistant Professor (Population Health and Reproduction) Carl W. Schmid, Ph.D., Professor Emeritus (Molecular and Cellular Biology) David Segal, Ph.D., Associate Professor (Pharmacology and Toxicology) Michael F. Seldin, Ph.D., Professor (Biochemistry and Molecular Medicine) Barbara L. Shacklett, Ph.D., Associate Professor (Microbiology and Immunology)
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Huaijun Zhou, Ph.D., Assistant Professor

Graduate Study. The Graduate Group in Genetics offers programs of study and research leading to the M.S. and Ph.D. degrees. Students in the Genetics graduate program have the opportunity to apply genomic, molecular, and classical genetic approaches to study model organisms, a broad range of native and agricultural species, humans, and companion animals. The group integrates genetic research across campus and unites over 100 faculty members from more than 25 departments spanning the College of Biological Sciences, the College of Letters and Science, the College of Agricultural and Environmental Sciences, the School of Medicine, and the School of Veterinary Medicine. Students experience an unsurpassed breadth of research and instructional opportunities from the most fundamental to applied aspects of genetics. For additional information regarding the program, contact the group coordinator (530) 752-4863.

Courses in Genetics (GGG)

Graduate Courses

201A. Advanced Genetic Analysis (5)

Lecture/discussion - 5 hours. Prerequisite: Biological Sciences 101, Statistics 100 or the equivalent, graduate standing. Fundamentals of genetic analysis and chromosome structure using model organisms including mutation, transmission, complementation, suppression, and enhancement as well as epigenetic phenomena at the whole organism and molecular levels.—I. (I.)

201B. Genomics (5)

(Ànimal Science)

Lecture—3 hours; discussion—2 hours. Prerequisite: course 201A, 201C or the equivalent. Prokaryotic and eukaryotic genomes. Experimental strategies and analytical challenges of modern genomics research and the theory and mechanics of data analysis. Structural, functional, and comparative genomics. Related issues in bioinformatics.—I. (I.)

201C. Molecular Biology (4)

Lecture - 4 hours. Prerequisite: Molecular and Cellular Biology 221A or the equivalent. Pass 1 restricted to graduate students in biochemistry and molecular biology, microbiology, or genetics. Structure and

organization of DNA and chromatin; DNA replication, repair and recombination; transcription and RNA processing; protein biosynthesis and turnover; transcriptional and post-transcriptional control mechanisms; examples from eukaryotic and eubacterial cells, and virsuses. (Same course as Molecular and Cellular Biology 221C.)—III. (III.)

201D. Quantitative and Population Genetics (5)

Lecture—5 hours. Prerequisite: course 201A or consent of instructor. Basic concepts of quantitative and population genetics including gene and genotypic frequencies, multiple factor hypothesis, phenotypic and genotypic values, heritability, selection, genetic variation, the detection of quantitative trait loci and evolution in populations. Experimental and analytical methods.—II. (II.)

205. Molecular Genetics Laboratory (5)

Laboratory-15 hours. Prerequisite: Biological Sciences 101 (may be taken concurrently) or the equivalent, enrolled in Genetics Graduate Group. Students will conduct experiments in molecular genetics laboratories. Individual research problems will emphasize experimental design, experience with methodologies, and data interpretation. May be repeated up to three times for credit. (S/U grading only.)—I, II, III. (I, II, III.)

210. Horizontal Gene Transfer (3)

Lecture/discussion-3 hours. Prerequisite: background in basic microbiology and genetics required; introductory course in molecular biology, biotechnology and microbial and animal/plant genetics recommended. Transfer of genes between unrelated organisms in nature. Dissemination of foreign DNA from genetically engineered organisms, including plants and animals. Mechanisms by which genes are transferred horizontally, and between kingdoms. - I. (I.)

211. Concepts in Human Genetics and Genomics (3)

Lecture/discussion-3 hours. Prerequisite: course 201A or the equivalent; course 201B, 201C or the equivalent recommended. Human genomic organization; genetic structure of populations; positional cloning, application of linkage, association, and haplotypes; quantitative trait loci analyses; integrative genetic studies of gene expression; DNA repair mechanisms in genetic disease; mutation analyses; epigenetics; mitochondrial disease; gene manipulation and therapy. - II.

220. Genomics and Biotechnology of Plant Improvement (3)

Lecture - 3 hours. Prerequisite: Biological Sciences 101 or the equivalent. Integration of modern biotechnology and classical plant breeding including the impact of structural, comparative and functional genomics on gene discovery, characterization and exploitation. Also covers molecular markers, plant transformation, hybrid production, disease resis tance, and novel output traits. (Same course as Plant Sciences 220.)—II. (II.)

291. Seminar in History of Genetics (2)

Seminar-2 hours. Prerequisite: Biological Sciences 101. The development of modern genetic theories beginning with Mendel. — I. (I.)

292. Seminar in Plant Breeding and Biodiversity (1-3)

Topics of current interest in plant breeding and biodiversity. May be repeated for credit. Offered in alternate years. (S/U grading only.) - (I.)

293. Seminar in Animal Genetics (1-3)

Seminar - 1-3 hours. Prerequisite: course 201A or consent of instructor. Emphasis on recent advances in the field of animal genetics, ranging from quantitative genetics to molecular biology as it relates to animals. — III.

294. Seminar in Human Genetics (2)

Seminar-2 hours. Prerequisite: course 201A and consent of instructor. May be repeated for credit up to five times if topic differs. Topics of current interest in human genetics and genomics. Offered in alternate years. — (II.)

295. Seminar in Molecular Genetics (1-3)

Seminar - 1-3 hours. Prerequisite: course 201A or consent of instructor. Topics of current interest related to the structure, modification and expression of

296. Scientific Professionalism and Integrity (2)

Lecture—1 hour; seminar—1 hour. Prerequisite: graduate standing or consent of instructor. Review of basic skills required of contemporary scientists. Topics include scientific conduct, manuscript preparation, grant writing, seminar presentations, and time management. Emphasis on responsibilities of scientists to factually and thoughtfully communicate results. (S/U grading only.)—I. (I.)

297. Seminar in Plant Genetics (1-3)

Seminar - 1-3 hours. Prerequisite: course 201A or consent of instructor. Current topics in plant genetics will be examined in student-conducted seminars and discussion format. The integration of molecular, organismal and population genetics to address questions in plant biology will be emphasized.—(II.)

298. Group Study (1-5)

Prerequisite: consent of instructor. Group study of selected topics in genetics. (S/U grading only.)

299. Research (1-12) (S/U grading only.)

Professional Course

300. Methods in Teaching Genetics (1-3)

Lecture/discussion. Prerequisite: graduate standing and consent of instructor. Practical experience in the methods and problems of teaching genetics. Includes analysis of texts and supporting material, discussion of teaching techniques, preparing for and conducting discussion or laboratory sections, formulating examinations under supervision of instructor. May be repeated for credit up to 3 times or 9 units if teaching in different genetics related course. (S/U grading only.)—I, II, III.

Geographic **Information Systems**

(College of Agricultural and Environmental Sciences) The Department of Biological and Agricultural Engineering offers a minor in Geographic Information Systems with an emphasis on spatial analysis. This minor is ideal for students interested in information processing of spatial data related to remote sensing, land information systems, marine cartography, thematic mapping, surface modeling, environmentalmodeling resources management, public utility planning, emergency response, geomarketing, geotechnics, precision agriculture, archaeology, military exercises, and computer-aided design. Prerequisites include Mathematics 16A-16B, Statistics 13 or Plant Sciences 120 or Civil and Environmental Engineering 114, and Plant Sciences 21 or Computer Science Engineering 15.

Minor Program Requirements:

UNITS

Geographic Information Systems...... 18

Applied Biological Systems Technology/ Landscape Architecture 150, Applied Biological Systems Technology 181N or 182, Select five or more units from Plant Sciences 121, Applied Biological Systems Technology/ Hydrologic Science 182 Environmental Resource Science 1855

Minor Adviser. S. K. Upadhyaya (Biological and Agricultural Engineering Department)

Geographic Studies

(College of Agricultural and Environmental Sciences) The interdepartmental minor in Geographic Studies is defined by its concern with place. Geographers strive to answer spatial questions regarding the earth's surface; to describe and explain the character of regions; to ascertain the ways in which historical and contemporary humans have used and shaped the earth's surface; and to understand the interactions of physical, biotic, and human systems within our global environment. The minor is compatible with a variety of environmental majors in the college and also with graduate programs in geography.

The minor is sponsored by the Department of Environmental Design.

Geography

See Geography (A Graduate Group), below.

Geography (A Graduate Group)

Chris Benner, Ph.D., Chairperson of the Group

Group Office. Carrie Armstrong-Ruport, Student Affairs Officer; 133 Hunt Hall (530) 752-4119; caruport@ucdavis.edu

Faculty

Chris Benner, Ph.D., Associate Professor (Human and Community Development)
Monique Borgerhoff Mulder, Ph.D, Professor (Anthropology)

Stephen Boucher, Ph.D, Associate Professor (Agricultural and Resource Economics) Mary Cadenasso, Ph.D, Assistant Professor (Plant Sciences)

Tim Caro, Ph.D, Professor

(Wildlife, Fish and Conservation Biology) Diana Davis, Ph.D. Associate Professor (History) Adela de la Torre, Ph.D., Professor

(Chicana/o Studies)
Deborah L. Elliott-Fisk, Ph.D., Sr. Lecturer, SOE (Wildlife, Fish, and Conservation Biology) Patsy Eubanks Owens, M.L.A., Professor

(Landscape Architecture) Ryan Galt, Ph.D., Assistant Professor (Human and Community Development)

Steven Greco, Ph.D., Associate Professor (Landscape Architecture)

Luis Guarnizo, Ph.D, Professor (Human and Community Development)

Erin Hamilton, Ph.D., Assistant Professor (Sociology) Susan Handy, Ph.D., Professor

(Environmental Science and Policy) Lynette Hart, Ph.D., Professor

(Population Health and Reproduction) Robert Hijmans, Ph.D, Associate Professor (Environmental Science and Policy)

Frank Hirtz, L.L.D., Ph.D., Sr. Lecturer SOE (Human and Community Development) Lovell (Tu) Jarvis, Ph.D., Professor

(Agricultural and Resource Economics) Suad Joseph, Ph.D., Professor (Anthropology) Carl Keen, Ph.D., Professor (Nutrition)

Martin Kenney, Ph.D., Professor (Human and Community Development) Nguyen Kien, Ph.D., Professor (Anesthesiology)
A. Peter Klimley, Ph.D., Adjunct Professor (Wildlife, Fish and Conservation Biology)
David Kyle, Ph.D., Associate Professor (Sociology)
Frank Loge, Ph.D., Associate Professor

(Civil and Environmental Engineering)

Jonathan London, Ph.D, Assistant Professor (Human and Community Development) Jeff D. Loux, Ph.D., Assistant Adjunct Professor (Landscape Architecture)

Mark Lubell, Ph.D., Professor
(Environmental Science and Policy) Jay R. Lund, Ph.D., Professor

(Civil and Environmental Engineering) Luz Mena, Ph.D., Assistant Professor (Women and Gender Studies)

Beth Middleton, Ph.D., Assistant Professor (Native American Studies)

Patricia Mohktarian, Ph.D., Professor (Civil and Environmental Engineering) Jeffrey Mount, Ph.D., Professor (Geology) Peter B. Moyle, Ph.D., Professor

(Wildlife, Fish and Conservation Biology) N. Claire Napawan, M.L.A., Assistant Professor (Landscape Architecture)

Kimberly Nettles, Ph.D., Associate Professor (Women and Gender Studies)
Bettina Ng'Weno, Ph.D., Associate Professor

(African American and African Studies Program)

Deb Niemeier, Ph.D., Professor (Civil and Environmental Engineering) James Quinn, Ph.D., Professor

(Environmental Science and Policy) Michael Rios. Ph.D., Associate Professor

(Landscape Architecture) Lynn Roller, Ph.D., Professor (Classics, Art History)

Margaret Rucker, Ph.D., Professor (Textiles and Clothing) Art Shapiro, Ph.D., Professo

(Evolution and Ecology) Heath Schenker, M.L.A., Professor

(Landscape Architecture)

Janet Shibamoto-Smith, Ph.D., Professor (Anthropology)
Aaron Smith, Ph.D., Associate Professor

(Agricultural and Resource Economics) Daniel Sumner, Ph.D., Professor

(Agricultural and Resource Economics) Margaret Swain, Ph.D., Associate Adjunct Professor (Women and Gender Studies)

Julie Sze, Ph.D., Associate Professor (American Studies)

Thomas P. Tomich, Ph.D., Professor (Human and Community Development)

Susan Ustin, Ph.D., Professor (Land, Air and Water Resources)

Charles Walker, Ph.D., Associate Professor (History)
Wesley W. Wallender, Ph.D., Professor (Land, Air and Water Resources) Academic Senate Distinguished Teaching Áward

Karen Watson-Gegeo, Ph.D., Professor (School of Education)

Stephen Wheeler, Ph.D., Associate Professor (Landscape Architecture)

Diane Wolf, Ph.D., Professor (Sociology) Truman Young, Ph.D., Professor (Plant Sciences)

Minghua, Zhang, Ph.D., Professor (Land Air and Water Resources)

Emeriti Faculty

Michael Barbour, Ph.D., Professor Emeritus (Plant Sciences)

David Boyd, Ph.D., Associate Professor Emeritus (Anthropology)

Cynthia Brantley, Ph.D., Professor Emeritus (History) Stephen Brush, Ph.D., Professor Emeritus (Human and Community Development)

Thomas A. Cahill, Ph.D., Professor Emeritus Dennis Dingemans, Ph.D., Associate Professor Emeritus (Geography)

Mark Francis, M.L.A., Professor Emeritus (Landscape Architecture)

Isao Fujimoto, Ph.D., Sr. Lecturer SOE Emeritus (Human and Community Development) Charles Goldman, Ph.D., Professor Emeritus

(Environmental Science and Policy) Distinguished Graduate Mentoring Award

James Grieshop, Ph.D., Specialist in Cooperative Extension Emeritus (Human and Community Development)

Louis Grivetti, Ph.D., Professor Emeritus (Nutrition)

Jack Ives, Ph.D., Professor Emeritus Stephen Jett, Ph.D., Professor Emeritus Dean MacCannell, Ph.D., Professor Emeritus (Landscape Architecture)

E. Steve McNiel, M.L.A., Sr. Lecturer, SOE Emeritus (Landscape Architecture)

Jay Mechling, Ph.D., Professor Emeritus (American Studies)

Janet Momsen, Ph.D., Professor Emeritus (Human and Community Development) Ben Orlove, Ph.D., Professor Emeritus (Environmental Science and Policy)

Richard Plant, Ph.D., Professor Emeritus (Plant Sciences)

David Robertson, Ph.D., Professor Emeritus (English) Michael P. Smith, Ph.D., Professor Emeritus

(Human and Community Development)
Robert L. Thayer, Jr., M.A., Professor Emeritus (Landscape Architecture)

Stefano Varese, Ph.D., Professor Emeritus (Native American Studies)

Geoffrey Wandesforde-Smith, Ph.D., Associate Professor Emeritus

Miriam J. Wells, Ph.D., Professor Emeritus (Human and Community Development)

Affiliated Faculty

Dave C. Campbell, Ph.D., Specialist in Cooperative Extension (Human and Community Development) Joan Florsheim, Ph.D., Associate Research Scientist (Geology)

Joyce Gutstein, Ph.D., Director (Public Service Research Program-JMIE) James Hill, Ph.D., Specialist in Cooperative

Extension (Plant Sciences) Eric Larsen, Ph.D., Associate Research Scientist (Landscape Architecture)

F. Thomas Ledig, Ph.D., Adjunct Professor (Plant Sciences)

Greg McPherson, Ph.D., Lecturer and Associate in the Agricultural Experiment Station

Lorence Oki, Ph.D, Associate Specialist in Cooperative Extension (Plant Sciences and Landscape Architecture)

Kenneth Tate, Ph.D., Specialist in Cooperative Extension (Plant Sciences) James Thorne, Ph.D. Research Scientist

(Environmental Science and Policy) Joshua Viers, Ph.D, Assistant Research Scientist (Environmental Science and Policy)

Graduate Study. The Graduate Group in Geography (GGG) offers programs of study and research leading to the M.A. and Ph.D. degrees. Faculty and students share a common interest in spatial interaction between humans and the biophysical environment. The wide faculty interests attract a diverse set of students in such areas as biogeography, urban forestry and related natural science and engineering fields, as well as human geography and related social science fields. A number of faculty members use and teach geographic information systems, remote sensing, and related geographic techniques, and most have a strong field orientation. The strengths of the Davis campus and its faculty enable the program to focus on important issues including people, place and power, community and regional identity and change, people-environment interaction, agricultural sustainability, landscape architecture, environmental change, biogeography, natural resource management, and technological innovations in computing and the use of geographic infor-mation. Students are mentored by faculty across the many colleges of the university.

Preparation. Most students considered for admission will have an undergraduate major in geogra-phy or in a closely related field. Generally, a student without an undergraduate degree in geography will be required to complete the equivalent of a minor in geography, consisting of one course each in human geography, physical geography and geographic methods, plus any additional undergraduate coursework required as background for the student's research emphasis, as determined by the student's guidance committee.

Graduate Advisers. D. Elliott-Fisk (Wildlife, Fish and Conservation Biology), S. Greco (Landscape

Courses in Geography (GEO) **Graduate Courses**

200AN. Geographical Concepts (4)

Lecture/discussion-3 hours; term paper. Prerequisite: graduate standing in Geography or consent of instructor. Concepts and thematic content of the discipline, including contemporary research questions. A brief review of the history of geographic thought and practice is done at the beginning of the course. — I. (I.) Elliott-Fisk

200BN. Theory & Practice of Geography (4) Lecture/discussion-4 hours. Prerequisite: graduate standing. Class size limited to 20. Development, application, and philosophical background of theory in discipline of geography and geographical knowledge production. Similarities and differences in theories employed in physical and human geography and cartography. Geographic contributions to

interdisciplinary theory bridging biophysical sciences, social sciences, and humanities. - II. (II.) Galt,

200CN. Quantitative Geography (4)

Lecture - 2 hours; laboratory - 6 hours. Class size limited to 25. Provides an overview of quantitative approaches in spatial data analysis. Overview of different approaches used for inference, modeling, and prediction. Also learn how to write computer programs to implement these methods.—III. (III.) Hij-

200DN. Socio-Spatial Analysis in Geography (4)

Lecture/discussion-4 hours. Class size limited to 25. Introduction to methodologies of socio-spatial analysis in interviews, and ethnographic fieldwork. Students develop a critical understanding of different methodological and theoretical approaches, and their appropriate applications in overall research design. - II. (II.) Benner, Eubanks-Owens

200E. Advanced Research Design in Geography (2)

Lecture/discussion—2 hours. Prerequisite: graduate standing; courses 200AN, 200BN, 200CN and 200DN. Class size limited to 15. Helps Ph.D. students develop their research question, design their research plan and complete a full dissertation research proposal.—I. (I.) Benner

201. Sources and General Literature of Geography (4)

Discussion—4 hours. Prerequisite: graduate standing in geography; consent of instructor. Designed for students preparing for higher degrees in geography. May be repeated for credit in one or more of the following subfields: physical, cultural, economic, urban, historical, political, conservation, and regional geography.

210. Topics in Biogeography (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: Evolution and Ecology 147 or Wildlife, Fish, and Conservation Biology 156 (may be taken concurrently) or equivalent; consent of instructor for undergraduates. Current topics in historical and ecological biogeography, including macroecology and areography, GIS and remote sensing, phylogeography, vegetation, plant and animal community and species geography. Systematics, climate change, and conservation will be addressed. Offered in alternate years

211. Physical Geography Traditions and Methods (3)

Lecture/discussion-2 hours; term paper. Prerequisite: Introductory course in physical geography. Graduate-level standing in geography or related discipline. Course Description: Discussion of the physical science tradition in geography, including key concepts and current research in climatology, geomorphology, soils geography, biogeography, climate change, watershed science, and coastal studies. Research paradigms, programs, and methods as used by physical geographers will be discussed. May be repeated three times for credit. Offered in alternate years. - I. Elliott-Fisl

280. Field Studies in Geography (3)

Lecture - 1 hour; fieldwork - 6 hours. Prerequisite: undergraduate or graduate coursework in geogra-phy and consent of instructor. A topic or subdisciphy and consent of instructor. A topic of subulsur-pline of geography will form the theme for the course in any given offering, with a focus on current research on this topic, field methodologies, and data analysis in human and physical geography. May be repeated two times for credit. Limited enrollment.

290. Seminar in Geography (1-3)

Seminar - 1-3 hours. Prerequisite: Graduate standing or consent of instructor. The seminar will focus on specified topical areas within geography, which will vary quarter to quarter. Students will be expected to present an oral seminar on an aspect of the general topic under discussion. May be repeated six times for credit. (S/U grading only.)—I, II, III. (I, II, III.)

291. Seminar in Cultural Geography (4) Seminar-3 hours

293. Graduate Internship (1-12)

Prerequisite: consent of instructor. Individually designed, supervised internship, off campus, in community or institutional setting. Developed with advice of faculty mentor. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

295. Seminar in Urban Geography (4) Seminar — 3 hours. — II. (II.)

297. Graduate Group in Geography Seminar (2)

Lecture/discussion - 1 hour; term paper. Prerequisite: graduate standing. Seminars by UC Davis faculty and prominent national and international scholars; research presentations by Graduate Group in Geography Ph.D. candidates. May be repeated for credit. (S/U grading only.)

298. Group Study (1-5)

Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12)

(S/U grading only.)

299D. Individual Study (1-12)

Prerequisite: graduate student status in Geography and consent of instructor. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)

Geology

(College of Letters and Science)

Howard J. Spero, Ph.D., Chairperson of the Depart-

David A. Osleger, Ph.D., Vice-Chairperson of the Department

Department Office. 2119 Earth and Physical Sciences Building (530) 752-0350; http://www.geology.ucdavis.edu

Faculty

Magali I. Billen, Ph.D., Associate Professor Sandra J. Carlson, Ph.D., Professor William H. Casey, Ph.D., Professor *(Chemistry)* Kari M. Cooper, Ph.D. Associate Professor Eric S. Cowgill, Ph.D. Associate Professor Howard W. Day, Ph.D., Professor James A. Doyle, Ph.D., Professor (Evolution and Ecology) Graham E. Fogg, Ph.D., Professor (Land, Air and Water Resources)

Tessa M. Hill, Ph.D., Assistant Professor Louise H. Kellogg, Ph.D., Professor Charles E. Lesher, Ph.D., Professor

James S. McClain, Ph.D., Professor Academic Senate Distinguished Teaching Award Isabel P. Montañez, Ph.D., Professoi Ryosuke Motani, Ph.D. Professor Jeffrey F. Mount, Ph.D., Professor Alexandra Navrotsky, Ph.D., Professor (Chemistry) Michael E. Oskin, Ph.D., Associate Professor David A. Osleger, Ph.D., Lecturer SOE John B. Rundle, Ph.D., Professor (Physics, Geology) Howard J. Spero. Ph.D., Professor Dawn Y. Sumner, Ph.D., Professor Donald L. Turcotte, Ph.D., Professor Geerat J. Vermeij, Ph.D., Professor Kenneth L. Verosub, Ph.D., Professor Academic Senate Distinguished Teaching Award Qing-zhu Yin, Ph.D., Professor

Emeriti Faculty

Robert A. Zierenberg, Ph.D., Professor

Richard Cowen, Ph.D., Senior Lecturer Emeritus, Academic Senate Distinguished Teaching Award John F. Dewey, Ph.D., Professor Emeritus Charles G. Higgins, Ph.D., Professor Emeritus Eldridge M. Moores, Ph.D., Professor Emeritus James R. Rustad, Ph.D., Professor Peter Schiffman, Ph.D., Professor Robert J. Twiss, Ph.D., Professor Emeritus

The Major Programs

"Civilization exists by geological consent—subject to change without notice."—Will Durant

Geology is the study of the Earth, and in particular its history, structure, and the processes that have molded our planet and its biosphere. Geology involves the origin of continents and ocean basins, earthquakes and volcanoes, variations in global climate, and how these physical changes impact the evolution of life. All of these planetary processes are viewed through the prism of 'deep time', a perspective unique to geologists and one that distinguishes geology from most of the other physical sciences.

A significant component of geology is oriented toward the interaction between humans and the Earth. This aspect includes the study of resources such as minerals, oil, and water; identification and mitigation of Earth hazards such as earthquakes, landslides, floods, and volcanic eruptions; identification and mitigation of polluted ground water; land use planning; and the study of ancient and modern climate change.

The Program. Students interested in becoming professional geologists or continuing their geological studies at the graduate level should chose the Bachelor of Science degree program. The Bachelor of Arts program is for students interested in an interdisciplinary program of study, or who plan to go into pre-college teaching. Both programs allow students to emphasize an aspect of the field of particular interest to them. The upper division electives are not restricted to geology courses but must be chosen to provide a relevant, coherent, and in-depth program of study. Transfer students should have completed as much as possible of the preparatory subject matter

Internships and Career Alternatives. In recent years in California, the largest employers of geologists have been environmental and geotechnical consulting firms, with oil companies, research laboratories and government agencies also providing opportunities. Students graduating with a Bachelor's degree may get entry-level positions in the private sector or they may go on to attain their teaching credential to fill the growing need for science teachers at all pre-college levels. A Master's degree is the most versatile professional level degree, and a Ph.D. is generally required for research and academic positions. Internships are strongly encouraged for undergraduates and are a means of exploring potential career opportunities that can lead to positions after graduation. UC Davis students have interned at the California Division of Mines and Geology, the State Department of Water Resources, CAL-EPA, and various consulting firms.

Education Abroad Options. The department strongly encourages interested students to pursue a portion of their studies abroad. Within the constraints of the campus and College residence requirements, it is possible for students to complete significant portions of the Geology major at an international institution provided that the student consults with one of the undergraduate advisers and carefully plans a course of study abroad that will complement their coursework at Davis. In recent years, UC Davis Geology majors have spent their junior or senior years completing upper division coursework at EAP partner institutions in New Zealand, Ghana, Chile, and the United Kingdom.

A.B. Major Requirements:
UNITS Preparatory Subject Matter 40-43
Geology 3, 3L, 50, 50L, 60
Mathematics 16A-16B or 21A-21B 6-8
Chemistry 2A-2B
Physics 7A-7B
Depth Subject Matter36
Geology 100, 100L, 101, 101L, 103, 107,
107L, 108, 109, 109L24 Additional upper division electives chosen
from upper division courses in geology.
Upper division courses in related fields may satisfy this requirement if approved in
advance by the major adviser12
Total Units for the Major76-79
Recommended. Chemistry 2C or Hydrologic Science 134, Physics 7C.
B.S. Major Requirements:
UNITS
Preparatory Subject Matter 57-59
Geology 3, 3L, 50, 50L, 60, 62
Chemistry 2A-2B
Select one of the following three options: General Geology option:
Hydrologic Science 134 or Chemistry
2C 5-6
Statistics 32 or 102
Geochemistry/Petrology option: Hydrologic Science 134 or Chemistry
2C 5-6
Statistics 32 or 102
Mathematics 21D
Quantitative/Geophysics option:
Mathematics 21D and 22A7
Physics 9A-9B-9C
Depth Subject Matter 52 Geology 100, 100L, 101, 101L, 103, 105,
106, 107, 107L, 108, 109, 109L, 110
Additional upper division electives chosen
from Geology 130–190 courses, Hydrologic Science 144, 146 and related fields
approved in advance by major adviser. No
more than 3 units upper division elective credit for Geology 115–129 courses.
Maximum of 6 units upper division elective
credit for Geology 192 or 194A-194B or
194HA-194HB
English Composition Requirement. It is recom-
mended that all majors complete the English compo-
sition requirement (University Writing Program 101 or 102 or 104 or the equivalent) before or concur-
rently with the following courses: Geology 101,

es: Geology 101, 105, 106, 108, 109L, 110.

Recommended. For the B.S. degree, one or more of the following courses are recommended for any of the options or to supplement the options as listed. Note that Mathematics 22A is not a necessary prerequisite to Physics 9C:

General Geology option: Mathematics 21D, 22A, 22B, Physics 9A-9B-9C instead of 7A-7B-7C, Statistics 104, 106, 108. Geochemistry/Petrology option: Mathematics 22A, Physics 9C, Hydrology 134 and Chemistry 2C, Chemistry 110A. Quantitative/Geophysics option: Mathematics 22B, Statistics 32 or 102, Hydrology 134 or Chemistry 2C.

Major Advisers. K.M. Cooper, R. Motani, R.A. 7 ierenberg

Minor Program Requirements:

Students majoring in Geology can acquire a minor in the related fields of Oceanography, Geophysics and Environmental Geology. The requirements for those minors are listed alphabetically in this Cata-

UNITS
Geology 19-24
Select one of the five emphases below.
General Geology emphasis19-20
Geology 50 (or 1) and 50L5-6 Geology 100, 101, 109 and either 107 or 108
Minor Advisers. K.M. Cooper, R. Motani, R.A.
Zierenberg
Engineering Geology emphasis 19-22
Geology 50 and 50L
Minor Adviser. R.A. Zierenberg
Geochemistry emphasis19-22
Geology 60 and either 146 or 1487 Chemistry 110A and 110B, or Materials Science and Engineering 130 and 1346 Chemistry majors may substitute one of the elective courses for Chemistry 110B. Two elective courses chosen from Chemistry 110C, Geology 108, 146, 148, Hydrologic Science 134, Soil Science 1026-9 Chemistry 110C and Materials Science and Engineering 134 cannot both be counted toward the minor.
Minor Adviser. R.A. Zierenberg
Paleobiology emphasis20-21
Geology 107 and 107L, 108
Minor Advisers. R. Motani, G. Vermeij
Science Temphine Cuedential Students who

Science Teaching Credential. Students who might wish to become a teacher should consult an advisor in the Mathematics and Science Teaching Program (MAST; http://mast.ucdavis.edu) at their first opportunity in order to combine the prerequisites for a credential program with General Education requirements. MAST also offers seminars that give participants experience in elementary, middle school, and high school classrooms. Students hoping to teach Earth and Planetary Science may prepare by satisfying the requirements for the B.S. degree in Natural Science (http://naturalsciences.ucdavis.edu) or the A.B. degree in Geology (77-79 units) and 36 additional units of science as outlined below. Students may also prepare for the science credential by taking the B.S. degree in Geology (108-111 units) and an additional 24 units as indicated by the asterisks (*) below.

Biological Sciences 2A-2B-2C*	
Chemistry 2C	5
Physics 7C	
Mathematics 16C	3

Geology 36*	. 4
Geology 116N*	. 3

Teaching Credential Subject Representative. H.W. Day. See also the Teaching Credential/M.A. Program on page 115.

Graduate Study. The Department of Geology offers a program of study and research leading to the M.S. and Ph.D. degrees. For information regarding graduate study in geology, address the Graduate Adviser, Department of Geology.

Graduate Advisers. M.L. Billen, K.L. Verosub, Q.

Courses in Geology (GEL) Lower Division Courses

1. The Earth (4)

Lecture—3 hours; discussion—1 hour. Introduction to the study of the Earth. Earth's physical and chemical structure; internal and surface processes that mold the Earth; geological hazards and resources. Not open for credit to students who have completed course 50. Only 2 units of credit to students who have completed course 2. GE credit: SciEng | SE, SL, WE. - I, II, III. (I, II, III.) Osleger

2. The Blue Planet: Introduction to Earth Science (3)

Lecture - 3 hours. Study of the solid and fluid earth and its place in the solar system. Holistic examination of how the solid earth interacts with the atmosphere, hydrosphere, biosphere, and extraterrestrial environment. Not open for credit to students who have completed course 50. Only 2 units of credit to students who have completed course 1. GE credit: SciEng | SE, SL.—I. (I.)

2G. The Blue Planet: Introduction to Earth Science Discussion (1)

Discussion—1 hour. Prerequisite: course 2 concurrently. Small group discussion and preparation of short papers for course 2. GE credit: Wrt | SE.—I.

3. History of Life (3)

Lecture - 3 hours. Prerequisite: course 1 recommended. The history of life during the three and onehalf billion years from its origin to the present day. Origin of life and processes of evolution; how to visualize and understand living organisms from their fossil remains. GE credit: SciEng | SE.-II. (II.) Mot-

3G. History of Life: Discussion (1)

Discussion - 1 hour. Prerequisite: course 3 concurrently. Small group discussion and preparation of short papers for course 3. GE credit: Wrt | SE, WE. - II. (II.) Motani

3L. History of Life Laboratory (1)

Laboratory-3 hours. Prerequisite: course 3 concurrently. Exercises in understanding fossils as the clues to interpreting ancient life, including their functional morphology, paleoecology, and evolution. GE credit: SE.—II. (II.) Motani

4. Evolution: Science and World View (3)

Lecture — 2 hours; discussion — 1 hour. Introduction to biological evolution. Emphasis on historical development, major lines of evidence and causes of evolution; relationships between evolution and Earth history; the impact of evolutionary thought on other disciplines. GÉ credit: SciEng | ŚE, SL, WE.-I. (I.)

10. Modern and Ancient Global **Environmental Change (3)**

Lecture—3 hours. Fundamental scientific concepts underlying issues such as global warming, pollution, and the future of nonsustainable resources presented in the context of anthropogenic processes as well as natural forcing of paleoenvironmental change throughout Earth's history. GE credit: SciEng | SE, SL, VL. –III. (III.) Montañez

12. Evolution and Paleobiology of Dinosaurs (2)

Lecture - 2 hours Introduction to evolutionary biology, paleobiology, ecology and paleoecology, using dinosaurs as case studies. GE credit: SE.-II. (II.) Carlson

16. The Oceans (3)

Lecture — 3 hours. Introductory survey of the marine environment. Oceanic physical phenomena, chemical constituents and chemistry of water, geological history, the seas biota and human utilization of marine resources. Not open for credit to students who have taken course 116. GE credit: SciEng | SE, SL.-I, II, III. (I, II, III.) Hill, Sumner

16G. The Oceans: Discussion (2)

Discussion/laboratory-2 hours; term paper or discussion. Prerequisite: course 16 (concurrent). Scientific method applied to discovery of the processes, biota and history of the oceans. Group discussion and preparation of term paper. Not open for credit to students who have taken course 116G. GE credit: SciEng, Wrt | SE, WE.-II. (II.) Hill, Spero

17. Earthquakes and Other Earth Hazards (2)

Lecture — 2 hours. The impact of earthquakes, volcanoes, landslides and floods on Man, his structures and his environment. Discussion of the causes, effects, and solution of geologic problems in rural and urban settings. GE credit: SE, SL.-I, II, III. (I, II, III.) Billen, Kellogg

18. Energy and the Environment (3)

Lecture-3 hours. Conventional and alternative energy resources and their environmental impacts. Basic principles, historical development, current advantages and disadvantages, future prospects. Oil, natural gas, coal, nuclear, wind, geothermal, water, tidal, solar, hydrogen, and other sources of energy for the 21st century. GE credit: SciEng | SE, SL, WE.-II. (II.) Verosub

20. Geology of California (2)

Lecture — 2 hours. The geologic history of California, the origin of rocks and the environments in which they were formed, the structure of the rocks and the interpretation of their structural history, mineral resources, and appreciation of the California landscape. GE credit: SE, SL, VL.—II. (II.) Osleger

25. Geology of National Parks (2)

Lecture - 2 hours. Appreciation of the geologic framework underlying the inherent beauty of U.S. National Parks. Each park provides a visual focus for understanding a variety of geologic processes such as mountain building, volcanism, stream erosion, and glacial action. GE credit: SE, SL, VL.-I. (I.) Osleger

28. Astrobiology (3)

Lecture—3 hours. Origin, evolution and distribution of life in our solar system and the Universe. Detecting habitable worlds, Drake equations, necessities and raw materials for life, philosophical implications of the search for life elsewhere. GE credit: SciEng | SE, SL.-I. (I.) Yin

30. Fractals, Chaos and Complexity (3)

Lecture/discussion-3 hours. Prerequisite: Mathematics 16A or 21A. Modern ideas about the unifying ideas of fractal geometry, chaos and complexity. Basic theory and applications with examples from physics, earth sciences, mathematics, population dynamics, ecology, history, economics, biology, computer science, art and architecture. Offered in alternate years. (Same course as Physics 30.) GE credit: SciEng | QL, SE. - (II.) Rundle

32. Volcanoes (3)

Lecture — 3 hours. Role of eruptions, and eruptive products of volcanoes in shaping the planet's surface, influencing its environment, and providing essential human resources. GE credit: SciEng | SE.-III. (III.) Cooper

35. Rivers (3)

Lecture - 3 hours. Introduction to geomorphology, climate and geology of rivers and watersheds, with case examples from California. Assessment of

impacts of logging, agriculture, mining, urbanization and water supply on river processes. Optional river field trips. GE credit: SciEng | SE, SL.-Mount

36. The Solar System (4)

Lecture-3 hours; discussion-1 hour. Nature of the sun, moon, and planets as determined by recent manned and unmanned exploration of the solar system. Comparison of terrestrial, lunar, and planetary geological processes. Search for life on other planets. Origin and evolution of the solar system. (Former course 113-113G.) GE credit: SciEng, Wrt | SE, VL, WE. – III. (III.) Osleger

50. Physical Geology (3)

Lecture - 3 hours. Prerequisite: high school physics and chemistry. The Earth, its materials, its internal and external processes, its development through time by sea-floor spreading and global plate tectonics. Students with credit for course 1 or the equiva lent may receive only 2 units for course 50. GE credit: SE.-I. II. (I, II.) Billen, Lesher

50L. Physical Geology Laboratory (2)

Lecture - 3 hours. Prerequisite: high school physics and chemistry. The Earth, its materials, its internal and external processes, its development through time by sea-floor spreading and global plate tectonics. Students with credit for course 1 or the equivalent may receive only 2 units for course 50. GE credit: SE, SL.-I, II. (I, II.) Billen, Lesher

60. Earth Materials: Introduction (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Chemistry 2A; Mathematics 16A or 21A; course or 50, 50L. Physical and chemical properties of rocks, minerals and other earth materials; structure and composition of rock-forming minerals; formation of minerals by precipitation from silicate liquids and aqueous fluids and by solid state transformations. GE credit: SE.—I. (I.) Day

62. Optical Mineralogy (2)

Lecture — 1 hour; laboratory — 3 hours. Prerequisite: course 60 (may be taken concurrently); high school physics is strongly recommended. Optical properties of inorganic crystals; techniques of mineral identification using the polarizing microscope; strategies for studying rocks in thin section. GE credit: SE, VL.—I. (I.) Day

81. Learning in Science and Mathematics

Lecture/discussion-2 hours; field work-2 hours. Exploration of how students learn and develop understanding in science and mathematics classrooms. Introduction to case studies and interview techniques and their use in K-6 classrooms to illuminate factors that affect student learning. Limited enrollment. (Same course as Education 81.) (P/NP grading only.) GE credit: SS, VL, WE. – I, II, III. (I, II, III.)

91. Geology of Campus Waterways (1)

Lecture/discussion-1 hour; fieldwork-1 hour. Research characterizing geological processes in waterways on campus including links among hydrologic, atmospheric, physical, and human processes; carbon cycling and interpreting processes from sediments; field research techniques; research project design and implementation; implications of results for society and environmental policy. May be repeated for credit three times. (P/NP grading only.) GE credit: SE, SL.—Sumner

92. Internship (1-12)

Internship - 3-36 hours. Prerequisite: consent of instructor; lower division standing. Work-learn experience on and off campus in all subject areas offered by the department. Internships supervised by a member of the faculty. May be repeated for credit up to 12 units. (P/NP grading only.) GE credit: SE.-I, II, III. (I, II, III.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. May be repeated for credit. May be repeated for credit up to three times. (P/NP grading only.) GE credit: SE.-I, II, III. (I, II, III.)

99. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor; lower division standing. (P/NP grading only.) GE credit: SE.

Upper Division Courses

101. Earth Dynamics II: Convergent and Collisional Processes (3)

Lecture - 3 hours. Prerequisite: courses 50-50L, 100, Mathematics 21B or 16B (may be taken concurrently), Physics 5A or 7A or 9A (may be taken concurrently); or consent of instructor. Geophysical and structural signatures of convergent tectonics, subduction zones, plate collisions and mountain belts. Topics include ductile deformation, folds, seismic Benioff zones, gravity and isostacy. Examples of collisions and resulting mountain belts. Examples drawn from western North America. GE credit: SciEng, Wrt | QL, SE.—II. (II.) Cowgill, Oskin

101L. Earth Dynamics II: Structure/Tectonics Laboratory (2)

Laboratory and fieldwork-6 hours; six days of field trips on four separate weekends required. Prerequisite: courses 50L, 100L, and 101 (may be taken concurrently); or consent of instructor. Continuation of Geology 100L. Analysis of three-dimensional geologic structures; introduction to field techniques; fieldmapping projects; interpretation of topographic and geologic maps; tectonic analysis of convergent and collisional terranes. GE credit: SE, VL.—II. (II.) Cowgill, Oskin

103. Field Geology (3)

Fieldwork and laboratory-9 hours; 7-8 days on weekends during quarter. Prerequisite: course 101L or consent of instructor. Field mapping projects and writing geological reports. Weekly classroom meetings devoted to preparation of maps, cross sections, stratigraphic sections, rock descriptions, and reports. GE credit: SE, VL, WE.-III. (III.) Cowgill

105. Earth Materials: Igneous Rocks (4)

Lecture – 2 hours; laboratory – 6 hours. Prerequisite: courses 60, 62; Mathematics 16A or 21A; Chemistry 2B (may be taken concurrently). Origin and occurrence of igneous rocks. Laboratory exercises emphasize the study of these rocks in hand specimen and thin section. GE credit: SciEng, Wrt | SE, WE.-II. (II.) Cooper, Lesher

106. Earth Materials: Metamorphic Rocks

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 105, Chemistry 2B, Mathematics 16A or 21A. Physical and chemical properties of metamorphic rocks; interpretation of metamorphic environments. Laboratory exercises emphasize the study of these rocks in hand specimen and thin section. GE credit: SciEng, Wrt | SE, WE.-III. (III.) Day

107. Earth History: Paleobiology (3)

Lecture - 3 hours. Prerequisite: courses 3-3L or Biological Sciences 1B. The evolution and ecological structure of the biosphere from the origin of life to the present. GE credit: SE.-I, III. (I, III.) Carlson, Motani

107L. Earth History: Paleobiology Laboratory (2)

Laboratory—6 hours. Prerequisite: courses 3-3L or Biological Sciences 1B; course 107 (may be taken concurrently). Exercises in determining the ecological functions and evolution of individuals, popula tions, and communities of fossil organisms in field and laboratory. GE credit: SE.-III. (III.) Carlson,

108. Earth History: Paleoclimates (3)

Lecture—3 hours. Prerequisite: course 1 or Geology/Environmental Science and Policy 116; and Chemistry 2A; or consent of instructor. Geological and environmental factors controlling climate change, the greenhouse effect with a detailed analysis of the history of Earth's climate fluctuations over the last 600 million years. Past and present climate records are used to examine potential future climatic scenarios. GE credit: SciEng, Wrt | SE, SL, WE.-III. (III.) Spero, Montañez

109. Earth History: Sediments and Strata

Lecture - 2 hours. Prerequisite: courses 50-50L. Principles of stratigraphic and sedimentologic analysis. Evaluation of historical and modern global changes in sedimentation within terrestrial and marine environments. Examination of the plate tectonic, climatic and oceanographic factors controlling the distribution and exploitation of economic fluids within sedimentary rocks. GE credit: SciEng | SE.-II. (II.) Sumner

109L. Earth History: Sediments and Strata Laboratory (2)

Laboratory-6 hours (includes four 1-day field trips). Prerequisite: course 109 (may be taken concurrently). Methods of stratigraphic and sedimentologic analysis of modern and ancient sediments. Identif cation of major sediment and sedimentary rock types. Outcrop and subsurface analysis of sedimentary basins. GE credit: Wrt | SE, WE.-II. (II.) Sum-

110. Summer Field Geology (8)

Fieldwork—8 hours/day, 6 days/week for six weeks. Prerequisite: courses 103, 109; course 105 recommended. Advanced application of geologic and geophysical field methods to the study of rocks. Includes development and interpretation of geologic maps and cross sections; gravity, magnetic, electrical resistivity and seismic surveys; and field analysis of plutonic and volcanic rock suites. GE credit: Sci-Eng, Wrt | SE, VL, WE.-IV. (IV.) McClain, Oskin, Cowgill

115. Earth Science, History, and People (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: upper division standing; course 1. Study of interplay between the Earth and its human inhabitants through history, including consideration of acute events such as earthquakes and eruptions as well as the geology of resources, topography, and water. GE credit: Sci-Eng or SocSci, Wrt | OL, SE, WE.—III. (III.) Verosub

116N. Oceanography (3)

Lecture - 2 hours; laboratory - 3 hours; field work. Prerequisite: one of Geology 1, 2, 16 or 50. Advanced oceanographic topics: Chemical, physical, geological, and biological processes; research methods and data analysis; marine resources, anthropogenic impacts, and climate change; inte-grated earth/ocean/atmosphere systems; weekly lab and one weekend field trip. (Same course as Environmental Science & Policy 116N.) GE credit: SE, SL.—II. (II.) Hill, McClain, Spero

129. Sample Preparation and Techniques for Petrology (1)

Laboratory—3 hours. Prerequisite: courses 60-60L. Introduction to petrographic laboratory techniques for petrographers. Topics covered may include thin and polished section preparation, rock crushing/ grinding, mineral separation, staining, and photomicroscopy. (P/NP grading only.) GE credit: SE

130. Non-Renewable Natural Resources (3)

Lecture - 3 hours. Prerequisite: course 1. Origin, occurrence, and distribution of non-renewable resources, including metallic, nonmetallic, and energy-producing materials. Problems of discovery, production, and management. Estimations and limitations of reserves, and their sociological, political, and economic effects. Offered in alternate years. GE credit: SE, SL.-III.

131. Risk: Natural Hazards and Related Phenomena (3)

Lecture - 3 hours. Prerequisite: upper division standing. Risk, prediction, prevention and response for earthquakes, volcanic eruptions, landslides, floods, storms, fires, impacts, global warming. GE credit: SE, SL.-I. (I.) Turcotte

132. Introductory Inorganic Geochemistry (3)

Lecture — 3 hours. Prerequisite: course 60, may be taken concurrently; Chemistry 2B. Nucleosynthesis of chemical elements, physical and chemical properties of elements, ionic substitution, elemental partition, distribution and transport among planetary

materials, basic thermodynamics and phase diagrams, isotopic geochronometers, stable isotope fractionation, mixing and dilution, advection and diffusion, geochemical cycles. — (II.) Cooper, Yin, Zierenberg

134. Environmental Geology and Land Use Planning (3)

Lecture - 3 hours. Prerequisite: one course in Geology, preferably course 50 or 1, or consent of instructor. Geologic aspects of land use and development planning. Geologic problems concerning volcanic and earthquake hazards, land stability, floods, erosion, coastal hazards, non-renewable resource extraction, waste disposal, water resources. GE credit: SciEng, Wrt | SE, WE.—II. (II.) Montañez, Osleger

136. Ecogeomorphology of Rivers and Streams (5)

Lecture-1 hour; discussion/laboratory-2 hours; fieldwork; term paper or discussion. Prerequisite: upper division or graduate standing in any physical science, biological science, or engineering, and consent of instructor. Integrative multidisciplinary field analysis of streams. Class project examines hydrology, geomorphology, water quality and aquatic and riparian ecology of degraded and pristine stream systems. Includes cooperative two-week field survey in remote wilderness settings with students from diverse scientific backgrounds. Restricted to advanced students in the physical sciences, biological sciences, or engineering. GE credit: SE, WE.-III. (III.) Mount, Moyle

138. Introductory Volcanology (4)

Lecture - 2 hours; fieldwork - 6 hours. Prerequisite: upper division standing, course 60 and 109 or the equivalents, or consent of instructor. Principles of physical and chemical volcanology. Taught in a volcanically active setting (e.g., Hawaii) with a strong field component. GE credit: SciEng | SE.—II. (II.) Zierenberg

139. Rivers: Form, Function and Management (4)

Lecture—3 hours; fieldwork—3 hours. Prerequisite: courses 50, 50L, or equivalent; Mathematics 16B or 21B recommended. Analysis of river form and pro cesses, emphasis on fluvial geomorphology, and river and stream restoration; case studies to illustrate concepts and applications. Two weekend field trips required. GE credit: SE.-III. Mount

140. Introduction to Process Geomorphology (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 1 or 50 or equivalent; Mathematics 16B or 21B, or equivalent; or consent of instructor. Quantitative description and interpretation of landscapes with emphasis on the relationships between physical processes, mass conservation, and landform evolution. Topics covered include physical and chemical weathering, hillslopes, debris flows, fluvial systems, alluvial fans, pedogenesis, eolian transport, glaciation and Quaternary geochronology. Offered in alternate years.—III. Oskin

141. Evolutionary History of Vertebrates (3)

Lecture — 3 hours. Evolutionary history of vertebrates; fossil record and phylogeny; timing of major evolutionary events; appearance of major vertebrate groups; physical constraints in vertebrate evolution; paleobiogeography of vertebrates; effect of continental movement on vertebrate evolution; dinosaurs and other strange vertebrates. Offered in alternate years. GE credit: SE. - (II.) Motani

141L. Evolutionary History of Vertebrates Laboratory (1)

Laboratory-3 hours. Prerequisite: course 141 (may be taken concurrently). Augments lecture course 141 through handling of specimens enabling in-person examination of three dimensional features observed in vertebrate skeletons, both fossil and living.

Offered in alternate years. GE credit: SE.—(II.) Mot-

142. Basin Analysis (3)

Laboratory—3 hours; lecture—2 hours. Prerequisite: courses 50, 50L, and 109. Analysis of sedimentary basins from initiation to maturity, including controls on sedimentary fill, subsidence analysis, sequence stratigraphy, core logs, and applications to petro-leum exploration and hydrology. One two-day field trip. Offered in alternate years. GE credit: SE, VL.-(I.) Sumner

143. Advanced Igneous Petrology (5)

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 105, Mathematics 16C or 21C, Chemistry 2C. Physical and chemical properties of magmatic environments and processes of igneous rock formation. Laboratory study of representative igneous rocks. GE credit: SciÉng, Wrt | SE. - Cooper, Lesher

144. Historical Ecology (3)

Lecture — 3 hours. Prerequisite: upper division course in environmental science or ecology, or an introductory course in paleobiology. Ancient ecosystems and the factors that caused them to change. Species, expansion, evolution of new modes of life, geologically induced variations in resource supply, and extinction provide historical perspective on the biosphere of future. GE credit: SE, WE.—II. (II.) Vermeij

145. Advanced Metamorphic Petrology (5)

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 106; Hydrologic Science 134 or Chemistry 2C; Mathematics 16C or 21C. Metamorphic processes and the origin of metamorphic rocks. Laboratory study of representative rock suites. Offered in alternate years. GE credit: SciEng, Wrt | SE. – (II.)

146. Radiogenic Isotope Geochemistry and Cosmochemistry (3)

Lecture—3 hours. Prerequisite: Chemistry 2C, Physics 7C, and Mathematics 16C. Basic principles of nuclear chemistry and physics applied to geology to determine the ages of terrestrial rocks, meteorites, archeological objects, age of the Earth, to trace geological/environmental processes, and explain formation of the chemical elements in the Universe. Offered in alternate years. GE credit: QL, SE. - (I.) Yin

147. Geology of Ore Deposits (4)

Lecture—3 hours; laboratory—3 hours; optional one-weekend field trip. Prerequisite: Chemistry 2C or Hydrologic Science 134, courses 60, 62, and 105. Tectonic, lithologic and geochemical setting of major metallic ore deposit types emphasizing ore deposit genesis, water/rock interaction and the environmental effects of mining. Offered in alternate years. GE credit: QL, SE.—(III.) Zierenberg

148. Stable Isotopes and Geochemical Tracers (3)

Lecture-3 hours. Prerequisite: Chemistry 2C or Hydrologic Science 134; courses 50, 50L, 60. Use of oxygen and hydrogen isotopes in defining hydrologic processes; carbon, nitrogen, and sulfur isotopes as indicators of exchange between the lithosphere, hydrosphere, atmosphere and biosphere. Radiogenic, cosmogenic, and noble gas isotope tracers. Offered in alternate years. GE credit: QL, SE.—III. Zierenberg

150A. Physical and Chemical Oceanography (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 116/Environmental Science and Policy 116; Physics 9B; Mathematics 21D; Chemistry 2C; or upper division standing in a natural science and consent of instructor. Physical and chemical properties of seawater, fluid dynamics, air-sea interaction, currents, waves, tides, mixing, major oceanic geochemical cycles. (Same course as Environmental Science and Policy 150A.) GE credit: QL, SE.—I. (I.) McClain, Spero

150B. Geological Oceanography (3)

Lecture - 3 hours. Prerequisite: course 50 or 116. Introduction to the origin and geologic evolution of ocean basins. Composition and structure of oceanic crust; marine volcanism; and deposition of marine sediments. Interpretation of geologic history of the

ocean floor in terms of sea-floor spreading theory. (Same course as Environmental Science and Policy . 150B.) GE credit: SE.—II. (II.) McClain

150C. Biological Oceanography (4)

Lecture - 3 hours; discussion - 1 hour; fieldwork one weekend field trip required. Prerequisite: Biological Sciences 1A and a course in general ecology or consent of instructor. Ecology of major marine habitats, including intertidal, shelf benthic, deep-sea and plankton communities. Existing knowledge and con-temporary issues in research. Segment devoted to human use. (Same course as Environmental Science and Policy 150C.) GE credit: SE, SL.—IV. (IV.) Hill

152. Paleobiology of Protista (4)

Lecture - 2 hours; laboratory - 6 hours. Prerequisite: courses 107 or Biological Sciences 1A or consent of instructor. Morphology, systematics, evolution, and ecology of single-celled organisms that are preserved in the fossil record. Offered in alternate years. GE credit: SE.—Hill

156. Hydrogeology and Contaminant Transport (5)

Lecture - 3 hours; laboratory - 3 hours; term paper. Prerequisite: Hydrologic Science 145, Civil and Environmental Engineering 144 or the equivalent. Physical and chemical processes affecting groundwater flow and contaminant transport, with emphasis on realistic hydrogeologic systems. Groundwater geology and chemistry. Fundamentals of groundwater flow and transport analysis. Laboratory includes field pumping test and work with physical and computer models. (Same course as Hydrologic Science 146.) GE credit: SE.—II. (II.) Fogg

160. Geological Data Analysis (3)

Lecture/discussion-3 hours. Prerequisite: Mathematics 21A or the equivalent. Introduction to quantitative methods in analyzing geological data including basic principles of statistics and probability, error analysis, hypothesis testing, inverse theory, time series analysis and directional data analyses. Use of computer in lectures and homework. GE credit: QL, SE. - (II.) Rundle

161. Geophysical Field Methods (3)

Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 50, Mathematics 21C, Physics 7C or 9C, or consent of instructor. Geophysical methods applied to determining subsurface structure in tectonics, hydrogeology, geotechnical engineering, hydro-carbon and mineral exploration. Theory, survey design and interpretation of gravity, electrical resistivity, electromagnetic, reflection and refraction seismology, and ground-penetrating radar measurements. GE credit: QL, SE.—I. Billen

162. Geophysics of the Solid Earth (3)

Lecture—3 hours. Prerequisite: Mathematics 21C, Physics 5C or 7C or 9C; or consent of instructor. Theory and use of physics in the study of the solid earth. Gravity, magnetism, paleomagnetism, and heat flow. Application to the interpretation of the regional and large-scale structure of the earth and to plate tectonics. Offered in alternate years. GE credit: QL, SE.—II. Kellogg

163. Planetary Geology and Geophysics (3)

Lecture - 3 hours. Prerequisite: Mathematics 21C, Physics 7C or 9C, and course 50 or 36 or Astronomy 10, or consent of instructor. Principles of planetary science. Planetary dynamics, including orbital mechanics, tidal interactions and ring dynamics. Theory of planetary interiors, gravitational fields, rotational dynamics. Physics of planetary atmospheres. Geological processes, landforms and their modification. Methods of analysis from Earth-based observations and spacecraft. GE credit: QL, SE.—III. (III.) Kellogg, Yin

175. Advanced Field Geology (3)

Discussion—3 hours; fieldwork—6 hours. Prerequisite: consent of instructor. Advanced field studies of selected geologic terrains, interpretation and discussion of field observations. May be repeated two times for credit when instructors varies. (P/NP grading only.) GE credit: SE.—I. (I.) Cooper, Roeske

181. Teaching in Science and Mathematics

Lecture/discussion-2 hours; field work-2 hours. Prerequisite: major in mathematics, science, or engineering; or completion of a one-year sequence of science or calculus and consent of the instructor. Class size limited to 40 students per section. Exploration of effective teaching practices based on examination of how middle school students learn math and science. Selected readings, discussion and field experience in middle school classrooms. (Same course as Education 181.) (P/NP grading only.) GE credit: SS, WE.-I, II, III. (I, II, III.) Horn

182. Field Studies in Marine Geochemistry

Lecture - 3 hours; laboratory - 1-3 hours; fieldwork - 6-40 hours. Prerequisite: consent of instructor. Marine geochemistry with the opportunity of going to sea or into the field on land. Techniques of seafloor mapping using bottom photography, marine geochemical sampling, and method of data reduction and sample analysis. Analysis of data/samples collected. GE credit: SE.—Hill

183. Teaching High School Mathematics and Science (3)

Lecture/discussion-2 hours; field work-3 hours. Prerequisite: course 81/Education 81 or course 181/Education 181 or consent of instructor. Exploration and creation of effective teaching practices based on examination of how high school students learn mathematics and science. Field experience in high school classrooms. Limited enrollment. (Same course as Education 183.) GE credit: OL, SS, WE. — I, II, III. (I, II, III.) Stevenson

190. Seminar in Geology (1)

Discussion-1 hour; seminar-1 hour; written abstracts. Prerequisite: major in Geology. Presentation and discussion of current topics in geology by visiting lecturers, staff, and students. May be repeated for credit. (P/NP grading only.) GE credit: SÉ. — I, II, III. (I, II, III.)

192. Internship in Geology (1-12)

Internship. Prerequisite: upper division standing; project approval prior to internship. Supervised work experience in geology. May be repeated for credit for a total of 10 units. (P/NP grading only.) GE credit: SE

194A-194B. Senior Thesis (3-3)

Prerequisite: open to Geology majors who have completed 135 units and who do not qualify for the honors program. Guided independent study of a selected topic, leading to the writing of a senior thesis. (Deferred grading only, pending completion of course sequence.) GE credit: SE, WE.

194HA-194HB. Senior Honors Project (3-3)

Independent study-9 hours. Prerequisite: open to Geology majors who have completed 135 units and who qualify for the honors program. Guided independent study of a selected topic, leading to the writing of an honors thesis. (Deferred grading only pending completion of sequence.) GE credit: SE,

198. Directed Group Study (1-5)

Prerequisite: senior standing in Geology or consent of instructor. GE credit: SE

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.) GE credit: SE.

Graduate Courses

205. Advanced Field Stratigraphy (3)

Lecture — 1 hour; field work — 2 hours. Prerequisite: courses 109 and 110 or consent of instructor; course 206 recommended. Fieldwork over spring break. Application of stratigraphic techniques to research problems. Collection, compilation, and interpretation of field data. Integration of data with models for deposition and interpretations of Earth history. Topics will vary. May be repeated for credit.—III. (III.) Sumner

206. Stratigraphic Analysis (3)

Lecture-3 hours. Prerequisite: courses 109, 109L or consent of instructor; course 144 recommended. Topics in advanced methods of stratigraphic analysis, regional stratigraphy and sedimentation, and sedimentary basin analysis. Emphasis on techniques used to interpret stratigraphic record and on current issues in stratigraphy and sedimentation. May be repeated for credit when topic differs. - II. (II.) Mon-

214. Active Tectonics (3)

Lecture/discussion - 3 hours. Prerequisite: graduate standing or consent of instructor. Active deformation associated with faults, landslides, and volcanoes. Geodetic measurement techniques such as triangulation, trilateration, leveling, Global Positioning System (GPS), and radar interferometry. GPS data acquisition and analysis. Inversion of geodetic data and mechanical models of crustal deformation. - III. (III.) Oskin

216. Tectonics (3)

Lecture/discussion - 3 hours. Prerequisite: course 101 or consent of instructor. Nature and evolution of tectonic features of the Earth. Causes, consequences, and evolution of plate motion, with selected examples from the Earth's deformed belts. Offered in alternate years. - I. Cowgill

217. Topics in Geophysics (3)

Lecture-1 hour; seminar-2 hours. Prerequisite: consent of instructor. Discussion and evaluation of current research in a given area of geophysics. Topic will change from year to year. May be repeated for credit. — (I.) I. Billen, Kellogg, McClain

218. Analysis of Structures in Deformed Rocks (3)

Seminar - 3 hours. Prerequisite: courses 100, 100L, 101, 101L, 170; or consent of instructor. Recent advances in the understanding and analysis of structures in brittlely and ductilely deformed rocks. Detailed investigation of the characteristics of the structures, models for their formation, and applications to inferring the kinematics of larger scale tectonics. Offered in alternate years. — (I.) Cowgill

219. Fracture and Flow of Rocks (3)

Lecture - 3 hours, Prerequisite: courses 100, 101, Mathematics 21 or 16, Physics 7 or 9, or consent of instructor. Origins of those structures in rocks associated with brittle and ductile deformation. Theoretical analysis, using continuum mechanics, and experimental evidence for the origin of the structures with emphasis on deformational processes in the earth. Offered in alternate years. - III. (III.) Billen

220. Mechanics of Geologic Structures (3)

Lecture - 3 hours. Prerequisite: course 170, Mathematics 21C, Physics 9A or 5A, or consent of instructor; Mathematics 21D and 22A recommended. Development in tensor notation of the balance laws of continuum mechanics, and constitutive theories of elasticity, viscosity, and plasticity and their application to understanding development of geologic structures such as fractures, faults, dikes, folds, foliations, and boudinage. Offered in alternate years

226. Advanced Sedimentary Petrology (3)

Lecture - 2 hours; laboratory - 3 hours. Prerequisite: course 144 or consent of instructor. Advanced petrography and geochemistry of sediments and sedimentary rocks. Geochemical, textural and mineralogical evolution of sedimentary rocks reflecting depositional or burial processes. Laboratory work emphasizes thin section study of rocks. May be repeated for credit when topic differs. - Sumner

227. Stable Isotope Biogeochemistry (4)

Lecture — 2 hours; laboratory — 6 hours. Prerequisite: graduate standing and consent of instructor. Discussion and application of stable isotope techniques for scientific research problems. Course emphasizes carbon, oxygen, nitrogen, hydrogen and sulfur isotopes. Laboratory will develop basic skills of cryogenic gas extraction and specific techniques for individual research using stable isotopes. - Spero

228. Topics in Paleoceanography (3)

Lecture - 3 hours. Prerequisite: courses 108, 150A or consent of instructor. Critical discussion and review of selected topics in paleoceanography and paleoclimatology relating to the history of the pro-cesses controlling and affecting climate change and ocean circulation throughout the geologic record. Topics vary. May be repeated for credit. Offered in alternate years. — (II.) Spero

230. Geomorphology and River Management (3)

Seminar-3 hours. Prerequisite: graduate standing, course 139 or equivalent. Impacts of management and land use activities on the geomorphology of rivers and streams. Evaluation and use of analytical tools for river assessment. Assessment of river and stream restoration strategies and emerging issues in river management. May be repeated for credit when topic differs. - I. (I.) Mount

232. The Oceans and Climate Change (3)

Lecture/discussion - 3 hours. Prerequisite: graduate standing or consent of instructor. Modern climate change and linkages between the ocean-atmospherecryosphere-terrestrial climate system. Importance of the ocean in forcing climate change, and the impacts of anthropogenic processes on the ocean. Topics vary. May be repeated three times for credit. Offered in alternate years.—(II.) Hill

235. Surface Processes (3)

Seminar - 3 hours. Prerequisite: courses 50, 50L, 139; Mathematics 21B or 16B recommended. Recent advances in the analysis of landforms and their evolution. Detailed investigation of the tools used to document surface processes. Evaluation of concepts and processes that govern landscape evolution. May be repeated for credit when topic differs. - III. Óskin

236. Inverse Theory in Geology and Geophysics (3)

Lecture - 3 hours. Prerequisite: consent of instructor. Inversion of data for model parameters. Evaluation of parameter uncertainties. Linear and nonlinear problems for discrete and continuous models. Bakus-Gilbert inversion. Offered in alternate years.—

238. Theoretical Seismology (3)

Lecture - 3 hours. Prerequisite: consent of instructor. Elastodynamic wave equation. Greens functions and source representations. Ray theory. Plane and spherical waves and boundary conditions. Elastic wave propagation in stratified media. Offered in alternate years. (P/NP grading only.)—McClain

240. Geophysics of the Earth (3)

Lecture-3 hours. Prerequisite: Earth Sciences and Resources 201, Physics 9B, Mathematics 22B. Physics of the earth's crust, mantle, and core. Laplace's equation and spherical harmonic expression of gravity and magnetic fields. Elastic wave equation in geologic media. Body and surface seismic waves. Equations of state, thermal structure of the earth. Offered in alternate years. — (III.) Turcotte

241. Geomagnetism (3)

Lecture—3 hours. Prerequisite: graduate standing. Nature and origin of the Earth's magnetic field. Present field and recent secular variation. Spherical harmonic analysis. Paleosecular variation. Polarity transitions and geomagnetic excursions. Statistics of polarity intervals. Dynamo theory. Planetary magnetism. Offered in alternate years. —Verosub

242. Paleomagnetism (3)

Lecture — 3 hours. Prerequisite: graduate standing. Principles and applications of paleomagnetism. Physical basis of rock and mineral magnetism. Field and laboratory techniques. Instrumentation. Analysis of paleomagnetic data. Statistical methods. Rock magnetic properties. Geological and geophysical applications. Offered in alternate years. - Verosub

246. Physical Chemistry of Metamorphic

Lecture - 3 hours. Prerequisite: course 145, Chemistry 110A, or consent of instructor. Physiochemical principles of metamorphic mineral assemblages and methods of interpreting the paragenesis of metamorphic rocks. Offered in alternate years. - (II.) Day

247. Metamorphic Petrology Seminar (3)

Seminar - 3 hours. Prerequisite: course 145 or consent of instructor; course 246 recommended. Selected topics in metamorphic petrology (e.g., mass transport processes, tectonic settings, geothermometry, thermal structure of metamorphic belts, regional studies). May be repeated for credit when topic differs. Offered in alternate years. (S/U grading only.) - Day

250. Advanced Geochemistry Seminar (3)

Seminar-3 hours. Prerequisite: course 146 or consent of instructor. Critical review of selected topics in geochemistry including: ore genesis, hydrothermal and geothermal fluids, recent and ancient sediments, isotope geology, origin and chemistry of the oceans. Subject varies yearly depending on student interest.

May be repeated for credit. Offered in alternate years.—Zierenberg

251. Advanced Topics in Isotope Geochemistry and Cosmochemistry (3)

Lecture/discussion-2 hours; term paper. Prerequisite: graduate standing or consent of instructor. Astrophysical context on origin of Solar System, synthesis of chemical elements, condensation sequence, star and planet formation, cosmochronology, building blocks of planets, development on planets' layered structure, atmosphere and hydrosphere and the role of comets/asteroids for volatile delivery. May be repeated three times for credit when topics differs. Offered in alternate years. - (II.) Yin

253. Current Topics in Igneous Petrology (3)

Seminar-3 hours. Prerequisite: graduate standing in Geology; course 143 or consent of instructor. Topical seminar designed to help graduate students develop and maintain familiarity with current and past literature related to igneous rock petrogenesis. May be repeated for credit when topic differs. (S/U grading only.)—II. Lesher, Cooper

254. Physical Chemistry of Igneous Processes (3)

Lecture—3 hours. Prerequisite: course 143 or consent of instructor; Chemistry 110A required; Chemistry 110B and 110C recommended. Introduction of modern concepts in chemical thermodynamics and kinetics, and fluid dynamics of magmatic systems for graduate students in petrology. Offered in alternate years.—Lesher

255. Experimental Petrology (3)

Lecture - 2 hours; laboratory - 3 hours. Prerequisite: course 143 or consent of instructor. Introduction to techniques and methods of design and executing experiments on Earth-forming minerals and rocks. Problems and examples from igneous and metamorphic petrology will be utilized. Offered in alternate years.—Lesher

260. Paleontology (3)

Seminar-3 hours. Prerequisite: graduate standing in geology or a biological science. Selected prob-lems in paleontology. Subject to be studied will be decided at an organizational meeting. May be repeated for credit when topic differs.—III. (III.) Vermeii

261. Paleobiology Graduate Seminar 1: Evolutionary aspects (3)

Lecture—1 hour; seminar—2 hours. Prerequisite: graduate standing in Geology or a biological science; qualified undergraduates accepted on an exception-only basis. This course will treat one or more of several topics in paleobiology from a phylogenetic perspective, including major patterns in evolution, building the tree of life, extinction and phylogeny, phylogeny of major phyla, and the relation between taxonomy and phylogeny. May be repeated for credit when topic varies. - (I.) Carlson

262. Paleobiology Graduate Seminar: Methodological Aspects (3)

Lecture—1 hour; seminar—2 hours. One or more major methods used in the study of fossils: Morphometrics and three-dimensional reconstruction of fossils, phylogenetic methodology, the application of geochemical techniques, and electron microscopy. May be repeated four times for credit if topic varies.-II. Motani

281N. Instrumental Techniques for Earth Scientists (3)

Lecture—2 hours; laboratory—3 hours. Prerequisite: Mathematics 21A, 21B, 21C, Physics 7A, 7B, 7C or 9A, 9B, 9C or consent of instructor. Laboratory research techniques for new graduate students in Geology. Demonstration of and exposure to appropriate techniques in research. - Yin

285. Field Studies in Marine Geochemistry (2-8)

Lecture - 3 hours; laboratory - 1-3 hours; fieldwork—6-40 hours. Prerequisite: consent of instructor. Marine geochemistry with the opportunity of going to sea or into the field on land. Techniques of seafloor mapping using bottom photography, marine geochemical sampling, and method of data reduction and sample analysis. Analysis of data/samples collected -Hill

290. Seminar in Geology (1)

Seminar—1 hour; discussion—1 hour. Presentation and discussion of current topics in geology by visiting lecturers, staff, and students. (S/U grading only.)—I, II, III. (I, II, III.)

291. Geology of the Sierra Nevada (1)

Seminar. Prerequisite: consent of instructor. Short oral presentations by students and faculty concerning results of their past work and plans for future work in the Sierra. A written abstract is required following the format required at professional meetings. (S/U grading only.) - Day

292. River Forum (1)

Seminar—1 hour. Prerequisite: graduate standing. Review and discussion of latest research and fundamental issues surrounding riverine systems, with emphasis on physical processes. Topics vary. (S/U grading only.)—I, II, III. (I, II, III.) Mount

293. Geologic Event of the Week (1)

Discussion-0.5 hours; seminar-0.5 hours. Prerequisite: graduate standing. Seminar/discussion group to review and discuss recent earthquakes, volcanic eruptions, and other significant geologic events. The focus is on understanding the available observations, the physical processes behind each event, the geological setting, and societal consequences. May be repeated for credit three times for up to three units. (S/U grading only.)—Kellogg

294. Structure/Tectonics Forum (1)

Seminar-1 hour. Prerequisite: graduate student in geology or consent of instructor. Seminar/discussion group to review and discuss latest research in structural geology and tectonics, and on-going research of participants. Topics will vary each quarter depending on the interests of the group. Occasional field trips to areas of current interest. May be repeated for credit when topic differs. (S/U grading only.)-I, II, III. (I, II, III.) Roeske

295. Advanced Problems in Geodynamics (3)

Seminar-3 hours. Prerequisite: courses 100 and 101 or consent of instructor. Seminar dealing with problems in geodynamics. Topics will vary (e.g., ductile deformation mechanisms, brittle fracture, earthquake prediction, driving forces for plate tectonics, mantle convection). Emphasis on recent literature. May be repeated for credit when topic differs. Offered in alternate years. (S/U grading only.)

296. Advanced Problems in Tectonics (3)

Seminar - 3 hours. Prerequisite: course 101 or consent of instructor. Seminar dealing with current problems in tectonics of selected regions. Topics will

change from year to year. Emphasis on study of recent literature. May be repeated for credit. Offered in alternate years. (S/U grading only.)

297. Geophysics Forum (1)

Seminar - 0.5 hours; discussion - 0.5 hours. Prereguisite: graduate student status in the Geology Department, or consent of instructor. Seminar/discussion group to review and discuss latest research in geophysics, and on-going research of participants. Topics will change each quarter depending on the interests of the group. May be repeated three times for credit. (S/U grading only.)—I, II, III. (I, II, III.) Kel-

298. Group Study (1-5) 299. Research (1-12) (S/U grading only.)

Professional Courses

390. Methods of Teaching Geology (1)

Discussion - 1 hour. Prerequisite: graduate student standing in Geology. Discussion of methods and problems of teaching geology. Topics include departmental facilities, grading efficiency/effectiveness, Teaching Assistant/student interaction, and teaching techniques for lecturing, discussions, and labs. Participation in teaching program required for Ph.D. in Geology. (S/U grading only.)—(I.) Carlson

391. Ethical Issues in Earth Sciences (1)

Seminar - 1 hour. Prerequisite: graduate standing in Geology or consent of instructor. Reading and discussion of ethical issues arising in the earth sciences. Topics include scientific misconduct, gender equity in science, authorship of scientific papers, establishing priorities in research, and related issues. Offered in alternate years. (S/U grading only.)

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Geophysics

(College of Letters and Science)

Geophysics is the study of the physical properties and processes within and surrounding the Earth. Many problems in the Earth Sciences require geophysical techniques for study. The interdisciplinary minor in geophysics is for students with backgrounds in the physical sciences, engineering and other fields who are interested in pursuing a graduate or professional career in geophysics, or those who desire a career in the energy, minerals, or environmental industries. The minor is sponsored by the Department of Geology in 2119 Earth and Physical Sciences

Geophysics22-25

Minor Program Requirements:

UNITS

Engineering 6 or Computer Science
Engineering 30 or Mechanical
Engineering 5
Choose two courses from the following
Geology 160 161 162 163

Applied Science Engineering 115............3 One course sequence chosen from the following: following: (a) Atmospheric Science 120, 121A, 121B

(b) Geology 100, 100L, 101, 101L or, (c) Mathematics 118A, 118B, 118C or, (d) Physics 104A or Engineering 180; and Physics 105A; and Engineering 104 or Hydrology 103N or Physics 105C

Minor Adviser. Magali Billen, Department of Geology in 2129 Earth and Physical Sciences Building (530) 754-5696

German

(College of Letters and Science)

Elisabeth Krimmer, Ph.D., Chairperson of the Depart-

Department Office. German and Russian 209 Sproul Hall (530) 752-4999; http://german.ucdavis.edu

Faculty

Carlee Arnett, Ph.D., Associate Professor Jaimey Fisher, Ph.D., Associate Professor Gail Finney, Ph.D., Professor Distinguished Teaching Award-Graduate/ Professional Elisabeth Krimmer, Ph.D., Professor

Emeriti Faculty

Clifford A. Bernd, Dr.Phil., Professor Emeritus John F. Fetzer, Ph.D., Professor Emeritus Ingeborg Henderson, Ph.D., Senior Lecturer Emerita Academic Senate Distinguished Teaching Award Winder McConnell, Ph.D., Professor Emeritus Karl R. Menges, Dr.Phil., Professor Emeritus H. Guenther Nerjes, Ph.D., Associate Professor **Emeritus**

Fritz Sammern-Frankenegg, Dr.Phil., Lecturer Emeritus

The Major Program

The German major explores in depth the literature and language, the culture and commerce of the German-speaking world (primarily Germany, Austria and Switzerland). The key to the major lies in the careful balance between solid core requirements and the possibility to explore German subject areas through the lens of other disciplines, such as music, art, philosophy, history, and economics.

The Program. The department offers courses that highlight literary figures, movements and themes. These courses form the core of upper-division literature electives, but we also offer courses that discuss contemporary culture and commerce in Germanspeaking countries. Regardless of emphasis, students will find maximum practice in spoken and written German as well as in listening comprehension in all upper-division courses offered in German.

Career Alternatives. Completion of the major prepares students for graduate study in German or for career opportunities in international fields ranging from employment in business and government to careers in the fine arts and sciences. Also, it permits admission to professional schools such as law and

A.B. Major Requirements:

	UNITS
Preparatory Subject Matter	0-27
German 1-2-3 (or the equivalent) 0-	15
German 20, 21, 220-	12
Depth Subject Matter	44
General Program	
German 101A, 101B, 103	
German 120 or 118E	4
Four courses chosen from upper-division	
offerings taught in German	16
Three additional upper division courses	
selected from either 104-109 or	
121-198	
Or courses in other disciplines that focus of	on
German history, thought, and culture, upo	n

approval of the major advisor. Electives include, but are not limited to: Art History 176C, 177A, 177B Comparative Literature 138, 140-142, 147 Economics 110B, 116, 160A and 160B, Film Studies 142, 176A, 176B
History 142A, and 142B, 144A and 144B
Music 110A, 110C, 110D, 110E
Philosophy 170, 175
Political Science 117, 118C, 137 Note: Many of the above electives from other

disciplines have prerequisites. The total of 44 upper-division units may include units earned in the Education Abroad

Program. Total Units for the Major......44

Minor Program Requirements:

The Department offers a German minor consisting of at least 20 upper-division units of courses taught in German. Students wishing to minor in German should consult the undergraduate advisor.

UNITS

German 20

Major Adviser. E. Krimmer

Honors and Honors Program. The honors program consists of two quarters of research (194H) terminating in an honors thesis. For details consult the undergraduate major advisor. Graduation with high or highest honors requires participation in the honors

Graduate Study. The Department offers programs of study and research leading to the M.A. degree and to the Ph.D. degree in German Literature. Additional degree options for a designated emphasis are available through departmental affiliations with the programs in Social Theory and Comparative History, Critical Theory, Feminist Theory, and Second Language Acquisition. Detailed information may be obtained by writing to the Department Chairperson or the Graduate Adviser.

Graduate Adviser. G. Finney

Prerequisite Credit. Credit normally will not be given on the lower-division level for a course that is the prerequisite of a course already successfully com-

Courses in German (GER)

Lower Division Courses

Course Placement: Students with two years of high school German normally continue in German 2; those with three years, German 3; those with four years, German 20.

1. Elementary German (5)

Discussion - 5 hours; laboratory - 1 hour. Introduction to German grammar and development of all language skills in a cultural context with special emphasis on communication. Students who have successfully completed German 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student's P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed. Not open to students who have taken course 1 A. GE credit: AH, WC.-I, II, III. (I, II, III.) Arnett

1A. Accelerated Intensive Elementary German (15)

Lecture/discussion-15 hours. Special 12 week accelerated, intensive summer session course that combines the work of courses 1, 2, and 3. Introduction to German grammar and development of all language skills in a cultural context with emphasis on communication. Not open to students who have completed courses 1, 2, or 3.—IV. (IV.) Arnett

2. Elementary German (5)

Discussion - 5 hours; laboratory - 1 hour. Prerequisite: course 1. Continuation of course 1 in areas of grammar and basic language skills. Not open for credit to students who have taken course 1A. GE credit: AH, WC.—I, II. (I, II.) Arnett

3. Elementary German (5)

Discussion - 5 hours; laboratory - 1 hour. Prerequisite: course 2. Completion of grammar sequence and continuing practice of all language skills through cultural texts. Not open to students who have taken course 1A. GE credit: AH, WC.-I, II. (I,

6. Conversational German (4)

Discussion—3 hours; term paper. Prerequisite: course 3. Course 6 may be taken concurrently with course 20. Designed to develop intermediate language skills with special emphasis on communication and grammatical accuracy. GE credit: AH.—II.

10. German Fairy Tales from the Grimms to Disney (4)

Lecture/discussion—3 hours; term paper. Introduction to the genre of fairy tale with a focus on the Brothers Grimm and Hans Christian Andersen in their respective political/cultural contexts. Discusses filmic adaptations by Disney, the East German DEFA and Hollywood. GE credit: ArtHum, Div, Wrt | AH, VL, WE.—I. (I.) Krimmer

20. Intermediate German (4)

Lecture/discussion—3 hours; extensive writing. Prerequisite: course 3; may be taken concurrently with course 6. Review of grammatical principles by means of written exercises; expanding of vocabulary through readings of modern texts. GE credit: AH, WC.-I, II. (I, II.)

21. Intermediate German (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 20. Review of grammatical principles by means of written exercises; expanding of vocabulary through readings of modern texts. GE credit: AH, WC.—I, II. (I, II.)

22. Intermediate German (4)

Lecture/discussion—3 hours; extensive writing. Prerequisite: course 21. Review of grammatical principles by means of written exercises; expanding of vocabulary through readings of modern texts. GE credit: AH, WC.—II, III. (II, III.)

40. Great German Short Stories (in English)

Lecture/discussion-3 hours; extensive writing. Major German short stories from Goethe at the end of the eighteenth century to Thomas Mann at the beginning of the twentieth century. Offered in alternate years. GE credit: AH, OL, WC, WE.-II.

45. Vampires and Other Horrors in Film and Media (4)

Lecture - 2 hours; discussion - 1 hour; film viewing-3 hours. History of representations of vampires and horror generally from the 19th through 21st centuries. Emphasis on transnational history of the horror genre; psychologies of horror effects; issues of race, gender, and class; intersections with prejudice, medicine, modernity. (Same course as Film Studies 45.) Offered in alternate years. GE credit: ArtHum | ACGH, AH, DD, OL, VL, WC, WE.—II, III Fisher

48. Myth and Saga in the Germanic Cultures (4)

Lecture—3 hours; term paper. Knowledge of German not required. Reading in English translation from the Norse Eddas, the Volsung and Sigurd-Siegfried cycles, and the Gudrun lays; literary mythology in German Romanticism culminating in Wagner's "total art-work" concept and The Ring of the Nibelung cycle. May not be counted toward major in German. GE credit: ArtHum, Wrt | AH, WC, WE.-I.

49. Freshman Colloquium (2)

Seminar-2 hours. Prerequisite: open only to students who have completed 40 or fewer quarter units of transferable college-level work. Readings, discussion and written projects treating topics such as communist-capitalist tension in German literary culture; masculine "versus" feminine authorial consciousness; disintegration and reconstitution of language reflecting cultural transformation; exorcising post-Holocaust national guilt and individual frustration -Germany's new European "mission."—II. (II.)

92. Field Work in German (1-12)

Internship - 3-36 hours. Prerequisite: lower division standing. Total immersion program in Germany or a German speaking setting in the U.S. to further develop students' proficiency in the German language. (P/NP grading only.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) (P/NP grading only.)

Upper Division Courses

101A. Survey of German Literature, 800-1800 (4)

Lecture/discussion-3 hours. Prerequisite: course 22. German literature from the Middle Ages to Classicism (800-1800) with an overview of major movements and authors. GE credit: ArtHum | AH, WC, WE.-I. (I.)

101B. Survey of German Literature, 1800-Present (4)

Lecture/discussion-3 hours. Prerequisite: course 22. German literature from the Age of Romanticism (1800) to the present with an overview of major movements and authors. GE credit: ArtHum | AH. -

103. Writing Skills in German (4)

Lecture — 3 hours; extensive writing. Prerequisite: course 22. Practice in different kinds of writing, such as abstracts, correspondence, lecture summaries analysis of or response to short literary texts. GE credit: AH, WC, WE.

104. Translation (4)

Lecture/discussion – 3 hours; extensive writing. Prerequisite: course 22. Exercises in German-to-English, English-to-German translation using texts from the areas of culture and commerce. Not open for credit to students who have completed course 104A Offered in alternate years. GE credit: AH, OL, VL,

105. The Modern German Language (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 22. Introduction to the linguistic analysis of contemporary German, including its phonology, morphology, syntax and semantics, as well as sociolinguistic considerations. GE credit: ArtHum, Wrt | AH, OL, WC, WE.-I. (I.) Arnett

109A. Business German (4)

Lecture/discussion-3 hours; laboratory-1 hour. Prerequisite: course 22 or consent of instructor. Specialized language course using business-oriented information and publications as the basis for discussions, roleplay, reports, compositions and transla-tions. Offered in alternate years.—II.

109B. Advanced Business German (4)

Lecture/discussion-3 hours; laboratory/discussion - 1 hour. Prerequisite: course 22 or consent of instructor. Specialized advanced language course providing in-depth study of major business topics with the help of authentic texts and videos. Offered in alternate years. - (II.)

112. Topics in German Literature (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: upper division standing or consent of instructor. Investigation of significant themes and issues within their European context. Knowledge of German is not required. May be repeated one time for credit. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC.-III.

113. Goethe's Faust (4)

Discussion-3 hours; term paper. Knowledge of German not required. Intensive study of Goethe's Faust in its entirety. Discussions and readings in English;

reading the text in the original is encouraged. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC, WE.-II, III.

114. From Marlene Dietrich to Run, Lola Run: German Women and Film (4)

Lecture/discussion-3 hours; extensive writing. Knowledge of German not required. Women in German film from the Weimar Republic to present, with special emphasis on conceptualizations of gender, historical and political context, aesthetic and filmic innovations. GE credit: ArtHum, Wrt | AH, VL, WC, WE.—III. (III.) Krimmer

115. German Literature Since 1945 (4)

Lecture — 3 hours; extensive writing. Knowledge of German not required. Major writers of the post-war generation of Austria, Switzerland and Germany: novelists, such as Böll, Grass, Johnson, Walser, Handke; playwrights such as Frisch, Dürrentmatt and Hochhuth; and poets, such as Celan, Enzensberger, and Aichinger. May be repeated for credit in different topic area. GE credit: ArtHum, Wrt | AH, WC,

116. Readings in Jewish Writing and Thought in German Culture (4)

Lecture — 3 hours; term paper. Prerequisite: Religious Studies 23 or consent of instructor. Historical tradition of Jewish thought in the German cultural context; unique contributions of Jewish writers to culture of the German-speaking world; what it means to be "other" in the mainstream culture. No credit will be given to those students who have completed Humanities 121. May be repeated two times for credit if topic differs. Offered in alternate years. (Same course as Jewish Studies 116.) GE credit: ArtHum, Div, Wrt. | AH, OL, WC, WE.—(I.)

117. After the Catastrophe: Jews and Jewish Life in Post-1945 Germany (4)

Lecture/discussion—3 hours; term paper. Jews and Jewish culture in post-1945 Germany, with special attention given to literature, historical debates, photography, film, as well as websites and other new media. Offered in alternate years. GE credit: ArtHum, Div, Wrt | ACGH, AH, DD, OL, VL, WC, WE.-II, III. Fisher

118A. Vienna at the Turn of the Twentieth Century (The End of the Habsburg Empire)

Lecture-1 hour; discussion-2 hours; extensive writing. Knowledge of German not required. Cultural ferment in Vienna, capital of the multinational Habsburg empire, at the turn of the century, with consideration of innovations in literature, music, graphic arts, architecture, philosophy and psychology, heralding European modernism. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC.—I. Finney

118B. Weimar Culture: Defeat, the Roaring Twenties, the Rise of Nazism (4)

Lecture - 1 hour; discussion - 2 hours; extensive writing. Knowledge of German not required. Expressionism in graphic arts, literature, film, New Objectivity, Brecht and Bauhaus considered in the context of the failure of the German experiment in democracy, the Weimar Republic of 1919-33. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC, WE.-III.

118C. Germany Under the Third Reich (4) Lecture/discussion-3 hours; term paper. Prerequisite: background in modern European history; course 118B recommended. No knowledge of German required. Interdisciplinary study of German society and culture during the Third Reich (1933-45); readings in aesthetics, history, and philosophy; study of Fascist culture in literature, film, architecture, and the graphic arts; focus on everyday life in Hitler's Germany. GE credit: ArtHum, Wrt | WC,

118E. Contemporary German Culture (4)

Lecture/discussion—3 hours. Prerequisite: course 22. The political, economic, social and cultural scene of Germany today. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC, WE.-II.

119. From German Fiction to German Film (4)

Lecture—3 hours; discussion—1 hour; term paper. Examines a number of film adaptations of major German prose works and plays to ascertain the types of changes involved in the shift in medium and the positive and negative effects achieved by such transferences. GE credit: ArtHum, Wrt | AH, OL, VL, WC.-II. (II.)

120. Survey of German Culture (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 22. Major developments in German arts, philosophical thought, social institutions, and political history. GE credit: ArtHum | AH, WC, WE.-III. (III.) Bernd

121. The Medieval Period in German Literature (4)

Discussion—3 hours; extensive writing. Prerequisite: course 22. Literary-philosophical profile of the Mittelhochdeutsche Blütezeit in terms of the significant epics, romances, and lyric poetry. Readings in German. Offered in alternate years. GE credit: ArtHum | AH. - II.

122. Reformation and Baroque (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 22. Exemplary literary works of the 16th and 17th centuries tracing the principal lines of development and showing the reflection in literature of the social, as well as religious, scenes. Offered in alternate years. GE credit: ArtHum | AH, WC, WE.-I.

123. Literature of the Classical Age (4)

Discussion — 3 hours; term paper. Prerequisite: course 22. A critical assessment of principal works of Goethe and Schiller within the historical and philosophical context of their times. Offered in alternate years. GE credit: ArtHum | AH, WC, WE.-I.

124. Major Movements in German Literature (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 22. Significant movements and schools in German literary history (e.g., the medieval trouba-dours, Storm and Stress, the romanticists, the George Circle, the expressionists), with emphasis on the broader cultural dynamics and ideologies as these apply to individual literary works. May be repeated one time for credit when topic differs. Offered in alternate years. GE credit: ArtHum | AH, WC.-II.

125. Short Fiction: 1880-1914 (4)

Lecture—3 hours; term paper. Prerequisite: course 22. Reading of short German fiction from the fin-desiècle period and representative of various prose styles and cultural currents. Offered in alternate years. GE credit: ArtHum | AH, WC, WE.-III.

126. Modern German Literature (4)

Discussion—3 hours; extensive writing. Prerequisite: course 22. Selections from significant works of major contemporary writers, such as Hesse, Mann, Kafka, Rilke, Brecht, Grass. May be repeated one time for credit with consent of adviser. GE credit: ArtHum | AH, WC, WE.-I. (I.) Finney

127. Major Writers in German (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 22. Examination of representative works by a major writer, set in the broader cultural context of the relevant period or movement. May be repeated one time for credit when topic differs Offered in alternate years. GE credit: ArtHum | AH, WC, WE.-I, III.

129. Postwar Women Writers (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 22. Major writers in both Germanies, Austria, and Switzerland since 1945. Topics include the concept of a feminist aesthetics, East vs. West German writers, and the status of minority women writers in Germany (Jewish, Turkish-German, Afro-German). GE credit: ArtHum, Div | AH, WC, WE.—I. (I.) Finney

131. German Lyric Poetry (4)

Lecture—3 hours; term paper. Prerequisite: course 22. Study of the genre of lyric poetry from the late Middle Ages through Renaissance, Baroque, Classical, Romantic, and Modern periods in correlation with other literary forms and the social climate of each period. Offered in alternate years. GE credit: ArtHum | AH, WC, WE.-I

132. The German Novelle (4)

Lecture—3 hours; term paper. Prerequisite: course 22. Inquiry into the art of the "Novelle" through analysis of the materials and formal devices of representátive authors from Goethe to Kafka. Offered in alternate years. GE credit: ArtHum | AH, WC,

133. The German Drama (4)

Lecture-3 hours; term paper. Prerequisite: course 22. Readings in the works of Germany's leading dramatists from the eighteenth century to the present day, such as Lessing, Goethe, Schiller, Kleist, Büchner, Hauptmann, Brecht. Offered in alternate years. GE credit: ArtHum | AH, OL, WC, WE. – (III.

134. Topics in German Intellectual History

Lecture/discussion-3 hours; term paper. Prerequisite: course 22. Topics in German intellectual history with materials from a number of periods, genres, and disciplines. May be repeated two times for credit when topic differs. GE credit: ArtHum | AH, WC, WE.-I, İII. (I, III.)

141. The Holocaust and its Literary Representation (4)

Lecture-2 hours; discussion-1 hour; term paper. Knowledge of German not required. Aesthetic representation and metaphorical transformation of the Holocaust in its human and historical perspectives. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC, WE. – (I.)

142. New German Cinema (4)

Lecture/discussion-3 hours; extensive writing. German filmmakers of the 1960s-1980s such as Fassbinder, Herzog, Syberberg, Brückner, Schlöndorf, Kluge, Wenders. Knowledge of German not required. May be repeated for credit with consent of instructor. (Same course as Film Studies 142) GE credit: ArtHum, Wrt | AH, OL, VL, WC, WE.—I. (I.) Fisher

143. Language Through Media (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 22. Study of contemporary German-language news media (press, video, film, CD-ROM, Internet) for insight into political and cultural developments in the German-speaking countries. Offered in alternate years. GE credit: ArtHum | AH, OL, WC, WE.-II. (II.) Arnett

144. Marx, Nietzsche, Freud (4)

Lecture/discussion-3 hours; term paper. Study of major texts of Marx, Nietzsche, and Freud, selected with an eye to their impact on 20th-century economics, ethics, and attitudes toward eros. Particular focus on conceptions of the self and the individual's relation to society. Offered in alternate years. (Same course as Humanities 144.) GE credit: ArtHum, Wri.-III.

160. Love in the Middle Ages (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 22. Analysis of the phenomenon of love in selected medieval lyrical poems and romances of the twelfth and thirteenth century Blütezeit. Origins of courtly love, love and individualism, love and the Church, love and adultery. Not offered every year. GE credit: ArtHum | WC, WE.—I.

168. Multiculturalism in German Literature (4)

Lecture/discussion—3 hours; term paper or discussion - 1 hour. Prerequisite: course 22. Examples of German Literature from the High Middle Ages to the present that explore the "encounter with the other" (people of color, different beliefs and cultures, and inner-German minorities). Offered in alternate years. GE credit: ArtHum, Div | AH, OL, VL, WC, WÉ. - II.

176A. Classic Weimar Cinema (4)

Lecture/discussion - 3 hours; film viewing - 3 hours. Prerequisite: Humanities 1. German Weimar (1919-1933) cinema. Fritz Lang, F.W. Murnau, and G.W. Pabst among others. Influence on world-wide (esp. Hollywood) film genres such as film noir, horror, science fiction, and melodrama. Not open for credit to students who have completed Humanities 176. Offered in alternate years. (Same Course as Film Studies 176A.) GE credit: ArtHum, Wrt | AH, OL, VL, WC, WE.-I. Fisher

185. The Age of Bismarck (4)

Discussion—3 hours; term paper. Prerequisite: course 22. Notable literary repercussions of the zenith of Germany's international status at the time of Bismarck's Chancellorship. The poetry of Storm, the prose of Fontane, the drama of Hauptmann. Offered in alternate years. GE credit: ArtHum | AH, WC, WE.-II.

192. Field Work in German (1-12)

Internship - 3-36 hours. Prerequisite: course 109A or consent of instructor. Total immersion program in Germany or a German speaking setting in the U.S. to further develop student proficiency in the German language. May be repeated two times or up to 12 units of credit with consent of instructor. (P/NP grading only.)

194HA-194HB. Honors Program (3-3)

Independent study—2 hours; term paper. Prerequisite: open only to majors with a 3.500 minimum GPA in at least 135 graduation units. (A) Research of an integrative nature (in either "General" or "Area Studies Emphasis" fields of major), guided by thesis advisor chosen by student; (B) Writing of Honors Thesis on topic selected by student in consultation with thesis advisor. (P/NP grading only. Deferred grading only, pending completion of course sequence.)

197T. Tutoring in German (1-4)

Tutorial - 3-12 hours. Prerequisite: consent of German Program Director. Tutoring in undergraduate courses including leadership in small voluntary discussion groups affiliated with department courses. May be repeated up to eight units of credit. (P/NP grading only.)

198. Directed Group Study (1-5) (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

202. Middle High German (4)

Discussion - 3 hours; lecture - 1 hour. Outline of grammar; selections from Middle High German epic, romance, and lyric poetry.—II. (II.)

206. Cognitive Grammar for Applied Linguists (4)

Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing. Analysis of grammar and application of cognitive grammar to language instruction. Syntactical problems and analyses relevant to the language the student will teach. Not offered every year. - III. Arnett

210. Techniques of Literary Scholarship (4)

Seminar-3 hours; term paper. The bibliographical, organizational, and methodological tools and resources for advanced, independent research. - I. (I.)

211. Concepts in Literary Theory (4)

Seminar-3 hours. Advanced course in concepts of literary theory and criticism. Discussion of the emergence of theoretical concepts and their impact on the understanding and appreciation of literary works. Discussion in German and English, readings in German. - II. (II.)

212. Contemporary Approaches to Literary Theory (4)

Seminar—3 hours; term paper. Study of contemporary theoretical approaches such as structuralism, deconstruction, feminism, Marxism/Frankfurt School, and reception theory in conjunction with the works of major authors. — III. (III.)

239. Narrative and Narrative Theory (4)

Seminar—3 hours; term paper. Studies, in a theoretical and literary historical context, major elements of 19th- and 20th-century narrative, such as techniques of framing, refraction, and montage; narrative perspective; mimesis; and self-consciousness. Focuses on paradigmatic prose texts alongside a spectrum of critical approaches. Offered in alternate years. - I. Finney

240. Forms of German Verse (4)

Seminar—3 hours; term paper. The development of German verse from the Middle Ages to the present, with special emphasis on different techniques of text analysis and interpretation. May be repeated for credit with consent of instructor. Offered in alternate years.—II. Bernd

241. The German Drama (4)

Seminar-3 hours; term paper. The major forms of German drama from its origins to the middle of the twentieth century. May be repeated for credit with consent of instructor.—I. (I.) Finney

242. The German Novelle (4)

Seminar—3 hours; term paper. The major German Novellisten, with particular emphasis on the flowering of this genre in the nineteenth century. May be repeated for credit with consent of instructor. -II. (II.)

243. Fontane and the Rise of the Modern German Novel (4)

Seminar-3 hours; term paper. Fontane, the father of the modern German novel and the chief German representative of the European novel at its greatest, in the context of the nineteenth-century European political and social scene. - II. (II.)

244. Gender and Comedy (4)

Seminar-3 hours; term paper. Studies of genre and gender in German-language comedy by male and female writers from the 18th century to the present. Authors treated include Lessing, Kleist, Büchner, Ebner-Eschenbach, Hauptmann, Hofmannsthal, Frisch, Langner, and Jelinek. Offered in alternate years. - III. Finney

252. The Writings of Lessing (4)

Seminar-3 hours; term paper. Study of Lessing's theory of literature with particular emphasis upon his critical attacks on French drama. — I. (I.)

253. Goethe (4)

Seminar—3 hours; term paper. Study of the origins of Goethe's thought in German Pietism, and his principal artistic, autobiographical, scientific, and philosophical works. - I. (I.)

254. Schiller (4)

Seminar-3 hours; term paper. A critical analysis of Schiller's major works and his impact on the intellectual climate in Germany during the late eighteenth and early nineteenth centuries. - III. (III.)

255. Aesthetics in the Age of Goethe (4)

Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Emergence of aesthetic autonomy from eighteenth century normative poetics during the Age of Goethe. The shift from a model based on the imitation of nature (and the Ancients) to a new concept grounded in the individuality of aesthetic experience.—I.

257. Heinrich von Kleist (4)

Seminar-3 hours; term paper. Kleist's important dramatic and prose works; special attention will be given to the peculiar hermeneutic problems in modern German, French, and Anglo-American Kleist criticism. - III. (III.)

258. The Novels of Thomas Mann (4)

Seminar-3 hours; term paper. Reading of selected novels with emphasis on aesthetic techniques, originality, ethical and political views, and influence on the contemporary literary scene in Germany. - II. (II.)

259. Studies in Kafka (4)

Seminar-3 hours; term paper. Study of Kafka's narrative techniques with special emphasis in the shorter works on the existential development from its roots in Expressionism. – II. (II.)

260. The Poetry of Rilke (4)

Seminar - 3 hours; term paper. Study of the principal motifs, myths, images, and problems in the poetry of Rainer Maria Rilke.—I. (I.)

261. Brecht and the Epic Theater (4)

Seminar — 3 hours; term paper. A reading of Brecht's works with emphasis on the ideas which impelled the development of new literary forms and concepts. - III. (III.)

262. Studies in Turn-of-the-Century Culture (4)

Seminar-3 hours; term paper. Investigates literary currents in turn-of-the-century Germany and Austria against the background of contemporaneous developments in psychology, the visual arts, philosophy, and music. Authors treated include Hauptmann, Holz and Schlaf, Schnitzler, T. Mann, Wedekind, Musil, Hofmannsthal. Offered in alternate years. -(II.) Finney

285. Middle High German Literature (4)

Lecture/discussion-3 hours; term paper. Prerequisite: consent of instructor. Extensive reading of Middle High German texts in the original language. Examines linguistic and literary problems. May be repeated for credit when topic differs.—III. (III.)

288. The Renaissance and Reformation in German Literature (4)

Seminar—3 hours; term paper. The parabolic and didactic style in Germany's literature during the sixteenth century. May be repeated for credit with consent of instructor. - I. (I.)

289. German Literature of the Baroque (4)

Seminar-3 hours; term paper. The "Elegantiaideal" and the varying methods used to portray it in seventeenth-century German literature. May be repeated for credit with consent of instructor. -1. (1.)

290. The Enlightenment in German Literature (4)

Seminar—3 hours; term paper. Revolt against the concept of the "Elegantiaideal," and evolution of a new literature based on reason and wit. May be repeated for credit with consent of instructor. - I. (I.)

291. Foreign Language Learning in the Classroom (4)

Seminar — 3 hours; project. Overview of approaches to university-level foreign language instruction and the theoretical notions underlying current trends in classroom practices across commonly taught foreign languages. (Same course as French 291 and Spanish 291.)-I, II. (I, II.) Anderson, Arnett, Blake, Iwa-

292. Sentimentality and Sturm und Drang in German Literature (4)

Seminar — 3 hours. Reaction to overemphasis on Reason: theories of Hamann and Herder and works of poets such as Lenz, Leisewitz, the early Goethe and Schiller. May be repeated for credit with consent of instructor. — III. (III.)

293. The Classical Age of German Literature (4)

Seminar—3 hours; term paper. Inquiry into the aesthetic and humanistic qualities of Germany's greatest literary epoch. May be repeated for credit with consent of instructor. — III. (III.)

294. The Romantic Period in German Literature (4)

Seminar—3 hours; term paper. Survey of the works of early nineteenth-century authors in reaction against the age of classicism. May be repeated for credit with consent of instructor. - 1. (I.)

295. Poetic Realism in German Literature

Seminar-3 hours; term paper. Outstanding figures in German literature between 1840 and 1890 Important phases in their developments will be treated. May be repeated for credit with consent of instructor. — Í. (I.)

296. Twentieth-Century German Literature

Seminar - 3 hours; term paper. Considers the revolt of the Hauptmann generation, Symbolism, Expressionism, and the chief currents of the contemporary scene. May be repeated for credit with consent of instructor. - I. (I.)

297. Special Topics in German Literature (4)

Seminar—3 hours; term paper. Various special topics in German literature, which may cut across the more usual period and genre rubrics. May be repeated for credit when topic differs.

298. Group Study (1-5) 299. Individual Study (1-12)

(S/U grading only.)

299D. Special Study for the Doctoral Dissertation (1-12)

(S/U grading only.)

Professional Courses

390A. The Teaching of German (2)

Lecture — 2 hours. Prerequisite: graduate standing or consent of instructor. Theoretical instruction in modern teaching methods and demonstration of their practical application. Required of new teaching assistants. (S/U grading only.)—I. (I.) Arnett

390B. The Teaching of German (2)

Lecture - 2 hours. Prerequisite: graduate standing or consent of instructor. Theoretical instruction in modern teaching methods and demonstration of their practical application. Required of new teaching assistants. (S/U grading only.)—II. (II.) Arnett

390C. The Teaching of German (2)

Lecture - 2 hours. Prerequisite: graduate standing or consent of instructor. Theoretical instruction in modern teaching methods and demonstration of their practical application. Required of new teaching assistants. (S/U grading only.)—III. (III.) Arnett

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Professional Course 400. Tutorial and Instructional Internship

Discussion - 1-3 hours. Prerequisite: graduate standing. Apprentice training in ongoing undergraduate literature courses taught by regular staff, with supplementary weekly critique sessions; intern leadership of discussion sections under staff supervision. May be repeated for credit. - I, II, III. (I, İI, III.)

Global and **International Studies**

(College of Letters and Science)

The interdisciplinary minor in Global and International Studies will enable students not only to learn about global and international issues at UC Davis, but also to gain first-hand academic experience abroad. The minor is also designed to give recognition for upper division course work while studying abroad. However, the minor can also be completed with approved course work taken at UC Davis.

Students will be expected to work closely with an academic adviser in developing an intellectually coherent program of study. Each proposal must be approved by the Faculty Director of the Education

The minor is sponsored by the Humanities Program. For information, visit the Éducation Abroad Center website in the Academics Section at http:// eac.ucdavis.edu.

Minor Program Requirements:

Global and International Studies......24 **Arts and Humanities Emphasis:**

One course from Anthropology 4, 20, International Relations 1, Political Science on global or international studies in the Arts and Humanities3-4 Course cluster requirement16-17

The minor requires the selection of interrelated courses totaling a minimum of 16-17 upper division units in area and regional studies or thematic course clusters in global and international studies in the Arts and Humanities.

Suggested course clusters include: (1) Country or region-specific courses: . Western Europe; Russian and East/Central Europe; Asia and the Pacific; Latin and South America; Africa and the Middle East; Jewish Studies; specific countries.

(2) Courses clustered around a thematic field in global and international studies: people and nationalities; the individual and society, arts, language, literature and culturé.

Study Abroad and International Intern-

ships. The course cluster requirement may be met in one of two ways: (1) completion of a minimum of 16-17 units in the course cluster emphasis by taking approved UC Davis upper division courses in the area of global/international studies and/or approved upper division courses taken while participating in EAP or another approved study abroad program, or (2) completion of 12 units of course work in a UC Davis accredited international intern ship, plus UC Davis courses sufficient to total 16-17 units. Those students who are unable to study abroad or participate in an international internship may fulfill the requirement by taking approved global/international courses at UC Davis. Students must meet with the GIS advisor and complete a Course Cluster Worksheet to demonstrate subject interrelatedness

Social Science Emphasis:

One course from Anthropology 20, International Relations 1, Political Science 3, or Sociology 5..... One upper division UC Davis general course on global or international studies in the Social
 Sciences
 3-4

 Course cluster requirement
 16-17

The minor requires the selection of interrelated courses totaling a minimum of 16-17 upper division units in area and regional studies or thematic course clusters in global and international studies in the Social Sciences.

Suggested course clusters for the Social Science Emphasis:

(1) Country or region-specific courses in the Social Sciences: Western Europe; Russian and East/Central Europe; Asia and the Pacific; Latin and South America; Africa and the Middle East; Jewish Studies; specific countries.

(2) Courses clustered around a thematic field in global and international studies: world trade and development; peace and security; global environment, health, and natural resources.

Study Abroad and International Intern-

ships. The course cluster requirement may be met in one of two ways: (1) completion of a minimum of 16-17 units in the course cluster emphasis by taking approved UC Davis upper division courses in the area of global/international studies and/or approved upper division courses taken while participating in EAP or another approved study abroad

program, or (2) completion of 12 units of course work in a UC Davis accredited international intern ship, plus UC Davis courses sufficient to total 16-17 units. Those students who are unable to study abroad or participate in an international internship may fulfill the requirement by taking approved alobal/international courses at UC Davis. Students must meet with the GIS advisor and complete a Course Cluster Worksheet to demonstrate subject interrelatedness.

Restrictions. No more than two courses from a single UC Davis department may be offered in satisfaction of the minor requirements.

Foreign Language Study. Students are strongly encouraged to study a foreign language, particularly the language of the country in which and about which they intend to study. However, only upper division course work may be used to fulfill requirements for the minor.

Greek

See Classics, on page 195.

Health Informatics (A Graduate Group)

Formerly Medical Informatics (A Graduate Group) Peter Yellowlees, M.B.B.S., M.D., Chairperson of the Group

Group Office. UC Davis Health System Health Informatics Program 2450 48th St., Suite 2800, Sacramento, CA 95817 (916) 734-8710; healthinformatics@ucdavis.edu

Faculty

April Armstrong, M.D., M.P.H., Assistant Clinical Professor (Dermatology)

Aaron Bair, M.D., M.S.c., Associate Professor (Emergency Medicine)

Matt Bishop, Ph.D., Professor (Computer Science) Dariusz Borys, M.D., Assistant Professor (Emergency Medicine) Robert Cardiff, M.D., Ph.D., Professor

(Pathology and Laboratory Medicine) Anthony Cheung, Ph.D. Professor Emeritus and Vice

Chair (Pathology and Laboratory Medicine) Mary Christopher, D.V.M., Ph.D., Professor (Pathology, Microbiology, and Immunology)

Cristina Davis, Ph.D., Assistant Professor (Mechanical and Aerospace Engineering) Regina Gandour-Edwards, M.D., Professor (Pathology and Laboratory Medicine)

Estella Geraghty, M.D., M.S., M.P.H, Assistant Professor of Clinical Internal Medicine (General Medicine)

Fred Gorin, M.D., Ph.D., Professor (Neurology) Bernd Hamann, Ph.D., Professor

(Computer Science) Donald Hilty, M.D., Professor (Psychiatry) Calvin Hirsch, M.D., F.A.C.P., Professor

(Internal Medicine and Public Health Sciences) Michael Hogarth, M.D., Associate Professor (Pathology and Laboratory Medicine) Janet Ilkiw, B.V.Sc., Ph.D., Professor

(Surgical and Radiological Sciences) Anthony Jerant, M.D., Associate Professor

(Family and Community Medicine) Patrice Koehl, Ph.D., Associate Professor (Computer Science)

Bertram Ludaescher, Ph.D., Professor (Computer Science)

James Marcin, M.D., M.P.H., Associate Professor (Pediatrics)

Thomas Nesbitt, M.D., M.P.H., Professor (Family and Community Medicine)

Hien Nguyen, M.D., M.A.S, Assistant Professor (Infectious Diseases)

Alberto Odor, M.D., Associate Professor (Anesthesiology and Pain Medicine) Sean Peisert, Ph.D., Assistant Adjunct Professor (Computer Science)

Jason Roof, M.D., Assistant Clinical Professor (Psychiatry)

J. Anthony Seibert, Ph.D., Professor (Radiology) Hendry Ton, M.D., M.S., Associate Professor (Psychiatry)

Xiaowei Yang, Ph.D., Assistant Professor (Biostatistics)

Peter Yellowlees, M.B.B.S., M.D, Professor (Psychiatry)

Heather Young, Ph.D., R.N., G.N.P., F.A.A.N., Associate Vice Chancellor (Nursing)

Emeriti Faculty

James Case, D.V.M., Ph.D. (Veterinary Medicine) Richard Walters, Ph.D., Professor Emeritus (Computer Science)

Affiliated Faculty

Mark Carroll, M.P.H., Lecturer (Pathology and Laboratory Medicine) Elizabeth Gibson, M.S.C.Phil, Director, Academic Technology Services

Glenna Gobar, D.V.M., M.P.V.M., M.S., Public Health Informatics Specialist (Pathology Informatics Core)

Christine Hotz, D.V.M., M.S., Assistant Adjunct Professor (Health Informatics)

Cecil Lynch, M.D., M.S., Volunteer Clinical Faculty (Health Informatics)

Terri Malmgren, M.L.S., Head Librarian (Carlson Health Sciences Library)

Wasyl Malyj, Ph.D., Director (Bioinformatics Core-NIH NCMHD Center of Excellence in Nutritional Genomics)

Michael Minear, Chief Information Officer (UC Davis Health System) Larry Ozeran, M.D., Volunteer Clinical Faculty
(Health Informatics)

Graduate Study. The Group currently offers an M.S. degree in Health Informatics. The program is primarily designed for clinicians (M.D., D.Ŏ., D.V.M., V.M.D., M.P.H., Pharm.D., R.N., others) and healthcare IT professionals with Bachelor's degree. The course of study provides research-oriented training that spans the use of computer systems in medicine today, including methods for clinical data acquisition, storage, and retrieval, the development, use and implementation of the electronic medical record, management of clinical data, and the use of medical decision support systems. A research project and thesis are mandatory degree requirements.

Preparation. The Group encourages applications from clinicians and healthcare IT professionals who have had experience in the manipulation of clinical information. Basic qualifications include an advanced degree in a health-related field or the equivalent in work experience. Proof of proficiency in a programming language is required. Applicants with extensive computer science or information technology background but little knowledge of clinical information would need to gain considerable practical experience in dealing with clinical information to be competitive in applying to the program.

Graduate Advisors. E. Geraghty (General Medicine), M. Hogarth (Pathology and Laboratory Medicine), C. Hotz (Health Informatics), A.Odor (Anesthesiology and Pain Medicine), P. Yellowlees (Psychiatry)

Courses in Health Informatics (MHI)

Graduate Courses

202. Computer-Based Patient Records (4)

Lecture/discussion-3 hours; discussion-1 hour. Prerequisite: current enrollment within the Health Informatics graduate program or consent of instructor. Introduction and overview of computer-based

clinical record systems. Topics include data modeling, health system standards and terminologies; security, privacy and confidentiality; workflow modeling; data visualization; legal; decision support; public health; and evidence-based practice. – III. (III.)

207. Decision Support Systems (4)

Lecture/discussion - 2 hours. Prerequisite: consent of instructor. Explores decision support systems for medical application. Topics include medical decision making, uncertainty, review of existing decision support systems, knowledge engineering, data mining, and knowledge based systems.—II. (II.) Malyj

208. Medical Informatics in Web-Based **Enterprise Computing (4)**

Lecture - 2 hours; discussion - 2 hours. Introduction to the decision making processes and technologies that are involved in developing Web-based distributed enterprise applications in medicine. Focus on the Informatician's role as a team member. —II. (II.)

209. Data Acquisition and Analysis (4)

Lecture - 2 hours; discussion - 1 hour; laboratory - 3 hours. Examines the nature, acquisition, and analysis of medical data. Data ranges from signals of electrical potentials, sounds, text, images (still and motion), and data from nucleic acid and protein expression and sequencing instruments.—I. (I.) Malvi

210. Introduction to Health Informatics (4)

Lecture - 3 hours; discussion - 1 hour. Overview course to give the student a broad exposure to the field of Health Informatics. Topics covered include, but are not limited to, networking, information sys tems, coding, HL7, Security, and HIPPA.-I. (I.)

211. Telemedicine (4)

Web virtual lecture—3 hours; web electronic discussion-1 hour. Issues for the development and maintenance of a successful telemedicine program with focus on strategic planning, clinical applications, project management, risk management and legal issues; reimbursement and contracting; human resources and program sustainability. - I, II, III. (I, II, III.) Yellowlees

215. Beginning and Intermediate Programming in M (MUMPS) (3)

Lecture - 3 hours. Project-oriented approach to fundamentals of programming in ANSI Standard M (MUMPS) language. Basic syntax, Hierarchical file structure; arrays and string subscripts, indirection and extrinsic functions. (S/U grading only.)—I, II, III. (I, II, III.) Walters

289A-E, G, I. Special Topics in Medical Informatics (1-5)

Lecture, laboratory, or combination. Prerequisite: consent of instructor. Special topics in (A) Data Acquisition, (B) Electronic Medical Information, (C) Computer Based Patient Records, (D) Decision Support, (E) Medical Image Analysis, (G) Biostatistics, (H) Modeling Biological Systems, (I) Coding Systems. May be repeated for credit when topic differs. - I, IÍ, III. (I, İI, III.)

289F. Database and Knowledge Management (4)

Lecture/discussion-3 hours; term paper. Prerequisite: consent of instructor. Course objectives include understanding the informatics techniques for data capture, information management, and knowledge generation that a student will use throughout their career. May be repeated for credit.—I, II, III. (I, II, III.) Lynch

289H. Modeling Biological Systems (4)

Lecture - 3 hours; laboratory - 1 hours. Class size limited to 20 students. Create awareness of how modern computer graphics have led to VR-Sim-Rob applications, and how they are modifying the teaching of medicine and in some cases the diagnosis and treatment of patients.—II. (II.) Odo

290. Seminar in Medical Informatics (1)

Seminar-1 hour. Restricted to 20 students. Discussion of current graduate research and topics in Health Informatics. Oral presentations of individual study. (S/U grading only.)-I, II, III. (I, II, III.) Odor

299. Research in Health Informatics (1-12)

Independent research in Health Informatics. (S/U grading only.) — I, II, III. (I, II, III.)

Hebrew

See Classics, on page 195.

Hindi

See Classics, on page 195.

History

(College of Letters and Science)

David Biale, Ph.D., Chairperson of the Department

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Faculty

Ali Anooshahr, Ph.D., Associate Professor Mario Biagioli, Ph.D., Professor David Biale, Ph.D., Professor

UC Davis Prize for Teaching and Scholarly Achievement

Beverly Bossler, Ph.D., Professorlan Campbell, Ph.D., Assistant Professor Diana Davis, Ph.D., Associate Professor Corrie Decker, Ph.D., Assistant Professor Edward Dickinson, Ph.D., Associate Professor Omnia El Shakry, Ph.D., Associate Professor A. Katie Harris, Ph.D., Associate Professor Ellen Hartigan-O'Connor, Ph.D., Associate Professor Ari Kelman, Ph.D., Associate Professor Kyu H. Kim, Ph.D., Associate Professor Norma B. Landau, Ph.D., Professor Victoria Langland, Ph.D., Assistant Professor Lisa Materson, Ph.D., Associate Professor Sally McKee, Ph.D., Professor Susan G. Miller, Ph.D. Associate Professor Kathryn S. Olmsted, Ph.D., Professor

Academic Senate Distinguished Teaching Award Lorena Oropeza, Ph.D., Associate Professor Eric Rauchway, Ph.D., Professor

Academic Senate Distinguished Teaching Award Andrés Reséndez, Ph.D., Professor Michael Saler, Ph.D., Professor

Academic Senate Distinguished Teaching Award Sudipta Sen, Ph.D., Professor John Smolenski, Ph.D., Associate Professor

Stylianos Spyridakis, Ph.D., Professor Academic Senate Distinguished Teaching Award Daniel Stolzenberg, Ph.D., Assistant Professor Kathleen Stuart, Ph.D., Associate Professor

Alan S. Taylor, Ph.D., Professor UC Davis Prize for Teaching and Scholarly Achievement

Baki Tezcan, Ph.D., Associate Professor Cecilia Tsu, Ph.D., Assistant Professor Charles Walker, Ph.D., Professor

Academic Senate Distinguished Teaching Award Clarence E. Walker, Ph.D., Professor Louis S. Warren, Ph.D., Professor

Emeriti Faculty

Arnold J. Bauer, Ph.D., Professor Emeritus Robert Borgen, Ph.D., Professor Emeritus William M. Bowsky, Ph.D., Professor Emeritus
Cynthia L. Brantley, Ph.D., Professor Emerita
David Brody, Ph.D., Professor Emerita
Joan Cadden, Ph.D., Professor Emerita Daniel H. Calhoun, Ph.D., Professor Emeritus Robert O. Crummey, Ph.D., Professor Emeritus Manfred P. Fleischer, Ph.D., Professor Emeritus William W. Hagen, Ph.D., Professor Emeritus

The Major Program

Achievement

The History major develops critical intelligence and fosters an understanding of ourselves and our world through the study of the past-both remote and

UC Davis Prize for Teaching and Scholarly

The Program. A student electing a major in History may complete Plan I or Plan II. Plan I enables students to receive a broad education in histories of several geographic areas. Plan II encourages interested students, including those preparing for graduate work in history, to enroll in a seminar, to undertake independent work, and to study the history of historical thought as part of the major. Students preferring more active engagement in research and writing are encouraged to follow Plan II.

Career Alternatives. A degree in history is excellent preparation for a professional career such as teaching, law, journalism, public administration, or business management. Professional schools in these and related fields are looking for students who can weigh conflicting evidence, evaluate alternative courses of action or divergent points of view, and express conclusions logically in everyday language. These analytical skills are stressed in history classes, and their mastery gives the history student a solid preparation for subsequent training in a specialized

A.B. Major Requirements:

LINITS

Preparatory Subject Matter (Plan I or II) 20

Five lower division courses chosen from the following six fields, including at least two from one field, one from a second field, and one from a third field. The fifth course can be taken from any field.....

(a) African and Middle East History: History

6, 15 (b) Asian History: History 6, 8, 9A, 9B (c) European History: History 3, 4A, 4B, 4C (d) Latin American History: History 7A, 7B,

(e) U.S. History: History 17A, 17B, 72A,

(f) World History: History 10A, 10B, 10C

Depth Subject Matter-Plan I...... 40-41

Four upper division courses from one of the fields of concentration listed below....... 16 Two upper division courses from one of the other fields of concentration listed below Two upper division courses from a field or fields other than those chosen to satisfy the or 102 or 103 (in field of concentration)...... One of the courses taken to fulfill the above requirements must deal with premodern

Total Units for the Major, Plan I...... 60-61 Depth Subject Matter-Plan II......42

history

Four upper division courses from one of the fields of concentration listed below. Include a

Three upper division courses from one of the History 101...... 5 History 102 in field of concentration (in exceptional circumstances, a student may, with the permission of an adviser, take the History 103 in field of concentration 4 One of the courses taken to fulfill the above requirements must deal with premodern history

Total Units for the Major, Plan II.......62 **Fields of Concentration**

(a) Europe: History 102A, 102B, 102C, 102D, 102E, 102F, 102I, 102P, 102X, 109A, 109B, 110A, 111B, 111C, 112A, 112B, 120, 121A, 121B, 121C, 122, 125, 130A, 130B, 130C, 131A, 131B, 131C, 132, 133, 134A, 135A, 135B, 136, 138A, 138B, 138C, 139A, 139B, 140, 141, 142A, 142B, 143, 144A, 144B, 145, 146A, 146B, 147A, 147B, 147C, 148A, 148B, 148C, 149, 151A, 151B, 151C, 151D, 160. (b) United States History: History 102K, 102L, 102M, 102X, 120, 169A, 169B, 170A, 170B, 170C, 171A, 171B, 171D, 172, 173, 174A, 174B, 174C, 174D, 175, 176A, 176B, 177A, 177B, 178A, 178B, 179, 180A, 180B, 180C, 181, 182, 183A, 183B, 184, 185A, 185B, 188, 189. 103A, 103A, 103B, 106, 109, 109, 102B, 102H, 102N, 102Q, 102R, 102X, 109A, 109B, 110, 110A, 111A, 112A, 112B, 112C, 113, 120, 190A, 190B, 190C, 190D, 113, 120, 190A, 190B, 190C, 190D, 191A, 191B, 191C, 191D, 191E, 191F, 193A, 193B, 193C, 194A, 194B, 194C, 194D, 194E, 195B, 196A, 196B. (d) African History: 102O, 102X, 109A, 109B, 110, 110A, 112C, 115A, 115B, 115C, 115D, 115E, 115F, 116. (e) Latin American History: History 102J, 102X, 109A, 109B, 110, 110A, 160, 162, 163A, 163B, 164, 165, 166A, 166B, 167, 168, 169A, 169B. (f) Within broad fields, a student may wish to concentrate some of the courses on a particular area or period, such as China or Great Britain or Medieval Europe. Special approval is not required.

Major Advisers. See the department's website for

History and Philosophy of Science. Courses from the History and Philosophy of Science program may count toward the History major. History and Philosophy of Science 130A fulfills upper division requirements in the field of pre-industrial Europe. History and Philosophy of Science 130B, 150, and 180 fulfill upper division requirements in either the U.S. or Modern Europe field.

Students can create a field in the History of Science upon consultation with a faculty adviser. They may draw upon the relevant History courses (History 85, 135A, 135B, 139A, 139B, 185A, and 185B) as well as History and Philosophy of Science offerings

Consult the History and Philosophy of Science pro gram for a more detailed description of course offerings this area and the minor in History and Philosophy of Science

Minor Program Requirements:

The minor in History consists of five upper division courses chosen so that at least three courses are in one field and at least one course is in another field. The two fields shall be chosen from among those defined in the catalog for the major. However, students may also, in consultation with and with the authorization of a faculty adviser, define other thematic fields.

UNITS

History20 At least 20 units of upper division history courses.....

Examples of minor with thematic emphasis: Pre-Law (British and American Political and Constitutional Development); The Twentieth Century; The History of Ideas in Society.

Minor Advisers. Same as major advisers.

Honors and Honors Program. A student becomes eligible for graduation with honors by meeting the minimum GPA (usually 3.500) and course requirements established by the College of Letters and Science. To qualify for high or highest honors, students must also complete the History Department honors program with a GPA of 3.500 or above and write a thesis that meets the criteria for high honors or highest honors. Students apply to participate in the department honors program during the latter part of their junior year. Admission to the program is based on GPA, a thesis proposal, examples of previous writing, and the recommendation of a faculty member who is willing to sponsor the student's project, interviews, and faculty recommendations. Students admitted to the program must complete the History 104A, 104B, 104C sequence of honors courses, which requires the completion of a senior honors thesis. Students who anticipate seeking admission to the honors program are urged to complete at least one History 102 (under-graduate seminar) before the end of their junior year. Inter ested students are urged to consult with faculty in their field early in their junior year. Students may follow either Plan I or Plan II described above, and may substitute History 104B and 104C for any courses in their program other than History 102.

Students who anticipate pursuing graduate work in history or a teaching credential, and who do not wish to opt for the research emphasis embodied in the honors program, are encouraged to select Plan II of the major.

Study Abroad and the History Major. The department strongly encourages interested students to pursue their studies abroad. While there are no specific required courses or prerequisites, students are urged to take at least one history course that touches upon the geographic area where they plan to study abroad before departing. To receive a history degree from UC Davis, students must complete at least 18 upper division units in the history major at UC Davis (which can also include History 101, 102, 103). The remaining major requirements can be fulfilled abroad provided that (a) the course should be evaluated as at least four UC Davis units, (b) the course should be considered upper division by the standards set forth by the Education Abroad Program, and (c) the course should be in the field of History. Students may present copies of the course work, syllabus, and writing assignments to the department's liaison person with the EAP office for

Note: students who wish to receive credit for courses taken abroad under programs other than EAP may petition the Undergraduate Program Committee to do so.

Teaching Credential Subject Representative. See the Teaching Credential/M.A. Program on

Waiver Program for Single-Subject Teaching Credential in History. The Department of History is currently working with the School of Education to develop a program of study to satisfy the California Teaching Commission's Subject Matter Competency requirement for the single subject credential in history/social science. For more information, contact Pamela Tindall at the Area 3 History and Cultures Project in 267 Social Science & Humanities Building.

Graduate Study. The Department of History offers programs of study and research leading to the M.A. and Ph.D. degrees in history. Detailed information may be obtained by contacting the Graduate Adviser.

Graduate Advisers. See the department's website for updated information.

American History and Institutions. This University requirement can be satisfied by passing any versity feedinement can be satisfied by pussing this one of the following courses in History: 17A, 17B, 72A, 72B, 170A, 170B, 170C, 171A, 171B, 172, 173, 174A, 174B, 174C, 174D, 175, 176A, 176B, 177A, 177B, 178A, 178B, 180A, 180B, 181, 183A, 183B, 184, 189. The upper division courses may be used only with the consent of the instructor; see also under University requirements.

Courses in History (HIS)

Lower Division Courses

3. Cities: A Survey of World Cultures (4)

Lecture-3 hours; lecture/discussion-1 hour. Survey of urban world cultures, focusing on up to ten cities selected by the instructor. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

4A. History of Western Civilization (4)

Lecture—3 hours; discussion—1 hour. Growth of western civilization from late antiquity to the Renaissance. GE credit: ArtHum, Wrt | AH or SS, WC, WE. - I. II. McKee

4B. History of Western Civilization (4)

Lecture-3 hours; discussion-1 hour. Development of western civilization from the Renaissance to the Eighteenth Century. GE credit: ArtHum, Wrt | AH or SS, WC, WE.-II. Landau, Stuart

4C. History of Western Civilization (4)

Lecture-3 hours; discussion-1 hour. Development of Western Civilization from the Eighteenth Century to the present. GE credit: ArtHum, Wrt | AH or SS, WC, WE.-I, II, III. Campbell, Saler

6. Introduction to the Middle East (4)

Lecture - 3 hours; discussion - 1 hour. Survey of the major social, economic, political and cultural transformations in the Middle East from the rise of Islam (c. 600 A.D.) to the present, emphasizing themes in religion and culture, politics and society. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—I. Teczan

7A. History of Latin America to 1700 (4)

Lecture - 3 hours; discussion - 1 hour. Introduction to the history of Spanish and Portuguese America from the late pre-Columbian period through the initial phase and consolidation of a colonial regime (circa 1700). Topics include conquest, colonialism, racial mixture, gender, and labor systems. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.-I. (I.) C.F. Walker

7B. History of Latin America, 1700-1900 (4)

Lecture-3 hours; discussion-1 hour. Latin America from colony to republic. The nature of Iberian colonialism, the causes for independence, the creation of nation states, the difficulties in consolidating these nations, and the rise of Liberalism and export economics in the nineteenth century. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—II. (II.) Resendez

7C. History of Latin America, 1900-present (4)

Lecture-3 hours; discussion-1 hour. Latin America since the beginning of the 20th century. Themes include export economies, oligarchic rule, crises of depression and war, corporatism, populism revolution and reform movements, cultural and ethnic issues, U.S.-Latin American relations, neo-liberal restructuring. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—III. (III.) Langland

8. History of Indian Civilization (4)

Lecture - 3 hours; discussion - 1 hour; written reports. Survey of Indian civilization from the rise of cities (ca. 2000 B.C.) to the present, emphasizing themes in religion, social and political organization, and art and literature that reflect cultural interaction and change. GE credit: ArtHum, Div | AH or SS, WC, WE.-II. Sen

9A. History of East Asian Civilization (4)

Lecture - 3 hours; discussion - 1 hour. Surveys traditional Chinese civilization and its modern transformation. Emphasis is on thought and religion, political and social life, art and literature. Perspectives on contemporary China are provided. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.—I,

9B. History of East Asian Civilization (4)

Lecture—3 hours; discussion—1 hour. Surveys traditional Japanese civilization and its modern transformation. Emphasis is on thought and religion, political and social life, art and literature. Perspectives on contemporary Japan are provided. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.—II.

10A. World History to 1350 (4)

Lecture - 3 hours; discussion - 1 hour. Historical examination of the changing relationship of human societies to one another and to their natural settings through the year 1350, with particular attention to long-term trends and to periodic crises that reshaped the links of culture and nature on a global scale. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.-I. Anooshahr

10B. World History, c. 1350-1850 (4)

Lecture — 3 hours; discussion — 1 hour. Major topics in world history from the 14th century to the beginning of the 19th century. Topics will vary but may include oceans as systems of human communication and conflict; the global consequences of "industrious revolutions" in Europe and Asia, etc. GE credit: ArtHum, Wrt | AH or SS, WC, WE.-I. Harris, Stolzenberg

10C. World History III (4)

Lecture - 3 hours; discussion - 1 hour. Major topics from world history of the 19th and 20th centuries, emphasizing the rise and fall of Western colonial empires; Cold War and the superpowers; the spread of the nation-states; and process of globalization. GE credit: ArtHum, Wrt | AH or SS, WC, WE.-II, III. Dickinson, El Shakry

11. History of the Jewish People from **Biblical Times (4)**

Lecture - 3 hours; discussion - 1 hour. History of the Jewish people from its roots in ancient Israel, through the classical and rabbinical periods, their relations with early Christianity and Islam, their transition to modernity, their emancipation, and into the modern world. Offered in alternate years. GE credit: AH, DD, VL, WC, WE.-(I.) Miller

15. Introduction to African History (4)

Lecture - 3 hours; discussion - 1 hour. Examination of the long-range historical context as background to current conditions in Africa. Includes the early development of African civilizations, the slave trade and its abolition, 20th century colonization, and African independent states. GE credit: ArtHum, Div, Wrt AH or SS, WC, WE.-II. Decker

17A. History of the United States (4)

Lecture - 3 hours; discussion - 1 hour. The experience of the American people from the Colonial Era to the Civil War. GE credit: ArtHum, Div, Wrt | ACGH, AH or SS, DD, WE. - I, II, III. (I, II, III.) Hartigan-O'Connor, Kelman, Smolenski, Taylor

17B. History of the United States (4)

Lecture - 3 hours; discussion - 1 hour. The experience of the American people from the Civil War to the end of the Cold War. Not open for credit to students who have completed course 17C. GE credit: ArtHum, Div, Wrt | ACGH, AH or SS, DD, WE.-I, II, III. (I, II, III.) Olmsted, Oropeza, Rauchway

17B. History of the United States (4)

Lecture - 3 hours; discussion - 1 hour. The experience of the American people from the Civil War to the end of the Cold War. Not open for credit to students who have completed course 17C. GE credit: ArtHum, Div, Wrt | ACGH, AH or SS, DD, WE.-II, III. (II, III.)

72A. Social History of American Women and the Family (4)

Lecture - 3 hours; discussion - 1 hour. Social and cultural history of women, sex roles and the family from colonial America until the late nineteenth century emphasizing changes resulting from the secularization, commercialization, and industrialization of American society. GE credit: ArtHum, Div, Wrt | ACGH, AH or SS, DD, WE.-II. Hartigan-O'Connor

72B. Social History of American Women and the Family (4)

Lecture—3 hours; discussion—1 hour. Social and cultural history of women, sex roles, and the family in twentieth-century America, emphasizing female reformers and revolutionaries, working class women, consumerism, the role of media, the "feminine mystique," changes in family life, and the emergent women's movement. GE credit: ArtHum, Div, Wrt | ACGH, AH or SS, DD, WE.—III. Materson

85. Nature, Man, and the Machine in America (4)

Seminar-4 hours; term paper. Prerequisite: consent of instructor. History of the attitudes and behavior of Americans toward their natural environment and their technology, from colonial times to the present. No final examination. Limited enrollment. GE credit: ArtHum | AH or SS, WE.

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) (P/NP grading only.)

Upper Division Courses

101. Introduction to Historical Thought and Writing (5)

Lecture/discussion-4 hours; term paper. Prerequisite: consent of instructor. Study of the history of historical thought and writing, analysis of critical and speculative philosophies of history and evaluation of modes of organization, interpretation, and style in historical writing. GE credit: WE.-II. III. (III.) Saler, Stolzenberg

102A-S, X. Undergraduate Proseminar in History (5)

Seminar-3 hours; term paper. Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. (A) Ancient; (B) Medieval; (D) Modern Europe to 1815; (E) Europe since 1815; (F) Russia; (G) China to 1800; (H) China since 1800; (I) Britain; (J) Latin America since 1810; (K) American History to 1787; (L) United States, 1787-1896; (M) United States since 1896; (N) Japan; (O) Africa; (P) Christianity and Culture in Europe, 50-1850; (Q) India; (R) Muslim Societies; (S) Education Abroad Program, GE credit: ArtHum, Wrt | AH or SS, WE. (X) Comparative History, selected topics in cultural, political, economic, and social history that deal comparatively with more than one geographic field.

May be repeated for credit. Limited enrollment.—I, II, III. (I, II, III.)

103. Topics in Historical Research (4)

Discussion - 3 hours; individual consultation with instructor; term paper. Prerequisite: consent of instructor. Individual research resulting in a research paper on a specific topic in one of various fields of history. May be repeated for credit. GE credit: WE.

104A. Introduction to Historical Research and Interpretation (4)

Seminar-3 hours; term paper. Prerequisite: acceptance into History Department Honors Program. Directed reading and research aimed at preparing students to select appropriate topics and methodologies for a senior honors essay and to situate their topics within a meaningful, broad context of historical interpretations. Culminates in the submission of a full prospectus for an honors essay. GE credit: WE. — I. (I.) Anooshahr

104B. Honors Thesis (4)

Tutorial-4 hours. Prerequisite: course 104A. Research in preparation of a senior honors thesis under the direction of a faculty adviser. (Deferred grading only, pending completion of sequence.) GE credit: WE.-II.

104C. Honors Thesis (4)

Tutorial—4 hours. Prerequisite: course 104A and 104B. Completion of a senior honors thesis under the direction of a faculty adviser. (Deferred grading only, pending completion of sequence.) GE credit:

109A. Global Environmental History (4)

Lecture/discussion-3 hours; project. Global, comparative study of how environmental change, human perceptions of nature, and manipulations of nature have changed over time. Primary focus post-1500, emphasis on critically analyzing many common ideas of environmental change. GE credit: ArtHum, or SocSci | AH or SS.—Davis

109B. Environmental History of Disease and Public Health (4)

Lecture/discussion - 3 hours; project. Restriction to upper division standing. Disease from prehistory to the present in global perspective; the origins of pathogens in human manipulations of the environment and how people and governments have mobilized to contain or eliminate them. GE credit: SciEng or SocSci, Div | SE or SS, SL.—I. Davis

110. Themes in World History (4)

Lecture—3 hours; term paper. Prerequisite: upper division standing. Issues and topics in world history. Topics will emphasize the interaction of diverse regions of the world as well as common patterns of historical change. May be repeated for credit if topic and/or instructor differs. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

110A. Colonialism and the Making of the Modern World (4)

Lecture—3 hours; term paper. History of the modern world, focusing on struggles between Europeans and colonized peoples; the global formation of capitalism: the creation of nation-states; and the constitution of bourgeois bodies and racial selves in modern societies. Offered in alternate years. GE credit: AH, VL, WC, WE.-(I.) El Shakry

111A. Ancient History (4)

Lecture—3 hours; discussion or paper (student option). History of ancient empires of the Near East and of their historical legacy to the Western world. GE credit: ArtHum, Wrt | ÁH or SS, WC, WE.-I. Spyridakis

111B. Ancient History (4)

Lecture—3 hours; discussion or paper (student option). Political, cultural and intellectual study of the Greek world from Minoan-Mycenaean period to end of Hellenistic Age. GE credit: ArtHum, Wrt | AH or SS, WC, WE.-II. Spyridakis

111C. Ancient History (4)

Lecture — 3 hours; discussion or paper (student option). Development of Rome from earliest times. Rise and fall of the Roman Republic; the Empire to 476 A.D. GE credit: ArtHum, Wrt | AH or SS, WC, WE.-II. (II.) Spyridakis

112A. Topics in Pre-Modern Jewish History (4)

Lecture—3 hours; term paper. Topics in the history of Jews from the Biblical era to the eras of Jewish emancipation. Topics can be framed chronologically (e.g., medieval Jewry) or thematically (e.g., trade and Jewish communities). May be repeated one time for credit. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.

112B. Topics in Modern Jewish History (4)

Lecture - 3 hours; term paper. Topics in the history of Jews from the era of Jewish emancipation to the present. Topics can be framed chronologically or thematically (e.g. Zionism, assimilation, the post Holocaust Diaspora). May be repeated one time for credit. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.

112C. History of Jews in the Muslim World

Lecture - 3 hours; term paper. Prerequisite: upper division standing recommended. History of Jewish communities in the lands of Islam from the time of the Prophet Muhammad to the present day. GE credit: SS, WC, WE.-I. (I.) Miller

113. History of Modern Israel (4)

Lecture — 3 hours; term paper. Topics include the rise and fall of utopian Zionism, the century-long struggle between Jews and Arabs, the development of modern Hebrew culture, the conflict between religious and secular Jews, and the nature of Israel's multicultural society. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.-III. Biale

115A. History of West Africa (4)

Lecture—3 hours; term paper. Prerequisite: course 15 recommended. Introductory survey of the history of West Africa and/or the Congo region from the earliest times to the present. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.

115B. History of East and Central Africa (4)

Lecture—3 hours; term paper. Prerequisite: course 15 recommended. Introductory survey of the history of east and central Africa from earliest times to the present. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.—Decker

115C. History of Southern Africa (4)

Lecture—3 hours; term paper. Prerequisite: course 15 recommended. Introductory survey of the history of Southern Africa (including South Africa) from earliest times to the present. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.-Decker

115D. History and Legacy of Colonialism in Africa (4)

Lecture—3 hours; term paper. Prerequisite: course 115A, 115B or 115C recommended. History of the implementation, development, and legacy of European Colonialism in Africa. A comparison of British, Belgian, French, and Portuguese colonial efforts and impacts. GE credit: SocSci, Div, Wrt | AH or SS, WC, WE.

115E. The African Slave Trade (4)

Lecture - 3 hours; writing - 1 hour. History of the African Slave trades, from the early Egyptian and Saharan trades in the pre-modern period to the trans-Atlantic trade (15th-19th century) and the contemporary trafficking of humans. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.-III. (III.) Lawrance

115F. History of North, Horn, Sudan and Nile Valley (North and North-East Africa)

Lecture - 4 hours; term paper. This course shall investigate the history of the north and northeast regions of continental África, encompassing the Mediterranean Coast, Maghreb, Sahara, Horn of Africa, the Nile Valley and the Sudan, covering the ancient period to the present. May be repeated up to four units for credit when instructor differs. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.-II. Miller

116. African History: Special Themes (4)

Lecture—3 hours; term paper. Prerequisite: courses 115A and 115B recommended. Themes of African history, such as African states and empires, slave trade, relationship of Egypt to rest of Africa, Bantu origins and migrations, and French policy of Assimilation and Association. GE credit: ArtHum | AH or SS, WC, WE.

120. World War II (4)

Lecture—3 hours; extensive writing. The Second World War from 1931 to 1945 in all of its theaters. Causes, conduct, and consequences of the war including military, political, economic, social, and cultural factors, with special emphasis on battlefield strategy and mobilization of the home front. Offered irregularly. GE credit: SS, WC, WE.-I, II, III, IV. (I, II, III, IV.) Rauchway

121A. Medieval History (4)

Lecture/discussion and panel presentations – 3 hours. European history from "the fall of the Roman Empire" to the eighth century. GE credit: ArtHum, Wrt | AH or SS, WC, WE. - McKee

121B. Medieval History (4)

Lecture/discussion and panel presentations—3 hours. European history from Charlemagne to the twelfth century. GE credit: ArtHum, Wrt | AH or SS, WC, WE.-McKee

121C. Medieval History (4)

Lecture/discussion and panel presentations—3 hours. European history from the Crusades to the Renaissance. GE credit: ArtHum, Wrt | AH or SS, WC, WE.-III. McKee

122. Selected Themes in Medieval History

Lecture - 3 hours; term paper. Each offering will focus on single major theme, such as medieval agrarian history, feudalism, the family, medieval Italy, or the Crusades. Readings include original sources in English translation and modern works. May be repeated for credit. GE credit: ArtHum | AH or SS, WC, WE.

125. Topics in Early Modern European History (4)

Laboratory/discussion-3 hours; term paper. Prerequisite: course 4B recommended. Social and cultural history, 1300-1800. Topics such as medieval and Renaissance Italy, early modern Italy, Ancient Regime France, family and sexuality, and material culture and daily life. May be repeated for credit. GE credit: ArtHum, Wrt | AH or SS, WC, WE.

130A. Christianity and Culture in Europe: 50-1450 (4)

Lecture — 3 hours; written report or research paper. A history of the ideas and institutions of Christianity and their impact on the late Roman Empire and medieval Europe in terms of outlook on life, art, politics and economics. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.

130B. Christianity and Culture in Europe: 1450-1600 (4)

Lecture—3 hours; written report or research paper. A history of the Lutheran, Zwinglian-Calvinist, Radical, Anglican, and Catholic Reformations as foundation stones of a new culture in Europe, with special attention to the interconnections between the revival of antiquity and the different reform movements. GE credit: ArtHum | AH or SS, WC, WE.-Harris

130C. Christianity and Culture in Europe: 1600-1850 (4)

Lecture—3 hours; written report or research paper. A survey of the intellectual, cultural and political reorientation of European society in the aftermath of the Wars of Religion. "Secularization" will be discussed in the context of the Enlightenment and Romanticism. GE credit: ArtHum | AH or SS, WC,

131A. Early Modern European History (4)

Lecture-3 hours; written reports. Prerequisite: courses 4A and 4B recommended. Western European history from about 1350 to about 1500. GE credit: ArtHum | AH or SS, WC, WE.—Stuart

131B. European History During the Renaissance and Reformation (4)

Lecture—3 hours; term paper. Survey of European society, politics, and culture from the late 15th through the early 17th centuries, with particular focus on the Italian and Northern Renaissance, on the Protestant Reformation, and the Catholic Counter Reformation. GE credit: ArtHum, Wrt | AH or SS, WC, WE.-Harris

131C. The Old Regime: Absolution, Enlightenment and Revolution in Europe (4)

Lecture—3 hours; term paper. Survey of European society, politics, and culture in the 17th and 18th centuries, focusing on religious warfare, absolutism, Scientific Revolution, Enlightenment and the growth of religious tolerance, the French Revolution and the collapse of the old regime. GE credit: ArtHum, Wrt AH or SS, WC, WE.-Stuart

132. Crime and Punishment in Early Modern Europe (4)

Lecture - 3 hours; term paper. Deviance and crime in early modern Europe, contrasting imaginary crimes, e.g. witchcraft, with "real" crimes such as highway robbery and infanticide. Examines impact of gender, sexual orientation, ethnicity, and class in processes of criminalization. GE credit: SocSci, Div, Wrt | AH or SS, WC, WE.-Stuart

133. The Age of Ideas (4)

Lecture - 3 hours; written reports. The Enlightenment and its background in the seventeenth century. GE credit: ArtHum | AH or SS, WC, WE.—I. Stolzen-

134A. The Age of Revolution (4)

Lecture-3 hours; written reports. Ideas and institutions during the French Revolution and the Napoleonic era. GE credit: ArtHum | AH or SS, WE.

135A. History of Science to the 18th Century (4)

Lecture/discussion—3 hours; term paper. Prerequisite: upper division standing. Survey of the historical development of science, technology, and medicine from the ancient world to the eighteenth century, with special emphasis on Isaac Newton as the culmination of the seventeenth century scientific revolution. GE credit: ArtHum | AH or SS, WC, WE.-Stolzenberg

135B. History of Science, 18th to 20th Centuries (4)

Lecture/discussion-3 hours; term paper. Prerequisite: upper division standing. Survey of the historical development of scientific thought in geology, biology, chemistry, physics, and cosmology from the eighteenth to the twentieth century, with special emphasis on emergence of broad explanatory principles that serve more than one science. GE credit: ArtHum | AH or SS, WC, WE.-

136. Scientific Revolution (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 135A or 135B recommended. History of science in Western Europe (1400-1750). Investigates the changing definitions of science in the age of Copernicus, Versalius, Harvey, Galileo and Newton. Considers the evolution of new ideas about nature, experiment, observation, and scientific theory. GE credit: ArtHum, Wrt | AH or SS, WC, WE.—II. Stolzenberg

138A. Russian History: The Rise of the First Empire, 1500-1881 (4)

Lecture—3 hours; term paper. Prerequisite: courses 4B and 4C recommended. Expansion of the Russian state in Muscovite and imperial era. Emphasis on autocratic rule, the incorporation of non-Russian peoples, and emergence of Russia as a Great Power Only two units of credit will be allowed to students who have completed former course 137B. GE credit: ArtHum, Wrt | AH or SS, WC, WE.

138B. Russian History: The Russian Revolution, 1880-1917 (4)

Lecture - 3 hours; term paper. Prerequisite: courses 4B and 4C recommended. History of the fall of the Russian Empire and of the Revolution of 1917. Not open for credit to students who have received credit for former course 138. GE credit: ArtHum, Wrt | AH or SS, WC, WE.—III. Campbell

138C. Russian History: The Rise and Fall of the Soviet Union, 1917 to the Present (4)

Lecture—3 hours; term paper. Prerequisite: courses 4B and 4C recommended. The emergence of the Soviet Union as a socialist system and a Great Power; the decline and collapse of the Soviet Union and the formation of independent nation states in its place. Not open for credit to students who have completed former course 137C. GE credit: ArtHum, Wrt | AH or SS, WC, WE.

139A. Medieval and Renaissance Medicine

Laboratory/discussion-3 hours; term paper. The history of medicine, circa 1000-1700. Revival of ancient medicine; role of the universities; development of anatomy, chemistry and natural history;

ideas about the body; cultural understanding of disease; hospital and the public health system. Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, WC, WE.

139B. Medicine, Society, and Culture in Modern Europe (4)

Lecture - 2 hours; discussion - 1 hour; term paper. History of European medicine, 18th to 20th centuries, by examining the development of medical knowledge in epidemiology and anatomy; function of this knowledge, how it changed with technological breakthroughs and professionalization; and role of medicine in attitudes toward poverty, women, race, disease. Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, WC, WE.

140. The Rise of Capitalism in Europe (4)

Lecture—3 hours; term paper. Prerequisite: course 4B or 4C. Comparative analysis of major interpretations of the rise of merchant capitalism during the Middle Ages and Renaissance; European expansion overseas, 1450-1815; the transition to modern capitalism via industrial revolution. Interplay of social, political, cultural, and economic history. Offered in alternate years. GE credit: SocSci | AH or SS, WC,

141. France Since 1815 (4)

Lecture - 3 hours; term paper. GE credit: ArtHum, Wrt | AH or SS, WC, WE.

142A. History of the Holocaust (4)

Lecture—3 hours; term paper. Prerequisite: upper division standing. Topics include comparative genocide, medieval and modern antisemitism, modern German history, the rise of Nazism, Jewish life in Europe before the Nazi period, and the fate of the Jewish communities and other persecuted groups in Europe from 1933-1945. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.-II. Biale

142B. The Memory of the Holocaust (4)

Lecture-3 hours; term paper. Prerequisite: uppe division standing. Examination of the literary, philosophical, theological and artistic responses to the Holocaust of the European Jews. Exploration of how memory is constructed, by whom and for what purposes. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.—Biale

143. History of Eastern Europe and the Balkans (4)

Lecture—3 hours; essays. History of the Baltic, Danubian, and Balkan lands since the Middle Ages. National cultures and conflicts in the Polish Commonwealth and the Habsburg and Ottoman Empires; nationalist movements, 1789-1914; the twentieth century, including an analysis of the contemporary scene. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.

144A. History of Germany, 1450 to 1789 (4)

Lecture—3 hours; extensive writing. Survey of early modern Germany, 1450 to 1789, covering the theology and social history of the Reformation, the Peasants War of 1525, religious warfare, state building and absolutism, the rise of Prussia, Austro-Prussian dualism, and the German Enlightenment. GE credit: AH or SS, WC, WE.

144B. History of Germany since 1789 (4)

Lecture/discussion - 3 hours; extensive writing. Prerequisite: course 144A recommended. History of the German lands in the age of the French Revolution; 19th-century liberalism, nationalism, and industrialization; the World Wars, National Socialism, and the Holocaust; east and west Germany in the Cold War; the post-reunification scene. (Not open for credit to students who have completed former course 144.) GE credit: ArtHum, Div, Wrt | AH or SS, WC,

145. War and Revolution in Europe, 1789-1918 (4)

Lecture—3 hours; term paper. Survey of revolutionary movements, international crises, and wars in Europe from the French Revolution to World War I. GE credit: ArtHum, Wrt | AH or SS, WC, WE.

146A. Europe in the Twentieth Century (4)

Lecture—3 hours; term paper. Survey of the history of Europe from 1919 to 1939. GE credit: ArtHum, Wrt | AH or SS, WC, WE.—I. Dickinson

146B. Europe in the Twentieth Century (4)

Lecture—3 hours; term paper. Survey of the history of Europe since 1939. GE credit: ArtHum, Wrt | AH or SS, WC, WE.-II. Dickinson

147A. European Intellectual History, 1800-1870 (4)

Lecture—3 hours; term paper. European thought in the early industrial era. Shifting cultural frameworks, from romanticism to scientism; liberal and socialist reactions to social change. Focus on the work of Goethe, Hegel, J.S. Mill, Marx, Darwin and Flaubert. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.-III. Saler

147B. European Intellectual History, 1870-1920 (4)

Lecture—3 hours; term paper. Cultural and intellectual watershed of the late nineteenth and early twentieth centuries. Emergence of modern art and literature; psychoanalysis and the new social sciences. Focus on the work of Baudelaire, Wagner, Nietzsche, Freud, Weber and Kafka. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.— Saler

147C. European Intellectual History, 1920-1970 (4)

Lecture—3 hours; term paper. European thought and culture since World War I. Coverage includes: literature and politics; Communism and Western Marxism; Fascism; Existentialism; Structuralism; Feminism. Particular attention to Lenin, Brecht, Hitler, Sartre, Camus, Beckett, Marcuse, Foucault, Woolf and de Beauvoir. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE. - Saler

148A. Women and Society in Europe: 1500-1789 (4)

Lecture—3 hours; term paper. Prerequisite: course 4B recommended. Roles and perceptions of women from the Renaissance to the French Revolution. Emphasis on social and economic factors as well as on discussions of women in the writings of political theorists and social commentators. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.

148B. Women and Society in Europe: 1789-1920 (4)

Lecture—3 hours; term paper. Prerequisite: course 4C and 148A recommended. Roles and perceptions of women from the French Revolution to World War I, primarily in France and England. Emphasis on social and economic developments within a loosely chronological and comparative framework. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.

148C. Women and Society in Europe: 1914-Present (4)

Lecture—3 hours; term paper. Prerequisite: course 148B recommended. The history of 20th-century Europe from the perspective of women and the family, and of sexual and gender relations. Emphasis on the impact on women of major events and move-ments, such as World War I, fascism, Soviet communism, World War II, the welfare state, feminism, and mass culture. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.

149. Comparative Cultural History of Modern Britain and France, 1880-1914 (4)

Lecture—3 hours; term paper. Cultural comparison of the histories of Britain and France during the fin de siecle. Addresses cultural debates of the period (including gender, race, class) and the practices of cultural history. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC,

151A. England: The Middle Ages (4)

Lecture—3 hours; term paper. Prerequisite: course 4A recommended. Origins of England to the accession of the Lancastrians. Survey includes: impact of Norman Conquest on Anglo-Saxon institutions; rise of the Church, common law, parliament, and the

economy; thought, arts, and literature to the age of Chaucer and Wyclif. GE credit: ArtHum, Wrt | AH or SS, WC, WE

151B. England: The Early Modern Centuries

Lecture—3 hours; term paper. Prerequisite: courses 4A, 4B; course 151A recommended. From Lancaster and York to the Glorious Revolution. Includes growth of the Church of England; beginnings of modern worldwide economy; rise of the gentry and parliament; thought, arts, and literature in the times of More, Shakespeare, Hobbes, Wren, and Newton. GE credit: ArtHum, Wrt | AH or SS, WC, WE.

151C. Eighteenth-Century England (4) Lecture - 3 hours; term paper. English history from the Glorious Revolution to the French Revolution. Examination of the transformation of one of Europe's most politically unstable kingdoms into the firmly established constitutional monarchy which provided an environment fit to engender the industrial revolu-

tion. GE credit: ArtHum, Wrt | AH or SS, WC,

151D. Industrial England (4)

Lecture -3 hours; term paper. English history from Waterloo to the Battle of Britain; the rise and continuance of the first industrial nation, examining the transformation of landed to class society, oligarchy to democracy and bureaucracy, Bentham to Bloomsbury, empire to commonwealth. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.—Landau

159. Women and Gender in Latin American History (4)

Lecture - 3 hours; extensive writing. Prerequisite: one course either on Latin America or in women's history in another world area. Roles of women and men in the history of Latin America, with an emphasis on the intersection of gender with racial and class catego ries. Introduction to the theoretical premises of women's and gender history. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.—Langland

160. Spain and America in the 16th Century (4)

Lecture—3 hours; term paper. Prerequisite: upper division standing. The Atlantic world in the 16th century, particularly the transcultural and reciprocal social and economic relations between Spain and America in the course of colonization. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.-III. Harris

162. History of the Andean Region (4)

Lecture/discussion-3 hours; written and/or oral reports. History of the Andean region, the area that now comprises modern Peru, Bolivia, and Chile, from the beginning of human settlement to the present. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.—III. (III.) C. F. Walker

163A. History of Brazil (4)

Lecture - 3 hours; written reports. The history of colonial and imperial Brazil from 1500 to 1889. GE credit: Art \dot{H} um | AH or SS, WC, WE.

163B. History of Brazil (4)

Lecture - 3 hours; written reports. The history of the Brazilian republic from 1889 to the present. GE credit: ArtHum | AH or SS, WC, WE.-I. Langland

164. History of Chile (4)

Lecture—3 hours; term paper. Prerequisite: course 161A, 161B, 165, or 168 recommended. Emphasis on the history of Chilean political economy from 1930 to the present. Various strategies of development (modernization, Marxism, Neo-Liberalism); the rise of mass politics; the course of foreign relations; and the richness of Chilean literature. Offered in alternate years. GE credit: ArtHum | AH or SS, WC,

165. Latin American Social Revolutions (4)

Lecture—3 hours; written reports. Major social upheavals since 1900 in selected Latin American nations; similarities and differences in cause, course, and consequence. GE credit: ArtHum | AH or SS, WC, WE.

166A. History of Mexico to 1848 (4)

Lecture/discussion—3 hours; written and/or oral reports. Political, economic, and social development of pre-Columbian, colonial and national Mexico to 1848. GE credit: ArtHum | AH or SS, WC, WE.

166B. History of Mexico Since 1848 (4)

Lecture/discussion-3 hours; written and/or oral reports. History of Mexico from 1848 to the present. GE credit: ArtHum | AH or SS, WC, WE.

167. Modern Latin American Cultural and Intellectual History (4)

Lecture - 3 hours; term paper. Prerequisite: upper division standing. Introduction to the cultural and intellectual history of modern Latin America including architecture, cinema, painting, music, and literature. GE credit: ArtHum, Wrt | AH or SS, WC, WE.—C.F. Walker, Reséndez

168. History of Inter-American Relations (4)

Lecture — 3 hours; written reports. Diplomatic history of Latin America since independence, intra-Latin American relations, relations with the United States, participation in international organizations, and communism in Latin America. GE credit: ArtHum | AH or SS, WC, WE.—II. C.F. Walker

169A. Mexican-American History (4)

Lecture/discussion-3 hours; written and/or oral reports. Economic, social, religious, cultural and political development of the Spanish-speaking population of the Southwestern United States from about 1800 to 1910. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.-Oropeza

169B. Mexican-American History (4)

Lecture/discussion—3 hours; written and/or oral reports. Role of the Mexican and Mexican-American or Chicano in the economy, politics, religion, culture and society of the Southwestern United States since 1910. GE credit: ArtHum, Div, Wrt | ACGH, AH or SS, DD, WE.-I. Oropeza

170A. Colonial America (4)

Lecture -3 hours; term paper. Colonial society from 1607 to the American Revolution, with emphasis on European expansion, political, social and economic foundations, colonial thought and culture, and imperial rivalry. GE credit: ArtHum, Div, Wrt | ACGH, AH or SS, WE.—II. Smolenski, Taylor

170B. The American Revolution (4)

Lecture—3 hours; term paper. Analysis of the Revolutionary epoch with emphasis on the structure of British colonial policy, the rise of revolutionary movements, the War for Independence and its consequences, and the Confederation period. GE credit: ArtHum, Div, Wrt | ACGH, AH or SS, WE.-III. Smolenski, Taylor

170C. The Early National Period, 1789-1815 (4)

Lecture - 3 hours. Political and social history of the American republic from the adoption of the Constitution through the War of 1812 and its consequences. GE credit: ArtHum | ACGH, AH or SS, DD, WE.

171A. Jacksonian America (4)

Lecture - 3 hours; term paper. Prerequisite: upper division standing. The political and social history of the United States from the end of the War of 1812 to the Compromise of 1850. How the market revolution transformed American life, and led the nation towards war. GE credit: ArtHum, Div, Wrt | ACGH, AH or SS, DD, WE.—Kelman

171B. Civil War and Reconstruction (4)

Lecture—3 hours; term paper. Prerequisite: upper division standing. Examination of the political and social history of the United States from the Compromise of 1850 to the end of Reconstruction in 1876. Causes of the war, the war itself, and the problems of reconstruction after the war. GE credit: ArtHum, Div, Wrt | ACGH, AH or SS, DD, WE.-I. Kelman

171BF. The Civil War in American Film (1)

Discussion - 1 hour; film viewing. Prerequisite: course 171B concurrently. Viewing and discussion of films with short writing assignments. (P/NP grading only.) GE credit: AH or SS.

171D. Selected Themes in 19th Century American History (4)

Lecture—3 hours; term paper. Prerequisite: upper division standing. Interpretative overview of a single topic in the history of the United States in the 19th century. Sample topics include social history, the 1850s, and southern history. May be repeated one time for credit when topic differs. Offered in alternate years. GE credit: ArtHum, Wrt | ACGH, AH or SS, WE.

172. American Environmental History (4)

Lecture-3 hours; term paper. Prerequisite: course 17A. Examination of changing relations between people and nature in the area of the current United States from pre-Columbian times to the present. Topics include ecological change; perceptions of nature; social conflicts over "proper" uses of nature; environ-mental movement. Offered in alternate years. GE credit: ArtHum, Wrt | ACGH, AH or SS, WE.-II.

173. Becoming an American: Immigration and American Culture (4)

Lecture—3 hours; term paper. Prerequisite: course 17B or 72B recommended. An introduction to the wide range of immigrant experiences and cycles of nativism that have shaped American culture in the twentieth century. From novels, memoirs and films, students will explore how external and internal immigration has created a multicultural society. Offered alternate years. GE credit: ArtHum, Div, Wrt | ACGH, AH or SS, DD, WE.-I. Tsu

174A. The Gilded Age and Progressive Era: United States, 1876-1917 (4)

Lecture—3 hours; term paper. Prerequisite: course 17B. U.S. history and the construction of modern America from the end of Reconstruction to U.S. entry into World War I. Includes Southern redemption, Western incorporation, electoral corruption, labor movements, Populism, Progressivism, women's suffrage, U.S. imperial expansion, and immigration restriction. Offered in alternate years. GE credit: ArtHum, Wrt | ACGH, AH or SS, DD, WE. - Rauch-

174AD. Emergence of Modern America: Discussion (1)

Discussion — 1 hour; short papers. Prerequisite: course 174A concurrently. Intensive discussion of topics and readings for course 174A. (P/NP grading only.)

174B. War, Prosperity, and Depression: United States, 1917-1945 (4)

Lecture — 3 hours; term paper. Prerequisite: course 17B. America's emergence as a world power, the business culture of the 1920s, the New Deal and World War II. Emphasis on such issues as government regulation of the economy, welfare capitalism, and class, racial, ethnic, and gender conflicts. Offered in alternate years. GE credit: ArtHum, Wrt | ACGH, AH or SS, DD, WE.-II. Olmsted, Rauchway

174BD. America in War, Prosperity and Depression: Discussion (1)

Discussion - 1 hour; short papers. Prerequisite: course 174B concurrently. Intensive discussion of topics and readings for course 174B. (P/NP grading only.)

174C. The United States Since World War II, 1945 to the Present (4)

Lecture—3 hours; term paper. America's struggle to respond to new complexities in foreign relations, social tensions, family changes and media. Emphasis on such topics as: Cold War; anticommunist crusade; civil rights, feminist and environmentalist movement; New Left; counterculture; Vietnam; Watergate; and the moral majority. GE credit: ArtHum, Wrt | ACGH, AH or SS, DD, WE.-III. Olmsted, Oropeza

174CD. The United States Since World War II: Discussion (1)

Discussion-1 hour. Prerequisite: course 174C concurrently. Intensive discussion of topics and readings for course 174C. (P/NP grading only.)

174D. Selected Themes in 20th Century American History (4)

Lecture—3 hours; term paper. Prerequisite: course 17B or the equivalent. Interpretive overview of a single topic in the history of the United States in the 20th century with attention to the phases and processes of historical change. May be repeated one time for credit when topic differs. Offered in alternate years. GE credit: ArtHum | ACGH, AH or SS, WE. - II. Olmsted

174DD. Selected Themes in 20th Century American History: Discussion (1)

Discussion - 1 hour. Prerequisite: course 174D concurrently. Intensive discussion of topics and readings for course 174D. May be repeated for credit. (P/NP grading only.)

175. American Intellectual History (4)

Lecture — 3 hours; term paper. Prerequisite: course 17B and upper division standing. Ideas that have shaped politics and society in the United States from colonial times to the present. Topics include American liberalism, republicanism, democracy, constitutionalism, communitarianism, utopianism, pragmatism, feminism, Darwinism, nationalism, conservatism, and economics. Offered in alternate years. GE credit: ArtHum, Wrt | ACGH, AH or SS, WE.—Rauchway

176A. Cultural and Social History of the United States (4)

Lecture-3 hours; term paper. Study of social and cultural forces in American society in the nineteenth century with emphasis on social structure, work and leisure, socialization and the family, social reform movements and changes in cultural values. GE credit: ArtHum | ACGH, AH or SS, WE.-II. Hartigan-O'Connor

176B. Cultural and Social History of the United States (4)

Lecture-3 hours; term paper. Study of social and cultural forces in American society in the twentieth century with emphasis on social structure, work and leisure, socialization and the family, social reform movements and changes in cultural values. GE credit: ArtHum | ACĞH, AH or SS, DD, WE.

177A. History of Black People and American Race Relations, 1450-1860 (4)

Lecture-3 hours; term paper. History of black people in the United States from the African background to Reconstruction. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.-C.E. Walker

177B. History of Black People and American Race Relations, 1860-Present (4)

Lecture - 3 hours; term paper. History of black people and race relations from 1860-present. Emphasis on Civil War, Reconstruction, Segregation, Age of Accommodation, black nationalism, urbanization, civil rights, and changing ideology of race relations GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.-Materson, C.E. Walker

178A. Race in America, 1492-1865 (4)

Lecture-4 hours. Prerequisite: course 17A or 17B or course 177A or 177B. Racial formation during the Age of Discovery, the Colonial Period, Early National and Antebellum periods up to the Civil War. Not open for credit to students who have completed course 178. Offered in alternate years. GE credit: ArtHum, Div, Wrt | ACGH, AH or SS, DD, WE.—I. C.E. Walker

178B. Race in America, 1865-Present (4)

Lecture—3 hours; term paper. Racial Formation in the Post Civil War. United States from 1860 to the present. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.-II. C.E. Walker

179. Asian American History, 1850-Present (4)

Lecture — 3 hours; term paper. Prerequisite: upper division standing recommended. The historical experience of people of Asian ancestry in the United States from the mid-nineteenth century to the present. Migration, labor, community formation, race relations, women and gender, popular culture. GE credit: SocSci, Div, Wrt | ACGH, AH or SS, DD,

180AN. American Political History, 1789-1896 (4)

Lecture—3 hours; term paper. Prerequisite: upper division standing. Growth of American politics from the birth of the republic to the end of the nineteenth century. Development of political parties, the expanding electorate, and how social issues such as slavery shaped the political process. Not open for credit to students who have completed course 180A. Offered in alternate years. GE credit: ArtHum, Wrt | ACGH, AH or SS, WE.

180BN. American Political History, 1896-present (4)

Lecture—3 hours; term paper. Prerequisite: course 17B. Politics in the United States from 1896 to the present. Topics include race and partisan politics; communism and anti-communism; the New Deal and the centralization of government; and the rise of the imperial presidency. Not open for credit to students who have completed course 180A or 180C. GE credit: ArtHum, Wrt | ACGH, AH or SS, WE

181. Religion in American History to 1890

Lecture-3 hours; term paper. Prerequisite: course 17A. American religious history from colonization through the Gilded Age. Topics include religious diversity in America; native American religion; Protestant evangelism; gender and religion; religion and bigotry; African American religion; religion in the Civil War; and religion's response to modernization. Offered in alternate years. GE credit: ArtHum, Wrt | ACGH, AH or SS, WE.—Smolenski

182. Gender and Justice in American History (4)

Lecture/discussion-3 hours; term paper. Prerequisite: upper-division standing recommended. Intersection of gender and law in North America from the colonial period through the 20th century. Topics include witchcraft, suffrage, child custody, protective labor laws, regulation of sexuality. Analysis of legal change, trials, and cultural influences. Offered in alternate years. GE credit: ACGH, AH or SS, DD, WE. - Hartigan-O'Connor

183A. The Frontier Experience: Trans-Mississippi West (4)

Lecture - 3 hours; written and/or oral reports. The fur trade, western exploration and transportation, the Oregon Country, the Greater Southwest and the Mexican War, the Mormons, mining discovery, and the West during the Civil War. GE credit: ArtHum, Div, Wrt | ACGH, AH or SS, WE.—Taylor, Warren

183B. The Frontier Experience: Trans-Mississippi West (4)

Lecture—3 hours; written and/or oral reports. Spread of the mining kingdom, the range cattle industry, Indian-military affairs, settlement of the Great Plains and Rocky Mountain Regions and political organization of the West. GE credit: ArtHum, Div, Wrt | ACGH, AH or SS, WE.—I. Warren

184. History of Sexuality in America (4)

Lecture - 3 hours; extensive writing. History of sexuality in America from pre-European through the late twentieth century. Topics include birth control, marriage, sexual violence, prostitution, inter-racial relationships, heterosexuality and homosexuality, the feminist, gay, and lesbian liberation movements, AIDS, commercialization of sexuality. Offered in alternate years. GE credit: ArtHum, Div, Wrt | ACGH, AH or SS, DD, WE. - Materson

185A. History of Science in America (4)

Lecture—3 hours; research paper. Survey of the European background. Study of American scientific institutions, ideas, personalities, creative processes in science, and of relationships between society and science from colonial times to present. GE credit: ArtHum, Wrt | AH or SS, WE

185B. History of Technology in America (4)

Lecture - 3 hours; research paper. Study of American technology, emphasizing biographical approach to historical understanding of technological change, creative processes, institutions, ideas, and relationships between technology and society from colonial times to present. GE credit: ArtHum, Wrt | AH or SS, WE.

188. America in the 1960s (4)

Lecture—3 hours; extensive writing or discussion—1 hour. Tumult and upheaval in American politics, culture, and society 1961-1969. Civil rights; Vietnam, the draft and the anti-war movement; rock and roll and the counterculture; modern feminism; modern conservatism; student movements; urban unrest and insurrection. Offered irregularly. GE credit: ACGH, DD, SS, WE. - Kelman, Rauchway

189. California History (4)

Lecture-3 hours; term paper. Prerequisite: upper division standing. California history from the pre-colonial period to the present including disposses sion of California's Indians, political economy of the Spanish and Mexican periods, Gold Rush effects, industrialization, Hollywood, water politics, World War II, Proposition 13, and the emergence of the Silicon Valley. Not open for credit to students who have completed two courses of course 189A, 189B, 189C. GE credit: ArtHum, Wrt | ACGH, AH or SS, DD, WE.-III. Tsu, Warren

190A. Middle Eastern History I: The Rise of Islam, 600-1000 (4)

Lecture — 3 hours; extensive writing. Middle Eastern history from the rise of Islam to the disintegration of the Abbasid Caliphate; the formative centuries of a civilization. Politics and religion, conquest and conversion, arts and sciences, Christians, Jews and Muslims, gender and sexuality, orthodoxy and heterodoxy. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC,

190B. Middle Eastern History II: The Age of the Crusades, 1001-1400 (4)

Lecture - 3 hours; extensive writing. Middle Eastern history during the age of the Crusades and Mongol invasions. The idea of holy war, the Crusades, the Mongols as the bearers of Chinese arts, nomads and sedentary life, feudalism, mysticism, slavery, women in the medieval Middle East. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—Tezcan

190C. Middle Eastern History III: The Ottomans, 1401-1730 (4)

Lecture — 3 hours; extensive writing. Middle Eastern history from the foundation of the Ottoman Empire on the borderlands of Byzantine Anatolia through its expansion into Europe, Asia, and Africa, creating a new cultural synthesis including the Arab, Greek Islamic, Mongol, Persian, Slavic, and Turkish traditions. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—Tezcan

190D. Middle Eastern History IV: Safavids Iran, 1300-1720 (4)

Lecture — 3 hours; term paper. Middle Eastern history focusing on Safavid Empire (present-day Iran, Iraq, Afghanistan, up to Georgia), beginning with the origins of the dynasty as a powerful religious family, to the establishment of the Empire, focusing on Social, Religious, Economic, and Political History. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.—Anooshahr

191A. Classical China (4)

Lecture — 3 hours; term paper. History of Chinese civilization from its origins through the establishment of city states and the flowering of classical philosophy, to the rise and fall of the First Empire. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.

191B. High Imperial China (4)

Lecture — 3 hours; term paper. Political disunion and the influx of Buddhism; reunification under the great dynasties of T'ang, Sung, and Ming with analysis of society, culture and thought. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.-I. Bossler

191C. Late Imperial China (4)

Lecture - 2 hours; discussion - 1 hour; two long papers. Prerequisite: course 9A or upper division standing. Patterns and problems of Chinese life traced through the Ming and Ch'ing dynasties (c. 1500–1800), prior to the confrontation with the West in the Öpium War. Readings include primary sources and novels portraying elite ethos as well as popular culture. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.

191D. Nineteenth Century China: The **Empire Confronts the West (4)**

Lecture - 2 hours; discussion - 1 hour; term paper. Prerequisite: course 9A, or upper division standing. The decline and fall of the Chinese Empire, with particular attention to the social and political crises of the 19th century, and the response of government officials, intellectuals, and ordinary people to the increasing pressures of Western imperialism. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE. -

191E. The Chinese Revolution (4)

Lecture - 2 hours; discussion - 1 hour; extensive writing. Prerequisite: upper division standing. Analysis of China's cultural and political transformation from Confucian empire into Communist state. Emphasis on emergence and triumph of peasant revolutionary strategy (to 1949), with some attention to its implications for post-revolutionary culture and politics. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.—II.

191F. History of the People's Republic of China (4)

Lecture - 2 hours; discussion - 1 hour; extensive writing. Prerequisite: upper division standing. Comprehensive analysis of recent Chinese history, including land reform, the Cultural Revolution, the post-Mao era, and the consequences of the new economic policies of the 1980s. Not open for credit to students who have completed course 190C. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.-III.

192. Internship in History (1-12)

Prerequisite: enrollment dependent on availability of intern positions, with priority to History majors. Supervised internship and study as historian, archivist, curator, or in another history-related capacity, in an approved organization or institution. (P/NP grading only.)

193A. History of the Modern Middle East, 1750-1914 (4)

Lecture—3 hours; term paper. Prerequisite: course 6 recommended. Transformation of state and society within the Middle East from 1750 to 1914 under pressure of the changing world economy and European imperialism. Themes include colonialism, Orientalism, Arab intellectual renaissance, Islamic reform, state-formation, role of subaltern groups. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, VL, WC, WE.—El

193B. History of the Modern Middle East from 1914 (4)

Lecture—3 hours; term paper. Prerequisite: course 6 recommended. The Middle East from the turn of the 20th century to the present. Themes include the legacy of imperialism, cultural renaissance, the World Wars, nationalism, Palestine/Israel, Islamic revival, gender, revolutionary movements, politics of oil and war, cultural modernism, exile and diaspora. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, VL, WC, WE.-II. El Shakry

193C. Environment and Development in the Middle East (4)

Lecture/discussion-3 hours; project. Prerequisite: upper division standing recommended. Examines Middle East environment and human use of nature over last 10,000 years. Discussion of colonial and contemporary environment and development planning and politics. Case studies include Egypt, the Maghreb, Palestine/Israel on rivers, desertification, national parks indigenous knowledge, etc. GE credit: ArtHum or SocSci | AH, SS.—Davis

193D. History of Modern Iran, From 1850 to Present (4)

Lecture—3 hours; term paper. Prerequisite: course 6 recommended. Modern Iran from the mid 19th century to the present. Themes include the legacy of imperialism, cultural renaissance, the World Wars, nationalism, modernization, Islamic revival, gender, revolutionary movements, politics of oil and war Offered in alternate years. GE credit: SocSci, Div, Wrt | AH or SS, VL, WC, WE.—Anooshahr

194A. Aristocratic and Feudal Japan (4)

Lecture—3 hours; term paper and/or discussion. Broad survey of the cultural, social, religious, and political aspects of Japanese history from mythological times through the sixteenth century emphasizing comparison of the organizations, values, and beliefs associated with the aristocratic and feudal periods. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.

194B. Early Modern Japan (4)

Lecture—3 hours; term paper and/or discussion. Survey of the cultural, social, economic, and political aspects of Japanese history from the seventeenth through the nineteenth centuries emphasizing the development of those patterns of thought and political organization with which Japan met the challenge of the nineteenth-century Western expansionism. GE credit: ArtHum, Div | AH or SS, WC, WE.—Kim

194C. Modern Japan (4)

Lecture—3 hours; term paper and/or discussion. Survey of the cultural, social, economic, and political aspects of Japanese history in the twentieth century emphasizing labor and social movements, militarism and the Pacific war, and the emergence of Japan as a major economic power. GE credit: ArtHum, Div | AH or SS, WC, WE.—I. Kim

194D. Business and Labor in Modern Japan (4)

Lecture—3 hours; term paper. Survey of labor and management relations in Japan from the mid-eighteenth century to the present. Offered in alternate years. GE credit: ArtHum | AH or SS, WC, WE.

194E. Education and Technology in Modern

Lecture—3 hours; term papers. Survey of education and technology in Japan from the mid-eighteenth century to the present. Offered in alternate years. GE credit: ArtHum | AH or SS, WC, WE.

195B. History of Modern Korea (4)

Lecture—3 hours; laboratory/discussion—1 hour. Prerequisite: upper division standing. History of Modern Korea, from Yi dynasty period to 1990s. Political and socioeconomic changes in 19th century, modernization under Japanese colonialism, postwar economic growth and effects of the Cold War. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.—I. Kim

196A. Medieval India (4)

Lecture - 3 hours; discussion - 1 hour; written reports. Survey of history of India in the millennium preceding arrival of British in the eighteenth century, focusing on interaction of the civilizations of Hindu-ism and Islam and on the changing nature of the state. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.-II. Sen

196B. Modern India (4)

Lecture — 3 hours; discussion — 1 hour; written reports. Survey of cultural, social, economic, and political aspects of South Asian history from arrival of the British in the eighteenth century to formation of new independent states-India, Bangladesh, and Pakistan—in the twentieth century. GE credit: Soc-Sci, Div, Wrt | AH or SS, WC, WE.—III. Sen

197T. Tutoring in History (2)

Discussion-1 hour; laboratory-3 hours. Prerequisite: enrolled as a History major with senior standing and consent of department chairperson. Tutoring of students in lower division courses. Weekly meeting with instructors in charge of courses. Written reports on methods and materials required. May be repeated one time for credit. No final examination. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor; upper division standing. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

201A-N, P-Q, S-T, W, X. Sources and General Literature of History (4)

Seminar-3 hours; term paper. Prerequisite: consent on instructor. Designed primarily for students preparing for higher degrees in history. (A) Ancient; (B) Medieval; (C) Renaissance and Reformation; (D) Early Modern Europe; (E) Europe since 1815; (F) China to 1880; (G) China since 1880; (H) Britain; (I) Latin America since 1810; (J) American History to 1787; (K) United States, 1787-1896 (L) United States since 1896; (M) Middle East; (N) Modern States since 1895; (N) Middle Edst; (N) Modern Japan; (P) African Historiography; (Q) Cross-Cultural Women's History; (S) History of Science and Medicine; (T) Jewish History; (W) Sources and General Literature of History; (X) World History. May be repeated for credit when different subject area is repeated for credit when different subject area is studied.

202A-I. Major Issues in Historical Interpretation (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing. Fundamental issues and debates in the study of history. (A) Ancient; (B) Medieval Europe; (C) Modern Europe; (D) India; (E) Africa; (F) China; (G) Japan; (H) United States; (I) Latin America. Readings, papers, and class reports. May be repeated for credit when a different subject area is studied. - I, II, III. (I, II, III.)

203A. Research Seminar (4)

Seminar — 3 hours; tutorial — 1 hour. Designed for students preparing for higher degrees in history. Individual research and analysis resulting in substantial research paper of publishable quality. Completion required of all Ph.D. candidates. The three courses must be taken in continuous sequence, ordinarily during second year. - I. (I.)

203B-203C. Research Seminar (4-4)

Seminar - 3 hours; tutorial - 1 hour. Prerequisite: course 203A. Designed for students preparing for higher degrees in history. Individual research and analysis resulting in substantial research paper of publishable quality. Completion required of all Ph.D. candidates. The three courses must be taken in continuous sequence, ordinarily during second year (Deferred grading only, pending completion of sequence.)—II, III. (II, III.)

204. Historiography (4)

Seminar-3 hours; term paper. Major issues in the philosophy and methodology of history.—I. (I.)

221. Medieval History (4)

Seminar-3 hours. Prerequisite: courses 121A, 121B, 121C recommended. Topics in the history of medieval and early Renaissance Europe

245. Modern European History (4)

Seminar-3 hours. Prerequisite: course 201E. Primary sources and research methodologies in the history of modern France and Germany. May be repeated one time for credit.—III. (III.)

261. Latin American History (4)

Seminar—3 hours. Prerequisite: two courses in Latin American history; reading knowledge of Spanish or Portuguese.—I, II, III. (I, II, III.)

271A-271B. United States History (4-4)

Seminar-3 hours; term paper. Prerequisite: course 201J-L or 202H. Research in literature, methods, and sources on aspects of United States history, culminating in each student completing a research paper in the field by the end of the second quarter. May be repeated for credit. (Deferred grading only, pending completion of sequence.)

291A. Chinese History (4)

Seminar - 3 hours; term paper. Prerequisite: consent of instructor. Research on topics to be chosen by the students for the purpose of writing article-length papers. May be repeated for credit. (Deferred grading only, pending completion of sequence.)—Bossler

291B. Chinese History (4)

Seminar — 3 hours; term paper. Prerequisite: consent of instructor. Completion of article-length papers on topics chosen by students. May be repeated for credit. (Deferred grading only, pending completion of sequence.) - Bossler

291C. Methods and Issues in Chinese History (4)

Seminar — 2 hours; tutorial — 1 hour. Prerequisite: reading knowledge of Chinese; consent of instructor. Readings in Chinese historical materials. Training in the use of Chinese reference works (including on-line resources). May be repeated for credit. -1. (1.)

292. College Teaching Internship (4)

Internship—4 hours. Prerequisite: course 300 (may be taken concurrently). Student prepares and teaches one lower division history course in a nearby community college under the supervision of a UC Davis instructor and a community college instructor. (S/U grading only.)

298. Group Study (1-5) 299. Research (1-12)

(S/U grading only.)

299D. Individual Study (1-12)

(S/U grading only.)

Professional Courses

389. Introductory Seminar for Teaching Assistants (1)

Seminar - 1 hour. Prerequisite: must be enrolled in course 390. An introduction to the broad comparative and theoretical issues of teaching methods and techniques in history. (S/U grading only.)—I. (I.)

390. Teaching History in College (2)

Discussion-2 hours. Designed for teaching assistants with emphasis on problems and procedures encountered by teachers of lower division classes at the university. (S/U grading only.)

History and Philosophy of Science

(College of Letters and Science) Joseph Dumit, Ph.D., Program Director

Program Office. 1240 Social Sciences and Humanities Building (530) 752-0703

Committee in Charge

Thomas Beamish, Ph.D. (Sociology) Mario Biagioli, Ph.D. (Science and Technology Studies, School of Law) Patrick Carroll, Ph.D. (Sociology) Timothy Choy, Ph.D. (Anthropology, Science and Technology Studies) Marisol de la Cadena, Ph.D. (Anthropology)
Joseph Dumit, Ph.D. (Anthropology, Science and Technology Studies) James Griesemer, Ph.D. (Philosophy) Caren Kaplan, Ph.D. (American Studies) Colin Milburn, Ph.D. (English) Roberta Millstein, Ph.D. (Philosophy) Daniel Stolzenberg, Ph.D. (History) Madhavi Sunder, J.D. (School of Law)

Minor Program Requirements:

The interdisciplinary minor in the history and philosophy of science invites students to examine historical and contemporary problems in a variety of scientific disciplines, and to explore concepts and procedures basic to science and how they have evolved. The

minor is sponsored by the Program in Science and Technology Studies.

History and Philosophy of Science 24

Philosophy 30..... Five courses from those listed below. One course must be from each of three areas: (a) history, (b) philosophy, and (c) science and technology studies..... (a) History 102, 135A, 135B, 136, 139A, . 139B, 185A, 185B, 188A, 188B; (b) Philosophy 106, 107, 108, 109, 110, (c) Science and Technology Studies 20, 130A, 130B, 131, 150, 180.

Minor Adviser. P. Carroll in 2272 Social Sciences and Humanities Building (530) 752-5388.

Honors Challenge

Lolita Nelson-Adkins, Program Manager

Program Office. 1350 Surge III (530) 752-9797; http://www.dhc.ucdavis.edu

The Program of Study

The Davis Honors Challenge (DHC) is a program for highly motivated students interested in enhancing their education through special courses, closer contact with faculty, and dynamic interaction with academic peers. Interested students apply in the spring quarter for places the following year

First-year students participating in the DHC take one honors course, one orientation seminar and one DHC freshman seminar. Second-year students take one problem oriented interdisciplinary seminar and have the option to substitute an honor's contract or a DHC Freshman Seminar for an honors course. Thirdyear students complete one honors contract and participate in a two-quarter sequence seminar. Fourth year students participate in a year-long team project. Transfer students complete an acclimation seminar and two honors contracts during their first year in the program. They are also required to meet with an honors counselor to help determine their program pathway. All students who successfully complete the program receive transcript notation for each year of

Lower division departmental Honors courses, special DHC sections of regular courses, DHC seminars, and special studies opportunities constitute the course offerings of the Davis Honors Challenge. A complete list of these courses, with course registration num bers, is made available to admitted students through the Davis Honors Challenge office.

Lower division seminars are offered each year during winter and spring quarters. The seminars are designed to foster critical thinking and analytic interpretation, improve oral and written and technical communication skills, enhance research skills, and provide experience with group dynamics and collab-orative exploration of problems. Enrollment in each seminar is limited to 20 students. Updated program information is available at our website.

Students not admitted to the program may not register for Davis Honors Challenge sections, seminars, or special study opportunities.

Courses in Davis Honors Challenge (HNR)

Lower Division Courses 90X. Honors Discussion Section (1)

Discussion-1 hour. Prerequisite: open only to students in the Davis Honors Challenge. Examination of special topics in selected lower division courses through additional readings, discussions, term papers, collaborative work, or special activities, including projects, field and laboratory experiences, computer simulations, creative works. May be repeated for credit.

92. Internship (1-12)

Internship—3-36 hours. Prerequisite: open only to students in the Davis Honors Challenge. Supervised work experience under the auspices of the Davis Honors Challenge. May be repeated for credit for a total of 12 units. (P/NP grading only.)

94. Honors Seminar (4)

Seminar-4 hours. Prerequisite: open only to students in the Davis Honors Challenge. Collaborative, multidisciplinary exploration of complex contemporary problem. Focus on critical thinking and analytical interpretation, on oral and written communication, and on the use of electronic media in gathering information. May be repeated for credit. GE credit: Wrt.

98. Directed Group Study (1-5)

Discussion - 1-5 hours. Prerequisite: open only to students in the Davis Honors Challenge. May be repeated for credit. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) Independent study—1-5 hours. Prerequisite: student in the Davis Honors Challenge. (P/NP grading only.)

Upper Division Courses 190X. Honors Contract (1)

Independent study or discussion—3 hours. Prerequisite: open only to students in the Davis Honors Challenge. In-depth examination of material in an upper division course as defined in an Honors Contract Proposal submitted by the student. Contract must be approved by the instructor and the Honors Council of the Academic Senate. May be repeated for credit.

192. Internship (1-12)

Internship—3-36 hours. Prerequisite: open only to students in the Davis Honors Challenge. Supervised work experience under the auspices of the Davis Honors Challenge. May be repeated for credit for a total of 12 units. (P/NP grading only.)

194. Honors Seminar (3)

Seminar-3 hours. Open only to students in the Davis Honors Challenge. Team-based work on actual problems drawn from the public or private sector. Focus on critical thinking and analytical interpretation, oral and written communication skills, and development of practical solutions to real-world problems. GE credit: Wrt.-II, III. (II, III.)

195. Honors Thesis/Honors Project (1-3)

Independent Study—3-9 hours. Prerequisite: Open only to students in the Davis Honors Challenge. Guided independent study of a selected topic leading to the presentation of an honors thesis/honors project. May be repeated for credit up to 9 units.

198. Directed Group Study (1-5)

Discussion — 1-5 hours. Prerequisite: open only to students in the Davis Honors Challenge. May be repeated for credit. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Independent study - 1-5 hours. Prerequisite: open only to students in the Davis Honors Challenge. May be repeated for credit. (P/NP grading only.)

Horticulture and Agronomy (A Graduate Group)

M. Andrew Walker, Ph.D., Chairperson of the Group

Group Office. 1224 Plant and Environmental Sciences Building (530) 752-7738; http://ggha.ucdavis.edu

Faculty

Douglas O. Adams, Ph.D., Professor (Viticulture and Enology)

Kassim Al-Khatib, Ph.D., Professor (Plant Sciences)

Diane M. Beckles, Ph.D., Associate Professor (Plant Sciences)

Alan B. Bennett, Ph.D., Professor (Plant Sciences) Alison M. Berry, Ph.D., Professor (Plant Sciences) Arnold J. Bloom, Ph.D., Professor (Plant Sciences) Eduardo Blumwald, Ph.D., Professor (Plant Sciences) Kent J. Bradford, Ph.D., Professor (Plant Sciences) Patrick H. Brown, Ph.D., Professor (Plant Sciences)
David W. Burger, Ph.D., Professor (Plant Sciences) Abhaya M. Dandekar, Ph.D., Professor (Plant Sciences)

Theodore M. DeJong, Ph.D., Professor

(Plant Sciences)
Jorge Dubcovsky, Ph.D., Professor (Plant Sciences)
Jan Dvorak, Ph.D., Professor (Plant Sciences)
Valerie T. Eviner, Ph.D., Associate Professor (Plant Sciences)

Albert J. Fischer, Ph.D., Associate Professor

(Plant Sciences)
Paul L. Gepts, Ph.D., Professor (Plant Sciences) Thomas M. Gradziel, Ph.D., Professor

(Plant Sciences)
William Horwath, Ph.D., Professor
(Land, Air and Water Resources)

Kentaro Inoue, Ph.D., Associate Professor (Plant Sciences)
Louise E. Jackson, Ph.D., Professor

(Land, Air and Water Resources)

Marie A. Jasieniuk, Ph.D., Associate Professor (Plant Sciences)

Judy Jernstedt, Ph.D., Professor (Plant Sciences) John M. Labavitch, Ph.D., Professor (Plant Sciences) Emilio A. Laca, Ph.D., Professor (Plant Sciences) J. Heinrich Lieth, Ph.D., Professor (Plant Sciences) Mark A. Matthews, Ph.D., Professor

(Viticulture and Enology)
Richard W. Michelmore, Ph.D., Professor (Plant Sciences)

David B. Neale, Ph.D., Professor (Plant Sciences) Michael P. Parrella, Ph.D., Professor (Entomology) Richard E. Plant, Ph.D., Professor (Plant Sciences) Vito S. Polito, Ph.D., Professor (Plant Sciences)
Daniel Potter, Ph.D., Professor (Plant Sciences)
Michael S. Reid, Ph.D., Professor (Plant Sciences)
Jeffrey S. Ross-lbarra, Ph.D., Associate Professor (Plant Sciences)

Kate M. Scow, Ph.D., Professor (Land, Air and Water Resources) Kenneth A. Shackel, Ph.D., Professor (*Plant Sciences*) Johan W. Six, Ph.D., Professor (*Plant Sciences*) David R. Smart, Ph.D., Associate Professor (Viticulture and Enology)

Dina St. Clair, Ph.D., Professor (Plant Sciences) Larry R. Teuber, Ph.D., Professor (Plant Sciences) Li Tian, Ph.D., Assistant Professor (Plant Sciences) Chris van Kessel, Ph.D., Professor (Plant Sciences) M. Andrew Walker, Ph.D., Professor

(Viticulture and Enology) Larry E. Williams, Ph.D., Professor (Viticulture and Enology)

John I. Yoder, Ph.D., Professor (Plant Sciences) Florence Zakharov, Ph.D., Assistant Professor (Plant Sciences)

Affiliated Faculty

Kendra Baumgartner, Ph.D., Lecturer and Research Plant Pathologist (Plant Pathology)

Marita Cantwell, Ph.D., Lecturer and Specialist in Cooperative Extension (Plant Sciences) Roger T. Chetelat, Ph.D., Lecturer and Agronomist

(Plant Sciences) Carlos H. Crisosto, Ph.D., Lecturer and Specialist in Cooperative Extension (*Plant Sciences*)

Joseph M. DiTomaso, Ph.D., Lecturer and Specialist in Cooperative Extension (Plant Sciences) Richard Y. Evans, Ph.D., Lecturer and Specialist in

Cooperative Extension (Plant Sciences)
Steven A. Fennimore, Ph.D., Lecturer and Specialist in Cooperative Extension (Plant Sciences) Louise Ferguson, Ph.D., Lecturer and Specialist in

Cooperative Extension (Plant Sciences)
Matthew W. Fidelibus, Ph.D., Associate Specialist in
Cooperative Extension (Viticulture & Enology)
W. Douglas Gubler, Ph.D., Lecturer and Extension

Plant Pathologist (Plant Pathology)

Bradley D. Hanson, Ph.D., Lecturer and Assistant Specialist in Cooperative Extension (Plant Sciences)

Timothy K. Hartz, Ph.D., Lecturer and Specialist in Cooperative Extension (Plant Sciences) James E. Hill, Ph.D., Lecturer and Specialist in Cooperative Extension (Plant Sciences)

Scott Johnson, Ph.D., Lecturer and Specialist in Cooperative Extension (Plant Sciences)

Stephen R. Kaffka, Ph.D., Lecturer and Specialist in Cooperative Extension (Plant Sciences)
Bruce D. Lampinen, Ph.D., Lecturer and Associate

Specialist in Cooperative Extension (Plant Sciences

W. Thomas Lanini, Ph.D., Lecturer and Specialist in Cooperative Extension (Plant Sciences)
Andrew J. McElrone, Ph.D., Assistant Adjunct

Professor (Viticulture and Enology)

Elizabeth J. Mitcham, Ph.D., Lecturer and Specialist in Cooperative Extension (*Plant Sciences*)

Jeffrey P. Mitchell, Ph.D., Lecturer and Specialist in Cooperative Extension (Plant Sciences)

Lorence R. Oki, Ph.D., Lecturer and Associate Specialist in Cooperative Extension (Plant

Dan E. Parfitt, Ph.D., Lecturer and Pomologist (Plant Sciences)

Stuart Pettygrove, Ph.D., Soils Specialist (Land, Air and Water Resources)

Daniel H. Putnam, Ph.D., Lecturer and Specialist in Cooperative Extension (Plant Sciences)

Kerri L. Steenwerth, Ph.D., Assistant Adjunct Professor (Viticulture and Enology)

Trevor V. Suslow, Ph.D., Lecturer and Specialist in Cooperative Extension (Plant Sciences) Kenneth W. Tate, Ph.D., Lecturer and Rangeland Specialist (Plant Sciences)

Allen E. Van Deynze, Ph.D., Lecturer and Biotechnology Specialist (Plant Sciences) Mark Van Horn, M.S., Lecturer (Plant Sciences) James A. Wolpert, Ph.D., Cooperative Extension Specialist (Viticulture and Enology)

Graduate Study. The Graduate Group in Horticulture and Agronomy offers programs of study leading to the M.S. and Ph.D. degrees for students interested in the science and management of agricultural crops, including their ecology, physiology, genetics, and post-harvest management, as well as the interaction of agricultural crops with the environment. These programs are designed to focus on a cropping system, such as agronomy, environmental horticulture, pomology, vegetable crops, viticulture and weed science. Within that cropping system, the student can specialize in one of a number of areas, including agroecology, biotechnology, breeding and crop improvement, crop physiology, crop production, floriculture, landscape horticulture, mineral nutrition, modeling, nursery production, pest management, plant growth and development, postharvest physiology, revegetation/restoration, and water relations. Research may be conducted within these areas with an applied or basic focus, but in association with a cropping system.

Preparation. For both the M.S. and Ph.D. programs, a level of competence equivalent to that of a sound undergraduate program in Plant Science is required. This includes coursework in general biology, chemistry, organic chemistry, physics, statistics, genetics, plant physiology, and soil science. A few limited deficiencies in any of these areas can be made up after admission to the graduate program. Specific requirements are outlined in detail on the group's website. The graduate adviser, the major professor, and the student will design a program of advanced courses to meet individual academic needs within one of the specializations

Graduate Advisers. Consult the Group office.

Courses in Horticulture (HRT) Graduate Courses

203. Research Perspectives in Horticulture

Lecture - 1 hour; lecture/discussion - 2 hours. Prerequisite: Plant Biology 111 and 112, or Environmental Horticulture 102 or the equivalent. Following lectures/discussions of scientific methodology, students develop research proposals aided by classroom discussions and individual interactions with instructors. Lectures and critiques of "classical papers" provide a sense of the evolution of the current concepts in perennial plant biology. Offered in alternate years.—II. (II.) DeJong, van Kessel

251. Modeling Horticultural Systems (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Plant Sciences 142, calculus, or consent of instructor. Development and application of models. Emphasis on physiological and ecological models, with examples from areas of interest to class participants. Applications to horticultural systems.—II. (II.) Lieth

290. Seminar (1)

Seminar – 1 hour. Prerequisite: graduate standing at UCD. Seminars presented by invited speakers, students, or faculty on selected topics in horticulture. (S/U grading only.)-III. (III.)

298. Group Study (1-5)

Human Anatomy

See Courses in Cell Biology and Human Anatomy (CHA), on page 394.

Human and **Community** Development

(College of Agricultural and Environmental Sciences) Patsy Eubanks Owens, Ph.D., Chairperson of the Department

Frank Hirtz, Ph.D., Vice-Chair of the Community and Regional Development Program

Zhe Chen, Ph.D., Vice-Chair of the Human Development and Family Studies Program

Department Advising Office. 1303 Hart Hall (530) 752-2244, 752-1805; http://hcd.ucdavis.edu

Faculty—Community and Regional Development

Christopher Benner, Ph.D., Associate Professor Ryan Galt, Ph.D., Assistant Professor Luis E. Guarnizo, Ph.D., Professor Frank Hirtz, Ph.D., Sr. Lecturer SOE Martin F. Kenney, Ph.D., Professor William Lacy, Ph.D., Professor Jonathan London, Ph.D., Assistant Professor Thomas Tomich, Ph.D., Professor

Emeriti Faculty

Stephen Brush, Ph.D. Professor Emeritus Isao Fujimoto, Ph.D., Lecturer SOE Emeritus James I. Grieshop, Ph.D., Specialist in Cooperative Extension Emeritus

Michael P. Smith, Ph.D., Distinguished Professor, Emeritus

Miriam Wells, Ph.D., Professor Emerita Alvin D. Sokolow, Ph.D., Specialist in Cooperative **Extension Emeritus**

Janet Momsen, Ph.D. Professor Emerita Distinguished Graduate Mentoring Award Joan Wright, Ph.D., Specialist in Cooperative Extension Emerita

Affiliated Faculty

David Campbell, Ph.D., Specialist in Extension Laurie Lippin, Ph.D., Continuing Appointment Lecturer

Bernadette Tarallo, Ph.D., Continuing Appointment Lecturer

Robert Wiener, Ph.D., Continuing Appointment Lecturer

Faculty—Human Development and Family Studies

Jay Belsky, Ph.D., Professor (Human and Community Development) Zhe Chen, Ph.D., Professor Katherine Conger, Ph.D., Associate Professor Rand Conger, Ph.D., Professor Amanda Guyer, Ph.D., Assistant Professor Lawrence V. Harper, Ph.D., Professor Lisa Miller, Ph.D., Associate Professor Adrienne Nishina, Ph.D., Assistant Professor Beth A. Ober, Ph.D., Professor

Emeriti Faculty

Keith Barton, Ph.D., Professor Emeritus Brenda Bryant, Ph.D., Professor Emerita Richard Ponzio, Ph.D., Extension Specialist Emeritus Emmy E. Werner, Ph.D., Extension Specialist Emerita

Affiliated Faculty

Jennifer Gonzales, Child Development
Demonstration Lecturer
Julia Luckenbill, Child Development Demonstration
Lecturer
Lenna Ontai Ph.D., Associate Specialist in
Cooperative Extension
Kelly Twibell, Child Development Demonstration

Major Programs. See Community and Regional Development, on page 203 and Human Development, on page 342.

Human Development

(College of Agricultural and Environmental Sciences)

Faculty. See Department of Human and Community
Development, on page 341.

The Major Program

Human development explores the developmental process in humans throughout the life cycle. Biological, cognitive, and personality/sociocultural aspects of development are studied.

The Program. Human development majors complete a group of preparatory courses in anthropology, general biology, genetics, history, philosophy, physiology, psychology, and statistics. Upper division students can design their programs in consultation with a faculty member to emphasize a particular interest. For instance, students can study the cognitive, social, and biological aspects of human development while emphasizing child or adult development.

Internships and Career Alternatives. At least one practicum course is required. A second practicum or supervised internship can be used to fulfill the restricted elective requirement for the major. In addition, students can intern in schools, early childhood education or senior centers, hospitals, rehabilitation centers, probation offices, group foster homes, mental health clinics, or as tutors for handicapped or bilingual students. Human development graduates fill a wide variety of positions in preschools, elementary and special educational settings, programs designed for parents, families, and the elderly, as well as governmental jobs related to social services for people of all ages. Students who emphasize biological aspects of human development can apply to medical school or pursue training for positions in the

health sciences. Human development prepares students to pursue advanced degrees in behavioral and social sciences, education, social work, family law, or health sciences.

Preparatory Requirements. UC Davis students who wish to change their major to Human Development must complete the following courses with a combined grade point average of at least 2.500. All of the following courses must be taken for a letter grade:

Psychology 1
Statistics 10 or 13 or Psychology 41 or Sociology 46A and 46B
One course from Anthropology 1, 2 or 15
One course from Biological Sciences 2A, 10, 101; Microbiology 10; Molecular and Cellular Biology 10; or Ne

B.S. Major Requirements:

Preparatory Subject Matter38
Two courses from: Anthropology 1, 2, or
15 8-9
One course from: Biological Sciences 2A,
10, Microbiology 10, or Neurobiology,
Physiology, and Behavior 12 3-4
One course from: Molecular and Cellular
Biology 10 or Biological Sciences 101† 4
One course from: History 17A, 17B, 72A,
72B, or Political Science 1
Two courses from Philosophy 5, 30, 31,
32, or 38
One course from: Neurobiology, Physiology,
and Behavior 10, 101, or Psychology
1014-5
Psychology 1
One course from: Psychology 41 or
Sociology 46A and 46B, or Statistics 10
or 13

At least one of the courses from the Depth Subject groups listed below must focus on childhood/adolescence (101, 102, 103, 110, 130, 132) and one on adulthood/aging (117, 143, 160, 161, 162, 163).

Restricted Electives 19-20

Five additional upper division courses chosen from among Human Development courses or from a list of restricted electives in consultation with faculty adviser. May include only one practicum course.

English Composition Requirement 4

Total Units for the Major......93-105

† Biological Sciences 101 cannot be used to satisfy both the Preparatory Subject Matter and the Depth Subject Matter Requirements.

Major Adviser. Zhe Chen

Minor Program Requirements:

The Department of Human and Community Development offers two minors.

UNITS

Minor Adviser. L. Miller, B. Ober

UNITS

Minor Adviser. K. Conger

UNITS

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Graduate Study. Graduate study is available through a Master of Science degree in child development, and a Ph.D. degree in human development. See also Graduate Studies. on page 111.

Courses in Human Development (HDE)

Questions pertaining to the following courses should be directed to the instructor or to the Human and Community Development Advising office in 1303 Hart Hall (530) 752-2244.

Lower Division Courses 12. Human Sexuality (3)

Lecture—3 hours. Vocabulary, structure/function of reproductive system; sexual response; pre-natal development; pregnancy and childbirth; development of sexuality; rape and sexual assault; birth control; sexually transmitted diseases; homosexuality; establishing/maintaining intimacy; sexual dysfunctions; communication; enhancing sexual interaction, cultural differences in attitudes towards sexuality. GE credit: Div | ACGH, DD, SS.—I, III. (I, II, III.)

92. Internship (1-12)

Internship—3-36 hours. Prerequisite: field work experience or at least one course (e.g., course 100A, 100B, 140 or 140L) related to fieldwork assignment; consent of instructor. Supervised internship, off campus and on campus, in community and institutional setting. May be repeated for credit for a total of 12 units or if involves progressively greater (supervised) participation in program delivery or assessment. (P/NP grading only.)—I, II, III. (I, II, III.)

98. Directed Group Study for Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) (P/NP grading only.)

100A. Infancy and Early Childhood (4)

Lecture—4 hours. Prerequisite: Psychology 1, Biological Sciences 1A, or 2A, or 10. Biological, social, and cultural influences in the psychological growth and development of children, prenatal through age six. Two observations of preschool children required.—I, II. (I, II.) Chen, Harper, Kraft

100B. Middle Childhood and Adolescence (4)

Lecture—4 hours. Prerequisite: course 100A, 120, or the equivalent; introductory biology. Interplay of biological and social-cultural factors in the emotional, cognitive and social development from middle childhood through adolescence.—II, III. (II, III.) Guevr. Nishina

100C. Adulthood and Aging (4)

Lecture—4 hours. Prerequisite: Psychology 1 or 15. Development during early, middle, and late adulthood; biological, cognitive, and psycho-social aspects of adult development. Emphasis on normative patterns of development which characterize "successful aging."—I, III. Miller, Ober

101. Cognitive Development (4)

Lecture — 3 hours: term paper. Prerequisite: course 100A or 100B or Psychology 140. Pass 1 restricted to Human Development or Psychology majors. Theories, methods, evidence, and debates in the field of cognitive development, such as nature/nurture, constraints on learning, and the role of plasticity. Topics include attention, memory, concepts about the physical and social world, and language. (Same course as Psychology 141.) GE credit: Wrt | WE.—I, II, III. (I, II, III.) Chen, Gibbs, Goodman, Graf Estes, Lagattuta, Rivera

102. Social and Personality Development (4)

Lecture—3 hours; term paper. Prerequisite: course 100A or 100B or Psychology 140. Pass 1 open to Human Development or Psychology majors. Social and personality development of children, infancy through adolescence. Topics include the development of personality, achievement motivation, selfunderstanding, sex-role identity, and antisocial behavior. Emphasis on the interface between biological and social factors. (Same course as Psychology 142.) GE credit: SocSci, Wrt | SS, WE. – Í, II, III. (Í, II, III.) Belsky, Gibbs, Hastings, Thompson

103. Cross-Cultural Study of Children (4)

Lecture - 4 hours. Prerequisite: course 100A or consent of instructor. Cross-cultural studies of children in developing countries and among minority groups in the U.S. GE credit: Div | ACGH, DD, SS, WC.—I.

110. Contemporary American Family (4)

Lecture — 4 hours. Prerequisite: introductory psychology. Factors currently influencing American families including changing economic conditions, changing sex roles, divorce, and parenthood; theories and research on family interaction. - II. (II, III.) K. Conger

117. Longevity (4)

Lecture - 3 hours; term paper. Prerequisite: upper division standing or consent of instructor. Nature, origin, determinants, and limits of longevity with particular reference to humans; emphasis on implications of findings from non-human model systems including natural history, ecology and evolution of life span; description of basic demographic techniques including life table methods. (Same course as Entomology 117.) GE credit: SciEng, Wrt | SE, SL, WE.—I. (II.) Carey

120. Research Methods in Human Development (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Statistics 13 or Education 114 or Psychology 41 or Sociology 46A & B. Scientific process, research designs, and experimental controls; APA manuscript style and scientific writing; statistical analysis and interpretation of results. Laboratory exercises to collect data, analyze and interpret results, and write scientific papers. GE credit: SocSci, Wrt | SS, WE.-I, III. (I, III.) Nishina

121. Psychological Assessment (4)

Lecture - 4 hours. Prerequisite: courses 100A-100B; elementary statistics. Current issues and methodology related to the process of psychological assessment with children

130. Emotionally Disturbed Children (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: courses 100A and 100B or consent of instructor. Discussion of psychosis, neurosis, behavior disorders, and learning difficulties in children.

132. Individual Differences in Cognition (4)

Lecture - 4 hours. Individual differences in cognition, including learning disabilities and giftedness. Education implications and neurodevelopmental substrates of individual differences in cognition.

140. Communication and Interaction with Young Children (2)

Lecture - 2 hours. Prerequisite: course 100A; concurrent enrollment in course 140L required; consent of instructor. Integration of research, theory and practice in child development, emphasizing the role of relationships in creating a growth-promoting environment for young children. Includes: peer relationships, emotional understanding and self regulation, attachment, communication and school readiness. To enroll, students must sign up for laboratory time at the Child and Family Studies Center located at 244 First Street, Davis, CA.-I, II, III. (I, II, III.) Chen

140L. Laboratory in Early Childhood (3-5)

Laboratory-6-15 hours; laboratory/discussion-3 hours. Prerequisite: course 140, must be taken concurrently for first 3 units of credit; students must contact the Center for Child and Family Studies to enroll. Application of theories of learning and development to interaction with infants, toddlers, and preschoolers at Early Childhood Laboratory. Applied skills in communication, guidance and curriculum. Limited enrollment. May be repeated two times for credit. (P/NP grading only.)—I, II, III. (I, II, III.) Chen

141. Field Study With Children and Adolescents (4-6)

Lecture - 2 hours, fieldwork - 6-12 hours. Prerequisite: course 100A or 100B; consent of instructor Study of children's affective, cognitive and social development within the context of family/school environments, hospitals and foster group homes. May be repeated for credit for a total of 12 units. —I, III. (I, Iİ, III.)

142. Field Study with Emotionally Distressed Children and Adolescents (4-6)

Discussion - 1.5 hours; fieldwork - 6-12 hours. Prerequisite: course 130 (may be taken concurrently); consent of instructor. Field study with children who are identified as emotionally distressed, including those with internalizing and externalizing behavioral problems. May be repeated for credit for a total of 12 units following consultation with and consent of instructor.

143. Field Studies of the Elderly (4-6)

Discussion — 2 hours; field work — 6-12 hours. Prerequisite: course 100C or 160 may be taken concurrently. Apply theory and research on adult development and aging, work with older adults in a variety of settings, and develop skills relevant to that application. Develop a small research project.-I. (I.) Miller, Ober

160. Social Aspects of Aging (4)

Lecture-4 hours. Prerequisite: course 100C or Psychology 115. How the social context affects adult development and aging. Emphasis on demography, social policy, culture, and adaptation. Oral histories as class projects. Offered in alternate years. GE credit: Div. - II.

161. Applied Cognition and Aging (4)

Lecture/discussion-4 hours. Prerequisite: introductory social sciences course, Human Development, Psychology 1, Education, or a related social science, or permission of instructor. Principles from cognition and aging and applies these to real-world concerns in areas including education, technology, job performance, and health. Considers physical and social changes in later life that impact functioning. Offered in alternate years. GE credit: SocSci, Wrt | SS, WE.—III. (I.) Miller

162. Issues in Aging (3)

Lecture - 2 hours; lecture/discussion - 1 hour. Prerequisite: course 100C or 160. Research and policy issues concerning the elderly and aging in contemporary society. Offered in alternate years.

163. Cognitive Neuropsychology in Adulthood and Aging (4)

Lecture/discussion-4 hours. Prerequisite: Psychology 1; course 100C recommended. Theories, methods, and findings concerning the relationship between cognitive processes and brain functioning. Readings, lectures, and in-class discussions cover research on normal younger and older adults, neuropsychological case studies, and selected patient groups (e.g., amnesia, schizophrenia, Alzheimer's disease).—I. Ober

190C. Introductory Research Conference (1)

Discussion - 1 hour. Prerequisite: involvement in ongoing research. Instructors lead discussions with undergraduate students who involve themselves in a research project. Research papers are reviewed and aspects of project proposals developed out of class are presented and evaluated. May be repeated for credit. (P/NP grading only.) - I, II, III. (I, İI, III.)

192. Internship (1-12)

Internship - 3-36 hours. Prerequisite: upper division standing and consent of instructor. Supervised internship off and on campus, in community, and institutional settings. (P/NP grading only.)

198. Directed Group Study (1-5)

(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

200A. Early Development (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: graduate standing; basic biology or physiology; one upper division course in psychology or a related field; one upper division or graduate course in developmental psychology (may be taken concurrently). Theory and research on the biological, social, cognitive to the course of the concurrently of the course of the course of the concurrently. tive, and cultural aspects of development from conception to the age of five years. - I. Chen, Harper

200B. Middle Childhood and Adolescence

Lecture — 3 hours; discussion — 1 hour. Prerequisite: graduate standing; basic biology or physiology, and at least two upper division or graduate-level courses in psychology or related fields. Theory and research on biological, cognitive, social, and cultural influences on behavioral development from age five years until late adolescence. - II. Nishing

200C. Development in Adulthood (4)

Lecture/discussion-4 hours. Prerequisite: courses 200A and 200B. Theory and research focusing on social, personality, cognitive, and biological development from early to late adulthood. Emphasis is on theory development and continuity and change.—III. Ober, Miller

203. Adolescent Behavioral and Emotional Development (4)

Lecture/discussion-4 hours. Prerequisite: course 200B. Analysis of recent theories, research methods, and major findings on adolescent behavioral and emotional development, including contextual and genetic influences on adolescence, pubertal transitions, and social/family contexts and processes. Emphasis on multi-level mechanisms underlying adolescent behavioral and emotional development. Offered in alternate years.

204. Developmental Neuroscience and Adolescent Psychopathology (4)

Lecture — 4 hours. Prerequisite: graduate standing in Human Development, Psychology, Education, Neuroscience or consent of instructor. Introduction to human developmental neuroscience. Understanding of adolescence and its characterization as a time of risky and unhealthy behavior and vulnerability to onset of mental disorder as well as issues around plasticity of the adolescent brain and prevention/ intervention. Offered in alternate years. - II. (II.)

205. Path Analysis, Factor Analysis, and Structural Equation Modeling (4)

Lecture — 4 hours. Prerequisite: Psychology 204B or equivalent graduate courses in statistics or permission of the instructor; familiarity with multiple regression and the basics of matrix algebra. Graduate standing in HDGG, Psychology, Sociology, Education, or a related social science, or permission of the instructor. Introduction of basic concepts, principles, and applications of structural equation modeling including path analysis, confirmatory factor analysis, multiple-group modeling, and latent growth curve modeling. Offered in alternate years.

206. Cross-Sectional Data Analysis with Categorical Observed and Latent Variables (4)

Lecture-4 hours. Prerequisite: Psychology 204B or equivalent graduate courses in statistics or permission of the instructor; familiarity with multiple linear

regression; restricted to Graduate standing in HDGG, Psychology, Sociology, Education, or a related social science, or permission of the instructor. Introduction to basic concepts, principles, and applications of: contingency table analysis; binary, multinomial, and ordinal logistic regression; latent class analysis; and latent trait analysis. Offered in alternate vears.

207. Topics in Applied Cognitive Aging (4)

Lecture/discussion—2 hours. Prerequisite: graduate standing in Human Development Graduate Group, Psychology, Education, or a related social science, or consent of the instructor. Apply principles from cognitive aging to real-world concerns in areas such as education, technology, job performance, and health. Examine how physical and social changes occurring in later life impact functioning. Offered in alternate years.—I. Miller

210. Theories of Behavioral Development

Lecture - 2 hours; discussion - 1 hour. Prerequisite: graduate standing in behavioral sciences. Consideration of enduring issues in theories of behavioral development; analysis of adequacy of major theoretical schools (e.g., social learning, Piagetian) as scientific theories. Offered in alternate years.—Harper

211. Physiological Correlates of Behavioral Development (4)

Seminar — 4 hours. Prerequisite: consent of instructor. An overview of mechanisms of organismic development and the implications of developmental biology for the analysis of behavioral ontogeny; consideration of parallels between processes of organismic development and behavioral development in children and infra-human mammals. Offered in alternate years.—III.

217. Development of Cortical and Perceptual Laterality (3)

Seminar—3 hours. Prerequisite: graduate standing in child or human development or consent of instructor. Current theory and research regarding the development of human cortical and perceptual laterality—emphasizing the relationship of this development to thinking and behavior. Offered in alternate years.

220. Research Methods in Human Growth and Development (4)

Lecture - 4 hours. Prerequisite: Statistics 13 or the equivalent and at least two upper division courses in Human Biology or Developmental Psychology. Overview of qualitative and quantitative approaches to empirical inquiry in the social sciences, with a focus on theory and research methods in biological growth and cognitive and social/emotional development from prenatal period to death.—III. (II.)

231. Issues in Cognitive and Linguistic Development (3)

Seminar—3 hours. Prerequisite: consent of instructor. Study and evaluation of key issues in the theoretical and empirical literature on cognitive and linguistic development. — (III.)

232. Cognition and Aging (3)

Lecture/discussion-3 hours. Prerequisite: course 200C. The manner in which cognitive processes are affected by aging as well as an understanding of the changes in the central nervous system occurring with aging. Offered in alternate years. - Ober

234. Children's Learning and Thinking (3)

Seminar - 3 hours. Prerequisite: course 200A or Psychology 212 recommended. Analysis of theories, research methods, and major findings of children's higher-order cognition, including origins of knowledge, development of problemsolving skills, reasoning strategies, and scientific concepts, with an emphasis on the underlying mechanism involved in children's thinking and learning processes. Offered in alternate years. —Chen

238. The Context of Individual Development (3)

Lecture/discussion -3 hours. Prerequisite: graduate standing in Human Development, Child Development, Education, Psychology, Anthropology, Sociology, or consent of instructor. Analysis of human

development within the context of daily life. Contextualizing theories and methods of developmental psychology will be distinguished from contextual theories and methods. Developmental psychology models will be distinguished from child psychology models. Offered in alternate years

239. Developmental Trajectories in Typical and Atypical Children; Birth to Five (4)

Lecture/discussion-3 hours; term paper. Prerequisite: graduate standing in Human Development, Psychology, Sociology, a related social science, or permission of the instructor. Discuss theories of development in typical and atypical children from birth to five from a socio-cultural perspective including parent-child interaction, peer interactions, cultural contexts of learning, as well as theoretical and empirical issues for understanding continuities and discontinuities in development. Offered in alternate years.—III.

240. Peer Relationships During Adolescence (4)

Lecture/discussion-4 hours. Prerequisite: graduate standing in Human Development, Psychology, Education, or consent of instructor. Course examines the role of peer relationships in adolescent development including forms and functions at the individual, dyadic and group levels. Ethnicity and cross cultural résearch will be discussed. Emphasis on methodology, including surveys, peer nominations/sociometrics, experimental, and observational designs.—

250. Current Research on Family Relationships (4)

Lecture/discussion—6 hours; term paper. Prerequisite: graduate standing in Human Development Graduate Group, Psychology, Sociology, a related social science, or permission of the instructor. Discussion of theories, methods, and current research on the nature and development of sibling, romantic, and parent-child relationships across the lifespan. Emphasis on interpersonal and family processes examined in ethnic/cultural contexts. Implications for individual development will be addressed.—III. K. Conger

252. Family Research, Programs and Policy

Seminar-3 hours; term paper. Prerequisite: graduate standing in Human Development, Psychology, Sociology, related social sciences, or consent of instructor. Course examines the competing interests of research, policy, and service on current issues of family functioning and individual well being. The course considers communication barriers between researchers, practitioners, and policy makers. Offered in alternate years.—(III.) K. Conger

290. Seminar (3)

Seminar-3 hours. Discussion and evaluation of theories, research, and issues in human development. Different topics each quarter. —I, II, III. (I, II, III.)

290C. Research Conference (1)

Discussion - 1 hour. Prerequisite: graduate standing and consent of instructor. Supervising instructors lead research discussions with their graduate students. Research papers are reviewed and project proposals are presented and evaluated. May be repeated for credit. (S/U grading only.)—I, ÍI, III. (I,

291. Research Issues in Human Development (4)

Seminar—4 hours. Prerequisite: graduate standing in the Behavioral Sciences. In-depth presentations research issues in particular areas of behavioral development. — I, Iİ. (I. II.) R. Conger

292. Graduate Internship (1-12)

Internship - 3-36 hours. Prerequisite: consent of faculty (internship sponsor) and satisfactory completion of placement-relevant course work, for example: Education 213, 216; course 222, 242; Law 272, 273. Individually designed supervised internship, off campus, in community or institutional setting. Developed with advice of faculty mentor. May be repeated for credit up to 12 units if justified skill acquisition and promise of informing evaluation research. (S/U grading only.) - I, II, III. (I, II, III.)

298. Group Study (1-5) 299. Research (1-12)

(S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Human Development (A Graduate Group)

Katherine J. Conger, Ph.D., Group Chairperson

Group Office. 1337 Hart Hall

(530) 754-4109; http://humandevelopment.ucdavis.edu

Jay Belsky, Ph.D., Professor (Human and Community Development)

Zhe Chen, Ph.D., Professor

(Human and Community Development)
Katherine J. Conger, Ph.D., Associate Professor (Human and Community Development)

Rand Conger, Ph.D., Professor

(Human and Community Development) Kathryn G. Dewey, Ph.D., Professor (Nutrition) Emilio Ferrer, Ph.D., Associate Professor

(Psychology)

Lorena Garcia, M.P.H., Dr.P.H., Assistant Professor (Department of Public Health Sciences)

Beth Goodlin-Jones, Ph.D., Associate Professor (Psychiatry, M.I.N.D. Institute)

Gail Goodman, Ph.D., Professor (Psychology) Katharine Graf Estes, Ph.D., Assistant Professor (Psychology) Kevin Grimm, Ph.D., Associate Professor

(Psychology)

Amanda Guyer, Ph.D., Assistant Professor (Human and Community Development, Center for Mind and Brain)

Randi Hagerman, M.D., Professor (M.I.N.D. Institute)

Robin L. Hansen, M.D., Professor (Pediatrics)

Lawrence V. Harper, Ph.D., Professor (Human and Community Development) Paul Hastings, Ph.D., Professor (*Psychology*) David Hessl, Ph.D, Associate Professor

(Psychiatry, M.I.N.D. Institute)

Suad Joseph, Ph.D., Professor (Anthropology) Penelope Knapp, M.D., Professor (Psychiatry, M.I.N.D. Institute)

Lisa Miller, Ph.D., Associate Professor (Human and Community Development)

Peter Mundy, Ph.D., Professor (Education, M I.N.D. Institute)

Adrienne Nishina, Ph.D., Associate Professor (Human and Community Development)

Lisa Oakes, Ph.D., Professor

(Psychology, Center for Mind and Brain) Beth A. Ober, Ph.D., Professor

(Human and Community Development) Lenna Ontai, Ph.D. Associate Specialist in Cooperative Extension (Human and Community Development)

Richard Ponzio, Ph.D., Specialist in Cooperative Extension (Human and Community Development)
Susan Rivera, Ph.D., Professor

(Psychology, Center for Mind and Brain) Richard W. Robins, Ph.D., Professor (Psychology)

Sally Rogers, Ph.D., Professor (Psychiatry, M.I.N.D. Institute) Julie Schweitzer, Ph.D., Associate Professor

(Psychiatry, M.I.N.D Institute)
Phillip Shaver, Ph.D., Professor (Psychology)
Ross A. Thompson, Ph.D., Professor (Psychology) Susan Timmer, Ph.D., Clinical Specialist (Pediatrics) Kali Trzesniewski, Ph.D., Associate Specialist in

Cooperative Extension (Associate Director of

Research for statewide 4-H Youth Development Program)

Anthony Urquiza, Ph.D., Psychologist (*Pediatrics*) Karen Watson-Gegeo, Ph.D., Professor (*Education*) Distinguished Graduate Mentoring Award Keith Widaman, Ph.D., Professor (Psychology)

Affiliated Faculty

Kristin Alexander, Ph.D., Associate Professor (California State University, Sacramento) Ann Mastergeorge, Ph.D., Associate Adjunct
Professor (Human and Community Development) Associate Professor and Specialist (University of Arizonal

Elizabeth Miller, M.D., Ph.D., Assistant Professor (Pediatrics)

Graduate Study. The interdisciplinary and interdepartmental Graduate Group in Human Development offers a program of study leading to the Ph.D. degree. The program provides lifespan study of human behavioral development, with a balance of emphasis on biological, cognitive, and socio-emotional development in context. Recipients of the degree will be prepared to teach, to conduct research, and to be actively involved in public service in human behavioral development.

Applicants seeking admissions and fellowships consideration must submit all materials by our priority December 15 deadline. Note that a separate fellowship application is required for university fellowships. The final admissions deadline is March 1. See our website for more details.

Graduate Adviser. Contact the Group office.

Humanities

(College of Letters and Science) Julia Simon, Ph.D., Program Director

Program Office. 213 Sproul (530) 752-1219; http://humanities.ucdavis.edu

Committee in Charge

Noah Guynn, Ph.D. (French and Italian) Colin Milburn, Ph.D. (English) Susette Min, Ph.D. (Asian American Studies) Pablo Ortiz, D.M.A. (Music) Jenny Kaminer, Ph.D. (German and Russian) Julia Simon, Ph.D. (French and Italian)

The Program of Study

The Humanities program is an undergraduate and graduate curriculum emphasizing innovative approaches to ideas that matter. Courses offered through the program are interdisciplinary in scope and aim to develop critical thinking and writing skills in three principal areas: major figures, works, and genres in world cultures; major themes in world literatures; and relationships between history, society, and culture.

Courses in Humanities (HUM) Lower Division Courses

1. Humanities Forum (2)

Lecture - 2 hours. Reading and discussion of a single work representative of a particular culture, historical period, or genre and significant for its ongoing cultural impact in the humanities, sciences, social sciences, technology, and popular arenas. Attention to provocative implications for contemporary society. May be repeated one time for credit if topic differs. GE credit: AH.

1D. Issues and Concepts in the Humanities (2)

Discussion - 2 hours. Prerequisite: course 1 concurrently. Small group discussions and preparation of short papers for course 1. May be repeated one time for credit if topic differs. GE credit: ArtHum, Wrt | AH, WE.

2A. Global Humanities Forum (4)

Lecture - 3 hours; extensive writing. Introduction to humanities topics and methodologies; analysis of major figures, works, and genres in world arts and literatures, with emphasis on relationships between history, society, and culture. May be repeated one time for credit if topic differs. GÉ credit: ArtHum | AH, WC, WE.-I, II, III. (I, II, III.)

2B. American Humanities Forum (4)

Lecture — 3 hours; extensive writing. Introduction to humanities topics and methodologies; analysis of major figures, works, and genres in American arts and literatures, with emphasis on relationships between history, society, and culture. May be repeated one time for credit if topic differs. GE credit: ArtHum | ACGH, AH, WE.-I, II, III. (I, II, III.)

3. Medicine and Humanities (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: completion of Subject A requirement. Evolution of the "medical arts" into the "science of medicine." The culture of medicine in the context of society, medical ethics. GE credit: SocSci, Wrt | AH or SS, WE.

4. Animals and Human Culture (2)

Lecture — 2 hours. The meaning of human relations with animals studied across a variety of historical periods and culture and from a variety of humanistic perspectives. Offered in alternate years. GE credit: ArtHum, Wrt | AH.

4D. Animals and Human Culture Discussion (2)

Discussion - 2 hours. Prerequisite: concurrent enrollment in course 4. Small group discussions and preparation of short papers for course 4. Offered in alternate years. GE credit: ArtHum, Wrt | AH,

7. Travel and Travel Literature (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: Subject A requirement. History of travel from the age of exploration to the modern era. Contemporary trends in travel, including mass tourism, adventure travel, and ecotravel. Social, economic. and cultural issues related to modern trends in travel. Analysis of literary representations of travel. GE credit: ArtHum, Div, Wrt | AH, WC, WE.

8. Introduction to Perspectives on Narrative (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: satisfaction of Subject A requirement. Interdisciplinary approach to the use of story across time, culture, and discipline. How the telling and retelling of particular stories reflect the values, concerns, and assumptions of their original audiences and genres. GE credit: ArtHum or SocSci, Div, Wrt | AH, WE.

9. Don Quixote and the Modern World (2)

Lecture — 2 hours. Reading Don Quixote as emblem of modernity in the West. Issues of reality versus illusion, heroism, freedom and self-fulfillment, racial tolerance and love. Don Quixote in other cultural and popular media: film, dance, art, musical drama, and television. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC.

9D. Don Quixote and the Modern World Discussion (2)

Discussion - 2 hours. Prerequisite: course 9 concurrently. Small group discussions and preparation of short papers for course 9. Offered in alternate years. GE credit: AH, WC, WE.

13. Witches: Myth and Historical Reality (4)

Lecture—3 hours; extensive writing. This course examines the historical construction of the witch. The four areas covered are: European pagan religions and the spread of Christianity; the "Burning' Times" in early modern Europe; 17th-century New England and the Salem witch trials; and fairytales. GE credit: ArtHum, Div, Wrt | AH, WC, WE

15. Language and Identity (4)

Lecture/discussion-3 hours; extensive writing. Introduction to topics related to the construction of identity through language use, including geographical and social factors affecting language groups. Language ideology affecting linguistic groups, including

bilinguals and non-native speakers of English. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH or SS, WÉ

18. Performance and the 21st Century (4)

Lecture/discussion-3 hours; extensive writing. Live performance and globalization in the twenty-first century. Consideration of the cultural context of performing arts and artists including their methods of creativity. GE credit: ArtHum or SocSci, Div, Wrt | AH, WE.

60. Narrative and Argumentative Approaches to Major Current Issues in the Media, Culture, and Society (4)

Lecture/discussion—3 hours; term paper. Prerequisite: English A or the equivalent. Interdisciplinary approach to contemporary issues (abortion, AIDS, civil rights, war and peace, welfare state) around which individuals, communities and institutions define themselves in American society, by applying principles of narrative theory to the narratives where those issues are embedded. GE credit: ArtHum or SocSci, Div, Wrt | AH, WE.

92. Internship (1-12)

Internship - 3-36 hours. Internships in fields where students can practice their skills. May be repeated for credit. (P/NP grading only.)

Upper Division Courses

144. Marx, Nietzsche, Freud (4)

Lecture/discussion-3 hours; term paper. Study of major texts of Marx, Nietzsche, and Freud, selected with an eye to their impact on 20th-century economics, ethics, and attitudes toward eros. Particular focus on conceptions of the self and the individual's relation to society. Offered in alternate years. (Same course as German 144.) GE credit: ArtHum, Wri | AH, WC.-I.

180. Topics in the Humanities (4)

Lecture/discussion - 3 hours; term paper. Analysis of interdisciplinary issues in the Humanities. Topics will vary. May be repeated one time for credit. GE credit: ArtHum, Wrt | AH, WE.

192. Internship (1-12)

Internship—3-36 hours. Internships in fields where students can practice their skills. May be repeated for credit. (P/NP grading only.)

198. Directed Group Study (1-4)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-4)

Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

250. Topics in the Humanities (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Topics in the humanities, selected by the instructor. May be repeated one time for credit.

292. Graduate Internship (1-15)

Lecture - 3 hours; lecture/discussion - 1 hour. Prerequisite: consent of instructor required. Individually designed supervised internship, off campus, in community or institutional setting. Developed with advice of faculty mentor. May be repeated for credit up to 15 units. (S/U grading only.)

298. Directed Group Study (1-5)

(S/U grading only.)

299. Individual Research (1-4)

Individual research in the humanities resulting in a formal written research report. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. (S/U grading only.)

Human Rights

(College of Letters and Science)

http://humanrightsminor.ucdavis.edu

The interdisciplinary minor in Human Rights gives students a chance to explore human rights as both a specific issue and within larger contexts through a wide variety of disciplines and courses.

Courses in the minor provide students with an opportunity to approach human rights as a practical, as well as an intellectual problem. The minor will be of special interest to students majoring in area studies and those planning to pursue careers in public service, law and international relations. Students will take courses in which human rights problems are the central focus of the course and other courses, which while not having human rights as their central theme, include elements that address the history, theory, practice, violation, promotion and protection of human rights, or in which students have the opportunity to conduct research projects relevant to the study of human rights.

The minor is sponsored by the Religious Studies Program.

Program Objectives

In addition to completing Religious Studies 90 or 134, students must take two additional Core Courses and two from the Elective Course list. Students must select courses from at least three different departments or programs to satisfy minor requirements.

Minor Program Requirements:

.....20 Human Rights History 142A, Religious Studies 131, Sociology 104, Spanish 159†.....8 Choose two elective courses from the following: American Studies 156, Anthropology 123B, 126B, 130A, 131, Chicana/o Studies 131/131S, 150, English 107, History 142A, 142B, 172, 177A, 177B, 183A, 183B, 189, Native American Studies 115, 130B, 130C, 157, Religious Studies 131, 167, Sociology 104, 130, 137, 157 160, 171, Spanish 159†, 175^, Women's Studies 102, 140, 170, 182.....8 * With prior permission of the Interdisciplinary Minor in Human Rights advisor, students may substitute one course from the list of electives as a core course. † When taught as "Witnessing in Latin America: Trauma, Violence and Memory. ^ Only if topic is related to human rights. Prior approval from minor adviser is required.

Advising. Religious Studies Program office, 213 Sproul Hall (530) 752-1219

Hydrologic Sciences (A Graduate Group)

Gregory Pasternack, Ph.D., Chairperson of the Group

Group Office. 1152 Plant and Environmental Sciences Building (530) 752-1669; http://lawr.ucdavis.edu/graduate_hyd.htm or http://lawr.ucdavis.edu/hsgg/index.htm

Faculty

Roger Bales, Ph.D., Professor (UC Merced School of Engineering) Fabian Bombardelli, Ph.D., Assistant Professor (Civil and Environmental Engineering) William Casey, Ph.D., Professor (Chemistry) Randy Dahlgren, Ph.D., Professor

Academic Senate Distinguished Teaching Award
Graham Fogg, Ph.D., Professor
Timothy Ginn, Ph.D., Professor
(Civil and Environmental Engineering)

Mark Grismer, Ph.D., Professor Thomas Harmon, Ph.D., Professor (UC Merced Environmental Systems School of Engineering) Peter Harpes Ph.D. Associate Professor

Peter Hernes, Ph.D., Associate Professor Jan Hopmans, Ph.D., Professor William Horwath, Ph.D., Professor M. Levent Kavvas, Ph.D., Professor (Civil and

Environmental Engineering)
John Largier, Ph.D., Professor (Bodega Marine

John Largier, Ph.D., Professor (Bodega Marine Laboratory) Mark Lubell, Ph.D., Professor (Environmental Science

and Policy)
Jay Lund, Ph.D., Professor (Civil and Environmental
Engineering)

Douglas Mackay, Ph.D., Adjunct Professor
James McClain, Ph.D., Professor (Geology)
Jeffrey Mount, Ph.D., Professor (Geology)
Alexandra Navrotsky, Ph.D., Professor
Gregory Pasternack, Ph.D., Professor
Kyaw Tha Paw U, Ph.D., Professor
Carlos Puente, Ph.D., Professor
Eliska Rejmankova, Ph.D., Professor (Environmental Science and Policy)

Samuel Sandoval Solis, Assistant Professor, Cooperative Extension Specialist

S. Geoffrey Schladow, Ph.D., Professor *(Civil and Environmental Engineering)*Kate Scow, Ph.D., Professor

Wendy K. Silk, Ph.D., Professor Johan Six, Ph.D., Professor (Plant Sciences) Howard Spero, Ph.D., Professor (Geology) Susan Ustin, Ph.D., Professor Wesley Wallender, Ph.D., Professor Tom Young, Professor (Civil and Environmental

Engineering)
Minghua Zhang, Ph.D., Adjunct Professor
Robert Zierenberg, Ph.D., Professor (Geology)

Emeriti Faculty

UNITS

Charles Goldman, Professor Emeritus Theodore Hsiao, Ph.D., Professor Emeritus Miguel Marino, Ph.D., Distinguished Professor Emeritus

Paul Sabatier, Ph.D., Professor Emeritus (Environmental Science and Policy) Bryan Weare, Ph.D., Professor Emeritus

Affiliated Faculty

Philip Duffy, Ph.D., Adjunct Associate Professor (School of Natural Resources, U.C. Merced) Joan Florsheim, Ph.D., Associate Research Geologist (Geology)

David Goldhamer, Ph.D., Irrigation Specialist Emeritus

Stephen Grattan, Ph.D., Water Relations Specialist Blaine Hanson, Ph.D., Irrigation Specialist Emeritus Thomas Harter, Ph.D., Cooperative Extension Specialist

Terry Prichard, M.S., Water Management Specialist Lawrence Schwankl, Ph.D., Irrigation Specialist Richard Snyder, Ph.D., Biometeorologist Specialist Kenneth Tate, Specialist in Cooperative Extension (Plant Sciences)

Josh Viers, Assistant Research Ecologist (Environmental Science and Policy)

Graduate Study. The Graduate Group in Hydrologic Sciences is an interdisciplinary program offering M.S. and Ph.D. degrees. Course work is available from many programs, including Hydrologic Sciences, Civil and Environmental Engineering, Geology, and Soil Science. Education in the group broadens the skills and knowledge of the physical science or engineering student interested in the occurrence, distribution, circulation and properties of water on earth. Because of water's ubiquity and importance to physical, chemical and biological processes, hydrologic sciences involve the geologic, atmospheric and oceanic sciences, as well as engineering and other applied physical sciences. Basic to the program are core courses in fluid dynamics,

hydrologic phenomena, hydrobiology, hydrogeochemistry, hydrologic techniques, and hydrologic policy. Students can pursue specializations in hydrogeochemistry, surface hydrology, subsurface hydrology, irrigation and drainage, watershed hydrology and water resources management. The subsurface hydrology specialization includes hydrogeology and vadose-zone hydrology.

Preparation. Applicants to the program are expected to have completed or to be completing an undergraduate degree in environmental or physical sciences, mathematics, or engineering. Undergraduate study must include one year each of calculus, of physics with calculus, and of chemistry. A second year of vector calculus, linear algebra and differential equations is recommended and will be required, before completion of graduate work. Additional courses in applied statistics, computer programming, and geology are recommended.

Specialization. Each student will pursue an individual program of advanced study under the direction of a group of faculty members with similar interests but diverse backgrounds. Course work in addition to the above is typically taken in the most appropriate departments.

Graduate Adviser. Mark E. Grismer (Land, Air and Water Resources)

Graduate Admissions Adviser. Carlos Puente, Ph.D.

Courses in Hydrologic Sciences (HYD)

Graduate Courses

200. Survey of Hydrologic Sciences (1)

Seminar—1 hour; term paper. Prerequisite: open to students in the Hydrologic Sciences program. Seminar course exposes students to the diversity of sciences involved in the program. Students prepare a paper and presentation in their area of research interest. May be repeated two times for credit. (S/U grading only.)—I. (I.) Grismerr

205. Continuum Mechanics of Natural Systems (4)

Lecture/discussion—4 hours. Prerequisite: Mathematics 21D and 22B, Physics 9B. Continuum mechanics of static and dynamic air, water, earth and biological systems using hydraulic, heat and electrical conductivity; diffusivity; dispersion; strain; stress; deformation gradient; velocity gradient; stretch and spin tensors. (Same course as Biological Systems Engineering 205.)—III. Wallender

210. Vadose Zone Transport Processes and Modeling (3)

Lecture/discussion—3 hours. Prerequisite: Soil Science 107, Mathematics 22B, programming language, or consent of instructor. Principles and modeling of water flow and chemical transport in the vadose zone, with specific applications to soils. Topics include hydraulic properties, finite difference application to unsaturated water flow, parameter optimization, diffusive and convective transport in gaseous and liquid phases. Offered in alternate years.—III. Hopmans

243. Water Resource Planning and Management (3)

Lecture—3 hours. Prerequisite: course 141 or Civil and Environmental Engineering 142. Applications of deterministic and stochastic mathematical programming techniques to water resource planning, analysis, design and management. Water allocation, capacity expansion, and reservoir operation. Conjunctive use of surface water and groundwater. Water quality management. Irrigation planning and operation models. (Same course as Biological Systems Engineering 243.)—(I.) Marino

252. Hillslope Geomorphology and Sediment Budgets (4)

Lecture—3 hours; fieldwork—3 hours. Prerequisite: course 141 or Geology 35 or Civil and Environmental Engineering 142 or consent of instructor. Exploration of theoretical and empirical foundations of sediment production on hillslopes using computer

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models and field experiments to promote an understanding of how watersheds evolve naturally and with human impacts. Offered in alternate years. - III. Pasternack

256. Geomorphology of Estuaries and Deltas (4)

Lecture - 3 hours; fieldwork - 3 hours. Prerequisite: course 141 or Geology 35 or Civil and Environmental Engineering 42 or consent of instructor. Survey of the processes and landforms associated with sediment deposition in the coastal zone. Application of geomorphic principles to coastal management issues. Offered in alternate years.—III. Pasternack

264. Modeling of Hydrologic Processes (3)

Lecture - 3 hours. Prerequisite: course 141 or the equivalent and Statistics 102 or the equivalent. Techniques used to model the spatio-temporal structure of rainfall and runoff are introduced. Procedures studied include those based on stochastic point processes, chaos theory, fractal geometry, and fractional noises. Offered in alternate years. — (III.)

269. Numerical Modeling of Groundwater Systems (3)

Lecture - 3 hours. Prerequisite: course 145A or Civil Engineering 144 and course 145B, Mathematics 22B. Finite difference and finite element techniques in modeling groundwater flow and transport. Fundamentals of constructing and calibrating models with hands-on applications. Methods and limitations of numerical solution of transport equations. Model interpretation and ethics.—(III.) Fogg

273. Introduction to Geostatistics (3)

Lecture—3 hours. Prerequisite: Statistics 130A and 130B, or the equivalent. Statistical treatment of spatial data with emphasis on hydrologic problems. Topics include theory of random functions, variogram analysis, Kriging, co-Kriging, indicator geostatistics, and stochastic simulation of spatial variability. Demonstration and use of interactive geostatistical software included. Offered in alternate years.—I. Fogg

275. Analysis of Spatial Processes (3)

Lecture - 3 hours. Prerequisite: Statistics 102 or the equivalent; course 273 or Statistics 273A recommended. Characterization of homogeneous random fields; extremes and spectral parameters; geometry of excursions, local averaging; scale of fluctuation; non-Gaussian and irregular random fields; geostatistical applications. Offered in alternate years. — (III.)

286. Selected Topics in Environmental Remote Sensing (3)

Discussion—2 hours; lecture—1 hour; project. Prerequisite: consent on instructor; Environmental and Resource Sciences 186 or equivalent required; Environmental and Resource Sciences 186L recommended. In depth investigation of advanced topics in remote sensing applications, measurements, and theory. May be repeated for credit. Not offered every year. — I. (I.) Ustin

290. Seminar in Hydrologic Science (1)

Seminar — 1 hour. Prerequisite: graduate standing and background in Hydrologic Science, consent of instructor. Seminars and critical review of problems, issues, and research in hydrologic sciences. Oral presentations of research. Topics will vary. May be repeated for credit. (S/U grading only.)—III. (III.)

298. Group Study (1-5)

Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

299. Research (1-12)

Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Professional Courses 410. OSHA HAZWOPER Refresher Course (1)

Lecture - 1 hour. Updates hazardous materials handling information for purposes of keeping certifica-tion current. Certification lapses until the refresher course is complete. (P/NP grading only.)—II. (II.) Grismer

440. Hazardous Waste Operations Training (3)

Lecture -2 hours; laboratory -2 hours. Prerequisite: upper division standing in College of Agricultural and Environmental Sciences. Forty-hour course designed to meet the requirements of Federal OSHA regulation CFR 1910.120. Covers the health, regulatory, processing and safe handling issues/problems associated with working with hazardous materials. (P/NP grading only.)—III. (III.) Grismer

Hydrology

(College of Agricultural and Environmental Sciences)

Faculty. See under Department of Land, Air and Water Resources, on page 361, Hydrology Section.

The Major Program

Hydrology is the study of the occurrence, distribution, circulation, and behavior of water and waterborne materials in the environment of Earth. It includes practical measurement and technical analysis of water phenomena underground, on the Earth's surface, and in the atmosphere. Contemporary hydrologic problems costing society \$10-100 billion per year include environmental restoration, sustainability of groundwater and surface water resources, water pollution, and natural disasters such as floods, droughts, landslides, avalanches, and land subsidence. The management of these problems demands hydrologic scientists with the comprehensive, interdisciplinary education embodied in this program. Beyond its societal utility, hydrology can be an exciting science for the curious-minded. Hydrologists explore natural phenomena such as climate change, waterfalls, health of coral reefs, biogeochemical cycles, and aquifers.

The Program. A hydrologist needs a strong background across the basic sciences of physics, mathematics, chemistry, and biology. Breadth of understanding comes from exposure to ecology, geology, engineering, policy, and law. Depth of experience is provided by core hydrology courses, internship opportunities, and practical outdoor training. Students choose electives to match their interests and career goals. Transfer students should have completed as much as possible of the preparatory subject matter listed below.

Internships and Career Alternatives. Job opportunities in hydrology exceed the available supply of trained hydrologists. Students commonly obtain internships and jobs with state and federal agencies, private consulting firms, environmental interest groups, irrigation districts, and utility companies. Federal agencies hiring hydrologists include the U.S. Geological Survey, U.S. Department of Agriculture (Fish and Wildlife, Agricultural Research, Forest Service, and National Resource Conservation Service), Environmental Protection Agency, and national research laboratories (Lawrence Livermore National Laboratory, Oak Ridge National Laboratory). State and local agency employers include California's Departments of Water Resources, Conservation, Fish and Game, and Toxic Substances as well as the Water Resources Control Board and Regional Water Quality Control Boards. To obtain higher levels of responsibility and salary, hydrologists often seek advanced degrees, and the hydrology major is designed to provide students with a

highly competitive education to get into graduate

B.S. Major Requirements:

UNITS
Preparatory Subject Matter67
Biological Sciences 1A, 1C, or
2A, 2B9-10
2A, 2B
Physics 9A, 9B, 9C
Mathematics 21A, 21B, 21C, 21D,
22A, 22B22
Geology 50, 50L5
Engineering 6 or the equivalent4
Depth Subject Matter46-55
Hydrologic Science 103N or Engineering
103 or equivalent4
Civil and Environmental Engineering
114 or Statistics 130A and 130B4-6
Hydrologic Science 134, 141, 142,
144, 15121 Soil Science 1075
Select one of Hydrologic Science 150,
Agricultural and Resource Economics 147,
Environmental Science and Policy 161,
166
Select three of Hydrologic Science 110,
122 124, 143, 146; Čivil and
Environmental Engineering 141; Applied
Biological Systems Technology 165 9-13
Restricted Electives16-26
To supplement or expand areas of student
interest selected with approval of adviser
Total Units for the Major129-148
Major Adviser. Greg Pasternak (Land, Air and Water Resources)

Minor Program Requirements: Hydrology

The Hydrology Section of the Department of Land, Air and Water Resources offers the minor in Hydrology for environmental or natural science students who have an interest in water/environmental issues. The interested student should have completed preparatory course work in calculus (Mathematics 16B), chemistry (Chemistry 2A; Chemistry 2B recommended), physics (Physics 5A), and biology (Biological Sciences 1A). Course work in the minor provides fundamental skills and knowledge of the hydrologic sciences. The program is sufficiently flexible for students to pursue particular water issues or problems of interest to them.

UNITS Hydrology20-23

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Hydrologic Science 103N or Engineering
1034
Hydrologic Science 141 or Environmental
and Resource Sciences 1004
Hydrologic Science 1444
Soil Science 1075
Hydrologic Science 134, Chemistry 100,
Soil Science 111, or Environmental Science
and Policy 151

Watershed Science

The Hydrology Program of the Department of Land, Air and Water Resources offers the minor in Watershed Science. This minor is intended for environmental, natural, or social science students who have an interest in the interfaces between hydrology, ecology, policy and management. The interested student should have completed preparatory course work in calculus (Mathematics 16B), chemistry (Chemistry 2A; Chemistry 2B recommended), physics (Physics 7A), and biology (Biological Sciences 1A). Course work in the minor provides fundamental skills and knowledge on science and management of watersheds in the context of current water resources and ecological problems.

Minor Program Requirements:

UNITS Watershed Science 21-26 Hydrologic Science 141 or Environmental and Resource Sciences 100.....4 Soil Science 100 or 118 4-5 Hydrologic Science 144 or Soil Science 107 4-5 Environmental and Resource Science 136, Hydrologic Science 124, or Hydrologic Science 151......4 Hydrologic Science 143, Environmental and Resource Sciences 144, or Environmental Science and Policy 151 Hydrologic Science 150, Environmental and Resource Sciences 121, or Environmental Science and

Minor Advisor. Graham Fogg (530) 752-6810; gefogg@ucdavis.edu.

Advising Center. 1150 PES Building

Courses in Hydrologic Science (HYD)

Questions pertaining to the following courses should be directed to the instructor or to the Resource Sciences Teaching Center in 113 Veihmeyer Hall or in 1150 Plant and Environmental Sciences Building (530) 752-1603.

Lower Division Courses

10. Water, Power, Society (3)

Lecture - 2 hours; discussion - 1 hour. Water resources issues. How water has been used to gain and wield socio-political power. Water resources development in California as related to current and future sustainability of water quantity and quality. Roles of science and policy in solving water problems. (Same course as Science and Society 10.) GE credit: SciEng or SocSci, Wrt | SE, SL, SS.-III. (III.)

47. Watershed Processes and Water Quality in the Tahoe Basin (2)

Lecture/laboratory-21 hours; fieldwork-9 hours; discussion-3 hours; term paper. Prerequisite: basic knowledge of environmental, soil, or hydrologic sciences. Watershed processes, runoff water-quality management, restoration in Lake Tahoe Basin. Soils, precipitation-runoff, revegetation and adaptive management related to erosion control, effective solutions, development of restoration strategies. Students develop field restoration. Course involves 3 days of instruction in Tahoe City. (Same course as Environmental Science and Management 47.) Not open to students who have successfully completed Environmental and Resource Sciences 47. (Formerly Environmental and Resource Sciences 47.) GE credit: QL, SE, SL.—IV. (IV) Grismer

92. Hydrologic Science Internship (1-12)

Internship—3-36 hours. Prerequisite: lower division student, consent of instructor. Work experience off and on campus in Hydrologic Science. Internship supervised by a member of the faculty. (P/NP grad-

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading

Upper Division Courses

103N. Fluid Mechanics Fundamentals (4)

Lecture-4 hours. Prerequisite: Physics 9B. Fluid mechanics axioms, fluid statics, kinematics, velocity fields for one-dimensional incompressible flow and boundary layers, turbulent flow time averaging, potential flow, dimensional analysis, and macroscopic balances to solve a range of practical problems. (Same course as Biological Systems Engineering 103.) GE credit: QL, SE.-II. (II.) Wal-

110. Irrigation Principles and Practices (3)

Lecture - 2 hours: laboratory - 3 hours. Prerequisite: Physics 7A; Soil Science 100 recommended. General course for agricultural and engineering students dealing with soil and plant aspects of irrigation and drainage. Soil-water principles including water movement, plant responses to irrigation regimes, water use by crops; also irrigation systems and water quality. Offered in alternate years. Not open for credit to students who have completed Water Science 110. GE credit: SE, SL.-(III.) Goldhamer, Grattan

124. Plant-Water-Soil Relationships (4)

Lecture - 3 hours; discussion - 1 hours. Prerequisite: one upper division course in soil science, such as Soil Science 100; and one upper division course in plant science or plant biology, such as Plant Biology 111; or consent of instructor. Principles of plant interactions with soil and atmospheric water environments and practical applications to crop management (e.g., irrigation) and plant eco-physiology (e.g., drought). Not open for credit to students who have completed Water Science 104. GE credit: QL, SE, SL. — IIİ. (III.) Shackel

134. Aqueous Geochemistry (6)

Lecture—4 hours; laboratory—3 hours. Prerequisite: Chemistry 2B. Chemistry of natural waters; dielectric properties of water; thermodynamic and mass-action relations; metal hydrolysis; acid-base equilibria; metalcoordination chemistry; solubility calculations; electron-exchange reactions; sorptive partitioning; ion exchange; and dissolved organic matter. GE credit: QL, SE.—III. (III.) Hernes, Parikh

141. Physical Hydrology (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Physics 9B, Mathematics 21B; course 100 recommended. Introduction to the processes that constitute the hydrologic cycle. Special emphasis on a quantitative description of the following processes: precipitation, infiltration, evaporation, transpiration surface runoff, and groundwater runoff. GE credit: QL, SE, SL, VL. -I. (I.) Puente

142. Systems Hydrology (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 141 or Civil and Environmental Engineering 142. General course considering hydrologic processes from a systems or statistical model perspective. General probability concepts are applied to frequency, time series and spatial data analysis. Linear systems are also considered in conjunction with Kalman filter techniques. GE credit: OL, QL, SE.-II. (II.) Puente

143. Hydrological Processes in Ecosystems

Lecture - 3 hours. Prerequisite: course 141 or Environmental and Resource Science 100. Movement and storage of water are integral parts of landscape and ecosystem functioning. Hydrological processes in individual ecosystems and the role of water linking the myriad components of the landscape. GE credit: QĹ, SE, SL. - (II.) Pasternack

144. Groundwater Hydrology (4)

Lecture-4 hours. Prerequisite: Mathematics 16B or 21A; course 103 or Engineering 103 recommended. Fundamentals of groundwater flow and contaminant hydrology. Occurrence, distribution, and movement of groundwater. Well-flow systems. Aquifer tests. Well construction operation and maintenance. Groundwater exploration and quality assessment. Agricultural threats to groundwater quality: fertilizers, pesticides, and salts. Same course as Hydrologic Science 144. GE credit: SE. -I. (I.) Fogg

146. Hydrogeology and Contaminant Transport (5)

Lecture—3 hours; laboratory—2 hours; term paper. Prerequisite: course 144 or Civil and Environmental Engineering 144 or the equivalent. Physical and chemical processes affecting groundwater flow and contaminant transport, with emphasis on realistic hydrogeologic examples. Groundwater geology and chemistry. Fundamentals of groundwater flow and transport analysis. Laboratory includes field pump-

ing test and work with physical and computer models. (Same course as Geology 156.) GE credit: SE.-II. (II.) Fogg

147. Runoff, Erosion and Water Quality Management in the Tahoe Basin (3)

Lecture/laboratory-30 hours; fieldwork-15 hours; discussion - 10 hours; term paper. Prerequisite: Physics 7B or 9B, Mathematics 16C or 21C, Civil and Environmental Engineering 142 or course 141 or Environmental and Resource Sciences 100. 5 days of instruction in Tahoe City. Practical hydrology and runoff water quality management from Tahoe Basin slopes. Development of hillslope and riparian restoration concepts, modeling and applications from physical science perspectives including precipitation-runoff relationships, sediment transport, and detention ponds. (Same course as Biological Systems Engineering 147.) GE credit: QL, ŠE, SL. – IV. (IV.) Grismer

150. Water Law (3)

Lecture — 3 hours. Prerequisite: Environmental and Resource Sciences 100 or 121 or consent of instructor. Principles and issues of California Water Law. Types of water rights, groundwater rights and management, and protection of instream uses. Water projects, role of federal government and federal/ state relations. Basic water quality acts, endangered species act, water transfers and current water issues. GE credit: ACGH, SS.—II. Cahill

151. Field Methods in Hydrology (4)

Lecture—2 hours; laboratory—3 hours; fieldwork—3 hours. Prerequisite: Environmental and Resource Sciences 100 or course 141. Measurement methods and data analysis for evaluation of water storage, movement and contamination in the field. Equipment such as data loggers, water and sediment samplers, pressure transducers, weather stations, surveying equipment, and flow meters will be used. GÉ credit: QĹ, ŠE, SL.—II. **Pasternack**

182. Environmental Analysis using GIS (4)

Lecture — 2 hours; laboratory — 4 hours. Prerequisite: Applied Biological Systems Technology 180 or the equivalent GIS experience and skills; general biology and/or ecology courses recommended. Ecosystem and landscape modeling with emphasis on hydrology and solute transport. Spatial analysis of environmental risk analysis including ecological risk assessment, natural resource management. Spatial database structures, scripting, data models, and error analysis in GIS. (Same course as Applied Biological Systems Technology 182.) Offered in alternate years. GE credit: QL, SE, SL, VL.—II. (II.) Zhang

192. Hydrologic Science Internship (1-12)

Internship - 3-40 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience off and on campus in water science. Internship supervised by a member of the faculty. (P/NP grading only.)

198. Directed Group Study (1-5)

(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: senior standing. (P/NP grading only.)

Immunology (A Graduate Group)

Nicole Baumgarth, D.V.M., Ph.D., Chairperson of the Group

Group Office. 5217 Vet Med 3A; (530) 754-0103;

http://immunology.compmed.ucdavis.edu/

lannis Adamopoulos., Assistant Professor (Rheumatology, Allergy and Clinical Immunology) Paul Ashwood, Ph.D., Associate Professor (Medical Microbiology, and Immunology)

Stephen Barthold, D.V.M., Ph.D., Professor and Director (Center for Comparative Pathology and Pathology, Microbiology and Immunology, Nicole Baumgarth, D.V.M., Ph.D., Professor

(Center for Comparative Medicine and Pathology, Microbiology and Immunology)
Andreas Baumler, Ph.D., Professor

(Medical Microbiology, and Immunology) Charles Bevins, M.D., Ph.D., Professor

(Medical Microbiology, and Immunology)
Christopher L. Bowlus, M.D., Associate Professor (Gastroenterology)

Kiho Cho, Ph.D., Associate Adjunct Professor

(Surgery) Satya Dandekar, Ph.D., Professor and Chair (Medical Microbiology, and Immunology) Kent L. Erickson, Ph.D., Professor (Cell Biology and Human Anatomy)

Laurel J. Gershwin, D.V.M., Ph.D., Professor (Pathology, Microbiology, and Immunology) Tzipora Goldkorn, Ph.D., Professor

(Pulmonary and Critical Care Medicine)
Leigh G. Griffiths, Vet.MB, MRCVS, Ph.D., Associate
Professor (Veterinary Medicine and Epidemiology)

Richard W. Harper, M.D., Ph.D., Associate Professor (Pulmonary and Critical Care Medicine)

James E.K. Hildreth, M.D., Ph.D., Professor and Dean (Molecular and Cellular Biology) Daniel Hwang, Ph.D., Adjunct Professor (Nutrition) Kirk C. Klasing, Ph.D., Professor (Animal Science) Hsing-Jien Kung, Ph.D., Professor and Deputy Director (Cancer Center Basic Science)

Kit S. Lam, M.D., Ph.D., Professor and Chief (Hematology and Oncology)
Bill Lasley, Ph.D., Professor Emeritus

(Population, Health and Reproduction) Pam Lein, Ph.D., Professor (Molecular Biosciences)

Patrick S.C. Leung, Associate Adjunct Professor (Rheumatology, Allergy and Clinical Immunology)
Fu-Tong Liu, M.D., Ph.D., Professor and Chair

(Dermatology)

Shirley Luckhart, Ph.D., Professor (Medical Microbiology, and Immunology) Emanual Maverakis, M.D., Assistant Professor

(Dermatology)
Stephen J. McSorley, Ph.D., Associate Professor (Center for Comparative Medicine and Anatomy Physiology and Cell Biology)
Lisa A. Miller, Ph.D., Associate Professor

(Anatomy, Physiology and Cell Biology) William J. Murphy, Ph.D., Professor (Dermatology) Lorena Navarro, Ph.D., Assistant Professor (Microbiology)

Robert T. O'Donnell, M.D., Ph.D., Associate Professor (Hematology and Oncology) John Peters, Ph.D., Associate Professor-in-Residence

(Internal Medicine) Kent E. Pinkerton, Ph.D., Professor and Director (Anatomy, Physiology and Cell Biology) Distinguished Teaching Award-Graduate/ Professional

David Pleasure, M.D., Ph.D. Professor (Neurology and Pediatrics)

Siba Raychaudhuri, M.D., Clinical Assistant Professor and Chief Rheumatologist (Sacramento VA Medical Center)

Grace L. Rosenquist, Ph.D., Assistant Adjunct Professor (Neurobiology, Physiology, and Behavior)

Barbara Shacklett, Ph.D., Associate Professor (Medical Microbiology, and Immunology)

Scott I. Simon, Ph.D., Professor (Biomedical Engineering)
Jay Solnick, M. D., Ph.D., Professor

(Center for Comparative Medicine and Medical Microbiology and Immunology)
Anthena Soulika, Ph.D., Assistant Professor

(Dermatology)

Ellen E. Sparger, D.V.M., Ph.D., Associate Adjunct Professor (Medicine and Epidemiology)

Charles B. Stephensen, Ph.D., Adjunct Professor (Western Human Nutrition Research Center) Jeffrey L. Stott, Ph.D., Professor

(Pathology, Microbiology, and Immunology)

Yoshikazu S. Takada, M.D., Ph.D., Professor (Dermatology)

Suzanne S. Teuber, M.D., Professor (Rheumatology, Allergy and Clinical Immunology)
Jose V. Torres, Ph.D., Professor

(Medical Microbiology, and Immunology) Alfonso Tramontano, Ph.D., Adjunct Professor

(Nephrology)
Renee M. Tsolis, Ph.D., Associate Professor (Medical Microbiology, and Immunology)
Joseph M. Tuscano, M.D., Professor
(Hematology and Oncology)

Judy Van de Water, Ph.D., Professor-in-Residence (Rheumatology, Allergy and Clinical Immunology) Andrew Vaughan, Ph.D., Professor

(Radiation Oncology)
Robert H. Weiss, M.D., Associate Professor (Nephrology)

Reen Wu, Ph.D., Professor (Anatomy, Physiology and Cell Biology) Heike Wulff, Ph.D., Associate Professor

(Pharmacology)

Tilahun D. Yilma, D.V.M., Ph.D., Director and Distinguished Professor of Virology (Medical Microbiology and Immunology and Pathology, Microbiology, and Immunology)

Graduate Study. The Graduate Group in Immunology is a multidisciplinary group offering a strongly interdisciplinary, flexible program in an exciting field of biology and medicine programs of study leading to the M.S. and Ph.D. degrees in various aspects of immunology. Participating faculty from various Schools and Departments at UC Davis provide research opportunities in the wide area of applied immunology. A focus of the program is infection and immunity, including host response regula-tion to parasites, viruses and bacteria and vaccine development and immune regulation. Other areas include nutrition and immunity, autoimmunity, cancer therapy and immune mediators and their uses for diagnosis and treatment.

Preparation. Applicants for candidacy to these programs should have completed undergraduate preparation in mathematics, physics, chemistry, biochemistry, molecular and cellular biology or related biological and medical sciences.

For work leading to the Ph.D. degree, the requirements include cell biology, chemical immunology, cellular immunology, immunohematology, and advanced immunology. In addition to these general requirements, more specialized preparation in at least one of the following is required: (a) microbiological specialties (bacteriology, virology, parasitology, medical microbiology); (b) zoological specialties (cell biology, endocrinology, embryology, proto-zoology, histology, cytology, physiology); (c) medical specialties (pathology, anatomy, pharmacology, clinical pathology, reproduction, hematology, epidemiology); (d) biochemistry/biophysics specialties (biologically active molecules, control mechanisms); (e) genetic specialties (developmental genetics, population genetics, cytogenetics, molecular genetics).

Graduate Adviser. See the graduate program website at

http://immunology.compmed.ucdavis.edu/people/.

Courses in Immunology (IMM)

Additional courses are available and listed under the individual sponsoring departments. Contact the Group office for information.

Graduate Courses

201. Introductory Immunology (4)

Lecture — 4 hours. Prerequisite: graduate standing. Comprehensive introduction to the principles of immunology. Limited enrollment.—İ. (I.) Miller

201L. Advanced Immunology Laboratory Rotations (4)

Laboratory/discussion-12 hours. Laboratory assignment in two research laboratories. Individual research problems with emphasis on methodological/procedural experience and experimental

design. Student writes a project outline and gives oral presentation. May be repeated two times for credit. (S/U grading only.)—İ. (I.) Ashwood

202L. Advanced Immunology Laboratory Rotations (5)

Laboratory/discussion-15 hours. Laboratory assignment in two research laboratories. One fourweek and one six week assignment in immunology research laboratories. Individual research problems with an emphasis on methodological/procedural experience and experimental design. May be repeated two times for credit. (S/Ŭ grading only.)-II. (II.) Bevins

203. Cancer Immunology (2)

Lecture — 1 hour; term paper. Covers concepts in cancer biology, progression and immune evasion. It will also cover topics such as: immune surveillance, immune effector mechanisms and current concepts in immune therapy. Offered in alternate years. - III. (III.)

204. Topics in Innate Immuniy (2)

Extensive writing or discussion-1 hour; performance instruction - 1 hour. Prerequisite: course 201 or equivalent; course 293 preferred. Restricted to first- or second-year GGI and MGG students; others with permission of instructor. Enrollment limited to 18 students. Covers current topics in the field of innate immunity through student seminar presentations and critical evaluation of the literature. Concepts include: pathogen recognition, intercellular communication, specialized cellular function and effector/signaling molecules. Offered in alternate years. — (IV.) Bevins

292. Immunotoxicology Seminar (2)

Seminar - 2 hours. Prerequisite: graduate standing in Pharmacology/Toxicology, Immunology, Physiology, or Biochemistry. Seminar presentations dealing with principles of xenobiotic effects on immune sys tem functions and specific examples of drugs and environmental chemicals exerting toxic effects on the immune system. Offered in alternate years. (S/U grading only.)—I. Golub

293. Current Concepts in Immunology (4)

Lecture/discussion-4 hours. Prerequisite: Pathology, Microbiology, and Immunology 126 or consent of instructor. Innate and acquired immunity as defense mechanisms against disease. Mechanisms regulating the distinct cell types driving these responses and current concepts in the literature. - II. Baumgarth

294. Comparative Clinical Immunology (4)

Lecture/discussion-4 hours. Prerequisite: Pathol ogy, Microbiology, and Immunology 126 or consent of instructor. Clinical immunology in animals and man. Pathogenesis of representative infectious diseases, hypersensitive reactions, and autoimmunity Emphasis on specific and nonspecific immune effector mechanisms to combat infections or mediate pathology. Not open for credit to students who have completed course 294A.—Gershwin, Van de Water

295. Cytokines (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: course 293 or consent of instructor. Cytokines and their involvement in human and animal physiology/ disease, molecular mechanisms and receptor signaling. Immune and non-immune actions. Overlapping/ redundant functions (referred to as the "cytokine network"). Offered in alternate years.—III. Érickson

296. Advanced Topics in Immunology (2)

Seminar-2 hours. Prerequisite: graduate standing or consent of instructor. Presentation, discussion, and analysis of faculty research topics in immunology. Required for Immunology Graduate Students every year until they have passed their qualifying exam. May be repeated for credit. (S/U grading only.)—I. (I.) Maverakis

297. Mucosal Immunology (2)

Lecture – 1 hour; discussion – 1 hour; term paper. Prerequisite: course 201 or equivalent. Basic concepts and current research topics in the field of mucosal immunology, with an emphasis on human immunology. Major emphases include innate and

adaptive mucosal immunity, the gastrointestinal tract, the lung, lymphocyte trafficking, and mucosal vaccination. Offered in alternate years. - II. Shacklett

Independent Study Program

Information. Chairperson, Committee on Courses of Instruction, c/o Academic Senate Office (530) 752-2231

The Independent Study Program provides an opportunity for upper division students to design and pursue a full quarter (12-15 units) of individual study in an area of special interest.

A program qualifying as Independent Study will consist of one or more courses in the 190–199 series. While the theme of such a program may be reasonably broad, a recognizable common thread should unite all the academic work you undertake during an independent study quarter. Regularly offered formal courses will only be acceptable as a part of such a program if they clearly fit its theme and contribute something essential toward the realization of its objectives. The program is not to be considered a way to take more variable-unit courses than normally

The procedure for enrolling in an Independent Study Program is as follows:

- (1) Develop, in general terms, a plan of study; (2) Locate a faculty sponsor or panel of sponsors and with their help and approval develop a detailed plan;
- (3) Complete a project proposal form (obtained from the Academic Senate office) and submit it to the Academic Senate Committee on Courses of Instruction.

The deadline for applications is the tenth day of instruction of the term before; see the Academic Calendar, on page 1, for specific dates.

You must report the completion or termination of the project to the Committee on Courses of Instruction.

Individual Major

(College of Agricultural and Environmental Sciences, College of Biological Sciences, and College of Letters and Science)

The Major Program

The Individual Major, an integrated program composed of courses from two or more disciplines, is designed by the student and is subject to approval by faculty advisers and appropriate college committees. This major enables a student to pursue a specific interest that cannot be accommodated within the framework of an existing major. It must clearly and specifically meet the student's educational goals as well as meet university and college academic

College of Agricultural and **Environmental Sciences**

The Individual Major in this College has been suspended indefinitely.

Program Office. 150 Mrak Hall (530) 752-0108

http://caes.ucdavis.edu/StudInfo/Advising/ undergraduate-advising

Student Proposal. An Individual Major may be organized by a student having a specific academic interest not represented by an established major. Each student wishing an Individual Major should submit a proposal to the Dean's Office, prior to reaching 120 units, for review by the Student Actions and Individual Major Subcommittee. This proposal must include (1) an essay describing the

special educational aims of the student, including a statement indicating why the educational objectives cannot be met by existing majors; (2) a list of planned courses; and (3) faculty adviser recommendations. It is critical that students contact a college counselor in the Dean's Office for consultation and development of the proposal.

Preparatory Subject Matter (variable)

Lower division courses basic to the program or needed to satisfy prerequisites for upper division requirements.

Depth Subject Matter 45-54

Upper division course work must include: (a) Interrelated courses of 45 upper division units from two or more areas of study; (b) At least one of the two or more areas of study must be within the College of Agricultural and Environmental Sciences; (c) At least 30 of the 45 upper division units that are required in the program must be taken from courses provided by the College of Agricultural and Environmental Sciences.

Unrestricted Electives (variable) Total Units for the Major......45-54

Master Adviser. Thomas Gordon, Ph.D. (Plant

College of Biological Sciences

Program Office. 202 Life Sciences

Student Proposal. A student who wishes to propose an individual major must submit the proposal to the Committee on Undergraduate Student Petitions prior to reaching 120 units. It is important for the student to make arrangements to speak with a counselor in the college early in the development of his/ her major as no individual major will be approved after a student has completed 120 units.

A.B. and B.S. Major Requirements:

Preparatory Subject Matter (variable)

Lower division courses basic to the program or needed to satisfy prerequisites for upper division requirements as determined by the Committee on Undergraduate Student

Depth Subject Matter45 units minimum

Upper division course work must include: (a) at least 30 units from courses offered by départments in the College of Biological Sciences;

(b) additional requirements as determined by the Committee on Undergraduate Student Petitions. See the Dean's Office for details. (c) for the B.A. degree, a maximum of 80 units toward the major; for the B.S. degree, a maximum of 110 units toward the major.

All University, General Education, and College of Biological Sciences Bachelor's degree requirements (variable) Total Units for the Degree 180

Principal Adviser (selected by student). A faculty member in a department or program in the College of Biological Sciences.

College of Letters and Science

Program Office. 200 Social Sciences and Humanities Building (Undergraduate Education and Advising office); http://www.ls.ucdavis.edu/

Committee in Charge

Karen L. Bales, Ph.D., Chairperson (Psychology) Shelley Blozis, Ph.D. (Psychology) Jon Rossini, Ph.D. (Theatre and Dance) Rajiv R.P. Singh, Ph.D. (Physics) John Terning, Ph.D. (Physics)

Student Proposal. A student who wishes to propose an individual major must submit the proposal to

the Faculty Committee on Individual Majors in the College of Letters and Science prior to reaching 120 units. The proposal must be submitted by the end of the fourth week of the quarter. This proposal will consist of (1) an essay, identifying the specific educational and professional objectives, including an indication of why the objectives cannot be met within existing majors, (2) a list of courses planned to complete the major, and (3) faculty adviser recommendations. The proposal will be reviewed and a decision provided the quarter of submittal. It is important that you carefully review the information in the Individual Majors Handbook; available at http://advising.ucdavis.edu/forms/default.aspx.

A.B. and B.S. Major Requirements:

Preparatory Subject Matter..... (variable)

Lower division courses basic to the program or needed to satisfy prerequisites for upper division requirements

Depth Subject Matter45-54

Upper division units must include: (a) interrelated and complementary courses from two or more departments which provide a unified pattern and focus; (b) at least 30 units from Letters and Science teaching departments or programs; (c) no more than 10 units in courses numbered 194H, 198 and 199; (d) for the A.B. degree, a maximum of 80 units toward the major; for the B.S. degree, a maximum of 110 units toward the major.

Total Units for Degree 180

Major Advisers (selected by student). Principal Adviser: a faculty member in a teaching department or program in the College of Letters and Science in the major field of emphasis. Secondary Adviser: a faculty member from a secondary area of

Honors Program. By the fourth week of the last quarter of the junior year, students potentially eligible for high or highest honors at graduation (see College section), may petition the Individual Majors Committee for tentative acceptance into an honors

Final admission will depend upon the Committee's approval of a senior thesis prospectus that has been agreed upon by the student and faculty adviser. The prospectus must be presented to the Committee by the end of the fourth full week of instruction of the first quarter of the senior year. Graduation with high or highest honors will be conditional upon both the maintenance of the required grade point average and the satisfactory completion of the senior thesis project. Students who anticipate doing a senior honors thesis should allow up to 3 units of independent study in the program during each of two quarters in the senior year as course options.

Integrated Studies Honors Program

James F. Shackelford, Ph.D., Program Director

Program Office. 1530 Surge III; (530) 752-9760; http://integratedstudies.ucdavis.edu

Faculty

John Boe, Ph.D., Emeritus (University Writing Program) Catherine Chin, Ph.D. Associate Professor (Religious Studies Finney, Gail, Ph.D., Professor (Comparative Literature) Robin Hill, B.F.A., Associate Professor (Art & Art History) Frank Hirtz, Ph.D., Associate Professor (Human and Community Development)

Jamison-McClung, Denneal, Ph.D., Associate Professor (Biotechnology) Naomi Janowitz, Ph.D., Professor (Religious Studies) George R. Mangun, Ph.D., Dean/Professor (College of Letters and Sciences/Psychology) Winder McConnell, Ph.D., Professor

(German and Russian) Bella Merlin, Ph.D., Professor (Theatre and Dance) Marco Molinaro, Ph.D., Lecturer

(Center for Biophotonics) Pablo Ortiz, D.M.A., Professor (Music) Sarah Pia Anderson, Ph.D., Professor (Theatre and Dance)

Kenneth A. Shackel, Ph.D., Professor (Pomology) Patricia Turner, Ph.D., Vice Provost/Professor (Undergraduate Education/African American Studies

D.R. Wagner, Ph.D., Lecturer (Design)

The Program of Study

The Integrated Studies Honors Program, a part of the University Honors Program, is an invitational, firstyear, residential honors program. Course offerings oriented toward undergraduate research opportunities are also offered beyond the freshman year. Established in 1969, the program aims to help highachieving students integrate knowledge gained from their study of the humanities, natural sciences, and social sciences and expand their learning experiences through interdisciplinary or multidisciplinary courses. Enrollment is limited to 25 students per class, and program membership is limited to the top 5% of the entering class.

Freshmen enroll in two Integrated Studies Honors Program courses and two seminars during the year. Students not admitted to the Program may not register for Integrated Studies Honors Program courses or seminars. Sophomores and Regents Scholars who receive that award as a junior enroll in three seminars during the year (Integrated Studies 90, 94, and 190). Juniors and Seniors enroll in Integrated Studies 194HA, 194HB and 190.

Courses in Integrated Studies (IST) Lower Division Courses

8. Colloquium (1)

Discussion-1 hour. Lectures, films, and readings on the interrelation between the arts and sciences. May be repeated for credit. (P/NP grading only.)—I. (I.)

8A. Special Topics in Natural Science and Mathematics (4)

Lecture—3 hours; discussion—1 hour. Group study of a special topic in natural sciences and mathematics. Course varies with topic offered. Limited enrollment. May be repeated for credit. GE credit: SciEng, Wrt | SE, SL. - I, II, III. (I, II.)

8B. Special Topics in Humanities (4)

Lecture - 3 hours; discussion - 1 hour. Group study of a special topic in humanities. Course varies with topic offered. Limited enrollment. May be repeated for credit. GE credit: ArtHum, Wrt | AH. – I, II, III. (I, II, III.)

8C. Special Topics in the Social Sciences (4)

Lecture—3 hours; discussion—1 hour. Group study of a special topic in social sciences. Course varies with topic offered. Limited enrollment. May be repeated for credit. GE credit: SocSci, Wrt | SS.-I, 11, 111. (1, 11, 111.)

9. Seminar (1)

Lecture — 1 hour. Preparation of a research report. Normally taken with course 8. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

90. Seminar (1)

Seminar - 1 hour. Prerequisite: course 9; consent of instructor; completion of 45 units with a minimum GPA of 3.250. Interrelation between the arts and sciences, focusing on a special topic. Limited to sophomores who participated in the Integrated Studies Honors Program during their freshman year and transfer students by consent of instructor. (P/NP grading only.) — I. (I.)

94. Seminar (1)

Seminar-1 hour. Prerequisite: course 9, consent of instructor and completion of 45 units with a minimum GPA of 3.500. Restricted to sophomores who participated in the Integrated Studies Honors Program during their freshman year and other students by consent of instructor. The nature of research at the undergraduate level. (P/NP grading only.)

Upper Division Courses

190. Topics in Integrated Studies (1)

Seminar-1 hour. Prerequisite: course 9. Discussion of the integration of the arts and sciences, focusing on a special topic. May be repeated three times for credit when topic differs. (P/NP grading only.)

194HA. Special Study for Honors Students

Independent study-3 hours; seminar-1 hour. Prerequisite: course 9, consent of instructor and completion of 90 units with a minimum GPA of 3.500. A program of research culminating in the writing of \boldsymbol{a} junior honors thesis under the direction of a faculty adviser. May be repeated one time for credit. (Deferred grading only, pending completion of sequence.) — I-II. (I-II.)

194HB. Special Study for Honors Students

Independent study—3 hours; seminar—1 hour. Pre-requisite: course 9, consent of instructor and completion of 90 units with a minimum GPA of 3.500. A program of research culminating in the writing of a junior honors thesis under the direction of a faculty adviser. May be repeated one time for credit. (Deferred grading only, pending completion of sequence.)—II. (II.)

197T. Tutoring in Integrated Studies (1-4)

Tutorial-1 hour. Prerequisite: consent of Director of Integrated Studies Honors Program. Tutoring in Integrated Studies courses, usually in small discussion groups. Weekly discussions with the instructor on the subject matter of the course being tutored and on the art and craft of teaching. May be repeated eight times for credit. (P/NP grading only.)—I, II, III. (I, II,

Interior Design

See Design, on page 215.

Internal Medicine

See Medicine, School of, on page

International Agricultural Development

(College of Agricultural and Environmental Sciences) International Agricultural Development is an interdisciplinary major in the Plant Sciences department.

Faculty. Includes members from various depart-

The Major Program

The goal of international agricultural development is to improve food production, nutrition, marketing, and health in less technically advanced countries. Students in this major are trained in technical areas of agriculture that can be applied to the problems of world hunger and health.

The Program. Principle subjects of study within the major are Agricultural Production, Economic Development, Environmental Issues, Nutrition, Rural Communities, and Trade and Commodity Development. Courses are in social sciences, humanities, and economic environments in which agriculture operates in countries outside the United States

Career Alternatives. The study of international agricultural development prepares a student for a variety of careers. Some students choose service through the Peace Corps. Others seek employment in international trade, while others choose to work for a governmental or private agency in a foreign nation. Religious groups and organizations also employ university-trained individuals for agricultural work in conjunction with missions and other types of human service work overseas. The major is also preparation for further graduate work in agricultural development.

B.S. Major Requirements:

UNITS

Preparatory Subject Matter.....47

Choose 47 units from either the Social Science or Natural Science core in consultation with adviser

Social Sciences core: Agricultural and Resource Economics 15; Plant Sciences 1; Animal Science 41 and 41L or Plant Sciences 2; Chemistry 10; Community and Regional Development 1; Economics 1A and 1B; International Agricultural Development 10; Mathematics 16A and 16B; Nutrition 10 or 20; Sociology 1 or Anthropology 2; Soil Science 10; Statistics 13 or Sociology 46B Natural Science core: Animal Science 41 and 41L or Plant Sciences 2; Biological Sciences 2A and 2B or 2A and 2C Chemistry 2A and 2B; Chemistry 8A and 8B or Physics 1A and 1B; Economics 1A or Agricultural and Resource Economics 15; International Agricultural Development 10; Mathematics 16A and 16B; Nutrition 10 or 20; Soil Science 10 or 100; Statistics 13

Depth Subject Matter36-37 Agricultural and Resource Economics 147

Agricultural and Resource Economics 147
or Plant Sciences 101 or Geography
1614
Economics 115A4
International Agricultural Development
142 or 1602-3
International Agricultural Development
103 and International Agricultural
Development 1708
Sociology 1704
Plant Sciences 110A, 110C, or 135;
Plant Sciences 142 3-4
Community and Regional Development
142 or 1524
Political Science 123 or 124 or Sociology
145A4
Textiles and Clothing 1743

Foreign Language Requirement.....0-15

Students must complete 15-unit level in one language or pass the foreign language proficiency examination. A score of 5, 4, or 3 on a foreign language College Board Advanced Placement Examination (except Latin) or a score of 550 on the College Board SAT II: Subject Test will also satisfy this requirement.

Internship Requirement......4-8

Students must complete at least 4 units of internship and may use up to 8 units toward major requirements. Internships can be chosen in consultation with an adviser. Internship requirement waived for students enrolled in the UC Education Abroad Program.

Areas of Specialization...... 30-35 Agricultural Production Option:

Agricultural and Resource Economics 140, Plant Sciences 101 and 105 or Animal Genetics 107

Additional 14-15 units of restricted electives in consultation with an adviser

Economic Development Option:

Agricultural and Resource Economics 100A and 100B, Economics 115B Agricultural and Resource Economics 120, 130, 140, 175 and International Agricultural Development 195A or 195B

Environmental Issues Option:

Students must consult with a faculty adviser to identify an emphasis within the option and to select suitable courses. Environmental Science and Policy 100 or 110, 160, 171 and Plant Biology 151 Agricultural and Resource Economics 147, Plant Sciences 101, Environmental Horticulture 150, Environmental Science and Policy 161, 175 and International Agricultural Development 195A

Rural Communities Option:

Community and Regional Development 140, 151, 151L, 152, 154 Community and Regional Development 164 or 172, International Agricultural Development 195A, additional restricted electives chosen in consultation with an

Trade and Development in Agricultural **Commodities Option:**

Agricultural and Resource Economics 100A, 113, 130, Plant Biology 172 Agricultural and Resource Economics 138, Economics 160A, 160B, Food Science and Technology 100A, 109, 160, International Agricultural Development 195A, Textiles and Clothing 162, 163

Total Units for Major...... 117-142 **International Agricultural Development** Abroad 0-20

A maximum of five courses abroad, selected with approval of an adviser, may be applied toward the 12 upper division courses in the major.

Specialization Advisers

A listing of faculty in the various areas of specialization and with interests in International Agricultural Development is available from the Major Adviser.

Major Adviser. P. Brown in 3041 Wickson Hall

Advising Center for the major is located in 1220 Plant and Environmental Sciences (530) 752-1715.

Minor Program Requirements:

International Agricultural Development...... 21-23

International Agricultural Development 10 and Agricultural and Resource Economics 115A..... Plant Sciences 101, 110A, 110C, International Agricultural Development 103, 170, 195A or Community and Regional Development 142 7-8

Minor Adviser. F. Hirtz in 1333 Hart Hall

Graduate Study. A program of study and research leading to the M.S. degree is available in International Agricultural Development. Detailed information regarding graduate study may be obtained by writing to the Graduate Program Coordinator for IAD (dddamanchyk@ucdavis.edu) or visiting the Graduate Studies' website at http:// www.gradstudies.ucdavis.edu/programs/ program_detail.cfm?id=57.

Graduate Advisers. Richard E. Plant (Plant Sciences), Stephen Boucher (Agricultural and Resource Economics), Patrick Brown (Plant Sciences), Paul L. Gepts (Plant Sciences), Frank Hirtz (Human and Community Development)

Related Courses. See Agricultural and Resource Economics 148, 215C, Agricultural Management and Rangeland Resources 111, Anthropology 221, Economics 115A-115B, 215A-215B-215C, Geography 142, Nutrition 20, Sociology 144.

Courses in International Agricultural Development (IAD)

Questions pertaining to the following courses should be directed to the instructor or to the Department of Plant Sciences Advising Center in 1220 Plant and Environmental Sciences (530) 752-1715.

Lower Division Courses

10. Introduction to International Agricultural Development (4)

Lecture - 3 hours; discussion - 1 hour. Theories, practices and institutions relating to agricultural development; the interaction of changing social, cultural and economic organization through successive stages of economic development; impact of new agricultural technology on underdeveloped regions. GE credit: SocSci, Div, Wrt | SS, WC, WE.-II. (II.) Brown

92. Internship (1-12)

Internship—3-36 hours. Prerequisite: consent of instructor. Supervised internship, off and on campus, in community and institutional settings. (P/NP grading only.) — I, II, III. (I, II, III.)

Upper Division Courses 103. Social Change and Agricultural Development (4)

Lecture/discussion-4 hours. Prerequisite: introductory social science course (Anthropology, Sociology, Economics, International Agricultural Development). How social and cultural factors influence technological change in agriculture; theories of diffusion of innovations; social impact analysis and technology assessment. GE credit: SocSci, Div | SS, WE. – I. (I.) Brush

142. Equipment and Technology for Small Farms (2)

Lecture — 1 hour; laboratory — 3 hours. Types and characteristics of agricultural equipment and technologies appropriate for small commercial farming. Adjustment and calibration of equipment. Selection of and budgeting for equipment. (Same course as Applied Biological Systems Technology 142.)—III. (III.) Shafii

160. Agroforestry: Global and Local Perspectives (3)

Lecture/discussion-3 hours. Prerequisite: Plant Sciences 2 or Biological Sciences 1C or 2C; Plant Sciences 142 or 150 or Biological Sciences 2B or a general ecology course. Traditional and evolving use of trees in agricultural ecosystems; their multiple roles in environmental stabilization and production of food, fuel, and fiber; and socioeconomic barriers to the adoption and implementation of agroforestry practices. Not open for credit to students who have taken previously taken Agricultural Management and Rangeland Resources 160. (Former course Agricultural Management and Rangeland Resources 160.) (Same course as Plant Sciences 160.) Offered in alternate years. GE credit: SE.-I. Gradziel

162. Field Course in Tropical Ecology and Sustainable Agricultural Development (8)

Lecture - 20 hours; discussion - 10 hours; field work-30 hours. Prerequisite: consent of the instructor; Biological Sciences 1C required; Biological Sciences 1A or 1B or course 10 recommended. Limited enrollment; accepted based on academic merit, personal experience, and academic discipline in order to provide a multidisciplinary atmosphere. International Field Course. Tropical Ecology of various ecosystems; Agricultural systems in the tropics; Sustainable agriculture - uniting ecology and agriculture, language and culture, trips to field research

stations and ecotourism field trips required. No credit given to students who have taken Pomology 162. GE credit: SciEng, Div, Wrt | SE, WC, WE.

170. Program Development for International Agriculture (4)

Lecture/discussion-4 hours. Prerequisite: course 10. Principles of leadership and management for international agricultural development. Organizations and organizational behavior, and the implications for planning and administering organizations involved in the global development effort.

190. Proseminar in International Agricultural Development (1)

Seminar-1 hour. Presentation and discussion of current topics in international agricultural development by visiting lecturers, staff and students. May be repeated for credit. (P/NP grading only.)

192. Internship (1-12)

Internship - 3-36 hours. Prerequisite: consent of instructor. Supervised internship, off and on campus, in community and institutional settings. (P/NP grading only.) — I, II, III. (I, II, III.)

195A. Field Study in Agricultural Development-California (3)

Lecture - 2 hours; seminar - 8 hours; fieldwork. Prerequisite: consent of instructor. Students will incur travel expenses. Observation of agricultural development strategies and effects on rural communities. Discussion with farmers, workers and organizational staff members. Study of farm commodities, institutions and experiences in dealing with agricultural development problems. International influence on U.S. agriculture. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. Directed group study. (P/NP grading only.)—I, II, III. (I, II, IIĪ.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. Special study for advanced undergraduates. (P/NP grading only.)—I, II, III. (I, II, III.)

Graduate Courses

200N. Philosophy and Practice of Agricultural Development (5)

Lecture/discussion - 5 hours; term paper. Introduces key elements of philosophy and practice of agricultural development in less developed countries; major paradigms of development; historical context within which these paradigms operate; various development techniques and initiatives emerging from agricultural production to institutional capacity building and management. Not open for credit to students who have completed former course 202.

201. The Economics of Small Farms and Farming Systems (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Agricultural and Resource Economics 100A. Economic perspective on small farm development. Establishes a basis for predicting farmers' responses to changes in the economic environment, and for proposing government policies to increase small farm production and improve farmer and national welfare.—II. (II.) Jarvis

202N. Analysis and Determinants of Farming Systems (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Plant Sciences 150 or the equivalent. Unifying concepts of cropping systems in temperate and tropical climatic zones; agroecosystems stability, diversity and sustainability; management strategies, resource use efficiency and their interactions; role of animals, their impact on energy use efficiency, nutrient cycling, and providing food and power. Not open for credit to students who have completed former course 200.-III. (III.) Bell, Van Kessel

203N. Project Planning and Evaluation (4)

Discussion-1 hour; workshop-3 hours. Prerequisite: courses 200N (or former course 202), 201, 202N (or former course 200). Interdisciplinary setting for application of student skills and specialization to a "real world" development project. Focus on team-building and effective interdisciplinary problem-solving methods, with the objective of producing a project document and presentation within a specified deadline. Not open for credit to students who have completed former course 203.-III. (III.) Miller

217. Conservation and Sustainable **Development in Third World Nations (4)**

Lecture/discussion-3 hours; fieldwork-2 hours. Prerequisite: at least one course from two of these three groups: a) Environmental Science and Policy 160, 161, 168A, 168B; b) Environmental Science and Policy 101, 133, International Agricultural Development 103, Geography 142; c) Anthropology 126, 131, Geography 141, Sociology 144, 145A, 145B. Examination of the patterns of resource ownership, control and management in agricultural lands, extractive zones (fisheries, forests) and wildlands, with emphases on conservation and sustainability. Comparison of industrial democracies and poorer nations. (Same course as Ecology 217.)

220. Food and Nutrition Strategies in **Developing Countries (4)**

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Agricultural and Resource Economics 100A. Identifies important topical problems in food and nutrition policy, develops theoretical frameworks suitable for their analysis, examines the empirical information relevant to the problems and, using theory data, draws appropriate policy implications. Offered in alternate years.

290. Seminar in International Agricultural Development (1-2)

Seminar — 1-2 hours. Prerequisite: consent of instructor. Discussion and critical evaluation of advanced topics and issues in international agricultural development. May be repeated for credit. (S/U grading only.)-I, II, III. (I, II, III.) Al-Khatib, Van Horn

291. Topics in International Agricultural Development (1-3)

Lecture/discussion - 1-3 hours. Prerequisite: consent of instructor. Selected topics dealing with current issues in agricultural development in lesser developed nations. Variable content. May be repeated one time for credit. - I, II, III. (I, II, III.)

292. Graduate Internship (1-12)

Internship — 3-36 hours. Prerequisite: participation in H. Humphrey Fellow Program or consent of instructor. Individually designed supervised internship, off or on campus, in community, business or institutional setting. Developed with advice of faculty mentor and Humphrey Coordinator. (S/U grading only.)—I, II, III. (I, II, III.)

298. Directed Group Study (1-5)

Prerequisite: consent of instructor. Directed group study. (S/U grading only.)-I, II, III. (I, II, III.)

299. Research (1-12)

Prerequisite: consent of instructor. Research. (S/U grading only.)—I, II, III. (I, II, III.)

Professional Course

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. Teaching assistant training practicum. May be repeated for credit. (S/U grading only.) — I, II, III. (I, II, III.)

International Agricultural Development (A Graduate Group)

Kassim Al-Khatib, Ph.D. Professor (Plant Sciences) Chairperson of the Group

Group Office. 205 Hunt Hall (530) 754-4424; http://iad.ucdavis.edu

Faculty

Wil Agatstein, Ph.D., Adjunct Faculty (Graduate School of Management) Diane M. Barrett, Ph.D., Specialist in Cooperative Extension (Food Science and Technology) Mark Bell, Ph.D., Lecturer (Plant Sciences) Stephen Boucher, Ph.D., Associate Professor (Agricultural and Resource Economics) Kenneth H. Brown, Ph.D., Professor (Nutrition) Patrick H. Brown, Ph.D., Professor (Plant Sciences) Marita Cantwell-De-Trejo, Ph.D., Specialist in Cooperative Extension, and Lecturer (Food Science and Technology) Tim E. Carpenter, Ph.D., Professor (VM: Medicine and Epidemiology) Colin A. Carter, Ph.D., Professor (Agricultural and Resource Economics) Michael R. Carter, Ph.D., Professor

(Agricultural and Resource Economics) Patricia A. Conrad, D.V.M., Ph.D., Professor (Pathology, Microbiology, and Immunology)
Kathryn G. Dewey, Ph.D., Professor (Nutrition)
Serge I. Doroshov, Ph.D., Professor (Animal Science) Richard Evans, Ph.D., Specialist in Cooperative Extension (Plant Sciences)

James Fadel, Ph.D., Professor (Animal Science) Steven Fennimore, Ph.D., Cooperative Extension Specialist (Plant Sciences)

Louise Ferguson, Ph.D., Specialist in Cooperative Specialist (Plant Sciences) Howard Ferris, Ph.D., Professor (Nematology) Albert Fischer, Ph.D., Professor (Plant Sciences)

Ryan E. Galt, Ph.D., Assistant Professor (Human and Community Development) Shu Geng, Ph.D., Professor (Plant Sciences) Paul L. Gepts, Ph.D., Professor (Plant Sciences) Robert Gilbertson, Ph.D., Professor (Plant Pathology) Barbara G. Goldman, Ph.D., Lecturer (Education Rachael Goodhue, Ph.D., Associate Professor (Agricultural and Resource Economics)

Thomas Gradziel, Ph.D., Professor (Plant Sciences) Richard D. Green, Ph.D., Professor

(Agricultural and Resource Economics) Luis Guarnizo, Ph.D., Professor

(Human and Community Development)
Bruce R. Hartsough, Ph.D., Professor
(Biological and Agricultural Engineering) Timothy K. Hartz, Ph.D., Specialist in Cooperative Extension and Lecturer (*Plant Science*)

James Hill, Ph.D., Agronomist (*Plant Sciences*) Robert Hijmans, Ph.D., Associate Professor

(Environmental Science and Policy) Frank W. Hirtz, Ph.D., Senior Lecturer

(Human and Community Development)
William Horwath, Ph.D., Professor
(Land, Air and Water Resources)

Russell C. Hovey, Ph.D., Associate Professor (Animal Science)

Theodore Hsiao, Ph.D., Professor

(Land, Air and Water Resources) Silas S. O. Hung, Ph.D., Professor (Animal Science) Lovell S. Jarvis, Ph.D., Professor

(Agricultural and Resource Economics) Bryan M. Jenkins, Ph.D., Professor (Biological and Agricultural Engineering)

Marion Jenkins, Ph.D., Research Engineer (Civil and Environmental Engineering)

Suad Joseph, Ph.D., Professor (Anthropology, Women and Gender Studies) Katrina Jessoe, Ph.D., Assistant Professor

(Agricultural and Resource Economics) Lucia Kaiser, Ph.D., Community Nutrition Specialist

in Cooperative Extension (Nutrition) Martin Kenney, Ph.D. Professor

(Human and Community Development) Emilio A. Laca, Ph.D., Professor (Plant Sciences)

W. Thomas Lanini, Ph.D., Specialist in Cooperative Extension and Lecturer (*Plant Sciences*)

Bruce Linquist, Ph.D., Professional Researcher (Plant Sciences) Jay Lund, Ph.D., Professor

(Civil and Environmental Engineering) Travis Lybbert, Ph.D., Associate Professor (Agricultural and Resource Economics) Miguel A. Marino, Ph.D., Professor (Land, Air and Water Resources; Civil and Environmental Engineering)

Philip E. Martin, Ph.D., Professor (Agricultural and Resource Economics) Mark A. Matthews, Ph.D., Professor

(Viticulture and Enology)
G. David Miller, M.Sci., Lecturer (Plant Sciences) Elizabeth J. Mitcham, Ph.D., Specialist in Cooperative Extension (Plant Sciences)

Jeffrey P. Mitchell, Ph.D., Specialist in Cooperative Extension and Lecturer (*Plant Sciences*) Donald Nevins, Ph.D., Professor (*Plant Sciences*) Raul H. Piedrahita, Ph.D., Professor

(Biological and Agricultural Engineering) Dan Potter, Ph.D., Professor (Plant Sciences)

Daniel Putnam, Ph.D., Cooperative Extension Specialist, Agronomist and Lecturer (Plant Sciences)
Pamela C. Ronald, Ph.D., Professor

(Plant Pathology)

Scott Rozelle, Ph.D., Adjunct Professor (Agricultural and Resource Economics) Roberto D. Sainz, Ph.D., Professor (Animal Science)

Richard Sexton, Ph.D., Professor (Agricultural and Resource Economics)

Rajinder Paul Singh, Ph.D., Professor (Biological and Agricultural Engineering)

Johan Six, Ph.D., Professor (*Plant Sciences*) Michael P. Smith, Ph.D., Professor (Human and Community Development)

Christine Stewart, Ph.D., Assistant Professor (Nutrition)

Daniel A. Sumner, Ph.D., Professor (Agricultural and Resource Economics) J. Edward Taylor, Ph.D., Professor

(Agricultural and Resource Economics) Larry R. Teuber, Ph.D., Professor (Plant Sciences) Tom Tomich, Ph.D., Director (Sustainable Agriculture

Research and Education Program) Cary Trexler, Ph.D., Associate Professor (School of Education)

Mark Van Horn, M.Sci., Lecturer (*Plant Sciences*) Chris van Kessel, Ph.D., Professor (*Plant Sciences*) Stephen Vosti, Ph.D., Associate Adjunct Professor (Agricultural and Resource Economics)

Karen Watson-Gegeo, Ph.D., Professor (School of Education) Distinguished Graduate Mentoring Award

Bruce Winterhalder, Ph.D., Professor (Anthropology)
Joshua Viers, Ph.D., Associate Research Ecologist (Environmental Science and Policy)

Aram A. Yengoyan, Ph.D., Professor (Anthropology) Tilahun D. Yilma, Ph.D., Professor

(Pathology, Microbiology, and Immunology) Glenn Young, Ph.D., Professor

(Food Science and Technology) Truman P. Young, Ph.D., Professor (Plant Sciences) Frank G. Zalom, Ph.D., Professor (Entomology)

Minghua Zhang, Ph.D., Associate Adjunct Professor (Land, Air and Water Resources) Ruihong Zhang, Ph.D., Professor

(Biological and Agricultural Engineering)
Richard A. Zinn, Ph.D., Professor (Animal Science)

Emeriti Faculty

David Boyd, Ph.D., Professor Emeritus (Anthropology) Stephen Brush, Professor Emeritus

(Human and Community Development) Montague W. Demment, Ph.D., Professor

(Plant Sciences) Theodore C. Foin, Ph.D., Professor Emeritus

(Plant Sciences) Isao Fujimoto, M.A., Lecturer Emeritus

(Human and Community Development)
James I. Grieshop, Ph.D., Emeritus Specialist in
Cooperative Extension (Human and Community Development)

Louis E. Grivetti, Ph.D., Professor Emeritus (Nutrition)
Theodore C. Hsiao, Ph.D., Professor Emeritus
[Land, Air and Water Resources]

E. Dean MacCannell, Ph.D., Professor Emeritus

(Environmental Design)
Janet D. Momsen, Ph.D., Professor Emeritus (Human and Community Development)

Richard E. Plant, Ph.D., Professor Emeritus (Plant Sciences)

Ernesto Pollitt, Ph.D., Professor Emeritus (Nutrition, Pediatrics)

William Rains, Ph.D., Professor Emeritus (Plant Sciences)

Michael S. Reid, Ph.D., Professor Emeritus (Plant Sciences)

Pete Richerson, Ph.D., Professor Emeritus (Environmental Science and Policy) Ronald E. Voss, Ph.D., Specialist in Cooperative Extension Emeritus (*Plant Sciences*)

Steven Weinbaum, Ph.D., Professor Emeritus (Plant Sciences)

Miriam J. Wells, Ph.D., Professor Emeritus (Human and Community Development)

Graduate Study. The International Agricultural Development M.S. degree program prepares students for careers in global agricultural and rural development, especially, but not exclusively, of developing and less-industrialized regions. This is an interdisciplinary program designed to provide students with knowledge and skills that will enable them to implement, facilitate, and manage programs that enhance agricultural development, resource management, and rural life.

Students are prepared to realize biological and technological improvement in agricultural and natural systems to facilitate social innovation. Training in International Agricultural Development includes both breadth and depth components. Breadth components, required of all M.S. students, aim to establish an understanding of the issues in international development as they relate to agriculture and the environment. These include the history and philosophy of development, leadership and management tech-niques, fundamentals of farming systems, and agricultural economics. Students acquire depth in their own areas of specialization within the agricultural and social sciences. The areas include agricultural and resource economics, agricultural engineering, agronomy, animal science, anthropology, aquaculture, avian science, community development, ecology, economics, entomology, environmental design, environmental toxicology, food science, gender, geography, horticulture, nutrition, plant pathology, plant biology, plant protection and pest manage ment, political science, preventive veterinary medicine, range science, sociology, soil science, sustainable agriculture, vegetable crops, viticulture, and water science.

Practical and on-site experience with development issues is encouraged and facilitated by guidance from the group's approximately 98 faculty members, who possess a wide range of experience in international development.

Graduate Adviser. Contact the Group office.

International **Commercial Law** (A Graduate Group)

Daniel L. Simmons, J.D., Chairperson of the Group Beth Greenwood, J.D., Director, International Programs, UC Davis School of Law

Group Office. International Law Programs, School of Law & UC Davis Extension, 1333 Research Park Drive, Davis, CA 95618 (530) 757-8569; lawinfo@ucde.ucdavis.edu http://www.law.ucdavis.edu/international

Courses are taught by School of Law faculty from UC Davis and other University of California law schools, the Graduate School of Management, Departments of Economics and Agricultural and Resource Economics. Additionally, outstanding practitioners from private practice and government—lawyers, economists, bankers, businessmen-have acted as adjunct faculty to provide an applied perspective through lectures, simulations and case stud-

Graduate Study

The Graduate Group in International Commercial Law offers a program of study and research leading to the LL.M.degree through a summer only program. Students are required to take 36 quarter units of study over two, three, four, or five summers. Thirty of the units must be UC Davis courses. Six units may be completed in another country with the approval of the Director of the ICL program. The classes are taught in an intensive format of 20 hours per week or four hours per day, two hours of lecture in the morning, two hours in the afternoon. Students complete four core courses, starting with the Orientation to U.S.A. Law and followed by three specialized core courses in international commercial law. Elective courses then provide in-depth study in focused topics such as private international law, conflict of laws, intellectual property, business associations, antitrust, tax, securities and finance and the like. Students also complete a research paper.

Preparation

Foreign applicants must present satisfactory evidence of the completion of legal academic training at an accredited educational institution. Domestic applicants must have completed at least six years of resident study at accredited colleges and law schools and must hold a professional degree from a law school approved by the American Bar Associa-

Graduate Advisors. Beth Greenwood (International Programs, School of Law), Dan Simmons (School of Law)

Courses in International Commercial Law (ICL)

ICL courses are taught in an intensive format during the summer quarter. For more information, contact the International Law Programs at (530) 757-8569 or e-mail at lawinfo@ucde.ucdavis.edu.

Graduate Courses

201. Orientation in United States Law (7)

Lecture/discussion-20 hours. Prerequisite: law school education or the equivalent. Investigation of the Common Law System of the United States. Includes structure of the U.S. government, Constitutional law, contracts, torts, real property, consumer law, securities law, intellectual property, antitrust, taxation, labor law, environmental law, ethics, remedies, legal research and trial practice.

202. Introduction to Contracts (4)

Lecture/discussion-20 hours. Prerequisite: Law school education or the equivalent. Examines sorts of promises that are enforced and the nature of protection given promissory obligations in both commercial and noncommercial transactions. Inquiry is made into the means by which traditional doctrine adjusts to changing social demands. Offered irregularly. — IV.

203. Civil Procedure (2)

Lecture/discussion-20 hours. Prerequisite: Law school education or the equivalent. Study of the fundamental and recurrent problems in civil actions including the methods used by federal and state courts to resolve civil disputes. Offered irregularly. -

204. International Joint Ventures (3)

Lecture/discussion-20 hours. Prerequisite: course 201, law school education or the equivalent. International and U.S. business and legal transactions. Legal planning, problem solving, decision making and negotiations related to the break-up and dissolution of a major international joint venture. U.S. laws including finance, tax, bankruptcy, labor, antitrust, environmental, corporate structures and intellectual property. Offered every three years.

205. Introduction to Constitutional Law (4)

Lecture/discussion-20 hours. Prerequisite: Law school education or the equivalent. Principles, doctrines and controversies regarding the structure and division of powers in American government. Includes judicial review, jurisdiction, standing to sue, federalism, federal and state powers and immunities, and the separation of powers among branches of the federal government. Offered irregularly. – IV.

211. Negotiations and Alternative Dispute Resolution (1)

Lecture/discussion - 10 hours. Prerequisite: course 201, law school education or the equivalent. Mechanisms for resolving disputes including the alternatives to litigation such as negotiation, mediation, and arbitration. Advantages and disadvantages of each approach. Offered in alternate years.

212. Introduction to Negotiation (2)

Lecture/discussion-20 hours. Prerequisite: Law school education or the equivalent. Introduction to theoretical and empirical approaches to negotiation for the purposes of making deals and resolving legal disputes. Offered irregularly. - IV.

214. Advanced Negotiation (2)

Lecture/discussion-20 hours. Prerequisite: Law school education or the equivalent. Principles and empirical approaches to advanced negotiations including negotiation framework, models, styles, multiple party/issue negotiations and settlements. Offered irregularly. — IV

2145. Advanced Negotiation (2)

Lecture/discussion-20 hours. Prerequisite: Law school education or equivalent. Principles and empirical approaches to advanced negotiations including negotiation framework, models, styles, multiple party/issue negotiations and settlements.

215. Business Associations (4)

Lecture/discussion-20 hours. Prerequisite: course 201, law school education or the equivalent. Legal rules and concepts applicable to business associations including general partnerships, joint ventures, limited partnerships, limited liability entities, and sole proprietorships. Offered in alternate years.

215S. Business Associations (4)

Lecture/discussion - 20 hours. Prerequisite: Law School education or equivalent; course 201. Legal rules and concepts applicable to business associations including general partnerships, joint ventures, limited partnerships, limited liability entities, and sole proprietorships

216. International Business Transactions (2)

Lecture/discussion - 20 hours. Prerequisite: course 201 and law school education or the equivalent. Legal problems arising from international business transactions. Focus on international sales contracts, choice of law, forum selection clauses, letters of credit, transfers of technology, regulation of bribery, development of joint ventures, repatriation of profits, foreign exchange problems, and national efforts to control imports. Offered in alternate years.

217. Alternative Dispute Resolution (2)

Lecture/discussion-20 hours. Prerequisite: Law school education or the equivalent. Introduces students to a wide variety of alternative dispute resolution procedures, with an in-depth emphasis on negotiation, mediation and arbitration. Offered irregularly.—IV.

219. Advanced Writing Project (4)

Project. Prerequisite: course 201, law school education or the equivalent. The completion of a written research project under the active supervision of a faculty member in satisfaction of the research-writing requirement. (S/U grading only.)

220. United States Taxation of Multinational Investments (2)

Lecture/discussion - 20 hours. Prerequisite: course 201, law school education or the equivalent. An analysis of the United States taxation of multinational investments including jurisdiction of tax, the U.S. tax system, foreign tax credits, treaties, and transfer pricing. Offered in alternate years.

227. Criminal Procedure (2)

Lecture/discussion—20 hours. Prerequisite: Law school education or equivalent. Federal constitutional limits on government authority to gather evidence and investigate crime. Includes Fourth Amendment limits on search, seizure, and arrest; Fifth Amendment privilege against self-incrimination; Sixth Amendment right to counsel. Not offered every year.—IV.

236. United States Securities Law and Regulation (2)

Lecture/discussion—20 hours. Prerequisite: course 201, law school education or the equivalent. Structural and jurisdictional issues associated with securities practice. Topics include the regulation of public offerings, transactions by corporate insiders, regulation of corporate disclosure and conduct, and the liabilities of corporations and individuals under antifraud provisions. Offered in alternate years.

239. Mediation (2)

Lecture/discussion—20 hours. Prerequisite: Law school education or the equivalent. Introduction to the mediation process. Development of communication skills, the ability to analyze disputes, to understand why mediations succeed or fail, and understand the advantages and limitations of mediation as a method of resolving disputes. Offered irregularly.—IV.

242. Private International Law (2)

Lecture/discussion—20 hours. Prerequisite: course 201; Law School education or equivalent. Operating law across national borders; emphasis on methods of resolving international disputes. International aspects of jurisdiction, choice of law, judgment enforcement, forum choice, process service, taking of evidence, foreign sovereign immunity, extraterritorial regulation of antitrust, securities; other national laws. Offered in alternate years.—(IV.) Wolff

2425. Private International Law (2)

Lecture/discussion—20 hours. Prerequisite: course 201; Law School education or equivalent. Operating law across national borders; emphasis on methods of resolving international disputes. International aspects of jurisdiction, choice of law, judgment enforcement, forum choice, process service, taking of evidence, foreign sovereign immunity, extraterritorial regulation of antitrust, securities; other national laws.—Wolff

247. Banking Law (1)

Lecture/discussion—10 hours. Prerequisite: course 201, law school education or the equivalent. Institutional features of international banking transactions, the structure of a large financial deal, and the mechanics of overseeing large loans. Emphasis on negotiable instruments such as bills of lading, letters of credit, standby letters of credit, and interbank transactions. Offered in alternate years.

249. Comparative Law (1)

Lecture/discussion—10 hours. Prerequisite: course 201 and law school education or the equivalent. A comparative study of the development of schools of legal thought, chiefly Common law systems and Civil law traditions. Attention to the historical reasons for their divergence, contemporary approaches to universal problems such as succession, torts, and contracts, the cross-fertilization of laws and difficulties commonly associated with importing foreign law into new territory. Offered in alternate years.

250. International Trade Law (3)

Lecture/discussion—20 hours. Prerequisite: course 201, law school education or the equivalent. An investigation of global trading systems including international trade in goods and services, e-commerce, international intellectual property, international tax planning and investment. Includes substantive and procedural provisions of the World Trade Organization (WTO) and the North American Free Trade Agreement (NAFTA). Offered every three years.

251. United States Litigation Issues (1)

Lecture/discussion — 10 hours. Prerequisite: course 201, law school education or the equivalent. Prevention and resolution of disputes in international com-

merce. Emphasis on preparing for a trial in the United States. Includes the study of pre-trial motions, jury selection, opening statements, rules of evidence, closing arguments, and the selection of appropriate strategies. Offered in alternate years.

262. Antitrust (1)

Lecture/discussion—10 hours. Prerequisite: course 201, law school education or the equivalent. Historical and institutional background of antitrust law in the United States. The statutory framework including price fixing, limits on distribution, monopolization and mergers, and reporting requirements. Offered in alternate years.

270. Financing International Transactions (3)

Lecture/discussion—20 hours. Prerequisite: course 201 and law school education or the equivalent. How capital is raised in international markets. Investment strategies for U.S. markets. Taxation of financial investments, international currency regulation, and assessing rates of return on international investments. Offered every three years.

274. Intellectual Property (2)

Lecture/discussion—20 hours. Prerequisite: Law School or equivalent; course 201. Intensive study of intellectual property law. Including copyright, trademark and patent law and unfair competition. Offered in alternate years.—Kurtz

274S. Intellectual Property (2)

Lecture/discussion—20 hours. Prerequisite: Law School or equivalent; course 201. Intensive study of intellectual property law. Including copyright, trademark and patent law and unfair competition. Offered in alternate years.—Kurtz

285. Environmental Law (2)

Lecture/discussion—20 hours. Prerequisite: Law school education or the equivalent. Introduction to federal and state environmental law. Historical development of environmental law; the role of courts, the legislature and the executive branch in the development and implementation of environmental policy. Review of major statutes. Offered irregularly.—IV.

290. American Legal System Research Seminar (1)

Seminar—5 hours. Prerequisite: course 201, law school education or equivalent. The American legal system and its structure. Legal research methodologies and presentation with attention to analysis, synthesis, organization, and editing techniques common to legal writing. (S/U grading only.)

291C. International Commercial Law Seminar (4)

Seminar—20 hours. Prerequisite: course 201, law school education or the equivalent. Advanced seminar on a current topic in International Commercial Law. Offered at the University of Cologne in Cologne, Germany for two weeks each summer. The topic will change each year.

292. International Commercial Law Seminar (4)

Lecture/discussion—20 hours. Prerequisite: Law school education or the equivalent. Advanced seminar in a current topic in International Commercial Law. The topic will change each year the course is offered. Offered irregularly. May be repeated one time for credit.—IV.

299. Advanced Research in Legal Problems (1-4)

Prerequisite: course 201, law school education or the equivalent. Student individualized research projects under faculty supervision. (S/U grading only.)

International and Community Nutrition

Kathryn G. Dewey, Ph.D., Program Director

Program Office. 3253 Meyer Hall (530) 752-1992; http://picn.ucdavis.edu/

Faculty

Monique Borgerhoff-Mulder, Ph.D., Professor (Anthropology)

Kenneth H. Brown, M.D., Distinguished Professor (Nutrition)

Caroline Chantry, M.D., Professor (Pediatrics)
Kathryn G. Dewey, Ph.D., Professor (Nutrition)
Lia C. H. Fernald, Ph.D., Associate Professor
(Public Health Nutrition, Community Health &
Human Development, UC Berkeley)
Lovell S. Jarvis, Ph.D., Professor

(Agricultural and Resource Economics)
Bo L. Lönnerdal, Ph.D., Distinguished Professor
(Nutrition)

Joshua W. Miller, Ph.D., Professor (Pathology) Christine P. Stewart, Ph.D., Assistant Professor (Nutrition)

Emeriti Faculty

Lindsay H. Allen, Ph.D., Professor Emeritus Louis E. Grivetti, Ph.D., Professor Emeritus Charles H. Halsted, M.D., Professor Emeritus Janet King, Ph.D., Professor Emeritus Ernesto Pollitt, Ph.D., Professor Emeritus Fernando E. Viteri, M.D., Ph.D., Professor Emeritus

Affiliated Faculty

Marjorie Haskell, Ph.D., Associate Researcher (Nutrition)

Sonja Y. Hess, Ph.D., Associate Project Scientist (Nutrition)

Sandra Huffman, Sc.D., Researcher (Nutrition) Lucia Kaiser, Ph.D., Specialist in Cooperative Extension (Nutrition)

Charles B. Stephensen, Ph.D., Adjunct Professor (Nutrition)

Marta Van Loan, Ph.D., Adjunct Professor (Nutrition)

Steven A. Vosti, Ph.D., Associate Adjunct Professor (Agricultural and Resource Economics)

Graduate Study. The Program in International and Community Nutrition, an Organized Research Unit located in the Department of Nutrition, coordinates specialized course work and research leading to the Designated Emphasis in International and Community Nutrition for students in various graduate programs. The program focuses on both theoretical and practical issues concerning the identification, treatment, and prevention of human nutritional problems in low-income countries and in disadvantaged groups in the United States. Students enrolled in the Designated Emphasis are expected to (1) complete the course requirements already established by their respective graduate programs, (2) participate in a weekly advanced seminar in international and community nutrition, (3) complete additional core courses in international nutrition (Nutrition 219A 219B, 258) and selected courses in the related disciplines of epidemiology, statistics, and social and behavioral sciences, and (4) conduct their dissertation research on a relevant topic under the supervision of a professor who is a member of the Program in International and Community Nutrition.

Students accepted into the following doctoral programs are automatically eligible to participate in the Designated Emphasis: Nutrition, Agricultural and Resource Economics, Epidemiology, Anthropology, and Human Development. Students from other programs may also be accepted by special request to the Program Director. Upon graduation, students receive a Ph.D. in their major field, with specific recognition for the Designated Emphasis in International and Community Nutrition.

Graduate Adviser. Contact the Program office.

International Relations

(College of Letters and Science) Daniel Kono, Ph.D., Program Director

Program Office. 464 Kerr Hall (530) 754-8098

Committee in Charge

Kyle Joyce, Ph.D. (Political Science) Alison Ledgerwood, Ph.D. (Psychology) Eric Schroeder, Ph.D. (University Writing Program) Deborah Swenson, Ph.D. (Economics)

The Major Program

Problems of security, development, ethnic conflict, human rights, health, and the environment are increasingly confronted at a global rather than a national level. With its theoretical models and realworld application, the study of international relations is an exciting and highly relevant interdisciplinary

The Program. Graduation with a major in international relations requires completion of introductory courses in political science, economics, statistics, and history. The major also requires fluency in English and a working knowledge (approximately 24 to 30 units of course credits or equivalent fluency) of one other modern language. Students choose one of four tracks that encompass major topical areas in combination with an area studies emphasis:

- (1) World Trade and Development;
- (2) Peace and Security;
- (3) Global Environment, Health, and Natural

(4) Peoples and Nationalities. Upper division course work for Tracks I, II and III is composed of twelve courses. Students choosing Track IV, Peoples and Nationalities, are required to study or work abroad for a minimum of one quarter; upper division course work is reduced to nine classes in recognition of the experience gained through education abroad.

Programs, Internships, and Career Alterna-

tives. One program of special interest to international relations majors is the Education Abroad Program, which provides insights into the life and culture of other countries. At UC Davis, the Internship and Career Center assists students in obtaining legislative, legal, and business internships. In addition, the UC Davis Washington Center arranges internships and runs a full-credit academic program in Washington, D.C. with a full range of opportunities for International Relations majors (see also Washington, D.C. Program, on page 529). International relations are program of the company to the co tions graduates are prepared for employment in government agencies (such as the Foreign Service), state agencies, international or non-governmental organizations (such as the United Nations), foundations, and companies having interests in international business, trade, or finance. The stringent language requirement of the major program enhances career prospects in jobs which demand knowledge of the language and culture of other

International Relations Abroad. International Relations strongly encourages all students to participate in the UC Education Abroad Program; those who choose to study Track IV, Peoples and Nationalities, must study or work abroad for a minimum of one quarter. A maximum of five courses taken abroad may be applied toward the 12 upper divi-sion courses in Tracks I, II, and III of the International Relations major. In Track IV, the four Area Studies courses may be done abroad. Courses are selected with the approval of an adviser for the International Relations program.

Preparatory Requirements. Before declaring a major in International Relations, students must complete the following courses with a combined GPA of

at least 2.500 at the University of California or other four-year school (at least 3.000 for similar courses taken at community college). All courses must be taken for a letter grade.

Economics 1A or Anthropology 2 4 units
Economics 1B4 units
History 4C or 10C4 units
International Relations 1 or Political
Science 34 units
Statistics 13 or Sociology 46B4 units

A.B. Major Requirements:

	UNI15
Preparatory Subject Matter	24-54
Economics 1A or Anthropology 2	
Economics 1B	. 4
History 4C or 10C	. 4
International Relations 1 or Political	
Science 3	
Statistics 13 or Sociology 46B	
Political Science 51	
Note: Preparatory Subject Matter does not	t
cover all potential prerequisite courses for	
upper division curriculum.	
Foreign language	. 0-30

One of the following series in a single language, or certified fluency at the highest level required below:

Arabic 1, 2, 3, 21, 22, 23 30
Chinese 1, 2, 3, 4, 5, 6
or Chinese 1A, 4, 5, 630
or Chinese 1CN, 2CN, 3CN
or Chinese 1BL, 2BL, 3BL
French 1, 2, 3, 21, 22
German 1, 2, 3, 20, 21
Hebrew 1, 2, 3, 21, 22, 23
Hindi/Urdu 1, 2, 3, 21, 22, 23 30
Italian 1, 2, 3, 4, 5
or Italian 1, 2, 3, 8A, 8B21
Japanese 1, 2, 3, 4, 5, 630
or Japanese 1A, 4, 5, 630
Portuguese 1, 2, 3, 21, 22
Russian 1, 2, 3, 4, 5
Spanish 1, 2, 3, 21, 22
or Spanish 31, 32, 33
Note: The language curricula are subject to
change; please check with an adviser for
the major. A language not listed above may
be substituted only with prior written
approval of the International Relations
Program Committee.

Depth Subject Matter 36-48

Tracks I, II and II: Twelve upper division courses

Track IV: Nine upper division courses Choose one track below:

Track I: World Trade and Development

Emphasizes contemporary economic relations of industrialized and developing countries.

For Advanced Industrialized Focus:
Economics 100; 101; 160A-160B, Political
Science 12320
Two courses selected from Group A 8
One course selected from Group B 4
Four courses to fulfill Area Studies
Requirement
For Developing Countries Focus:
Economics 115A-115B, 162 12
Political Science 123, 124 8
One course selected from Group A 4
Two courses selected from Group B 8
Four courses to fulfill Area Studies
Requirement
Group A courses (Advanced Industrialized
Countries):
Agricultural and Resource Economics 138,
Countries):

Anthropology 127, Community and Regional Development 118, 141, Economics 102, 110B, International Relations 104, Political Science 130, 140A, 140B, Sociology 138, 139, 141, Group B courses (Developing Countries): Anthropology 122A, 122B, 126A, 126B, 127, Community and Regional Development 153A, 153B, Economics 110B, International Agricultural Development 103, International Relations 104, Political Science 124, 126, 142A Sociology 138, 141, 145A, 145B

Track II: Peace and Security

Focuses on political and security relationships among states and non-state actors, examining questions of war, peace, alliances, and diplomacy. Select five courses spanning two disciplines:

Economics 162, History 174B, 174C, Political Science 120, 121, 130, or departments selected from Comparative Literature 157, Economics 122, History 145, 146A, 146B, Philosophy 118, Political Science 112, 122, 124, 126, 131, 140A, 140B, Sociology 100, 118, 157, Women's

Track III: Global Environment, Health, and **Natural Resources**

Familiarizes students with new sources of global interdependence such as biodiversity, natural resource conflicts, population growth, and world health.

Note: Some courses shown below have

Anthropology 101 4 Political Science 123......4 Environmental Science and Policy 161 or Select two from Agricultural and Resource Economics 147, 175, 176, Anthropology 103, Applied Biological Systems Technology 182, Economics 115A, Environmental Science and Policy 164, International Agricultural Development 170, Nature and Culture 120, Physics 160, Political Science 107, 175, Sociology 1607-8 Select two from one of the following groups......9Atmospheric and Marine Environments: Atmospheric Science 116, 149, Environmental and Resource Sciences 121, 131, Geology 116N Land use and Energy Supply: Anthropology 104N, Community and Regional Development 142, Environmental and Resource Sciences 144, Environmental Science and Policy 167, Geology 130, International Agricultural Development 104, Plant Sciences 101, 144, 150, 160, Political Science 171 Health and Human Populations: Anthropology 102, 131, Environmental Science and Policy 121, Environmental Toxicology 101, Internal Medicine-Infectious Diseases 141, Nutrition 111AV, 111B, 118, Sociology 170; Epidemiology and Preventive Medicine 198 and 199 may be taken with the director's prior approval Four courses to fulfill Area Studies

Track IV: Peoples and Nationalities

Examines social and cultural foundations of national development and international relations.

Select two courses from Anthropology 102, 123AN, 130A, Sociology 118, 156, or 181 Select one course each from three of the following four groups 12 The Mixing of Peoples: Anthropology 130BN; Community and Regional

Development 176; International Relations 104; Political Science 126 Women: Anthropology 126B; Human Development 103; Sociology 145B; Women's Studies 102, 182 Religion: Anthropology 124; Philosophy 105; Religious Studies 161,170; Sociology Development and its Impact on Social Cleavages: Anthropology 122B, 126A, 126B; Political Science 124, 142A; Sociology 145A, 145B Four courses to fulfill Area Studies of one quarter

Area Studies Requirement

Four courses: Courses must incorporate at least two of three groups (History, Social Analysis, Culture and Literature); we encourage students to take all four courses from one region, but will accept a minimum of three from one region and one from a different region. Tracks I, II and III students who choose to take advantage of an Education Abroad experience may fulfill the Area Studies requirement by completing three courses instead of four; all three courses must be from one region.

Africa and the Middle East

History: History 113, 115A, 115B, 115C, 115D, 115F, 193B Social Analysis: African American and African Studies 107C, 110, 111, 156, Anthropology 140A, 140B, 142, Political Science 135, 136, 146A, 146B, Religious Studies 167, Women's Studies 184 Culture and Literature: African American and African Studies 157, 162, Art History 150, Comparative Literature 147, 166, Dramatic Art 155A, French 124

East and South Asia

History: History 191E, 191F, 194C, 194D, 194E, 195B, 196B Social Analysis: African American and African Studies 107C, Anthropology 143A, 143B, 147, 148A, 148B, 148C, 149B, Economics 171, Political Science 148A, 148B, 148C, Sociology 147, 188 Culture and Literature: Anthropology 145, Art History 153, 163C, Chinese 101, 104, 105, 110, Dramatic Art 154, East Asian Studies 113, Japanese 103, 104, 106, 131, 132, 133, 135, 136

Latin America

History: History 159, 162, 163B, 164, 165, 166B, 167, 168 Social Analysis: African American and African Studies 107A, 180, Anthropology 144, 146, Chicana/o Studies 130, Native American Studies 120, 133B, Political Science 143A, 143B, Sociology 158
Culture and Literature: African American and African Studies 163, Art History 151, Chicana/o Studies 160, Comparative Literature 152, 165, Dramatic Art 155A, Spanish 149, 151N, 153, 154, 155, 156, 157, 158, 170, 172

Russian and East/Central Europe

History, Wistory 1288, 1296, 142

History: History 138B, 138C, 143 Social Analysis: Political Science 144A, 144B

Culture and Literature: Russian 123, 129, 130

Western Europe

History: History 140, 141, 142A, 144B, 145, 146A, 146B, 147B, 147C, 151D Social Analysis: African American and African Studies 107C, Political Science 137, 147A, 147B, 147C, 147D, 161 Culture and Literature: Film Studies 121 176A, 176B, French 108, 120, 121, 133, German 114, 115, 118B, 118C, 118E, 120, 126, 141, 142, 143, 168, 185,

Italian 108, 120A, 120B, Spanish 137N, 138N, 139, 140N, 141, 142, 148, 157,

Total units for the major.....60-102 Major Adviser. Daniel Kono (Political Science)

Courses in International Relations

Lower Division Courses

1. Global Interdependence (4)

Lecture - 3 hours; discussion - 1 hour. Development of the concept of global interdependence along its political, economic, demographic, cultural, technological, and environmental dimensions. Focus on the ways societies and states interact. Course provides the foundation for upper division multidisciplinary work in international relations. GE credit: SS, WE.-

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading

Upper Division Courses

104. The Political Economy of International Migration (4)

Lecture — 3 hours; term paper or discussion — 1 hour. Prerequisite: upper division standing. Analysis of worldwide migration patterns, and social scientific theories of international and transnational migration. Focus in economical, political, and social impact of immigration and potential for international and regional cooperation. (Same course as Sociology

131. Ocean Politics (4)

Lecture—3 hours; term paper. Prerequisite: course 1 or Political Science 3; Political Science 123 recommended. The political, economic, security and environmental aspects of the world's oceans. Focus on the international dimensions of ocean economic resources, and on the means—both cooperative and conflictual-by which these resources have been and are likely to be, managed. GE credit: WE.

190. Topics in International Relations (4)

Lecture/discussion - 4 hours. Prerequisite: consent of instructor. Selected topics in international relations. Variable content. May be repeated for credit when topic differs. GE credit: WE.

192. International Relations Internship (1-12)

Internship - 3-36 hours (to be arranged). Prerequisite: upper division standing and consent of instructor. Work experience in international relations, with term paper summarizing the practical experience of the student. (P/NP grading only.) GE credit: SS, WE.

194HA-194HB. Special Study for Honors Students (4-4)

Seminar—2 hours; term paper. Prerequisite: open only to majors of senior standing who qualify for honors program. Directed reading, research, and writing on topics selected by students and instructor culminating in preparation of a senior honors thesis under direction of a faculty adviser. (Deferred grading only, pending completion of sequence.) GE credit: OL, SS, WE.—I, III. (I, III.)

198. Directed Group Study (1-5)

Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

International Science Studies

This interdisciplinary minor in International Science Studies will introduce College of Agricultural and Environmental Sciences students to global issues, which affect their major disciplines in the current world, and also provide an opportunity to gain first hand experience abroad when appropriate. The goal of this minor is to enable our college students to develop greater international competence and to enhance their employability.

The minor assumes that the student will have a major in the sciences, and that classes taken under one of the three tracks in the minor will contribute depth to the existing major or establish depth in a selected additional field of study. Students will be expected to work closely with an academic advisor in developing an intellectually coherent program of the study. A minimum of 18 units of upper division work is required. Only a single course can be counted toward both major and minor and no course can be used to satisfy the requirements of more than one

Minor Program Requirements:

UNITS

International Science Studies24

Global issue course requirement............7-8 Focusing on broad range of global issues and their impacts on ecological and environmental resources and biodiversity, in addition to international policy and economics. Beyond the courses taken under each track, choose two out of the three courses listed below:

(1) Atmospheric Science 116

(2) Plant Sciences 150

(3) Agricultural and Resource Economics 115B

Select one of the following tracks...... 16-17

Education Abroad Program courses taught overseas and relevant international internship activities will count towards the minor requirement with advisor's approval. For each track, students can take a maximum of three units from EAP courses, with a valid transcript, and three units from relevant international internship activities. The international internship activities would require a pre-approved study plan with the academic advisor before the maximum of three units can be awarded. Language and culture related courses are encouraged, but not required for

(1) Ecological, environmental, and energy studies track: Select 16-17 units from Anthropology 103, Agricultural and Resource Economics 147, Atmospheric Science 116, 133, Environmental Science and Management 100, 121, 131, 144, 120, 30, Environmental Science and Policy 100, 116, 151, Evolution and Ecology 147, Soil Science 109, Hydrology 143 (2) Policy and management focus track: Select 16-17 units from Agricultural and Resource Economics 115A/B, Agricultural and Resource Economics 138, International Relations 190, Community and Regional Development 156, 180, International Agricultural Development 160, 162, 170, Environmental Science and Policy 102, 175 (3) Agriculture, food, and fiber systems track: Select 16-17 units from Anthropology 103, 130, Atmospheric Science 133, Community and Regional Development 153A/B, Environmental Science and Management 21, 131, Evolution and Ecology 138, Hydrology 124, Plant Sciences 150, 160, Food Science

358 Internship

and Technology 108, 109, Nutrition 119A/ B, Textiles and Clothing 174

Minor Advisor. Shu-Hua Chen (Land, Air and Water Resources) (530) 752-1822, shachen@ucdavis.edu

Internship

See Internship Program, below; and Washington, D.C. Program, on page

Internship Program

Subhash H. Risbud, Ph.D., Director

Jeanne B. Shelby, Associate Director and Project Manager

Marcie Kirk Holland, Project Manager Janice Morand, Project Manager

The Internship and Career Center 2nd and 3rd Floors, South Hall (530) 752-2855

Program Areas

Agricultural and Environmental Sciences, Career Recruiting Programs, Engineering and Physical Sciences, Graduate Student and Postdoctoral Career Services, Health and Biological Sciences and Liberal Arts and Business

Internship Experience

The Internship and Career Center facilitates a campus-wide internship program. All internships, both credit and non-credit, can be taken for Transcript Notation with completion of required evaluation reports. The notation briefly describes the nature and location of the internship experience. Questions pertaining to academic credit and Transcript Notation may be directed to The Internship and Career Cen-

Course Credit. Internship courses (numbered 92 and 192) are available for credit on a variable-unit and Passed/Not Passed grading basis. A maximum of 12 units of 92 and/or 192 courses may be counted toward the 180-unit minimum needed for graduation. To qualify for the 192 course, students must have acquired 84 units of credit. All credited internships require approval and sponsorship by a faculty member from an appropriate discipline. Arrangements may be made through the department of the sponsoring faculty member and facilitated by The Internship and Career Center Staff.

Italian

(College of Letters and Science) Julia Simon, Ph.D., Chairperson of the Department

Department Office. 213 Sproul Hall (530) 752-1219; http://italian.ucdavis.edu

Faculty

Margherita Heyer-Caput, Ph.D., Professor Juliana Schiesari, Ph.D., Professor (Comparative Literature, French and Italian)

Emeriti Faculty

JoAnn Cannon, Ph.D., Professor Emerita Dennis Dutschke, Ph.D., Professor Emeritus Gustavo Foscarini, M.A., Senior Lecturer Emeritus

Affiliated Faculty

Antonella Bassi, M.A., Lecturer Jay Grossi, M.A., Lecturer

The Major Program

The major in Italian provides a solid language background which will enable the student to develop an appreciation for Italian language and culture.

The Program. The Italian program is small and geared to the individual needs of the student. The use of Italian is stressed on all levels and knowledge of the language is required for literature courses that are taught only in Italian. The Italian program actively participates in the Education Abroad Program, the Quarter Abroad Program, the International Internships Program, and the Summer Sessions International (Rome), all of which offer opportunities for travel and study in Italy.

Career Alternatives. Specific career opportunities for those students who have a background in foreign languages are abundant. In addition to the Foreign Service, jobs are available in business and education, both overseas and in the U.S. For example, those wishing to live (for brief or longer periods of time) and work in Italy have a choice of cities: Milan for business, Rome for international concerns in agriculture and nutrition in the F.A.O., and Florence for retail commerce and the arts, just to name a few. In the U.S., foreign-owned companies or American companies with interests in the foreign market need qualified people who are also fluent in a foreign language.

A.B. Major Requirements:

LINITS Preparatory Subject Matter 0-27 Italian 1, 2, 3, 4, 5, and 9 (or the equivalent) 0-27

Depth Subject Matter 36 Italian 101 and 105......8

Upper division courses in literature, taught in Must include at least one course from two of the following literary periods:

(a) Early Italian

adviser.

(b) Renaissance and Baroque

(c) Eighteenth through Twentieth Centuries Upper division General Education courses in Italian may fulfill this requirement with approval of the major adviser. A total of 8 units in literature may be replaced by Italian 107 (highly recommended) and/or by courses in related fields such as history, art history, music, comparative literature, English, critical theory, classics, and linguistics. Note: All upper division courses are to be chosen in consultation with the major

Total Units for the Major......36-63

One year or one quarter of study abroad with the Education Abroad Program or college Latin or a

Major Adviser. M. Heyer-Caput

Minor Program Requirements:

Italian 101 and 105...... 8

Three upper division courses in literature chosen in consultation with major One course chosen from two of the

following three areas:

(a) Early Italian Literature (b) Renaissance and Baroque

(c) Eighteenth through Twentieth Centuries (One of the above courses may be replaced

by course 107 or by a course of literature in translation offered by the Italian

Mionr Adviser. M. Heyer-Caput

Honors and Honors Program. Candidates for high or highest honors in Italian must write a senior

thesis under the direction of a faculty member. For this purpose, honors candidates must enroll in Italian 194H (3 units) and Italian 195H (3 units). Normally, a student will undertake the honors project during the first two quarters of the senior year; other arrangements must be authorized by the department chair. Only students who, at the end of the junior year (135 units), have attained a cumulative gradepoint average of 3.500 in courses required for the major will be eligible for the honors program. The requirements for earning high and highest honors in Italian are in addition to the regular requirements for the major in Italian.

Education Abroad Program. The department of French and Italian encourages students to study abroad in the Summer Abroad program, the Quarter Abroad Program, or the Education Abroad Program. Applicable courses taken on EAP are accepted for credit in the major or the minor programs.

Teaching Credential Subject Representative. See the Major Adviser above; see the Teaching Credential/M.A. Program on page 115.

Prerequisite Credit. Credit will not normally be given for a course if it is a prerequisite of a course already successfully completed. Exceptions can be made only by the major adviser.

Quarter Abroad Program. The UC Davis Quarter Abroad Program and the Italian Program offer an exciting Italian Language and Culture Program in Florence, Italy. While studying abroad in Florence, students will earn 23-28 UC Davis quarter units and experience the richness and vitality of Italian and European culture.

Participants fulfill three-quarters-worth of Italian language study, enroll in culture and film courses, integrate in the Florentine community through meaningful internships with transcript notation, and explore electives in areas such as art history, photography, and food science.

There is no language requirement, and all registered UC Davis students with 2.00 GPA and above, good academic standing, and good disciplinary standing are eligible to apply.

For more information, please contact Professor Margherita Heyer-Caput at mheyercaput@ucdavis.edu or see http://quarterabroad.ucdavis.edu.

Courses in Italian (ITA) **Lower Division Courses**

Students offering high school language preparation as a prerequisite must take a placement test.

1. Elementary Italian (5)

Discussion - 5 hours; laboratory - 1 hour. Introduction to Italian grammar and development of all language skills in a cultural context with special emphasis on communication. (Students who have successfully completed Italian 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student's P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed.) GE credit: WC.—I, II. (I, II.)

1A. Accelerated Intensive Elementary Italian (15)

Lecture/discussion-15 hours. Special 12-week accelerated, intensive summer session course that combines the work of courses 1, 2, and 3. Introduction to Italian grammar and development of all language skills in a cultural context with emphasis on communicative ability. Not open for credit to students who have completed courses 1, 2, or 3.-IV. (IV.) Bassi, Grossi

1S. Elementary Italian (5)

Discussion/laboratory-5 hours. Introduction to Italian grammar and development of all language skills in a cultural context with special emphasis on communication. This course will be taught abroad. Not open for credit to students who have completed course 1.-III. (III.)

2. Elementary Italian (5)

Discussion - 5 hours; laboratory - 1 hour. Prerequisite: course 1. Continuation of course 1 in areas of grammar and basic language skills. GE credit: WC.−II, III. (II, III.)

25. Elementary Italian (5)

Discussion/laboratory-5 hours. Prerequisite: course 1. Continuation of course 1 in the areas of grammar and basic language skills. This course will be taught abroad. Not open for credit to students who have completed course 2.—III. (III.)

3. Elementary Italian (5)

Lecture/discussion-5 hours. Prerequisite: course 2. Continuation of grammar sequence, and practice of all language skills through cultural texts. GE credit: WC.—I, II, III. (I, II, III.)

35. Elementary Italian (5)

Lecture/discussion-5 hours. Prerequisite: course 2. Completion of grammar sequence and continuing practice of all language skills through cultural texts. This course is taught abroad. Not open for credit to students who have completed course 3.

4. Intermediate Italian (4)

Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: course 3. Review of grammar and syntax through written exercises and short prose works. Intended to develop the linguistic foundations of students who have completed the first year language classes. GE credit: WC.-I, II, III. (I, II, III.)

45. Intermediate Italian (4)

Lecture/discussion-3 hours; laboratory-3 hours. Prerequisite: course 3, 3S, or the equivalent. Review of grammar and syntax through written exercises and readings of short prose works. Intended to develop the linguistic foundations of students who have completed the first year language classes. This course is taught abroad. Not open for credit to students who have completed course 4. GE credit: WC.-I, III. (I, III.)

5. Intermediate Italian (4)

Lecture/discussion-3 hours; laboratory-3 hours. Prerequisite: course 4. Review and study of grammar and syntax, readings of short prose works, and written exercises. Intended to prepare students to read, understand, and discuss modern Italian. GE credit: WC.-I, II, III. (I, II, III.)

5S. Intermediate Italian (3)

Lecture/discussion - 3 hours. Prerequisite: course 4. Prepare students to read, understand, and discuss texts written in Italian and to act as a transition between Italian 4 and Italian 10. This course will be taught abroad. Not open for credit to students who have completed course 5.—III. (III.)

8A. Italian Conversation (3)

Discussion - 3 hours. Prerequisite: course 3 or the equivalent. Course designed to offer practice in speaking Italian. May be repeated one time for credit. (P/NP grading only.) GE credit: WC.-I, III. (I, III.)

8AS. Italian Conversation (3)

Discussion - 3 hours. Prerequisite: course 3 or the equivalent. Practice in the speaking of Italian. Course is taught abroad. May be repeated for up to 6 units of credit. Not open for credit to students who have completed course 8. (P/NP grading only.) GE credit: WC.—III.

8B. Italian Conversation (3)

Discussion - 3 hours. Prerequisite: course 8A. Course designed to offer practice in speaking Italian. (P/NP grading only.) GE credit: WC.—II. (II.)

8BS. Italian Conversation (3)

Discussion - 3 hours. Prerequisite: course 8A. Practice in the speaking of Italian. Course is taught abroad. May be repeated for up to 6 units of credit. Not open for credit to students who have completed course 8B. (P/NP grading only.)—III.

9. Reading Italian (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 5. Reading and discussion of modern Italian prose, including selections from creative, scientific and journalistic writings. Introduction to contemporary Italian literature and culture. Strengthening the student's command of the Italian language. GE credit: WC.-I, II, III. (I, II, III.)

9S. Reading Italian (3)

Lecture/discussion—3 hours; term paper. Prerequisite: course 5 or 5S. Reading and discussion of modern Italian prose, including selections from creative, scientific and journalistic writings. Introduction to contemporary Italian literature and culture as well as strengthening the student's command of the Italian language. This course is taught abroad. Not open for credit to students who have completed course 9. GE credit: WC.-I, III. (I, III.)

50. Studies in Italian Cinema (4)

Lecture - 2 hours; discussion - 1 hour; term paper. Introduction to Italian cinema through its genres. Focus is on cinema as a reflection of and a comment on modern Italian history. Film will be studied as an artistic medium and as a form of mass communication. ArtHum, Wrt | AH, WC, WE.—II. (II.)

90X. Lower Division Seminar (1-2)

Seminar — 1-2 hours. Prerequisite: lower division standing and consent of instructor. Examination of a special topic in Italian language or culture (such as Italian culture seen through film, Italian feminism, literature, or politics) through shared readings, discussions, written assignments, or special activities such as film screening or laboratory work.

98. Directed Group Study (1-5)

Primarily intended for lower division students. (P/NP grading only.)

985. Directed Group Study (1-4)

Prerequisite: consent of instructor. Group study on focused topics in Italian literature and culture. Varies according to instructor. This course is offered abroad. May be repeated for credit when topic differs. (P/NP grading only.)—III. (III.)

99S. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. Opportunity for a faculty member to work with an advanced under graduate student in a focused manner on a topic or topics of mutual research/creative interest. This course is offered abroad. May be repeated for credit when topic differs. (P/NP grading only.)—III.

Upper Division Courses

101. Advanced Conversation, Composition, and Grammar (4)

Lecture — 3 hours. Prerequisite: course 9 or consent of instructor. GE credit: AH, OL, WC, WE.-I. (I.) Heyer-Caput

1015. Advanced Composition, Conversation and Grammar (4)

Lecture — 3 hours; extensive writing. Prerequisite: course 9. Instruction and practice in expository writing in Italian, with emphasis on advanced grammar, organization, and vocabulary building. Course will be taught in Italy. Not open for credit to students who have completed course 101. GE credit: AH, OL, WC, WE.-III.

104. Italian Translation and Style (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 101 or consent of instructor. Practice in translation from Italian to English and English to Italian, using literary and non-literary texts of different styles. Analysis of linguistic problems and elements of style contained in the translation material. GE credit: AH, WC.-III. (III.)

104S. Translation and Style (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 101 or consent of instructor. Practice in translation from Italian to English and English to Italian, using literary and non-literary texts of different styles. Analysis of linguistic problems and elements of style contained in the translation material. Course will be taught abroad. Not open for credit to students who have completed course 104. GE credit: AH, WC.-III.

105. Introduction to Italian Literature (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 101 or consent of instructor. Introduction to the study of the principal authors, works, and movements of the Medieval, Renaissance, and Early Modern periods in Italy. GÉ credit: ArtHum | AH, OL, WC.—II. (II.) Heyer-Caput, Schiesari

105ST. Introduction to Italian Literature (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 101 or consent of instructor. Introduction to the study of the principal authors, works, and movements of the Medieval, Renaissance and Early Modern periods in Italy. This course is taught abroad. Not open for credit to students who have completed course 105. GE credit: ArtHum, Div, Wrt | AH, OL, WC.-III.

107. Survey of Italian Culture and Institutions (4)

Lecture-3 hours; term paper. Assessment of the impact of regional autonomy on Italian cultural life from the Middle Ages to the present. Special emphasis will be placed upon achievements in literature, the arts, philosophy, and socio-political institutions. To be taught in English. GE credit: ArtHum | AH, OL, SS, VL, WC, WE.—III. (III.)

107S. Survey of Italian Culture and Institutions (4)

Lecture/discussion—3 hours; term paper. An assessment of the impact of regional autonomy on Italian cultural life from the Middle Ages to the present. Special emphasis will be placed upon achievements in literature, the arts, philosophy, and socio-political institutions. To be taught in English. Not open for credit to students who have completed course 107. GE credit: ArtHum | AH, OL, SS, VL, WC, WE.—III.

108. Contemporary Issues in Italian Culture and Society (4)

Lecture/discussion-3 hours; term paper. Analysis of cultural issues in contemporary Italy: Myth and reality of imagined Italies, Italian identities; immigration and race relations; the media and popular culture. Taught in English. GE credit: ArtHum, Div, Wrt | AH, OL, SS, VL, WC, WE.—I. (I.) Bassi

108S. Contemporary Issues in Italian Culture and Society (4)

Lecture/discussion—3 hours; term paper. Analysis of cultural issues in contemporary Italy; myth and reality of imagined Italies; Italian identities; immigration and race relations; the media and popular culture. Taught in English. This course will be taught abroad. Not open for credit to students who have completed course 108. GE credit: ArtHum, Div, Wrt | AH, OL, SS, VL, WC, WE.-III. (III.)

112. Medieval and Renaissance Poetry: St. Francis to Petrarch (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 9 or consent of instructor. Study of the origins of Italian religious and secular poetry of the 13th and 14th centuries. A diversified poetry is illustrated in works of St. Francis, Dante, Cavalcanti, Petrarch, the Sicilian School, the Sweet New Style Poets, and other authors. Offered in alternate years. GE credit: ArtHum | AH, OL, WC, WE. - (I.)

113. Dante Alighieri, Divina Commedia (Inferno, Purgatorio, Paradiso) (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 9 or consent of instructor. Study of Dante Alighieri's Divina Commedia, and its role in the development of Italian language and literature. Emphasis will be placed on reading the whole poem within the historical context of the Middle Ages. GE credit: ArtHum | AH, OL, WC, WE.-III. (III.)

114. Boccaccio, Decameron, and the Renaissance Novella (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 9 or consent of instructor. Study of the development of the short story in Italy, as exemplified in Giovanni Boccaccio's Decameron, in his predecessors and Renaissance followers. Offered in alternate years. GE credit: ArtHum | AH, OL, WC, WE.-II.

115A. Studies in the Cinquecento (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 9 or consent of instructor. Analysis of key texts from the high moment of the Italian Renaissance. The political and aesthetic legacy of humanism will be foregrounded in relation to authors such as Ficino, Ariosto, Machiavelli, Aretino, Castiglione, and Tasso. Offered in alternate years. GE credit: ArtHum | OL.—(III.) Schiesari

115B. Italian Literature of the Renaissance and the Baroque: From Cellini to Marino (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 115A. Continued examination into the loss of an ideal. Emphasis on the conflicts in Michelangelo and Tasso leading to Marino, with an excursus on Galileo's role in the formation of a modern literary standard. GE credit: ArtHum | OL.-III. (III.)

115C. Italian Drama from Machiavelli to the Enlightenment (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 9 or consent of instructor. Development of comic and tragic forms as critical representations of their societal and historical contexts, i.e. Machiavelli and the logic of power, Baroque dramatists in the service of counter-reformation Italy, Goldoni's comedies and bourgeois social consciousness. Offered in alternate years. GE credit: ArtHum | OL. — I. Schiesari

115D. Early Modern Italian Lyric (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 9 or consent of instructor. Examination of the poetic tradition influenced by Petrarch. Consideration of the relation between gender and genre in such poets as Petrarch, Bembo, della Casa, Tasso, Marino, Gaspara Stampa, Veronica Franco, Isabella di Morra. Offered in alternate years. GE credit: ArtHum | WE.-I. Schiesari

118. Italian Literature of the Eighteenth Century (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 9 or consent of instructor. Development of modern Italian literature. Emphasis on the work of Goldoni, Bettinelli, Baretti, Parini, Alfieri and Vico. GE credit: ArtHum | OL.—I. (I.)

119. Italian Literature of the Nineteenth Century (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or consent of instructor. Romanticism in Italy, including Manzoni, Verga, and Verismo. GE credit: ArtHum | AH, OL, WC, WE.—II. (II.) Heyer-Caput

120A. Italian Literature of the Twentieth Century: The Novel (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 9 or consent of instructor. Development of the novel from Svevo to the present. Emphasis on the work of Svevo, Levi, Moravia, Pavese, and Vittorini. GE credit: ArtHum. - III. (III.) Heyer-Capu

120B. Italian Literature of the Twentieth Century: Poetry and Drama (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 9 or consent of instructor. Italian poetry with emphasis on Hermeticism; the theater of Luigi Pirandello and its role in the development of contemporary Italian drama. GE credit: ArtHum | AH, WC, WE.—I. (I.) Heyer-Caput

121. New Italian Cinema (4)

Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: course 1 and upper-division standing, or consent of instructor. Italian cinema of the 21st century in the context of profound cultural and social changes in Italy since World War II. Productions by representative directors such as Amelio, Giordana, Moretti, Muccino are included. Knowledge of Italian not required. Offered in alternate years. (Same course as Film Studies 121.) GE credit: ArtHum, Div, Wrt | AH, OL, VL, WC, WE.-III. Heyer-Caput

1215. New Italian Cinema (4)

Lecture/discussion-3 hours; film viewing-3 hours. Prerequisite: course 1 and upper-division standing, or consent of instructor. Italian cinema of the 21st

century in the context of profound cultural and social changes in Italy since World War II. Productions by representative directors such as Amelio, Giordana, Moretti, Muccino are included. Knowledge of Italian not required. (Same course as Film Studies 121S.) GE credit: ArtHum, Div, Wrt | AH, OL, VL, WC, WE.-I, III. (I, III.) Heyer-Caput

131. Autobiography in Italy (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 9 or consent of instructor. The development of representations of selfhood with particular attention to generic conditions, the confessional tradition and the problem of women's self-representation. Authors studied may included Petrarch, Tasso, Casanova, Alfieri, Zvevok, Sibilla Aleramo and Primo Levi. Offered in alternate years. GE credit: ArtHum | AH, OL, WC, WE.—III. Heyer-Caput, Schiesari

139B. Italian Literature in English: Boccaccio, Petrarch and the Renaissance (4)

Lecture/discussion-3 hours; term paper. Petrarch and Boccaccio and their relations to the Middle Ages and the Renaissance; the Renaissance, with particular attention to the works of Lorenzo de' Medici, Leonardo da Vinci, Machiavelli, Ariosto, Michelangelo, and Tasso. GE credit: ArtHum | AH, OL, WČ, WE.-II. (II.)

140. Italian Literature in English Translation: Dante, Divine Comedy (4)

Lecture/discussion-3 hours; term paper. Prerequisite: any course from the GE Literature Preparation List. Reading of Dante Alighieri's Divine Comedy, through the otherworld realms of Inferno, Purgatory, and Paradise. GE credit: ArtHum, Wrt | AH, OL, WC, WE.-I. (I.)

141. Gender and Interpretation in the Renaissance (4)

Lecture/discussion-3 hours; term paper. Prerequisite: completion of Subject A requirement, at least one course in literature, or consent of instructor. Critical analysis of Renaissance texts with primary focus on issues such as human dignity, education and gender politics; "high" and "low" culture and its relation to literary practices. (Same course as Comparative Literature 138.) GE credit: ArtHum, Div, Wrt | WC, WE.-I. (I.) Schiesari

142. Masterpieces of Modern Italian Narrative (4)

Lecture - 1.5 hours; discussion - 1.5 hours; term paper. Prerequisite: either English 3, Comparative Literature 2, or History 4C. Analysis of major works of Italian narrative fiction from unification of Italy to present. Students will learn to use representative methods and concepts which guide literary scholarship. Consideration of works within European social and cultural context. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC, WE.-III

145. Special Topics in Italian Literature (4)

Lecture/discussion-4 hours. Prerequisite: course 9 or consent of instructor. Study of special topics and themes in Italian literature, such as comic literature, epic poetry, pre-twentieth century theater, fascism, futurism, women and literature, and the image of America, etc. May be repeated for credit when topic differs. GE credit: Wrt | AH, OL, VL, WC, WE.-I, II, III. (I, II, III.)

145S. Special Topics in Italian Literature (4)

Lecture/discussion-4 hours. Prerequisite: course 9 or consent of instructor. Study of special topics and themes in Italian literature, such as comic literature, epic poetry, pre-twentieth-century theater, fascism, futurism, women and literature, the image of America, etc. This course is taught abroad. May be repeated for credit. Not open for credit to students who have completed course 145. GE credit: ArtHum, Wrt. - III.

145ST. Special Topics in Italian Literature (4)

Lecture/discussion-4 hours. Prerequisite: course 9 or consent of instructor. Study of special topics and themes in Italian literature, such as comic literature, epic poetry, pre-twentieth-century theater, fascism, futurism, women and literature, the image of Amer-

ica, etc. This course is taught abroad. May be repeated for credit. Not open for credit to students who have completed course 145. GE credit: ArtHUm, Wrt | AH, OL, VL, WC, WE.-III.

150. Studies in Italian Cinema (4)

Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: Humanities 10 or consent of instructor. Introduction to Italian cinema through its genres. Focus on cinema as a reflection or a comment on modern Italian history. Film as an artistic medium and as a form of mass communication. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.—II. (II.)

190X. Upper Division Seminar (1-2)

Seminar – 1-2 hours. Prerequisite: upper division standing and consent of instructor. Examination of a special topic in Italian language or culture through shared readings, discussions, written assignments or special activities such as film screening or laboratory work. Limited enrollment. May not be repeated for credit. GE credit: AH, WC, WE.

192. Italian Internship (1-12)

Internship—3-36 hours. Prerequisite: upper division standing and consent of chairperson of Italian Department. Participation in government and business activities to gain work experience and to develop a better knowledge of Italian language and culture. (P/NP grading only.)

1925. Italian Internship (1-12)

Internship—3-36 hours. Prerequisite: upper division standing, consent of instructor and UC Davis program director or chairperson of Italian Department. Participation in community service, teaching, government, and business activities to gain work experience and to develop a better knowledge of Italian language and culture. This course is offered abroad. (P/NP grading only.)-I. (I.)

194H. Special Study for Honors Students

Independent study—3 hours. Prerequisite: open only to majors of senior standing who qualify for honors program. Guided research, under the direction of a faculty member, leading to a senior honors thesis on a topic in Italian literature, civilization, or language studies. (P/NP grading only.) GE credit: AH, WC

195H. Honors Thesis (3)

Independent study—3 hours. Prerequisite: course 194H. Writing of an honors thesis on a topic in Italian literature, civilization, or language studies under the direction of a faculty member. (P/NP grading only.) GE credit: AH, WC, WE.

197T. Tutoring in Italian (1-4)

Seminar — 1-2 hours, laboratory — 1-2 hours. Prerequisite: upper division standing and consent of instructor. Tutoring in undergraduate courses, including leadership in small voluntary discussion groups affiliated with departmental courses. May be repeated for credit for a total of 6 units. (P/NP grading only.)

197TC. Community Tutoring in Italian (1-5)

Discussion—1-2 hours; laboratory—2-4 hours. Pre-requisite: consent of instructor. Field experience as Italian tutors or teacher's aides. May be repeated for credit for a total of 10 units. (P/NP grading only.)

198. Directed Group Study (1-4)

Prerequisite: consent of instructor. (P/NP grading

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading

Graduate Courses

297. Individual Study (1-5)

Prerequisite: graduate standing or consent of instruc-

298. Group Study (1-5)

Prerequisite: graduate standing or consent of instruc-

299. Research (1-12)

Prerequisite: graduate standing or consent of instructor. (S/U grading only.)

299D. Dissertation Research (1-12)

Prerequisite: graduate standing or consent of instructor. (S/U grading only.)

Professional Course 396. Teaching Assistant Training Practicum (1-4)

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Japanese

See East Asian Languages and Cultures, on page 218.

Jewish Studies

(College of Letters and Science)
Diane L. Wolf, Ph.D., Program Director

Program Office. 2216 Social Sciences and Humanities Building http://jewishstudies.ucdavis.edu

Committee in Charge

David Biale, Ph.D. (History) Lisa Materson, Ph.D. (History) Susan Miller, Ph.D. (History) Moulie Vidas, Ph.D. (Religious Studies) Diane Wolf, Ph.D. (Sociology)

The Program of Study

The Program in Jewish Studies offers students the opportunity to explore Jewish history, communities, literature, religion, and culture in a comparative perspective and multicultural framework. Courses include Hebrew language instruction as well as the study of classical and modern Jewish texts in translation.

The interdisciplinary minor in Jewish Studies provides an introduction to the study of Jewish culture, thought, history, and literature. Students learn a broad range of methodologies and critical concepts in these areas and gain insight into the relation between Jewish identities, histories, and representations and those of the cultures in which Jews throughout the world have lived.

The Program in Jewish Studies will be of special interest to students in History, Religious Studies, Comparative Literature and Sociology as well as other fields in the Humanities and Social Sciences.

Minor Program Requirements:

UNITS

Jewish Studies......20

Advising. Jewish Studies Program office; (530) 754-7007; jst@ucdavis.edu.

Courses in Jewish Studies (JST) Lower Division Course

10. Introduction to Jewish Cultures (4)

Lecture—3 hours; term paper. Diverse Jewish cultures created over the past 2,000 years using examples from less-familiar communities such as India, China, and Ethiopia. Topics include the tensions

between homeland/diaspora and questions of identity (race, nationality, culture, or religion). GE credit: SocSci, Div, Wrt | SS, WC, WE.

Upper Division Courses 101. Topics in Jewish Thought (4)

Lecture/discussion—3 hours; extensive writing. Prerequisite: course 10 or Religious Studies 23 or consent of instructor. Selected themes in Jewish thought in historical and social perspective. This course traces the historical development of topics in Jewish thought such as Messianism, or focuses on one specific historical period, such as modern Jewish thought. May be repeated for credit when topic differs. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—II. (II.)

110. Selected Topics in Jewish Literature (4)

Lecture/discussion—3 hours; extensive writing. Pre-requisite: one lower division literature or Jewish Studies course or consent of instructor. Literature written about the Jewish experience, treated in its historical and social context. Examines literature written in one language, such as English, Hebrew, or Yiddish, or a theme, such as gender or modern identities, as expressed in different literary traditions. May be repeated for credit when topic differs. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—II. (II.)

111. Israeli Writing Since 1960 (4)

Lecture/laboratory—3 hours; extensive writing. Prerequisite: one course in American or European literature. Contemporary Hebrew literature, in translation, in relation to post-independence debates about religious, social, and political identity of the Jewish state; literary reflections of Israeli ethnic diversity and changing gender relations; modern Hebrew poetry and postmodern experiments in fiction. Not open for credit to students who have completed Humanities 119. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—II.

112. Readings in Jewish Writing and Thought in German Culture (4)

Lecture/discussion—3 hours; term paper. Prerequisite: Religious Studies 23 or consent of instructor. Historical tradition of Jewish thought in the German cultural context; unique contributions of Jewish writers to culture of the German speaking world; what it means to be "other" in the mainstream culture. May be repeated for credit twice when topic differs. Not open for credit to students who have completed Humanities 121. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—I.

116. Readings in Jewish Writing and Thought in German Culture (4)

Lecture—3 hours; term paper. Prerequisite: Religious Studies 23 or consent of instructor. Historical tradition of Jewish thought in the German cultural context; unique contributions of Jewish writers to culture of the German-speaking world; what it means to be "other" in the mainstream culture. No credit will be given to those students who have completed Humanities 121. May be repeated two times for credit if topic differs. Offered in alternate years. (Same course as German 116.) GE credit: ArtHum, Div, Wet — (1)

120. Cinema and the American Jewish Experience (4)

Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: course 10 recommended. Examination of American cinema to reveal how Jewish identity is expressed and submerged, tracing the relations between religion, identity, race, politics, and art. Not open for credit to students who have completed Humanities 122. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WE.—I.

121. Oral History and Jewish Life (4)

Lecture/discussion—3 hours; term paper. Oral history methodologies and application to an in-depth oral history interview about Jewish life. Topics include oral history practices and ethics, immigration, migration, religious practice, ethnic relations, and community organization structures. Not open for credit to students who have completed Humanities 123. GE credit: SocSci, Wrt | SS.—III.

Land, Air and Water Resources

(College of Agricultural and Environmental Sciences)
Randy Dahlgren, Vice Chairperson

Department Office. 1110 Plant and Environmental Sciences Building (530) 752-1130; http://lawr.ucdavis.edu

Faculty—Soils and Biogeochemistry

Office. 1110 Plant and Environmental Sciences Building (530) 752-1130

Randy Dahlgren, Ph.D., Professor (Soil Biogeochemistry) Academic Senate Distinguished Teaching Award William R. Horwath, Ph.D. Professor (Soil Biogeochemistry) Benjamin Z. Houlton, Ph.D. Assistant Professor

Benjamin Z. Houlton, Ph.D. Assistant Professor (Biogeochemistry) Louise Jackson, Ph.D. Professor and Specialist in

Cooperative Extension (Soil Science)
Alexandra Navrotsky, Ph.D., Professor
(Chemical Engineering and Materials Science)
Sanjai Parikh, Ph.D., Assistant Professor
(Soils and Biogeochemistry)
James H. Richards, Ph.D., Professor (Plant Nutrition)

James H. Richards, Ph.D., Professor (Plant Nutrition) Kate M. Scow, Ph.D., Professor (Soil Science) Wendy K. Silk, Ph.D., Professor (Hydrologic Science) Randal J. Southard, Ph.D., Professor (Soil Genesis/Morphology)

Emeriti Faculty

Conrad J. Bahre, Ph.D., Professor Emeritus
Caroline S. Bledsoe, Ph.D., Professor Emeritus
Richard G. Burau, Ph.D., Professor Emeritus
Emanuel Epstein, Ph.D., Professor Emeritus
Robert G. Flocchini, Ph.D., Professor Emeritus
André E. Läuchli, Ph.D., Professor Emeritus
Roland D. Meyer, Ph.D., Specialist in Cooperative
Extension Emeritus
H. Michael Reisenauer, Ph.D., Professor Emeritus
Dennis E. Rolston, Ph.D., Professor Emeritus
Michael J. Singer, Ph.D., Professor Emeritus
Auchael J. Singer, Ph.D., Professor Emeritus
Robert J. Zasoski, Ph.D., Professor Emeritus

Affiliated Faculty

- A. Toby O'Geen, Ph.D. Specialist in Cooperative Extension
- G. Stuart Pettygrove, Ph.D., Specialist in Cooperative Extension

Faculty—Atmospheric Science

Office. 1110 Plant and Environmental Sciences Building (530) 752-1130

Cort Anastasio, Ph.D., Professor (Tropospheric Chemistry) Shu-hua Chen, Ph.D., Associate Professor (Regional Scale Meteorologist) Ian Faloona, Ph.D., Associate Professor (Atmospheric Science) Richard D. Grotjahn, Ph.D., Professor (Atmospheric Science) Terrence R. Nathan, Ph.D., Professor (Atmospheric Science)

Kyaw Tha Paw U, Ph.D., Professor

(Atmospheric Science) Emeriti Faculty

Thomas A. Cahill, Ph.D., Professor Emeritus John J. Carroll, III, Ph.D., Professor Emeritus Ruth Reck, Ph.D., Professor Emeritus Roger H. Shaw, Ph.D., Professor Emeritus Marilyn L. Shelton, Ph.D., Professor Emeritus Su-Tzai Soong, Ph.D., Professor Emeritus Bryan C. Weare, Ph.D., Professor Emeritus

Affiliated Faculty

Richard L. Snyder, Ph.D., Lecturer (Atmospheric Science) and Specialist in Cooperative Extension

Faculty—Hydrology

Office. 1110 Plant and Environmental Sciences (530) 752-1130

Graham E. Fogg, Ph.D., Professor (Hydrogeology)
Mark E. Grismer, Ph.D., Professor (Hydrologic
Science, Biological and Agricultural Engineering)
Peter J. Hernes, Ph.D., Associate Professor
(Hydrologic Science)
Jan W. Hopmans, Ph.D., Professor

Jan W. Hopmans, Ph.D., Professor (Vadose Zone Hydrology) Gregory B. Pasternack, Ph.D., Professor (Watershed Hydrology)

(Watershed Hydrology)
Carlos E. Puente, Ph.D., Professor (Hydrology)
Susan Ustin, Ph.D., Professor

(Environmental and Resource Sciences)

(Environmental and Resource Sciences)
Wesley W. Wallender, Ph.D., Professor (Hydrologic
Science, Biological and Agricultural Engineering)

Emeriti Faculty

James W. Biggar, Ph.D., Professor Emeritus Robert H. Burgy, M.S., Professor Emeritus David A. Goldhamer, Ph.D., Lecturer Emeritus Donald W. Grimes, Ph.D., Lecturer Emeritus Delbert W. Henderson, Ph.D., Professor Emeritus Theodore C. Hsiao, Ph.D., Professor Emeritus Allen W. Knight, Ph.D., Professor Emeritus Miguel A. Mariño, Ph.D., Professor Emeritus Donald R. Nielsen, Ph.D., Professor Emeritus William O. Pruitt, Jr., Ph.D., Lecturer Emeritus Frank E. Robinson, Ph.D., Lecturer Emeritus Verne H. Scott, Ph.D., Professor Emeritus

Affiliated Faculty

Stephen Grattan, Ph.D., Lecturer (Hydrologic Science) and Specialist in Cooperative Extension Thomas Harter, Ph.D., Specialist in Cooperative Extension

Doug Mackay, Ph.D. Adjunct Professor (Hydrologic Science)

Lawrence J. Schwankl, Ph.D., Lecturer (Hydrologic Science) and Specialist in Cooperative Extension Minghua Zhang, Ph.D., Adjunct Professor (Hydrologic Science)

Land, Air and Water Resources is a multidisciplinary department with faculty who specialize in atmospheric, plant, environmental resource, soil, hydrology, and water engineering. Teaching and research focus on both agricultural forestry, natural ecosystems, climate change and environmental science. The faculty contribute to numerous other undergraduate and graduate programs in the Colleges of Letters and Science, Engineering, and Agricultural and Environmental Sciences.

Major Programs. Undergraduates in the department major in Atmospheric Science, Environmental and Resources Sciences, Environmental Science and Management, and Hydrology, and Soil and Water Science; see http://lawr.ucdavis.edu/academic_programs.htm.

Undergraduate Advising Center is located in 1150 Plant and Environmental Sciences Building (530) 752-1603.

Graduate Study. Graduate work is offered in the area of Atmospheric Science, Hydrologic Sciences, and Soils and Biogeochemistry. For detailed information, call (530) 752-1669 or see http://lawr.ucdavis.edu/academic_programs.htm.

Courses. See courses listed under Atmospheric Science, Hydrologic Sciences, Hydrology, Environmental and Resource Sciences, Environmental Science and Management, and Soil Science. See also the websites listed above.

Landscape Architecture

(College of Agricultural and Environmental Sciences) Patsy Eubanks Owens, M.L.A., Chairperson, Landscape Architecture Program

Department Office. 131 Hunt Hall (530) 752-3907; http://lda.ucdavis.edu

Faculty

Steven E. Greco, Ph.D., Associate Professor Eric Larsen, Ph.D., Associate Research Scientist Jeff Loux, Ph.D., Assistant Adjunct Professor E. Byron McCulley, B.S.L.A., Continuing Lecturer N. Claire Napawan, M.L.A., Assistant Professor Lorence Oki, Ph.D., Associate Specialist in Cooperative Extension

Patsy Eubanks Owens, M.L.A., Professor Michael Rios, Ph.D., Associate Professor Heath Massey Schenker, M.A., Professor Stephen Wheeler, Ph.D., Associate Professor

Emeriti Faculty

Nigel J.R. Allan, Ph.D., Professor Emeritus Mark Francis, M.L.A., Professor Emeritus Dean MacCannell, Ph.D., Professor Emeritus Edward S. McNiel, M.L.A., Senior Lecturer, SOE Emeritus

Robert L. Thayer, Jr., M.A., Professor Emeritus

The Major Program

Landscape architecture is the planning and design of land areas where human use requires adaptation or conservation of the environment. Students who study landscape architecture are concerned about the welfare of the environment and the people who use it. They are capable of solving physical problems and are able to visualize and "think" in terms of spaces and three-dimensional concepts. The program is fully accredited by the American Society of Landscape Architects, which is the only organization professionally sanctioned to grant landscape architectural accreditations in the United States. The program was last reviewed in 2006.

The Program. The curriculum balances creativity and visual and spatial skills with technological expertise and a thorough background in physical, natural, and social sciences. Students develop proficiency at problem solving relating to design of parks, urban open spaces, energy-efficient neighborhoods, land reclamation projects, city and regional planning, and landscape planning for wilderness and scenic regions, coastal and riparian environments, and other sensitive land areas. The program stresses a process-oriented approach to design and emphasizes environmental and community values.

Preparatory Requirements. Students are admitted to the landscape architecture major only after submitting a portfolio for review and selection by the faculty. Contact the Landscape Architecture Advising Office for further information in 135 Hunt Hall (530) 754-8628

Career Alternatives. Graduates may find jobs in private landscape architectural firms or public agencies and corporations employing landscape architects. The landscape architecture major provides the student with excellent preparation for graduate school or career development in a wide range of environmental and design-related fields.

B.S. Major Requirements:

	UNIIS
Preparatory Subject Matter	63-74
Communication 1	4
Biological Sciences 2A, 10 or	
Plant Sciences 2	5
Environmental Horticulture 6	4
One course from Mathematics 16A; Statistics 13; Computer Science 10	. 3-4

One course from Chemistry 2A, 10; Physics 1A, 10; Geology 1; Geography 1; or Soil Science 103-5
One course from Landscape Architecture
2 or 3
Two courses from Anthropology 2, 3, 20,
Economics 1A, 1B, Psychology 1, Political
Science 1, 2, 3, 4, 5, 7, Sociology 1, 2,
3, 4, 5, or 258-10
Two courses from Art Studio 2, 5, 7, 8,
16, any course from History, Music, Dramatic
Art, Philosophy, Art History, language, or
cultural studiesliterature8-10
Landscape Architecture 1, 21, 23, 30,
50, 60, 61, 70
Sonth Subject Matter 44-

epin subject maner44-4
Landscape Architecture 160, 161, 170,
193A, 193B 20
Four studios from Landscape Architecture
180/181 or 19117-20
Landscape Architecture 120 or 150 4
Landscape Architecture 190 (three
quarters) 3
Internship (Landscape Architecture 192)
recommended.

Restricted Electives32	2
Psychology 155 4	
Two courses from Environmental Horticulture	
105, 133; Plant Biology 147; Plant Biology	
102; Wildlife Fish, and Conservation Biology	
156. (One course must be Environmental	
Horticulture 105 or Plant Biology 102.) 8	
Select 20 units of upper division courses in consultation with adviser	

Total Units for the Major 153

Major Adviser. Stephen Wheeler

Advising Center is located in 135 Hunt Hall (530) 754-8628.

Graduate Study. Graduate-level landscape architecture courses are available to students pursuing graduate programs compatible with or directed toward landscape management, planning, and design issues. Department faculty are active members of various graduate groups: Community Development, Geography, Transportation Technology and Policy and Ecology. Faculty members have expertise in many areas, including landscape history, social theory, practice of public space design, historic landscape preservation, city and regional planning, community participation in urban landscape design, landscape ecology, resource management, bioregionalism, and regenerative landscape systems. Graduate students pursue more focused interests, expanding their professional expertise and/or conducting advanced research in landscape architecture or related disciplines.

Courses in Landscape Architecture (LDA)

Lower Division Courses

1. Landscape Meaning (4)

Lecture-3 hours; discussion-1 hour. Overview of the meaning of landscapes as manifested in designed and natural landscapes, everyday and sacred environments, parks, plazas, community gardens and found spaces. Introduction to the profession of landscape architecture and methods used to design, plan and manage landscapes. Not open for credit to students who have taken course 40. GE credit: ArtHum or SocSci, Wrt | AH, OL, QL, SE, SL, SS, VL, WC, WE.—I. (I.) McNiel, Napawan

2. Place, Culture and Community (4)

Lecture—4 hours. Introduction to the relationship of social and spatial arrangements. Basic social-science concepts such as class, status, role, kinship, ritual, myth, alienation, etc., introduced through sitespecific case studies of both historical and contemporary communities. GE credit: SocSci, Wrt | ACGH, SS, VL, WC, WE.—II. Owens

3. Sustainable Development: Theory and Practice (4)

Lecture -2 hours; extensive problem solving -2 hours, discussion -1 hour. Origins, theoretical perspectives, and practical applications of the concept of sustainable development at a number of scales (site, building, neighborhood, city, region, and nation) through lectures, sketch exercises, student projects, walking tours. GE credit: SocSci, Wrt | ACGH, SS, VL, WE.—III. (III.) Wheeler

21. Landscape Drafting and Visualization

Studio — 8 hours; two all-day field trips. Prerequisite: course in free-hand drawing recommended. Development of idea expression through graphic media and the use of drawing techniques for visual representation, including plan, section, and axonometric drawing. Includes an introduction to computerized drafting and drawing. GE credit: VL.—I. (I.) Massey Schenker, Napawan

23. Computer Graphics for Landscape Architecture (4)

Studio — 8 hours; two all-day field trips. Prerequisite: course 21. Landscape architectural communications explored through the computer. Includes computerized drafting, drawing, rendering, desktop publishing, and photorealistic simulation. — II, III. (II, III.)

30. History of Landscape Architecture (4)

Lecture — 3 hours; discussion — 1 hour. Introduction to the history of landscape architecture, emphasizing landscape design as a product of cultural, political, social, and environmental factors. Topics include the history of gardens, parks, community design and environmental planning. Not open for credit to students who have taken course 140. GE credit: ArtHum, Wrt | ACGH, AH, VL, WC, WE.-II. (II.) Massey Schenker

50. Site Ecology (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Biological Sciences 1A, 2A or 10 or an introductory course in biology, botany, or plant science; priority given to Landscape Architecture majors. Introduction to ecological concepts, including nutrient dynamics, population regulation, community structure, ecosystem function. Principles will be applied to human activities such as biological conservation, ecological restoration, landscape planning, and management. Weekly laboratory devoted to field exercises in local ecosystems. GE credit: SciEng | SE, VL, WE.-III. (III.) Greco

60. Technology I: Grading and Drainage (4)

Studio-8 hours. Prerequisite: courses 21 and 23 or consent of instructor. Priority given to Landscape Architecture majors. Topographic and grading problems in landscape engineering: drainage plans, grading plans, spot elevations, road alignment, sections and profiles and cut and fill calculations. Not open for credit to students who have taken course 132.-III. (III.) McCulley

61. AutoCAD for Landscape Architects (4)

Lecture—2 hours; laboratory—4 hours. Prerequisite: Agricultural Management and Range Resources 21 or equivalent with consent of instructor. Priority given to Landscape Architecture majors. Introduction o computer-aided drafting (CAD) techniques and their application to landscape design. Drawing set-up, layer control, basic drawing and editing commands, dimensioning and text styles, symbol libraries, and display commands used in the creation of landscape architectural drawings.—II, III. (II, III.)

70. Basic Landscape Design Studio (4)

Studio-8 hours; field trips. Prerequisite: courses 1, 21, 30 or consent of instructor. Priority given to Landscape Architecture majors. Introduction to basic aesthetic, functional, social, and environmental considerations in landscape design. Provides a broad foundation in landscape design methodologies and skills necessary to create environmentally and socially responsible landscape designs. Not open for credit to students who have taken course 11. GE credit: OL, QL, VL.-II. (II.) Napawan, Owens

98. Directed Group Study in Landscape Architecture (1-5)

Prerequisite: consent of instructor. Directed group study. (P/NP grading only.)

99. Special Study for Undergraduates in Landscape Architecture (1-5)

Prerequisite: consent of instructor. (P/NP grading

Upper Division Courses

120. Advanced Computer Applications (4)

Studio - 8 hours; two all-day field trips. Prerequisite: course 23; open to majors in Landscape Architecture only. Studio work using computer-aided design, geo-graphic information systems, and other advanced computer programs.—(III.) McNiel

150. Introduction to Geographic Information Systems (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Plant Sciences 21 or equivalent with consent of instructor. Priority given to College of Agricultural and Environmental Science majors. Basic concepts, principles, and methods of GIS are presented. Data structures, database design, GIS data creation, GPS, and spatial analysis techniques are emphasized. Lab topics include: online data sources, aerial photography, GPS data input, suitability analysis, carto graphic design, and graphic communication. Not open for credit to students who have completed Applied Biological Systems Technology 180/Plant Sciences 180 or Applied Biological Systems Technology 181N. (Same course as Landscape Applied Biological Systems Technology 150.) GE credit: SE, VL.—I. (I.) Greco, Upadhyaya

160. Technology 2: Construction Materials and Detailing (4)

Studio-8 hours. Prerequisite: courses 21, 23, and 60. Priority given to Landscape Architecture majors. Introduction to materials and methods in landscape construction, including properties of common construction materials (stone, concrete and wood), detailing, preparation of cost estimates and specifications, design of drainage systems, fountains and roof decks. Not open for credit to students who have taken course 133.—I. (I.) McCulley

161. Technology 3: Professional Practice and Construction Documents (4)

Studio – 8 hours. Prerequisite: courses 21, 23, 60 and 160. Legal and professional aspects of landscape architecture, including the development of construction documents (drawings and specifications), proposal writing, fee calculations, project management, cost estimation, and insurance. - II. (II.) McCulley

170. Field Studio in Landscape Architecture

Lecture — 2 hours; workshop — 6 hours. Prerequisite: courses 1, 21, 23, 30, 50, 60 and 70 or consent of instructor. Field study and problem solving experience for juniors in the landscape architecture major. Analysis of complex landscape design and planning problems. Two all-day, weekend field trips required. . GE credit: VL.—I. (I.)

180A. Special Topics in Landscape Architecture: Postmodern Landscapes (2)

Lecture — 2 hours. Prerequisite: upper division standing. Basic principles of critical theory and postmodern modes of analysis. Application to interpretation and change of designed environment. Offered in alternate years. Not open for credit to students who have taken course 185

180C. Special Topics in Landscape Architecture: Art of the Environment (2)

Lecture - 2 hours. Prerequisite: courses 1 and 30. Priority given to Landscape Architecture and Design majors. Introduction to environmental art. Encouragement of critical thinking about the intersection of art, landscape and environmental issues. Offered in alternate years. - Massey Schenker

180F. Special Topics in Landscape Architecture: Landscape Ecology (2)

Lecture - 2 hours. Prerequisite: course 50 or an introductory course in Ecology. Theories, major concepts and research methods of landscape ecology. Spatial structure, function and dynamics of various landscape types. Biological conservation, ecological restoration, and landscape planning, design, and management. Not open for credit to students who have taken Landscape Architecture 183. Offered in alternate years. GE credit: SE, WE. – (II.) Greco

180G. Special Topics in Landscape Architecture: Landscape and Regional Land Planning (2)

Lecture - 2 hours. Prerequisite: upper division standing. Theories, laws, and practices of community planning. Creation of livable and sustainable communities and natural landscapes, Smart growth, new urbanism, neo-traditional town planning, transit-oriented, and sustainable communities. Traditional master planning vs. participatory planning and design approaches. Offered in alternate years. GE credit: ACGH, SS.—II. (II.) Loux, Wheeler

1801. Special Topics in Landscape Architecture: Regenerative Landscape Systems (2)

Lecture - 2 hours. Prerequisite: courses 1 and 30. Priority given to Landscape Architecture majors. Theories, basic techniques and applications for various systems by which landscapes regenerate and sustain life (both human and non-human) and culture over time. Offered in alternate years. GE credit: SL. — (II.) Wheeler, Lou

180J. Special Topics in Landscape Architecture: Community Participation in Design (2)

Lecture - 2 hours. Prerequisite: upper division standing. History and role of community participation in landscape design; methods of community involvement, including workshop techniques. Introduction to design processes, including public participation. Offered in alternate years. GE credit: ACGH, DD, SS.-Owens

180K. Special Topics in Landscape Architecture: Social Factors in Landscape Architecture (2)

Lecture—2 hours. Prerequisite: Psychology 155 and upper division standing. Concepts in environmental psychology as they relate to landscape architecture. Discussion of needs of various user groups of a land area. Introduction to post occupancy evaluations. Offered in alternate years. GE credit: DD, SS, WE.-Owens

180L. Special Topics in Landscape Architecture: Public Open Space (2)

Lecture - 2 hours. Prerequisite: upper division standing. Intensive study of public open spaces, including parks, plazas, playgrounds, greenways and community gardens. Current issues associated with design and management of the public environment of cities. Offered in alternate years.

180M. Special Topics in Landscape Architecture: Urban and Community Design

Lecture—2 hours. Prerequisite: upper division standing. Theories and methods of community and neighborhood design. Past and contemporary approaches including new urbanism, planned unit development, mixed use, pedestrian and transit-oriented development. Issues of open space and community form. Offered in alternate years.

180N. Special Topics in Landscape Architecture: Planting Design (2)

Lecture - 2 hours. Prerequisite: upper division standing and Environmental Horticulture 6. Develop an understanding of the sensory, visual and functional importance of plants in the landscape. Visualization and design of planted landscapes. Development of planting plans. Offered in alternate years. Not open for credit to students who have taken course 156.

1800. Special Topics in Landscape Architecture: Current Issues in Landscape Architecture (2)

Lecture - 2 hours. Prerequisite: course 1 and 30. Priority will be given to Landscape Architecture and Design majors. Study of current issues in landscape architecture with emphasis on design and/or design history. Offered in alternate years.

180P. Special Topics in Landscape Architecture: Water in Community Planning and Design (2)

Lecture - 2 hours. Prerequisite: course 50 or equivalent with consent of instructor. Upper division standing or above. Priority given to Landscape Architecture majors. Theories, policies, methods, and resources related to the integration of water resources management with urban/community planning and landscape design including water use/ demand, quality, treatment, conservation, and storm water/drainage. Offered in alternate years. -Loux

180Q. Historic Preservation (2)

Lecture - 2 hours. Prerequisite: upper division standing. Priority given to Landscape Architecture majors. Roots and present focus of historic preservation movement; current philosophies and laws governing preservation, restoration, and revitalization as they affect landscape architects. Offered in alternate years. — (I, II, İII.) McNiel

181A. Postmodern Landscapes Design and Planning Studio (3)

Studio-6 hours; one field trip required. Prerequisite: course 170; course 180A concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180A. Offered in alternate

181C. Art of the Environment Design and Planning Studio (3)

Studio - 6 hours; one field trip required. Prerequisite: course 170; course 180C concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180C. Offered in alternate years.—Massey Schenker

181F. Landscape Ecology Design and Planning Studio (3)

Studio-6 hours. Prerequisite: course 170; 180F must be taken concurrently. Priority to Landscape Architecture majors. Design theory and methods to real-world projects in ecology. Ecological principles and their application in biological conservation, ecological restoration, and landscape planning, design, and management. Field trip required.

Offered in alternate years. GE credit: OL, VL, SE.—I.

181G. Special Topics in Landscape Architecture: Landscape and Regional Land Planning Studio (3)

Studio-6 hours. Prerequisite: course 170, course 181G concurrently. Applications of recent models and practices of urban planning and design to create livable and sustainable cities, towns, villages, rural, and natural landscapes. Testing of models by creating plans and designs for new communities, and for urban infill, restoration or redevelopment projects. Field trip required. Offered in alternate years. GE credit: VL.—Loux, Wheeler

181H. The Bioregional Landscape Design and Planning Studio (3)

Studio - 6 hours; one field trip required. Prerequisite: course 170; course 180H concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180H. Offered in alternate years.

1811. Regenerative Landscape Systems Design and Planning Studio (3)

Studio - 6 hours; one field trip required. Prerequisite: course 170; course 1801 concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 1801. Offered in alternate years. GE credit: VL.

181J. Community Participation in Design: Design and Planning Studio (3)

Studio - 6 hours; one field trip required. Prerequisite: course 170; course 180J concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180J. Offered in alternate years. GE credit: DD, OL, VL.—Owens

180K. Special Topics in Landscape Architecture: Social Factors in Landscape Architecture (2)

Lecture - 2 hours. Prerequisite: Psychology 155 and upper division standing. Concepts in environmental psychology as they relate to landscape architecture. Discussion of needs of various user groups of a land area. Introduction to post occupancy evaluations. Offered in alternate years. GE credit: DD, SS, WE.-Owens

181L. Public Open Space Design and Planning Studio (3)

Studio-6 hours; one field trip required. Prerequisite: course 170; course 180L concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180L. Offered in alternate years.

181M. Urban and Community Design: Design and Planning Studio (3)

Studio-6 hours; one field trip required. Prerequisite: course 170; course 180M concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180M. Offered in alternate

181N. Planting Design and Planning Studio (3)

Studio-6 hours; one field trip required. Prerequisite: course 170 and Environmental Horticulture 6; course 180N concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180N. Offered in alternate years.

1810. Current Issues Design and Planning Studio (3)

Studio-6 hours; one field trip required. Prerequisite: course 170; course 1800 concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 1800. Offered in alternate

181P. Special Topics in Landscape Architecture: Water in Community Planning and Design Studio (3)

Studio-6 hours. Prerequisite: courses 50 and 61 (or equivalent courses with consent of instructor); course 170; course 180 concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to community and site scale projects associated with course 180P. Offered in alternate years.—II. Loux

181Q. Special Topics in Landscape Architecture: Historic Preservation Studio

Studio-6 hours. Prerequisite: junior standing in the Landscape Architecture program; course 180Q to be taken concurrently. Methods and tools currently used by professional preservation architects and planners, including inventory and evaluation methods and traditional planning and design approaches. Field trip required. Offered in alternate years.—I, II, III. (I, II, III.) McNiel

190. Proseminar in Landscape Architecture

Seminar—1 hour. Lectures and discussion of critical issues in landscape architecture. May be repeated three times for credit. (P/NP grading only.)-I, II, III.

191. Landscape Architecture Planning & Design Studio (2-12)

Seminar — 1 hour; workshop — 3 hours. Prerequisite: course 1, 70, and 170 or consent of instructor. Priority to Landscape Architecture majors. Faculty initiated workshops featuring advanced studies and applications of original work in landscape architecture. May be repeated for up to 20 units of credit. -1, II, III. (Í, II, III.)

192. Internship in Landscape Architecture

Internship. Prerequisite: senior standing in Landscape Architecture. Professional field experience in landscape architecture. May be repeated for a total of 12 units. (P/NP grading only.)

193A. Senior Project in Landscape Architecture (3)

Studio-6 hours. Prerequisite: senior standing in Landscape Architecture. Projects will focus on a critical area of landscape architectural design, planning, analysis, communication, or research. Limited enrollment. Required of all Landscape Architecture majors. (P/NP grading only.)—II. (II.)

193B. Senior Project in Landscape Architecture (4)

Studio-8 hours. Prerequisite: course 193A and senior standing in Landscape Architecture. Projects will focus on a critical area of landscape architectural design, planning, analysis, communication, or research. Limited enrollment. Required of all Landscape Architecture majors. (P/NP grading only.)—

197T. Tutoring in Landscape Architecture (1-5)

Tutoring—3-15 hours. Prerequisite: consent of instructor. Tutoring in Landscape Architecture courses. (P/NP grading only.)

198. Directed Group Study in Landscape Architecture (1-5)

Prerequisite: consent of instructor. Directed group study. (P/NP grading only.)

199. Special Study for Advanced Undergraduates in Landscape Architecture

Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

200. Citizenship, Democracy, & Public Space (4)

Seminar — 4 hours. Prerequisite: graduate standing or consent of instructor. Introduction to seminal works in political theory, philosophy, and the social sciences that focus on citizenship and the public sphere; development of critical perspective regarding restructuring of public space in a pluralistic and global culture; discussion of contemporary case studies-III. (III.) Rios

201. Theory and Philosophy of the Designed Environment (4)

Seminar-4 hours. Prerequisite: course 140 or the equivalent; graduate standing or consent of instructor. Examines the major theories of environmental design. Epistemology of design serves as framework to examine modern landscape architecture, architecture, urban design and planning. Normative theories of design are reviewed along with the social and environmental sciences. Offered in alternate years.—II. Rios

202. Methods in Design and Landscape Research (4)

Seminar - 4 hours. Prerequisite: Statistics 102 or the equivalent; graduate standing or consent of instructor. Explores many of the research and advanced design and planning methods employed in landscape architecture. Exercises provide the student with a vehicle for designing independent landscape research and creative activities. Lectures provide an historical overview of research methodology. Offered in alternate years. - Owens

204. Case Studies in Landscape Design and Research (4)

Seminar—4 hours; field trip required. Prerequisite: graduate standing in Landscape Architecture, Ecology, Geography or Community Development or consent of instructor. Real-world designed environment situations where creative activity and/or basic

research is the primary product. May be repeated for credit for a total of 12 units. Not offered every

205. Physical Planning and Design (4)

Lecture - 2 hours; discussion - 2 hours. Regulation, design, and development of the built landscape, planning and land development processes, zoning and subdivision regulation, site planning, urban design goals and methods, public participation strategies, creatively designing landscapes to meet community and ecological goals. Limited to graduate students. Not offered every year.—I. (I.) Wheeler

210. Advanced Landscape Architecture Studio (4)

Laboratory-8 hours. Prerequisite: course 113 or the equivalent; graduate standing or consent of instructor. Exposes students to real-world, designed-environment situations where creative activity and/or basic research is the primary product. Advanced landscape problems will be utilized at the site, urban or rural scale. Offered in alternate years.

220. Public Space and Culture (3)

Seminar—3 hours. Prerequisite: course 182 or the equivalent; graduate standing or consent of instructor. Explores the public environment of cities including their streets, parks, and squares. Public life and culture of American cities is examined and design responses to this culture evaluated. Typology is used to identify spaces. Offered in alternate years.

230. Landscape and Memory (4)

Seminar-4 hours; term paper. Prerequisite: graduate standing or consent of instructor. Theories of memory from other fields (critical theory, psychoanalysis, history) applied to landscape design, especially heritage and tourist sites. The relationships between place, memorial, and event. Offered in alternate years.

240. Historic, Cultural Landscapes: Concept, Perception, Preservation (4)

Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. Historic cultural landscapes, as defined by the National Register of Historic Places. Identification and analysis of aerial extent, structured makeup, integrity, and historical significance using common and emerging methods and tools. Offered in alternate years. - McNiel

250. Life-Place: Bioregional Theory and Principles (4)

Seminar - 3 hours; tutorial - 1 hour. Prerequisite: graduate standing or consent of instructor. The emerging concept of bioregionalism as a hypothesis for environmental quality; theoretical structures and practical methods by which individuals and groups identify with naturally-bounded "life-places" or "bioregions" and strive to live respectfully and reciprocally within them. Offered in alternate years.

260. Landscape and Power (4)

Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. How various representations of landscape have historically worked as agents of cultural power. Course framework is interdisciplinary, including studies of landscape representation in literature, art, photography, cartography, cinema, and landscape architecture. - Massey Schenker

270. Environment and Behavior (4)

Seminar - 3 hours; tutorial - 1 hour. Prerequisite: graduate standing or consent of instructor; Psychology 144 recommended. Factors that influence human's interaction with their surroundings and the mechanisms used for recognizing and addressing general and specific human needs in community design and development decisions. Offered in alternate years. - Owens

280. Landscape Conservation (3)

Seminar — 3 hours. Prerequisite: contact department for prerequisite courses; graduate standing or consent of instructor. Focus is on land planning, design, and management techniques to further the goal of resource preservation. Examines current critical theory in the establishment and management of conservation areas. Offered in alternate years.—II. Greco

290. Graduate Seminar in Landscape Architecture (2)

Seminar — 2 hours. Prerequisite: graduate standing and consent of instructor. Seminar on selected topics in landscape architecture research, analysis, planning, design, communication, or education. May be repeated for credit. (S/U grading only.)

297. Practicum in Landscape Architecture (1-10)

Independent study—1-10 hours. Prerequisite: graduate standing and consent of instructor. Opportunity for students to work directly in the field with academics at other institutions or with professionals in an office setting. Gives experience beyond the confines of campus and allows direct interaction with the community. (S/U grading only.)

298. Group Study (1-5)

Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

299. Directed Individual Research for Graduate Students (1-12)

Requires consent of instructor. May be repeated for credit. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Landscape Restoration

(College of Agricultural and Environmental Sciences)

This minor is of particular interest to students majoring in Wildlife, Fish, and Conservation Biology, Environmental Science and Management, Landscape Architecture, Biological Sciences, Evolution and Ecology and Plant Biology. Biological Sciences 1C or Plant Sciences 2 is a prerequisite to some courses in the minor. The minor is sponsored by the Department of Plant Sciences.

UNITS

Minor Program Requirements:

Minor Adviser. T.P. Young (Plant Sciences)

Advising Center is located in 1224 Plant and Environmental Sciences (530) 752-7738.

Latin

See Classics, on page 195.

Latin American and **Hemispheric Studies**

(College of Letters and Science)

Charles F. Walker, Ph.D., Program Director

Program Office. Hemispheric Institute on the Americas, 1277 Social Sciences and Humanities Building (530) 752-3046

Committee in Charge

Miroslava Chávez-García, Ph.D., Associate Professor *(Chicana/o Studies)* Marisol de la Cadena, Ph.D., Associate Professor (Anthropology) Luis Guarnizo, Ph.D., Professor

(Human and Community Development) Robert Irwin, Ph.D., Associate Professor (Spanish) Victoria Langland, Ph.D., Assistant Professor (History)

Robert Newcomb, Ph.D., Assistant Professor (Spanish and Portuguese)

Pablo Ortiz, Ph.D., Professor (Music) Charles F. Walker, Ph.D., Professor (History)

The minor in Latin American and Hemispheric Studies offers students the opportunity to explore connections throughout the Western Hemisphere from an array of perspectives across multiple academic

The minor is made up of six courses, arranged in three tiers: Basic (one lower division course on the history of Latin America); Core (two introductory upper division courses chosen from a designated list of fields other than History); and Elective (three additional upper division courses from a designated list of courses that focus primarily on Latin American and/or Hemispheric issues). Students are strongly encouraged to develop proficiency in Spanish or Portuguese, either through course work (such as completion of Spanish 24 or 33), or through life

Minor Program Requirements:

Latin American and Hemispheric Studies24

Basic Courses..... One course from History 7A, 7B, 7C Core Courses One course each from two of the following categories:

(a) Anthropology 144;

(b) Native American Studies 115; (c) Spanish 150 or 151; (d) Political Science 143 Elective Courses .. Three courses selected from the following list to achieve a total of 24 units: African and African American Studies 107A, 155, 163, 172, 180; Anthropology 130C, 146; Art History 151; Chicana/o Studies 130, 160; Comparative Literature 151, 152, 165; Film Studies 189; Music 127; Native American Studies 110A, 110B, 110C, 110D, 120, 125, 133, 181A, 181B, 181C, 184; History 160, 162, 163A, 163B, 164, 165, 166A, 166B, 167, 168, 169A, 169B; Spanish 107A, 117, 149, 151, 153, 154, 155, 156, 157, 158, 159, 163, 170, 171, 172, 174, 175,

176, 177; Portuguese 100, 159, 161, 162, 163; Women's Studies 80, 102

Minor Adviser. C.F. Walker in 1279 Social Sciences and Humanities Building (530) 752-3046

Law, School of

Kevin Johnson, J.D., Dean

Vikram D. Amar, J.D., Associate Dean (Academic

Jean Korinke, Assistant Dean (Development & Alumni Relations)

Hollis L. Kulwin, J.D., Senior Assistant Dean (Student Affairs)

Sharon Pinkney, Assistant Dean (Admission & Enroll-

Adam Talley, Senior Assistant Dean (Administration)

Dean's Office. 1011 Martin Luther King, Jr. Hall (530) 752-0243; http://www.law.ucdavis.edu

Afra Afsharipour, J.D., Acting Professor Vikram D. Amar, J.D, Professor Karima Bennoune, J.D., M.A., Professor Ashutosh Bhagwat, J.D., Professor Mario Biagioli, M.F.A., M.A., Ph.D., Professor Andrea K. Bjorklund, J.D., Professor Alan E. Brownstein, J.D., Professor Anupan Chander, J.D., Professor Gabriel Chin, J.D., Professor Holly S. Cooper, J.D., Lecturer J. Angelo DeSantis, J.D., Lecturer Christopher S. Elmendorf, J.D., Professor Floyd F. Feeney, LL.B., Professor Katherine Florey, M.F.A., J.D., Professor Lawrence Green, J.D., Lecturer Angela Harris, M.A., J.D., Professor Robert W. Hillman, J.D., Professor David Horton, J.D., Acting Professor John Patrick Hunt., J.D., Acting Professor Lisa Ikemoto, J.D., Professor Edward J. Imwinkelried, J.D., Professor Krystal Callaway Jaime, J.D., Lecturer Elizabeth E. Joh, J.D., Professor Margaret Z. Johns, J.D., Senior Lecturer Kevin R. Johnson, J.D., Professor Thomas W. Joo, J.D., Professor Raha Jorjani, J.D., Lecturer Courtney G. Joslin, J.D., Acting Professor Hollis L. Kulwin, J.D. Leslie A. Kurtz, J.D., Professor Evelyn A. Lewis, J.D., Professor Carlton F.W. Larson, J.D., Professor Peter Lee, J.D., Professor Evelyn A. Lewis, J.D., Professor Albert C. Lin, J.D., Professor Sharon Weeks McCormack, J.D., Acting Professor Miguel Mindez, J.D., Professor Millard Murphy, J.D., Lecturer Amagda PJrez, J.D., Lecturer Rex Ř. Perschbacher, J.D., Professor Lisa R. Pruitt, J.D., Professor Meehan Rasch, J.D., Lecturer Leticia Saucedo, J.D., Professor Donna Shestowsky, M.S., J.D., Ph.D., Professor Madhavi Sunder, J.D., Professor Clayton Tanaka, J.D., Lecturer Dennis Ventry, J.D., Professor Carter C. White, J.D., Lecturer

Emeriti Faculty

John D. Ayer, J.D., LL.M., Professor Emeritus Iorian Bartosic, B.C.L., LL.M., Professor Emeritus Antonio Bernhard, J.D., Professor Emerita Carol S. Bruch, J.D., Professor Emerita Joel C. Dobris, LL.B., Professor Emeritus Harrison C. Dunning, LL.B., Professor Emeritus Daniel Wm. Fessler, J.D., S.J.D., Professor Emeritus Arturo Gándara, J.D., Professor Emeritus Gary S. Goodpaster, J.D., Professor Emeritus George S. Grossman, LL.B., M.S., L.S., Professor Emeritus

Bill Ong Hing, J.D., Professor James E. Hogan, LL.B., Professor Emeritus John B. Oakley, J.D., Professor Emeritus John W. Poulos, J.D., Professor Emeritus

Edward H. Rabin, LL.B., Professor Emeritus Cruz Reynoso, LL.B., Professor Emeritus Mortimer D. Schwartz, J.D., LL.M., Professor Emeritus

Daniel L. Simmons, J.D., Professor James F. Smith, J.D., Senior Lecturer Emeritus Martha S. West, J.D., Professor Emerita Bruce A. Wolk, J.D., Professor Emeritus Richard C. Wydick, LL.B., Professor Emeritus

Courses in Law (LAW)

Courses of Instruction. The courses listed below have all been taught at least once in the last three years. There is no guarantee that any given course will be taught within the next three years. The numbers in parentheses indicate the number of semester credits. Please see Law School Course Description Page for current information http:// www.law.ucdavis.edu/current/registrar/coursedescriptions.html#.

Professional Curriculum

First Year Courses 200. Introduction to Law (1)

Discussion - 1 hour. Introduction to basic concepts of the law, the historical roots of common law and equity, the precedent system in its practical opera-tion, the modes of reasoning used by courts and attorneys, and the fundamentals of statutory interpretation. (S/U grading only.)

200A. Introduction to the Law of the United States (2)

Discussion - 2 hours. History and fundamental principles of the United State's legal system. Important current legal issues, developments and trends. Required for LL.M. students who have not attended a U.S. law school. Fall semester only. (S/U grading

201. Property (4)

Discussion-4 hours. A study of doctrines and concepts of property law with primary emphasis on real property. Course coverage includes: the estates in land system; the landlord-tenant relationship, conveyancing, and private and public land use control.

202. Contracts (5)

Discussion—5 hours. Examines sorts of promises that are enforced and the nature of protection given promissory obligations in both commercial and noncommercial transactions. Inquiry is made into the means by which traditional doctrine adjusts or fails to adjust to changing social demands.

203. Civil Procedure (5)

 ${\sf Discussion-5}$ hours. A study of the fundamental and recurrent problems in civil actions including the methods used by federal and state courts to resolve civil disputes.

204. Torts (5)

Discussion - 5 hours. Familiarizes students with legal rules, concepts and approaches pertinent to the recovery for personal injuries, property damages and harm done to intangible interests.

205. Constitutional Law I (4)

Discussion—4 hours. The principles, doctrines and controversies regarding the basic structure of and division of powers in American government. Specific topics include judicial review, jurisdiction, standing to sue, federalism, federal and state powers and immunities, and the separation of powers among the branches of the federal government.

206. Criminal Law (3)

Discussion - 3 hours. Study of the bases and limits of criminal liability. Coverage of the constitutional, statutory, and case law rules which define, limit, and provide defenses to individual liability for the major . criminal offenses.

207. Legal Research and Writing I (2)

Discussion/laboratory—2 hours. This fall semester course taught by Wydick Fellowship Program faculty is an integrated legal research and writing skills course. Basic legal research resources and strategies are introduced and practiced.

207A. Legal Research (LLM) (1)

Discussion - 1 hour. A description of the evolution and use of sources of law and secondary authority. LL.M. students only

207B. Advanced Legal Research (2)

Seminar-2 hours. Restricted to 35 students. Will introduce students to advanced legal research tools and techniques used in practice, including efficient computer research techniques.

208. Legal Research and Writing II (2)

Discussion-2 hours. Focuses on persuasive writing and oral advocacy. Students will complete inte grated research and writing assignments, including a complaint, a strategic defense office memorandum, a motion to dismiss in federal court, and an appellate brief, with oral arguments by all students.

Second and Third Year Courses

- General/Topical Survey Courses: 224, 254A, 257, 277T, 281, 285C, 285D, 294A, 298
- Business Law: 215, 215A, 220, 228, 232, 236A, 236B, 242, 243, 247, 253, 255, 266A, 269A, 269C, 271A, 271B, 284, 286D, 291A, 291B

 Constitutional Law: 216A, 218, 240, 282812424
- 288, 288A
- 288, 288A Criminal Law: 210, 210A, 213, 213A, 227A, 245, 245T, 276, 286D Estate Planning: 214, 223, 221
- Environmental Law: 235, 235A, 256, 264, 264A, 265, 282, 285, 285A, 285B, 285C, 285T, 289A, 409, 450
- Family Law: 225, 242, 272, 435 Health Law and Bioetics: 212A, 226 286, 286, 286A, 286B, 286C, 286D, 286E
- Human Rights and Social Justice: 213A, 218, 220T, 222, 222A, 226, 231, 231A, 248B, 251T, 251 TB, 254, 254A, 259, 259P, 259T, 260, 267, 276, 277, 286B, 286D, 287A, 288, 292, 408, 420, 440, 450T, 460
- Individual and Group Study: 411A 41B, 416, 417, 418, 419, 498, 499
- Intellectual Property and Technology: 209A 217, 248A, 266A, 274, 274A, 274D, 285C, 286, 295A, 296, 296T,
- International, Comparative and Foreign Law: 210, 213A, 224, 230, 247A, 248, 248T1, 248B, 242, 252, 270, 274A, 291A, 291B, 292, 293, 440,
- Labor and Employment Law: 231A, 248F, 251, 251T, 255, 260, 279, 285C, 285D, 455
- Legal Theories and Ethics: 220T, 237, 250, 258, 259, 284, 286C, 286D
- Medicine and Mental Health Law: 212, 241, 286, 286A, 286B, 286C
- Procedure and Jurisdiction: 242, 246, 257, 275, 281, 283, 297
- Public Law and Policy 2101, 235, 235T, 240, 240A, 248, 254, 257, 257A, 279, 281, 285T, 287A, 287T, 293, 408A, 445, 460
- Skills and Litigation: 211, 219, 219T, 228, 229, 239, 261, 263A, 271, 275, 278, 280, 297, 401A, 401B, 409, 410A, 410B, 410C, 412, 413, 414,
- 415, 430, 451, 465 Taxation: 214, 220, 220T, 247, 247B, 255, 271, 271A, 271B
- Clinical Programs-Externships: 425, 430, 445, 450, 455, 460, 470
- Clinical Programs-In-House Clinicals: 420, 435, 440, 480
- Individual and Group Study: 411, 411B, 416, 417, 418, 419, 495, 499

209A. Patent Law (3)

Discussion-3 hours. Prerequisite: course 274 or consent of instructor. Covers all essential aspects of patent law: patentable subject matter, novelty, utility, nonobviousness, enablement, prosecution, infringement, and remedies.

209T. Innovation and Technology Transfer Seminar (2)

Seminar — 2 hours. Prerequisite: course 209A or 274, recommended but not required. Restricted to 15 students. From biomedicine to cleantech, public institutions are playing leading roles in developing cutting-edge technologies. Explores the law and policy of publicly-supported innovation and technology

210. Criminal Justice Administration Seminar (2)

Seminar-2 hours. This course compares U.S. criminal procedure with that of other countries, particularly the differing roles of the prosecutor, defense counsel, and the judge. Limited enrollment.

210A. Policing Seminar (2)

Seminar - 2 hours. Restricted to 10 students. What are the expectations and roles of the police in a democratic society? We need order maintenance and crime control, but to assume these tasks the police sometimes intrude upon interests considered fundamental to free societies.

210B. Policing Seminar (2)

Seminar-2 hours. Limited enrollment. What are the expectations and roles of the police in a democratic society? We need order maintenance and crime control, but to assume these tasks the police sometimes intrude upon interests considered fundamental to free societies

211. Negotiation (2)

Discussion - 2 hours. Theoretical and empirical approaches to negotiation for the purposes of making deals and resolving legal disputes. Limited enrollment.

211A. Advanced Negotiations Strategy and Client Counseling (3)

Discussion - 3 hours. Prerequisite: consent of instructor. Application Course. Must apply and secure professor approval to enroll. Will involve participating in discussions and a series of simulations. Your classmates will be counting on you to actively participate and be well prepared for every simulation. Do not apply to take this course unless you are willing and able to participate fully and can accept constructive feedback. If you anticipate missing more than two class sessions, do not apply to take this course. Understand the dynamics of interviewing and counseling process. Designed to be relevant to a broad spectrum of negotiation problems that are faced by legal professionals.

212A. Medical Liability Law and Policy (2)

Discussion - 2 hours. This course will consider the many ways in which society seeks to establish and maintain quality in patient care.

213A. Transnational Criminal Law (3)

Discussion—3 hours. Prerequisite: course 205; course 206. Will examine the laws responses to a particular aspect of globalization, transnational crime. The course will explore the phenomenon of transnationality and how it affects the power of nationstates, acting alone or together, to prosecute certain crimes.

214. Estate and Gift Tax (3)

Discussion—3 hours. Prerequisite: course 220; course 221 recommended. Fundamentals of federal transfer taxation, including the estate tax, the gift tax, and the generation-skipping transfer tax.

215. Business Associations (4)

Discussion-4 hours. Legal rules and concepts applicable to business associations, both public and closely held. Corporate form of organization, partnerships and other associational forms.

215A. The Law of Corporate Governance Seminar (2)

Seminar — 2 hours. Prerequisite: course 215. Advanced issues in the governance of publicly held corporations. Separation of ownership and control and how the law has addressed this issue at the theoretical level and in the context of topics such as the duties of corporate directors, shareholder voting rights, and competition among states to attract corporate charters

215S. Special Session Business Associations (4)

Discussion-4 hours. Provides a broad survey of the legal rules and concepts applicable to business associations, both public and closely.

216A. Law and Religion (3)

Discussion—3 hours. Restricted to 20 students. Federal constitutional law relating to religion. Federal constitutional law relating to religion; the interpretation and application of the Free Exercise Clause and the Establishment Clause of the First Amendment.

217. Telecommunications Law (3)

Discussion—3 hours. Economic and administrative regulation of telephony, radio and television broadcasting, and video technologies such as cable and direct broadcast satellites. Emphasis on the recently enacted Telecommunications Reform Act and the role of the Federal Communications Commission, as well as other sources of regulation such as related antitrust law and state public utility regulation.

218. Constitutional Law II (4)

Discussion-4 hours. Students who have completed course 218A or course 218B may not take this course. Principally covers the First Amendment and the Equal Protection Clause.

218A. Constitutional Law II—Equal Protection (2)

Discussion - 2 hours. Students who have previously taken course 218, or who plan to take course 218 for 4 units in Spring 2011, may not take this course. Students enrolled in this course will be given priority registration spring semester 2011 to enroll in course 218B. Focuses on the Equal Protection Clause of the Fourteenth Amendment.

218B. Constitutional Law II-First Amendment (2)

Discussion - 2 hours. Students who have previously taken course 218 or who plan to take course 218 for 4 units in Spring 2011 may not take this course. Students not required to take course 218A in order to take this course. Principally covers the free speech clause of the First Amendment.

218T. Selected Topics in Constitutional Law (2)

Seminar-2 hours. Examines two core themes of Constitutional Law I and Federal Jurisdiction: federalism and separation of powers. Concentrates on habeas corpus and the Eleventh Amendment as vehicles for examining the constitutional themes in greater depth.

218TA. Separation of Powers (2)

Discussion - 2 hours. Study of the separation of powers in our federal government by focusing on certain historical events and their impact on constitutional

219. Evidence (3)

Discussion—3 hours. Covers rules regarding the admissibility of testimonial and documentary proof during the trial of civil and criminal cases, including rules governing relevancy, hearsay, the examination and impeachment of witnesses, expert opinion, and constitutional and statutory privileges.

219A. Advanced Evidence (3)

Discussion - 3 hours. Prerequisite: course 219. Limited to six students; selected by professor. Interested students complete an application form; available in the Law Registrar's Office. Credit is contingent on attending all classes and participating in all exercises. Participation is crucial to the success of the course, as students will be working in teams of three. Do not take this course unless you are willing and

able to participate fully and can accept criticism. Public interest lawyers often spend much time in the courtroom. Prosecution, defender, and legal aid offices usually don't have resources to train lawyers in trial work. Seeks to help remedy this deficiency by helping develop witness interrogation skills. (S/Ú grading only.)

220. Federal Income Taxation (4)

Discussion — 3 hours. Surveys the federal income tax system, with consideration of the nature of income, when and to whom income is taxable, exclusions from the tax base, deductions and credits, and tax consequences of property ownership and disposition.

220A. Federal Income Taxation (3)

Discussion — 3 hours. Surveys the federal income tax system, with consideration of the nature of income, when and to whom income is taxable, exclusions from the tax base, deductions and credits, and tax consequences of property ownership and disposi-

220B. Tax and Distributive Justice (3)

Discussion-3 hours. Advanced tax course designed to introduce students to issues of tax policy, with particular emphasis on tax distribution (i.e., who or what should pay taxes in society) and tax incidence (i.e., who or what ends up paying taxes in society).

220BT. Law of Banking and Financial Institutions (2)

Discussion-2 hours. Guide to dual regulatory system, and an understanding of banks and other financial institutions, such as thrifts, credit unions, industrial banks, finance companies, and money transmitters, as well as large versus community banks.

220S. Special Session Federal Income Taxation (2)

Discussion-2 hours. Introduction to the basic principles of federal income taxation using the American federal tax model. Topics include identification of income subject to taxation, gains and losses from property transactions, the timing of income and deductions and the identity of people subject to tax on particular items of income.

220T. State and Local Taxation (2)

Discussion - 2 hours. Introduction to fundamentals of state and local taxation. Beginning with historical and constitutional aspects, students will analyze recent developments in state and local taxation and their impact on client representation.

221. Trusts, Wills and Decedent's Estates (3)

Discussion - 3 hours. The law of decedent's estates, wills and trusts. Topics include intestate succession; family protection and limits on the power of testation; execution, revocation and revival of wills; will substitutes; intervivos and testamentary private trusts. Topics may include contracts to make wills; class gifts; powers of appointment; the Rule against Perpetuities; and introduction to the administration of estates and trusts, including powers, duties, rights, and liabilities of fiduciaries and the management of assets.

222. Critical Race Theory Seminar (2)

Discussion - 2 hours. Examines race relations and racial discrimination in America through the perspectives of proponents of the Critical Race Theory (CRT) movement, a collection of legal scholars who challenge both conservative and liberal political orthodoxies.

222A. Latinos and Latinas and the Law (2)

Seminar - 2 hours. Seminar analyzes some of the legal issues of particular relevance to the Latino community in the United States, including racial identity, immigration, language regulation, national and transnational identity issues, affirmative action, and civil rights

222T. Asian Pacific Americans and Law (3)

Discussion—3 hours. Profound impact on how American Law has shaped Asian Pacific Americans demographics, experiences, and possibilities of Asian Americans will be examined

223. Estate Planning Seminar (2)

Seminar - 2 hours. Prerequisite: course 221. Selected topics in the estates and trusts area. Content varies with instructor. Satisfies the advanced legal writing requirement. Limited enrollment.

224. Animal Law Seminar (2)

Seminar-2 hours. An introduction to legal principles affecting animals and their use.

225. Marital Property (2)

Discussion-2 hours. The California community property system, including the rights of marital and domestic partners during the ongoing relationship, and upon the end of the relationship by death or

226. Disability Rights (2)

Discussion - 2 hours. The Americans with Disabilities Act (A.D.A.) as it applies to employment, higher education, public accommodations, and government services and programs. Emphasis on the statutory definition of disability, entities subject to the A.D.A., the "otherwise qualified" requirement, forms of discrimination, reasonable accommodation, and defenses.

226T. Topics in Disability Rights (2)

Seminar-20 hours. Focuses on the Americans with Disabilities Act (ADA) as it applies to employment, higher education, public accommodations, and government services and programs. (P/NP grading

227A. Criminal Procedure (3)

Discussion—3 hours. Federal constitutional limits on government authority to gather evidence and investigate crime. Topics include Fourth Amendment limits on search, seizure, and arrest; the Fifth Amendment privilege against self-incrimination; and the Sixth Amendment right to counsel.

227B. Advanced Criminal Procedure (3)

Discussion—3 hours. Examines a range of issues, including bail, charging decisions, preliminary hearings, discovery, statute of limitations, venue, joinder and severance, pleas, plea bargaining, assistance of counsel, trial, double jeopardy, sentencing, appeal and collateral remedies.

227CT. Topics in California Criminal Practice (2)

Seminar-2 hours. Advanced criminal law and procedure class aimed at students planning to practice criminal law in California, either as an extern or summer clerk, or after graduation.

228. Business Planning and Drafting (3)

Discussion - 3 hours; extensive writing. Prerequisite: course 215 or instructor consent; course 220 or instructor consent. Caution: Prerequisites for this class are rarely waived; do not register for the course unless you have satisfied them or received advance approval from the Professor waiving them with respect to you. Restricted to 12 students. Acquaint student with a range of business transactions frequently encountered by lawyers representing business clients and/or individuals of moderate or large wealth.

228A. Mergers and Acquisitions Law (3)

Discussion - 2 hours. Prerequisite: course 215. Takes a practical approach to mergers and acquisitions, with an in-depth look at the planning, negotiation and completion of mergers and acquisitions.

228B. Accounting for Lawyers (2)

Discussion-2 hours. Exposes student to basic principles of accounting, from the perspective of the prac-

228T. Accounting for Lawyers (2)

Discussion-2 hours. Exposes students to basic principles of accounting, from the perspective of the practicing attorney.

229. Scientific Evidence (3)

Discussion - 3 hours. Prerequisite: course 219. In addition to examining the evidence law governing the admission of scientific testimony, this course considers trial advocacy in presenting and attacking such testimony. Limited enrollment.

230. International Environmental Law (3)

Discussion-3 hours. Prerequisite: prior course work in environmental law and/or international law is helpful. Elective Course for Environmental Law Certificate Program. May satisfy Advanced Writing Requirement with professor's permission. Provides an overview of the structure and basic principles of international environmental law and policy.

230T. Free Trade and the Environment (2)

Seminar-2 hours. Free Trade and Environ. Course Description: Examines the relationship between legal rules relating to trade and rules for the protection of

231. Sex Based Discrimination (3)

Discussion - 3 hours. Issues raised by legal and social distinctions between men and women. Explores potential remedies for discrimination drawn from constitutional law, statutory enactments, and common law developments. Subject matter areas include sex-based discrimination in constitutional law, family law, reproductive rights, educational opportunity, criminal law, and employment.

231A. Sexual Orientation, Gender Identity, and the Law (3)

Discussion-3 hours. Examines the legal and social regulation of sexual orientation and gender identity.

232. Real Estate Finance (2)

Discussion – 2 hours. An examination of the problems involved in the acquisition, financing, and development of real estate, and of lender remedies and debtor protections in the event of debtor default. The practical application of California legal doc-

235. Administrative Law (3)

Discussion-3 hours. Examines how the U.S. Constitution and the federal Administrative Procedure Act constrain and regulate decision making by government agencies and officials.

236A. Securities Regulation (2)

Discussion - 2 hours. Prerequisite: course 215 or consent of instructor. Legal rules and concepts applicable to business associations, both public and closely held. Corporate form of organization, partnerships and other associational forms.

236B. Securities Regulation II (2)

Discussion - 2 hours. Prerequisite: course 215 or consent of instructor; course 236A recommended. Securities Exchange Act of 1934 and the regulation of securities markets. Topics covered include regulation of securities markets and securities professionals, responsibilities of securities lawyers, continuous reporting, transnational securities fraud, and enforcement of the securities acts.

236S. Securities Regulations (2)

Discussion - 2 hours. Focuses on the Securities Act of 1933 and the Securities Exchange Act of 1934 as they affect international transactions involving US Securities. Topics include international public offerings, registration statements, exemptions from registration, secondary offerings, market regulation, liability provisions, the definition of a security, enforcement of the securities act, responsibilities of securities lawyers and international lawyers representing clients dealing in US securities. .

237. Legal History (2)

Discussion – 2 hours. A survey of Anglo-American legal history from the origins of the common law in medieval England through the twentieth-century. The course will focus on the development of legal institutions, such as courts and juries, as well as on doctrines of substantive law.

239. Mediation: Theory and Practice (3)

Discussion - 3 hours. Prerequisite: course 211, 297. The basic, practical knowledge necessary to begin a mediation practice. Detailed understanding of the mediation process to counsel clients knowledgeably about the mediation option and represent clients ably in mediation. Communication skills, development of the ability to analyze disputes to understand why negotiations' succeed or fail, and understanding of the advantages and limitations of mediation as a

method of resolving disputes. The stages of a mediation: contracting (establishing contact with the parties and explaining the process), developing the issues, working the conflict, resolving the conflict, and closure. Limited enrollment.

240. Elections and Political Campaigns (2)

Discussion - 2 hours. Covers selected constitutional and statutory aspects of federal and state elections, including campaign finance, initiatives, and other topical issues. Limited enrollment.

240A. Law of the Political Process (3)

Discussion - 3 hours. Covers many of the foundational issues in the "law of democracy," as that body of statutory and constitutional law has developed in the United States.

241T. Voting Rights Act Seminar (2)

Seminar-2 hours. Explores the Voting Rights Act of 1965, its subsequent amendments, and litigation brought under or in reaction to the Act.

242. Conflict of Laws (3)

Discussion—3 hours. A study of how law operates across state and national borders. The topics covered include choice of applicable law in transactions involving multiple jurisdictions, recognition of judgments, and the exercise of jurisdiction.

2425. Special Session Conflict of Laws (2)

Discussion - 2 hours. Study of transactions with multi-state and international contracts. Topics include jurisdiction, recognition of foreign judgments, and choice of applicable law. Addresses problems that international lawyers encounter in a wide variety of deals with the emphasis on international commercial deals.

243. Commercial and Bankruptcy Law (4)

Discussion-4 hours. The business debtor who doesn't have enough money (or is unwilling) to pay his debts. Remedies available to creditors to force payment, along with devices that creditors may use to give themselves priority against limited assets. Examination of the role of bankruptcy. Bankruptcy both as a means for providing funds for creditors, and as a device for maximizing asset value.

245. Corporate and White Collar Crime (3)

Discussion - 3 hours. The law of conspiracy, corporate criminal liability, mail and wire fraud, RICO, money laundering, and other business and environ-mental crimes and associated defenses.

245B. Death Penalty Seminar (2)

Seminar—2 hours. Offers overview of the constitutional law governing the death penalty in the United States. Limited enrollment.

246. Federal Jurisdiction (3)

Discussion — 3 hours. Prerequisite: course 205. A study of subject-matter jurisdiction of federal courts.

247. Taxation of Partnerships and LLCs (3)

Discussion - 3 hours. Prerequisite: course 220. The federal income taxation of business entities whose owners are taxed on the income, deductions and losses of the entity on a pass-through basis.

247A. International Aspects of U.S. Taxation (3)

Discussion - 3 hours. Prerequisite: course 220. Completion or current enrollment in a course covering the domestic taxation of corporations is suggested but not required. Corporate Tax may be taken concurrently. Examine the U.S. income tax laws and policies related to the taxation of foreign income of U.S. persons and U.S. income of foreign person.

247B. Corporate Tax (3)

Discussion/laboratory—2 hours. Examination of the federal income tax relationship between corporations and their owners. Covers the transfer of funds into a corporation on formation and the re-transfer of money and property from the corporation to its shareholders

248. Public International Law (3)

Discussion - 3 hours. Introductory course covers basic international law concepts and the law-making process.

248A. Jurisdiction in Cyberspace Seminar (2)

Seminar—2 hours. Review concepts in international law, conflicts of law, cyberlaw, and federal jurisdiction to address the growing multi-jurisdictional conflicts created by the Internet. Examine European efforts at crafting intra-Europe jurisdictional rules, as well as other international jurisdiction treaty projects such as those at the Hague. Limited enrollment. GE credit: Wrt.

248B. International Human Rights (3)

Discussion—3 hours. Introduces international human rights legal system through an examination of its historical origins and precursors and a review of its international legal backdrop, including the character and sources of international law, the UN Charter and the UN system.

248BT. Human Rights in the Former Soviet Union: Legal Tools for Repression and Redress: Part II (2) Seminar (2) hours. This course first provides a historical context for the current political and human rights situation in the Former Soviet Union. It then analyzes the legal mechanisms and other strategies that some of the Former Soviet Union's countries governments employ to repress their own citizens. Finally, the class examines the ways in which citizens use the law to seek relief from remedies for the repression of their rights.

248D. Globalization and the Law (3)

Discussion - 3 hours. Globalization of people, finance, goods, services, and information puts pressure on the nation-state form. In a world of diasporas and multinational corporations, what does citizenship mean? n the absence of a world government, can we grapple with problems that now take on a global form? We will canvass a number of different approaches, including: the technical coordination of the Basel Accord on capital adequacy; the World Trade Organization regime universalizing substantive legal standards related to intellectual property; the Internet governance regime offered by ICANN, a California not-for-profit corporation; private and state-based efforts to support global health financing; and the Kyoto Protocol's cap-and-trade system for responding to a global problem where the sources, costs and benefits are not uniformly distributed. We will also consider issues of extraterritoriality, regulatory competition, and so-called Asian

248G Legal Spanish for Lawyers (2)

Discussion - 2 hours. Designed for law students who are native Spanish-speakers or who have achieved proficiency in Spanish through study or experiences in a Spanish-speaking country. The course will pro-vide a brief review of basic Spanish and then move into more complicated grammatical structures, all within a legal context. The legal context will be the representation of Spanish-speaking clients in the following areas of law: Family Law, Public Benefits (Social Security, Medi-Cal, etc.), Immigration, Employment, Torts, Civil Rights and Criminal Defense. Students will be encouraged to develop the vocabulary they will need for their own areas of interest/specialization (if known). Students will discuss issues of cultural and linguistic competency in serving Spanish-speaking clients. The course will include a unit on legal ethics surrounding translation, interpretation and communication with clients. It is vital that attorneys know when to call on a professional interpreter or translator. We will also discuss the ethics rules for attorneys surrounding legal translation and interpretation

248T Fundamentals of Public International Law (1)

Discussion — 1 hour. This course will introduce students to the basic principles of international law as well as basic techniques of international legal research. We will cover the sources of international law; the roles played by states, organizations, and individuals in international law; and the interaction of domestic law (especially U.S. law) and international law. We will discuss some of the procedural and practical hurdles that accompany arguing cases

before international tribunals. The research component will involve hands-on assignments to track down international legal materials.

248TC International Econmic Law (3)

Discussion—3 hours. This course will examine the architecture of the international economic system, with a focus on both trade and investment.

248T. Fundamentals of Public International Law (1)

Seminar—1 hour. Introduces students to the basic principles of international law as well as basic techniques of international legal research. GE credit: Wrt.

248TT. Theories of International Law (2)

Discussion—2 hours. International law, once critiqued as powerless and ineffective, is now challenged as a threat to American democracy. Introduction to competing theories of international law, including natural law, positivism, realism, liberalism, constructivism, fairness, legal process, and world public order.

249. Comparative Law (3)

Discussion—3 hours. The uses of comparative method, principal differences between common law and civil law and the styles of legal reasoning that prevail in these two great legal cultures. Topics include the evolution of the civil law, the phenomenon of codification, the structure of European civil codes and the interpretation of their provisions, the respective roles of counsel, judges and law teachers, civil law procedure, and the analysis of selected areas of substantive law. Knowledge of a foreign language is not required.

2495. Special Session Comparative Law (1)

Discussion—1 hour. This course will provide a comparative perspective for students of American law. After an initial look at the uses of the comparative method, discussions will be centered around the main differences between common law and civil law and the different styles of legal thinking. Topics to be covered will be the evolution of the civil law and the idea of codification, the structure of European civil codes and the interpretation of their provisions, the personnel of the law and procedure in civil law countries, and the analysis of selected problems of substantive law. Knowledge of a foreign language will not be required.

250. Jurisprudence Seminar (2)

Seminar—2 hours. Deals principally with the question of how judges should decide "hard cases," where the content of the law is in doubt and competent arguments have or could be offered for mutually inconsistent decisions in favor of either party. Limited enrollment.

250AT. Legal Theory Workshop (2)

Seminar—3 hours. Introduction to cutting edge research by legal academics and professors in affiliated disciplines.

250T. Asian American Jurisprudence (3)

Discussion—3 hours. Legal, social, and political discourse on race relations has traditionally been framed in Black-White terms. This course disrupts the traditional view by taking Asian Americans seriously.

251. Labor Law (2)

Discussion—2 hours. Survey of the legislative, administrative, and judicial regulation of labor relations under federal law. Historical development of labor law, the scope of national legislation, union organization and recognition, the legality of strikes, picketing, and the negotiation of collective bargaining agreements.

251T. Labor Law I (2)

Discussion—2 hours. Restricted to students who previously took Labor Law in Fall 2008 may not enroll in Labor Law I. Survey of the legislative, administrative, and judicial regulation of labor relations under federal law.

251TB. Labor Law II (2)

Discussion—2 hours. Prerequisite: course 251T preferred; not required. Survey of the legislative, administrative, and judicial regulation of labor relations under federal law.

252. International Litigation and Arbitration (3)

Discussion—3 hours. Current developments in international law, conflict of laws, civil procedure, arbitration, and comparative law in the context of transactions and disputes that cut across national boundaries.

254. Housing Law (2)

Discussion – 2 hours. Survey course covers legal and policy issues related to developing, protecting and preserving affordable, safe and accessible housing and sustaining viable, diverse communities.

254A. Law and Rural Livelihoods Seminar (2)

Seminar – 2 hours. Provides broad overview of law as it relates and applies to rural people and places.

254T. Law and Rural Livelihoods Seminar (2)

Seminar—2 hours. Provides a broad overview of law as it relates and applies to rural people and places.

255. Pension and Employee Benefit Law (3)

Discussion—3 hours. Prerequisite: course 220. The federal regulation and taxation of private pensions and employee benefits. The Employee Retirement Income Security Act (ERISA), including such topics as coverage, forfeitures, spousal rights, creditor access, fiduciary duties, preemption of state law, remedies, and other litigation issues. Internal Revenue Code issues such as discrimination in favor of the highly compensated, limitations on contributions and benefits, rollovers, IRAs, early distribution penalties, and minimum distribution rules.

256. Land Use (2)

Discussion—2 hours. Local agencies, developers, environmental interest groups, and others who regularly deal with the administrative and legislative applications of land use planning and development laws. Topics include zoning, general plans, local government land use regulation, and related areas of litigation. The expanding role of the California Environmental Quality Act.

257. Legislative Process (2)

Discussion—2 hours. Fundamental elements of the legislative process, including legislative procedure; the legislature as an institution; lobbying; statutory interpretation, legislative-executive relations; and the legislature's constitutional powers and limitations.

257A. Legislative Intent Seminar (2)

Seminar— $\bar{2}$ hours. Theories and principles of statutory and constitutional interpretation. Original intent vs. living constitution; permissible kinds of evidence for determining legislative intent; canons of construction; extent to which initiatives should be interpreted similarly to legislative enactments.

257B. Statutory Interpretation (2)

Seminar—2 hours. This course addresses the process of statutory interpretation, commercial and public interest, and construction of public instruments. The course covers legal and political science theories, and the practicalities of the legislative process, which bear on interpretation of statutes and regulations

258. Professional Responsibility (2)

Discussion—2 hours. The American Bar Association's Model Rules of Professional Conduct and the Code of Judicial Conduct, which are tested on the Multistate Professional Responsibility Examination, and the California Rules of Professional Conduct, which are tested on the California Bar Examination. Issues affecting the legal profession, including lawyers' ethical duties and responsibilities to clients, the courts, third parties, and the legal system.

258A. Legal Ethics and Corporate Practice (3)

Discussion—3 hours. Focus on corporate practice to explore the ethical responsibilities of lawyers.

258BT. Mindfulness and Professional Identity (3)

Seminar - 3 hours Introdution to the practice of mediation and connect it with readings about the legal profession.

259. Feminist Legal Theory (2)

Discussion-2 hours. Provides an overview of feminist legal theory and considers how its various strands inform legislative and judicial law making. Satisfies Advanced Writing Requirement

259A. Women, Islam and the Law (2)

Seminar-2 hours. This course will study legal and religious reform movements for women's rights within Muslim communities in the context of current scholarly and political debates about fundamentalism, democracy, equality, secularism, universalism, and multiculturalism. This is a limited enrollment sem-

259P. Women and the Law Practicum (1)

Discussion/lecture. Prerequisite: prior or concurrent enrollment in course 259. Complements the content of the feminist legal theory course by providing students the opportunity to consider how feminist theory may be used to inform law-making.

260. Employment Discrimination (3)

Discussion - 3 hours. Examine federal laws prohibiting employment discrimination, including Title VII of the Civil Rights Act of 1964, the Equal Pay Act, the Age Discrimination in Employment Act, the Americans with Disabilities Act, the Rehabilitation Act of 1973, and § 1981.

260AT. Employment Law (3)

Discussion - 3 hours. Provides an overview of employment law, labor law and employment discrimination law and aims to serve as a foundation for understanding the law and policy (statutory and common law) that surround the employer-employee relationship.

261. Judicial Process (2)

Discussion-2 hours. Examines a variety of issues concerning the judicial process. Focus is on judge's role in the legal process, the administration of justice, ethical issues, decision making, bias, and critical examination of the strengths and weaknesses in our current judicial system.

262. Antitrust (3)

Discussion - 3 hours. Focus of the course is the federal antitrust laws, concentrating on basic substantive areas of the Sherman and Clayton Acts.

262S. Special Session Antitrust (1)

Discussion-1 hour. A study of the federal antitrust laws including price fixing, limits on distribution, tying arrangements, monopolization and mergers.

262T. Regulated Industries (2)

Discussion-2 hours. Examines regulation of business in sectors, traditionally described as "common carrier" and "utility" industries, where because of market failures normal competitive mechanism will not protect consumers from exercises of market power.

263A. Trial Practice I (3)

Discussion - 2 hours; laboratory - 1 hour. Prerequisite: course 219, may be taken concurrently. Introduction to the preparation and trial of cases, featuring lectures, videotapes, demonstrations, assigned readings and forensic drills. Laboratory held on Tuesday, Wednesday, and Thursday evening. Limited enrollment.

264. Water Law (3)

Discussion - 3 hours. Property rights in surface waters, including riparian rights, prior appropriation, and public rights use of water bodies; environmental constraints on exercise of water rights; groundwater rights and management; federal allocation and control of water resources; legal aspects of interstate allocation.

264A. Ocean and Coastal Law (2)

Discussion - 2 hours. An introduction to the goals and challenges of coastal and ocean policy.

265. Natural Resources Law Seminar (2)

Seminar - 2 hours. Topic varies each year. This year, we will take a close look at the challenges of managing the Sacramento-San Joaquin Delta, which is both the most important estuary on the west coast and the hub of California's water delivery system. Limited enrollment.

266A. Law of E-Commerce (3)

Discussion — 3 hours. Emerging legal issues crucial to the conduct of business in cyberspace. Discussion of the evolution and current administration of the Internet and the World Wide Web.

267. Civil Rights Law (3)

Discussion-4 hours. Civil remedies for civil rights violations under the primary United States civil rights statute. Specifically, covers actions for constitutional and statutory violations under 42 USC §1983, affirmative defenses, and abstention doctrines.

267B. Civil Rights Seminar (2)

Seminar—2 hours. The social, political, legal and historical factors which led to the creation of the United States Commission on Civil Rights (USCCR) in 1957. The United States Commission on Civil Rights is a bipartisan, independent agency established by the Civil Rights Act. It is directed to investigate complaints alleging deprivations of the right to vote, and voter fraud; to study and collect information relating to discrimination and the denial of equal protection of the laws under the Constitution on the basis of race, color, religion, sex, age, disability, or national origin; and submit reports, findings and recommendations to the President and to Congress. The role that the USCCR has played and continues to play in American politics, legislative enactments and the national dialogue on equality, fairness and justice in the context of civil and human rights. Satisfies Advanced Legal Writing Requirement. Limited enroll-

269. Basic Finance for Lawyers (3)

Discussion-3 hours. Prerequisite: students with a non-law basic finance course will not be admitted, except with consent of instructor. Basic techniques of analysis that are part of the core curriculum in a good business school. Gives background necessary for understanding and advising your clients and for understanding other business-related law school courses

269A. Basic Finance (3)

Discussion—3 hours. Students with a non-law basic finance course must have instructor's permission. Basic techniques of analysis that are part of the core curriculum in a good business school are studied. Purpose is to give you background necessary for understanding and advising clients and for understanding other business-related law courses

269C. Corporate Finance (3)

Discussion - 3 hours. Prerequisite: course 215 or concurrent enrollment recommended. Focus on how corporations raise money, stocks and bonds, etc.; how deals are structured and why corporations use one strategy instead of another.

269D. Seminar on Financial Regulation (2)

Seminar-2 hours. Introduction to the legal and regulatory issues presented by contemporary capital

270. International Business Transactions (2)

Discussion-2 hours. Select legal problems arising from international business transactions. Topics include the international sales contract, letters of credit, transfers of technology, regulation of bribery, development of joint ventures, repatriation of profits, and foreign exchange problems.

2705. Special Session International **Business Transactions (2)**

Discussion - 2 hours. A consideration of select legal problems arising from international business transactions. Topics include the international sales contract, letters of credit, transfers of technology, regulation of bribery, repatriation of profits, and national efforts to control imports.

271. Nonprofit Organizations and Drafting

Discussion - 4 hours. Prerequisite: course 215 or consent of instructor. Legal rules and concepts applicable to nonprofit organizations.

271A. Nonprofit Organizations: State and Local Governance Issues (2)

Discussion - 2 hours. Prerequisite: course 215 (may be taken concurrently) or consent of instructor. State and local laws applicable to nonprofit organizations, i.e., public interest, cultural, religious, educational, and other not-for-profit entities. Federal tax exemptions of nonprofits, state and local laws impacting nonprofits with respect to incorporation or charitable trust formation, operation and governance, dissolution, fiduciary obligations of trustees and officers and directors, management and investment obligations vis-à-vis trust assets, cy pres, rights of members of social clubs, trade associations and labor unions, enforcement of obligations and rights by the attorney general and others, and regulation of charitable solicitation. Topics may include local property tax and other tax exemptions, nonprofit accounting issues public/private partnerships and Federal antitrust and constitutional constraints.

271B. Nonprofit Organizations: Tax Exemptions and Taxation Focus (2)

Discussion - 2 hours. Prerequisite: course 215 or consent of instructor; course 220 recommended. Conceptual basis and substantive law criteria for the federal and state income tax exemption of nonprofit organizations and those particular circumstances and activities which will result in income taxation or financial sanction, including qualifications for exempt status, the nondistribution constraint, the inurement and private benefit concepts, limitations on campaign activities, permissible lobbying expenditures, the unrelated business income tax, the deduction for charitable contributions, intermediate sanctions, the differences between private foundations and public charities, special excise taxes, the exemption application process and reporting and disclosure requirements. Topics may include nonprofit accounting issues, local property tax and other local tax exemptions, and public/private partner-

272. Family Law (3)

Discussion—3 hours. An introduction to the legal regulation of the family.

274. Intellectual Property (3)

Discussion—3 hours. Provides a broad survey of intellectual property law.

274A. International Intellectual Property (2)

Discussion—3 hours. Prerequisite: prior or concurrent enrollment in course 274. Surveys the international aspects of copyright, patent and trademark law, including a look at basic international instruments, such as the Paris Convention, the Berne Convention, and Trade Related Aspects of Intellectual Property Rights of the World Trade Organization.

274AS. Summer Session Intellectual Property (2)

Discussion - 2 hours This course provides a broad survey of the field of intellectual property. Areas covered will include trademarks, patents, trade secrets, idea protection, unfair competition, and copyright.

274BT. Chinese Intellectual Property Law

Discussion—2 hours. Deals primarily with the legal protection of copyrights, patents, and trademarks in China. It focuses on the basic legal principles and rules concerning the protection of these three core forms of IP rights.

274D. Intellectual Property in Historical Context Seminar (2)

Seminar—2 hours. How the legal system has adapted to earlier periods of rapid change by creating, delimiting, and expanding intellectual property rights (IPRs). Required paper satisfies advanced writing requirement.

274T. Theory and History of Intellectual Property (3)

Seminar – 3 hours. Seminar traces development of intellectual property law in the U.S. and Europe because it is not possible to understand the logic and shape of current Intellectual Property concepts outside of their messy history.

275TA. Intellectual Property Agreement **Drafting for Biotech & Pharma**

Seminar — 2 hours. Prerequisite: upper-division Business Law course or Intellectual Property course; priority given to students that have completed course 274. Covers the negotiation and drafting of intellectual property agreements common in the biotechnology and pharmaceutical arena.

275. Complex Litigation (2)

Discussion - 3 hours. Issues that frequently arise in large complex litigation involving multiple parties and multiple claims.

276. Juvenile Justice Seminar (2)

Seminar-2 hours. Legal and philosophical bases of a separate juvenile justice process for crimes committed by minors; police investigation, apprehension, and diversion; probation intake and detention; juvenile court hearing and disposition; juvenile corrections. The role of counsel at each phase of the process is examined.

277. Native American Law (2)

Seminar-2 hours. Legal relations between Native American tribes and the federal and state governments. Topics include the basic jurisdictional conflicts, which dominate this area of law and cover specific areas such as land rights, hunting and fishing rights, water rights, domestic relations law, and environmental protection. Religious freedom, repatriation. Issues regarding terminated and non-recognized tribes are also addressed.

277T. Indian Gaming Law Seminar (2)

Seminar - 2 hours. Examines unique historical, political and legal context in which Indian tribes operate casinos, including impacts on tribal sovereignty, relations between tribes, states and local governments and changing relationships among the tribes themselves members, with particular reference to experience of California.

278. Pretrial Skills (2)

Discussion — 2 hours. This course uses role-playing exercises, videotaped simulations, and related projects to introduce students to lawyering skills basic to the practice of law, including client interviewing, witness interviewing and discovery, including depositions. Limited enrollment.

279. Public Sector Labor Law (2)

Seminar - 2 hours. Prerequisite: course 251 or consent of instructor. Application of private sector labor law doctrines to the public sector. Emphasis on the four California public sector statutes and the impact of constitutional law on public employees. Class presentation and seminar paper required. Satisfies advanced writing requirement. Limited enrollment.

280. Advanced Legal Writing: Analytical & Persuasive Writing (2)

Seminar - 2 hours. Prerequisite: consent of instructor. Develop essay writing skills and performance test drafting typically employed on the bar examination. (S/U grading only.)

280BT. Analytical and Persuasive Writing I

Discussion-2 hours. Prerequisite: consent of instructor. Restricted to third-year Law students only. Skills focused on the development of legal analytical and organizational methods essential to successful completion of the Performance Test component of the California Bar Exam (and other states), and, by extension, to success in the practice of law. (S/U grading only.)

281. Local Government Law (2)

Discussion—2 hours. Local Government Law explores the structure of state and local government through the lens of the virtues and flaws of the ideas of Madison and DeToqueville, i.e., centralized federal government vs. decentralized local government.

282. Energy Law Seminar (2)

Seminar-2 hours. The history, law, and public policy of energy regulation in the United States with an emphasis on economic and environmental regulation. Competitive restructuring of the natural gas and electric utility industries emphasized. The basic regulatory schemes for other energy sources such as hydroelectric power, coal, oil, and nuclear power explored. Recommended to anyone who has an interest in the energy sector, various models of economic regulation, or regulated industries.

282AT. Renewable Energy Seminar (2)

Seminar - 2 hours. Seminar will provide a broad overview of renewable energy law and policy with a particular focus on the California policy and institutional context.

283. Remedies (3)

Discussion - 2 hours. Survey of modern American civil remedies law in both private and public law contexts. Topics addressed include equitable remedies, equitable defenses, contempt power, injunctive relief, restitution, and money damages in torts and contracts.

284. Law and Economics (3)

Discussion - 3 hours. Introduces students to the economic analysis of law. We will explore several economic methods and concepts, including rational choice theory, behavioral economics, and utilitarianism. We will apply these tools to illuminate and critique familiar areas of law, including property contracts, torts, criminal law, and civil procedure. Prior study of economics is not required.

285. Environmental Law (3)

Discussion - 4 hours. An introduction to federal and state environmental law, including coverage of historical development of environmental law; the role of courts, the legislature and the executive branch in the development and implementation of environmental policy; allocation of authority among different levels of government; the role of market forces in environmental decisions; the major regulatory strategies that have been applied to control environmental harm, and enforcement of environmental law. Major statutes considered include the National Environmental Policy Act, Endangered Species Act, Clean Air Act and Clean Water Act.

285A. California Environmental Issues Seminar (2)

Seminar-2 hours. The "nation-state" of California has for many years been a national and global leader in environmental law and policy. Survey of key California environmental law and policy issues.

285B. Environmental Practice (3)

Discussion—3 hours. Prerequisite: course 285 recommended. Examines underlying theory and practice in securing compliance with our major environmental laws.

285BT. Food Justice (2)

Seminar-2 hours. Focus on the law and policy of the emerging "food justice movement," which combines the goals and principles of the environmental justice movement with some of the policy initiatives involved in "ethical consumption" and "sustainable agriculture" movements.

285C. Agricultural Law and Policy (3)

Discussion — 3 hours. An introduction to agricultural law, focusing on legal principles and issues at the forefront of contemporary debates about agriculture in society

285D. Farmworkers and the Law (2)

Discussion — 2 hours. Provides an overview of California and federal laws impacting farmworkers and how such laws have been applied to regulate working conditions in agriculture.

285E. Climate Change Law and Policy (3)

Discussion—3 hours. Addresses the legal and public policy dimensions of climate change, perhaps the most important environmental issue of our time.

285T. Food Law and Policy (2)

Seminar - 2 hours. Addresses the unique intersection between new consumer food-movement and food law and policy. A broad range of current food law and policy issues will be examined.

285TA. Environmental Justice (3)

Discussion - 3 hours. Introduction to the field of environmental justice.

286. Health Care Law (3)

Discussion—3 hours. Addresses legal issues raised in three general areas: access to health care, health care financing, and quality of care. Course materials and discussion will focus on both public and private aspects of these issue areas.

286A. Topical Issues in Health Law (2)

Seminar — 2 hours. The course focuses on four-six issues at the interface of law, medicine, bioethics, and health policy that are currently the subject of major litigation, legislation, and/or contentious debate in the domains of bioethics and public policy. Limited enrollment.

286B. Public Health Law (2)

Discussion - 2 hours. Restricted to 15 students. Public health law, seen broadly, is the government's power and responsibility to ensure the conditions for the population's health.

286C. Bioethics (3)

Discussion—3 hours. Course examines the ethical and legal issues that arise from biomedical research and use of medical technologies. Limited enrollment. GE credit: Wrt

286D. Legal Psychology Seminar (2)

Seminar - 2 hours. Examines how psychological theory and research can be used to shape laws and policies to make them better reflect what we know empirically about how individuals process information, make decisions and behave.

286E. Reproductive Rights, Law, and Policy

Seminar – 2 hours. Addresses a variety of laws and practices that affect reproductive health and procreative decision making. Limited enrollment.

287. Public Land Law (3)

Discussion-3 hours. Legal aspects of federal land management, including the history of public land law, authority over federal lands and specialized law dealing with particular natural resources and uses found on federal lands (minerals, timber, range, wildlife, recreation and preservation).

287A. Public Benefits Law (2)

Seminar-2 hours. Will explore the theory and practice of law pertaining to the enactment and administration of public benefits programs for poor and other disadvantaged persons in our society. Limited enrollment

287T. Law and Society Seminar (2)

Seminar-2 hours. Study of law and society challenges traditional legal scholarship by exploring mul-tiple ways in which law both shapes and is shaped by societies and social interactions. Seminar will introduce students to important literature and debates in the field. Limited enrollment.

288. Advanced Constitutional Law Seminar

Seminar—2 hours. Prerequisite: Prior or concurrent enrollment in course 218 or 218A. Explores in-depth selected topics or problems in constitutional law and theory. Current focus is on the interpretation and application of the religion clauses of the First Amend-

288B. Supreme Court Simulation Seminar (2)

Seminar-2 hours. Consideration in depth of approximately nine cases involving constitutional law that will be decided during the present term of the U.S. Supreme Court. Limited enrollment.

289A. Biotechnology Law and Policy (2)

Seminar – 2 hours. Coverage includes the regulation of biotechnology research, including restrictions on cloning and fetal stem cell research; regulation of the products of biotechnology to protect human health

or the environment, including restrictions on use or distribution of genetically modified organisms; the availability and scope of intellectual property protection for biotechnology products, including genes and engineered organisms; and the international law governing access to the natural resources that provide the starting materials for biotechnology and trade in bioengineered organisms or their products. Limited enrollment

290. International Trade Dispute Seminar (2)

Seminar—2 hours. The WTO and other regional trading agreements, particularly the NAFTA, provide mechanisms for resolution of trade disputes. Students are introduced to economic, political, and legal theories underlying establishment of such bodies.

291A. International Finance (3)

Discussion—3 hours. How a framework of national and international laws and institutions regulates and fails to regulate the flow of money around the world.

291B. International Investment Dispute Seminar (2)

Seminar — 2 hours. This seminar will examine the law of investor-State dispute resolution.

292. Immigration Law and Procedure (3) Discussion — 3 hours. Surveys the history of U.S. immigration law and policy.

292T. Advanced Topics in Immigration and Citizenship Law Seminar (2)

Seminar - 2 hours. Conducts a closer examination of various topics and subject matters that relate to immigration and citizenship law.

293. Public Interest Law Seminar (2)

Seminar - 2 hours. This class will examine the issues and problems associated with providing civil legal services to persons and interests in American society that typically have been unable to afford or otherwise obtain representation from the private bar.

294A. Law and Popular Culture (2)

Seminar-2 hours. This course examines works of popular culture, films, and legal texts. Each session will focus on a particular film and its cultural implications, particular problem or problems of law, law practice, legal ethics, traditional ethics, or public policy. — I. (I.)

295A. Trademark and Unfair Competition

Discussion - 2 hours. Prerequisite: course 274 recommended. We will take an intensive look at selected issues in Trademark Law, including the concepts of trademarks and unfair competition, acquisition and loss of trademark rights, infringement, trademarks as speech, and international aspects of trademark protection.

295T. Brands and Trademarks (2)

Seminar-2 hours. Explores the challenges brands pose to traditional trademark law. Taking a close, interdisciplinary look at branding: from the business schools' theories of brand management to semiotic analyses of brand meaning to art criticism of brand advertisements.

296. Copyright (3)

Discussion-3 hours. Thorough examination of the law of copyright, including its application to literature, music, films, television, art, computer programs, and the Internet. Issues addressed include copyright protection, the copyright owner's rights, the term of protection, copyright ownership and transfer, infringement, and defenses to infringement.

297. Alternative Dispute Resolution (3)

Discussion—3 hours. Introduces students to a wide variety of alternative dispute resolution procedures, with an emphasis on negotiation, mediation and arbitration. Limited enrollment.

297AT. Commercial Arbitration Seminar (2)

Seminar - 2 hours. Trace the development of commercial arbitration law, with a special emphasis on hot-button contemporary issues like consumer and employment arbitration, the separability doctrine, preemption of state law, and the arbitrability of statutory claims.

298. Sociology of the Legal Profession Seminar (2)

Seminar — 2 hours. Comprehensive look at the organization, operation, and ideology of the legal profession. Limited enrollment.

Professional Courses

400A. Study Abroad-University College Dublin, Ireland (12)

Independent study. Students must apply and be accepted into the International Study Ábroad Program. Semester away study abroad at the University College Dublin, Ireland. Enhance knowledge of international legal regimes and obtain a global legal educational experience. (S/U grading only.)

400B. Study Abroad – University of Cophengen, Denmark (12)

Independent study. Students must apply and be accepted into the International Study Abroad Program. Semester study abroad at the University of Copenhagen, Denmark. Enhance knowledge o international legal regimes and obtain a global legal educational experience. (S/U grading only.)

400C. Study Abroad-China University of Political Science and Law (12)

Independent study. Students must apply and be accepted into the International Study Abroad Program. Semester-away study abroad at the China University of Political Science and Law. Enhance knowledge of international legal regimes and obtain a global legal educational experience

408. Community Education Seminar (3)

Seminar/clinic-3 hours. Trains students to educate the community about basic legal rights and responsibilities. Students attend an initial four-hour orientation, followed by weekly seminars that will prepare students to teach in a local high school at least two times per week. Paper or journal required, to be determined by instructor. Limited enrollment. (S/U grading only.)

408A. Educational Policy and the Law Seminar (2)

Seminar-2 hours. Prerequisite: course 235 recommended. Examines the interaction between policy and the law of various educational themes such as the "right" to an education, financial equalization, merit and testing, privatization of education, and educational access. Limited enrollment.

409. Environmental Law Moot Court Competition (1)

During the first eight weeks of fall semester, students research and submit briefs as appellants, respondents, or third parties on a problem of environmental law that is prepared by the National Environmental Law Moot Court Board. Students attend four to six classes (including guest lectures) on aspects of appellate advocacy, legal writing, and environmental law. Members of the spring environmental law moot court team will be selected on the basis of performance in class. (S/U grading only.)

410A. Appellate Advocacy I (2)

Discussion/laboratory. Basic appellate practice and procedure. Beginning instruction in oral advocacy skills and an opportunity to practice these skills in front of a moot court. Limited enrollment. (S/U grading only.

410B. Appellate Advocacy II (Moot Court)

Practice-2 hours. Continuation of course 410A. Focuses on the development of effective appellate brief writing skills and the refinement of oral advocacy skills. Limited enrollment. (S/U grading only.)

411. Journal of International Law and Policy (1-2)

The Journal is a biannual journal produced by King Hall students with an interest in international law. The editor-in-chief of the journal receives two units of credit each semester. The managing editor receives one unit of credit each semester. (S/U grading only.)

411A. International Law Journal (1-2)

The Editor in Chief of the Journal of International Law and Immigration receives two credits for each semester of service. Only one person may receive this credit in any one semester as editor in chief. Managing and executive editors receive one unit. (S/U grading only.)

411B. Journal of Juvenile Law and Policy (1-2)

A biannual publication of the UC Davis School of Law that addresses the unique concerns of children in the American legal system. The editor-in-chief of the journal receives two credits each semester. Managing editors receive two credit each semester. (S/U grading only.)

411C. UC Davis Business Law Journal (1-2)

Run by dedicated law students who are committed to providing current and valuable legal and business analysis. The Journal addresses a broad spectrum of issues that fall within the intersection of business and the law. May be repeated two times for credit. (S/U grading only.)

412. Carr Intraschool Trial Advocacy Competition (1)

Competition - 1 hour. Named after the late Justice Frances Carr, this competition is open to secondand third-year students. A preliminary round is followed by quarter-finals, semi-finals, and a final round. Students participate in mock trials presided over by judges and critiqued by experienced litigators. Limited enrollment. (S/U grading only.)

413. Interschool Competition (1-3)

Prerequisite: consent of appropriate faculty adviser. Participation in interschool moot court and lawyering skills competitions. Enrollment is limited to students actually representing the School in the interschool competitions. Competition must be authorized by the appropriate faculty adviser. The faculty adviser may condition the award of academic credit for any particular competition on the performance of such additional work as may be reasonable to justify the credit. May satisfy advanced legal writing requirement. (S/U grading only.)

414. Moot Court Board (1)

Prerequisite: courses 410A-410B. Members of Moot Court Board may receive one credit for each semester of service on the board, up to maximum of two. Credit awarded only after certification by Moot Court Board and approval of the faculty advisers to Moot Court Board. Limited enrollment. (S/U grading

415. Trial Practice Honors Board (1)

Members of the Trial Practice Honors Board administer the Frances Carr competition. Members are nominated by their individual Trial Practice I adjuncts. Students receive one credit for serving on the Board, awarded upon approval of the faculty adviser. (S/U grading only.)

416. Law Review Writer (1-3)

The writing of a law review article under the editorial supervision of editors of the UC Davis Law Review. Office hours (including but not limited to Bluebooking and cite-checking) are required. 1 or 2 units, maximum 3 total units. In the spring semester, credit is obtained only upon achieving status as a member of the UC Davis Law Review, which requires that the student has made substantial progress towards completing an editorship article. Credit is awarded only after certification by the editor in chief and approval of the faculty advisors. One unit of credit is earned the first semester. Two units are earned the second semester upon nomination and acceptance of nomination to the Editorial Board. One unit is earned second semester if only a membership draft and office hours are completed. May be repeated for credit. (S/U grading only.)

417. Law Review Editor (1-2)

Editors must have completed an editorship article and must perform editorial duties requiring a substantial time commitment. Credit awarded only after certification by the editor-in-chief of the Law Review and approval of the faculty advisers to the Law

Review. Students may receive four credits over two semesters for service as an editor. Deferred grading pending only, pending completion of sequence.

418. Environmental Law and Policy Journal (1-2)

Independent study. Each year nearly 100 King Hall students work together to publish Environs. Getting involved with the journal will provide you with the chance to develop essential skills that will benefit you throughout school and career. (S/U grading only.)

419. Advanced Writing Project (1-4)

The completion of a writing requirement project under the active and regular supervision of a faculty member in satisfaction of the legal writing requirement. The writing project must be an individually authored work of rigorous intellectual effort of at least 20 typewritten double-spaced pages, excluding footnotes. The project may take any of several forms, for example, a paper, a brief, a memorandum of law, a proposed statute, a statutory scheme or set of administrative regulations (with explanatory com ments), or a will or agreement (with explanatory comments). The advanced writing project may also be undertaken in connection with another course or seminar to satisfy the legal writing requirements. The number of units shall be approved by the faculty supervisor and will depend upon the scope of the writing effort. (S/U grading only.)

419A. Advanced Writing Project (1-4)

The completion of a writing requirement project under the active and regular supervision of a faculty member in satisfaction of the legal writing requirement. The writing project must be an individually authored work of rigorous intellectual effort of at least 20 typewritten double-spaced pages, excluding footnotes. The project may take any of several forms, for example, a paper, a brief, a memorandum of law, a proposed statute, a statutory scheme or set of administrative regulations (with explanatory com ments), or a will or agreement (with explanatory comments). The advanced writing project may also be undertaken in connection with another course or seminar to satisfy the legal writing requirements. The number of units shall be approved by the faculty supervisor and will depend upon the scope of the writing effort. (S/U grading only.)

4195. Special Session Advanced Writing Project (1-4)

The completion of a writing requirement project under the active and regular supervision of a faculty member in satisfaction of the legal writing require ment. The writing project must be an individually authored work of rigorous intellectual effort of at least 20 typewritten double-spaced pages, excluding footnotes. The project may take any of several forms, for example, a paper, a brief, a memorandum of law, a proposed statute, a statutory scheme or set of administrative regulations (with explanatory comments), or a will or agreement (with explanatory comments). The advanced writing project may also be undertaken in connection with another course or seminar to satisfy the legal writing requirements. The number of units shall be approved by the faculty supervisor and will depend upon the scope of the writing effort. (S/U grading only.)

420. Civil Rights Clinic (2-6)

Clinical activity. Prerequisite: prior or concurrent enrollment in course 219; priority given to students enrolled in or have taken course 267. Clinic provides practical experience in providing legal services to indigent clients who have filed civil rights actions in state and federal trial and appellate courts. Students work on clinic cases under the supervision of the clinic director. Limited enrollment. May be repeated for credit. (S/U grading only.)

425. Judicial Clinical (2 to 6 or 12)

Clinical program. Prerequisite: course 261 required for full-time clinical students and recommended for part-time clinical students. Students may arrange judicial clerkship clinical programs with an approved list of state and federal judges through the Clinical office and under the sponsorship of the faculty member in charge. All students must complete

weekly time records and bi-weekly journals. Full-time clinical students must complete an evaluative final paper of approximately 10 pages. (S/U grading only.)

430. Clinical Program in Federal Taxation (2-6)

Clinical program. Prerequisite: course 220. Students will have the opportunity to work with the Internal Revenue Service or other governmental tax agency. Journals and attendance at group meetings are required. (S/U grading only.)

435. Family Protection Clinic (4)

Clinical activity. Prerequisite: course 219 (may be taken concurrently). Representation of low-income persons in family law and related matters arising out of situations involving family violence. Students are supervised by the staff attorney at the clinic's office located in Woodland at the Sexual Assault and Domestic Violence Center of Yolo County. (S/U grad-

440. Immigration Law Clinical (2 to 6 or 12)

Clinical program. Students may represent clients in administrative law hearings in San Francisco. Minimum units for the course are 4 and maximum is 12. Each unit assumes four hours work per week, including participation in the seminar, conference, and case research and development. Students who have completed course 292 may take the clinic for a minimum of 2 units. Limited enrollment. (S/U grading

445. Legislative Process Externship (2-5)

Clinical activity. Prerequisite: course 240 (may be taken concurrently) or consent of instructor. Practical experience in the operation of the office of a legislator or a legislative committee. The major thrust of the program is to enable students to become familiar with the give and take realities of making laws, as contracted with their interpretation and enforcement. Journals are required. (S/U grading only.)

450. Environmental Law Externship (2-6)

Clinical activity—2-6 hours. Prerequisite: course 285 or consent of instructor. Practical experience in environmental law. Students will work in an approved government, non-profit or private law office engaged in some form of environmental law work for a minimum of 8 hours per week. Students must prepare a journal describing and reflecting upon their clinical experience, and meet periodically with the instructor.

455. Employment Relations Externship (2-6)

Clinical activity. Prerequisite: course 251 or 260 (may be taken concurrently). Practical experience in employment relations, including employment discrimination and public sector labor law. Work under the direct supervision of a government lawyer. Opportunity to participate in a range of with emphasis on observation and participation in actual investigation, interviewing, drafting pleadings, and attendance at hearings. (S/U grading only.)

460. Public Interest Law Clinical (2-6)

Clinical activity. Prerequisite: prior or concurrent enrollment in course 293 recommended. Students work with a public interest practitioner in a nonprofit organization. Journals and attendance at two group meetings are required. Clinical students must complete an evaluative final paper of approximately 8 pages. Hours completed in public interest setting may be applied toward the practicum requirement for the Public Interest Law Program. (S/U grading only.)

465. Intellectual Property Externship (2-6)

Clinical activity. Prerequisite: course 293 and Comparative Public Services recommended. Opportunity to work for government, academic, and nonprofit entities. (S/Ŭ grading only.)

470. Administration of Criminal Justice Externship (2-6 or 12)

Clinical activity - 2-12 hours. Prerequisite: Completion of, or concurrent enrollment, in courses 219 and 227; course 263A recommended. Gain practical experience working full or part time in a District

Attorney's or Public Defender's office in one of several surrounding counties or in a federal Public Defender or U.S. Attorney's office. Students participate in the many activities associated with the office for which they extern: observation, interviewing, research, counseling, motion practice, and trials under State Bar rules. Limited enrollment. (S/U grading only.)

475. Washington UC-DC Law Program (10)

Clinical activity—10 hours. Open to 2L and 3L students. Uniquely collaborative externship program in Washington, D.C., combining weekly seminars with full-time field placement offering students an unparalleled opportunity to learn how federal statutes, regulations, and policies are made, changed, and understood in the nation's capital. (S/U grading only.)

475A. Law Making and Law Changing in the Nation's Capital (3)

Seminar-3 hours. Companion seminar to the Washington UC-DC Externship. Designed to enhance the externship experience in three principal wavs.

480. Clinical Program in Prison Law (2-6)

Clinical program. Provides practical experience in providing legal services to real clients who have various problems related to their incarceration in state prison. The services require analysis and application of Constitutional Law, state statutory law, agency regulations, and the rules of professional responsibility. Students will work under the direct supervision of the Prison Law clinical director and will be assigned a portion of the director's caseload. Students will be required to follow the law office procedure of the clinic and employ skills such as interviewing, research, writing, negotiating, and possibly, the preparation of legal documents to be filed in court. (S/U grading only.)

485. California Supreme Court Clinic (6)

Clinical activity-6 hours. Class size limited to 6 students. California Supreme Court Clinic will provide students with an immersive experience in litigating cases before the state's highest court. (S/U grading

495. Legal Research and Writing I (2)

Discussion—2 hours. Integrated legal research and writing skills course. Basic legal research resources and strategies are introduced and practiced. (S/U grading only.)

498. Group Study (1-4)

Groups of students (not fewer than 4 or more than 10) with common interest in studying a stated legal problem may plan and conduct their own research and seminar program, subject to the following regulations: (1) the program may extend over no more than two semesters; (2) the plan for the program and the list of members of the group must be submitted to Dean's office at least 4 weeks prior to opening of the semester in which the program is to begin; (3) a three-member faculty board will be appointed for each group proposed and will have authority to approve or disapprove the program and the amount of credit sought; (4) changes in the program or in membership of the group must be approved by the faculty board and normally will be approved only prior to the semester involved; (5) group members must conduct a weekly seminar session to be arranged by them; (6) each member of the group must submit an individual paper or an approved alternative growing out of the seminar subject to the faculty board; (7) S/U grading only unless the entire group requests letter grades in advance

499. Independent Research Project (1-4)

Students may receive credit for individual projects, subject to the following regulations: (1) the project may extend over no more than two semesters; (2) each project will be under the supervision of a faculty member; (3) an outline of the project must be approved by the supervising faculty member; (4) normally, no faculty member will be permitted to supervise more than five students working on individ-ual programs during any semester; and (5) each student must submit an individual paper or approved alternative to the supervising faculty member. (S/U grading only.)

499A. Independent Research Project (1-4)

Students may receive credit for individual projects, subject to the following regulations: (1) the project may extend over no more than two semesters; (2) each project will be under the supervision of a fac-ulty member; (3) an outline of the project must be approved by the supervising faculty member; (4) normally, no faculty member will be permitted to supervise more than five students working on individual programs during any semester; and (5) each stu-dent must submit an individual paper or approved alternative to the supervising faculty member. Grading is on a Satisfactory/Unsatisfactory basis unless a request for letter grading has been made in

499B. Law Students Study Away (10)

Independent study. Students studying away from UC Davis, School of Law. (S/U grading only.)

499C. Joint Degree Student-GSM (10)

Joint degree course for graduate School of Management students. (S/U grading only.)

499S. Special Independent Research Project

Students may receive credit for individual projects, subject to the following regulations: (1) the project may extend over no more than two semesters; (2) each project will be under the supervision of a faculty member; (3) an outline of the project must be approved by the supervising faculty member; (4) normally, no faculty member will be permitted to supervise more than five students working on individual programs during any semester; and (5) each student must submit an individual paper or approved alternative to the supervising faculty member.

499SA. Special Session Independent Research Project (1-4)

Students may receive credit for individual projects, subject to the following regulations: (1) the project may extend over no more than two semesters; (2) each project will be under the supervision of a faculty member; (3) an outline of the project must be approved by the supervising faculty member; (4) normally, no faculty member will be permitted to supervise more than five students working on individual programs during any semester; and (5) each student must submit an individual paper or approved alternative to the supervising faculty member. (Deferred grading only, pending completion of sequence.

499SB. Special Session Independent Research Project (1-4)

Students may receive credit for individual projects, subject to the following regulations: (1) the project may extend over no more than two semesters; (2) each project will be under the supervision of a faculty member; (3) an outline of the project must be approved by the supervising faculty member; (4) normally, no faculty member will be permitted to supervise more than five students working on individual programs during any semester; and (5) each student must submit an individual paper or approved alternative to the supervising faculty member.

Linguistics

(College of Letters and Science)

., Ph.D. Chairperson of the Department

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Faculty

Raúl Aranovich, Ph.D., Associate Professor Robert J. Bayley, Ph.D. Professor David Corina, Ph.D., Professor Patrick Farrell, Ph.D., Professor John A. Hawkins, Ph.D., Professor Julia Menard-Warwick, Ph.D., Associate Professor Almerindo E. Ojeda, Ph.D., Professor Vaidehi Ramanathan, Ph.D., Professor Lenora A. Timm, Ph.D., Professor

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Gwendolyn Schwabe, M.A., Senior Lecturer Emerita Maximo Torreblanca, Ph.D., Professor Emeritus Benjamin E. Wallacker, Ph.D., Professor Emeritus

Affiliated Faculty

James L. Davis, M.A., Lecturer Angela Foin, M.A., Lecturer Janet Lane, M.A., Lecturer John Samsel, M.A., Lecturer Kathleen Ward, Ph.D., Lecturer

The Major Program

Linguistics is the systematic study of human language. It focuses on theories of language structure, variation, and use, description of contemporary languages, and the examination of language change through time. Because of the pervasive influence of language in our everyday lives, work in linguistics interacts in important ways with studies carried out in many other fields, including psychology, anthropology, neuroscience, philosophy, computer science, sociology, literature, language teaching, communication and education.

The Program. An introductory lower division course provides students with basic concepts and some of the methods needed to analyze language in a systematic way. Upper division courses probe more deeply into specific aspects of language structure, language use, and the relationship of language to other realms of human activity.

Career Alternatives. Majors in linguistics find practical outlets for their linguistic training in a variety of fields: the computer science industry (software dévelopment); teaching English as a second language; foreign language teaching; elementary and secondary level bilingual-bicultural programs; language-oriented missionary work; bilingual-bicultural curriculum development (e.g., for publishing houses); legal work; speech therapy; lexicography (preparation of dictionaries). All these types of employment share an interest in persons skilled in the analysis of language, spoken and/or written—linguistics equips students with just such skills.

A.B. Major Requirements:

	UNITS
Preparatory Subject Matter	. 4-24
Linguistics 1	4
Foreign language, one course beyond the	
15-unit requirement of the College of Letters	S
and Science in the same language used to	
fulfill the college requirement 0-2	.0
Depth Subject Matter	44
Linguistics 103A, 103B, 111, 131 1	
Any three Linguistics courses from among	
those numbered from 110 to 159 1	2
One Linguistics course from among those	
numbered from 160 to 169	4
One Linguistics course from among those	
numbered from 170 to 189	4
At least eight upper division units from the	•
following courses	8
requirements listed above, African American and African Studies 156,	
Anthropology 110, 117, 119, 120,	
Communication 105, Education 151,	
English 105, 106 French 109, 160, 161	
162, German 105, Human Development	
101, Native American Studies 107,	
Philosophy 137A, 137B, 137C,	
Psychology 132, Spanish 111N, 112N,	
113, 114N, 115, 115S, 116, 117, 118	3.

Major Adviser. R. Aranovich

Minor Program Requirements:

Linguistics offers two minor programs:

(1) General Linguistics, which provides the student with basic knowledge of language structure and linguistic analysis;

(2) Linguistics for Language Teachers, which especially complements the major in English with the Teaching Area of emphasis; it is also of relevance to students interested in teaching foreign languages.

UNITS

General Linguistics24
Linguistics 1, 103A, 103B
UNITS
Linguistics for Language Teachers 24
Linguistics 1, 106, 165 12 English 105 4 Linguistics 160 or 163 4 Linguistics 173 or Education 151 4
Miner Advisor Same as Major advisor

Minor Adviser. Same as Major adviser

Grading Recommendation. Though not required, it is recommended that all courses offered in satisfaction of the Linguistics major be taken for a letter grade.

Honors and Honors Program. The honors program consists of six units of 194H credit normally taken in the fall and winter quarters of the senior year. Completion of the program is a prerequisite for High or Highest Honors at graduation. Specific eligibility criteria may be obtained from the major adviser. For general information regarding graduation with honors and Dean's Honors Lists, please see Academic Information, on page 72

Graduate Study. The Linguistics Graduate Group offers study and research leading to the M.A. and Ph.D. degrees. Please see Linguistics (A Graduate Group), on page 377; more detailed information may be obtained from the Graduate Adviser or from the Chairperson of the Linguistics

Graduate Adviser. R.J. Bayley, V. Ramanathan

Courses in Linguistics (LIN) **Lower Division Courses**

1. Introduction to Linguistics (4) Lecture - 3 hours; discussion - 1 hour. Introduction to

the study of language; its nature, diversity, and structure. GÉ credit: ArtHum or SocSci, Wrt | AH, SS.-1, 11, 111. (1, 11, 111.)

5. Global English and Communication (4)

Lecture-2 hours; discussion-2 hours. English as a global language and its uses in intercultural communication. Cultural, historical, and political dimensions of varieties of English spoken around the world. Experiential grounding in strategies for increasing interpretive and verbal communicative competence for a globalized world. (Same course as Communication 5.) GE credit: AH or SS, OL. WC.—II. (II.) Farrell, Feng, Ramanathan

6. Language and Society (4)

Lecture—3 hours; discussion—1 hour. Language as a social phenomenon. Topics include linguistic diversity, language policy, language and identity, language and social structure, speech communities and social networks, the effect of social factors on language variation, linguistic consequences of language contact. GE credit: SocSci, Div, Wrt | ACGH, DD, SS, WE.—II. Bayley, Ramana-

20. Oral English for Undergraduate ESL

Lecture/discussion - 3 hours. Prerequisite: consent of instructor; limited primarily to students who have fulfilled their Subject A requirement or have completed

Total Units for the Major......48-68

course 23. Intensive practice in oral English for undergraduate ESL students. Students will learn to identify and modify features of their pronunciation which limit their ability to communicate clearly. Students will also learn and practice strategies for effective participation in academic tasks. May be repeated one time for credit with consent of coordinator. (P/NP grading only.)

21. Introduction to Reading and Composition for Non-Native Speakers (5)

Lecture/discussion - 5 hours. Prerequisite: admission by placement examination only. Provides undergraduate students whose native language is not English with intensive work in reading and in writing organized, coherent, and grammatically correct paragraphs and short academic essays. (P/NP grading only.)

22. Intermediate Reading and Writing for Non-Native Speakers (4)

Lecture/discussion-4 hours. Prerequisite: admission by placement examination, by successful completion of course 21, or by consent of instructor. Provides undergraduate students whose native language is not English with experience in writing essays in recognized rhetorical modes. Students will also read to develop fluency and critical thinking and will study grammar needed for academic writing. (P/NP grading only.)

23. Advanced Reading and Composition for Non-Native Speakers (4)

Lecture/discussion - 4 hours. Prerequisite: admission by placement examination, by successful completion of course 22, or by consent of instructor. Provides undergraduate students whose native language is not English with experience writing persuasive essays related to reading passages. Students will also read for tone, style, context, and assumptions and will study advanced grammar needed for persuasive essays. (P/NP grading only.)

24. English Structures and Strategies in Academic Writing (4)

Lecture/discussion-4 hours. Prerequisite: course 23. Practice in academic writing designed to prepare undergraduate students from language backgrounds other than English for successful academic work. Development of academic writing, critical thinking, and reading skills. Development of clear, accurate language for presenting an effective argument. Open to students from language backgrounds other than English. - Samsel

25. English for International/ESL Graduate Students (4)

Lecture/discussion—4 hours. Prerequisite: admission by placement examination or consent of instructor. Open to international and ESL graduate students and limited status international undergraduates (Education Abroad Program participants). A multi-skills ESL course designed to help international/ESL students improve their English language skills for successful academic study. Emphasis on writing, speaking, listening, reading, and academic culture. (P/NP grading only.)—I. Lane

26. Writing for International Graduate Students (3)

Lecture — 3 hours. Prerequisite: satisfactory completion of course 25 if held for it, or consent of instructor. Admission limited to international graduate students. Focuses on writing needed for academic work, including summaries, critiques, research and grant proposals, memos, resumes, and research papers. Includes a review of grammar needed for writing and some focus on reading skills and American vocabulary and idioms. (P/NP grading only.)

27. Academic Writing for ESL Students (4)

Lecture/discussion-4 hours. Writing skills necessary for upper division courses, including skills crucial to writing lab and project reports, summaries, critiques, abstracts, and responses to exam questions. Includes practice with the syntax, grammar, and vocabulary characteristic of academic writing. Offered irregularly.—I.

28. Reading in Scientific and Technical Subjects for ESL Students (4)

Lecture/discussion-4 hours. Instruction and practice in reading scientific and technical texts. Techniques for comprehending and analyzing grammatical and organizational patterns. Notetaking skills, summarizing, vocabulary enrichment. (P/NP grading only.)

96. Directed Group Study in English as a Second Language (1-5)

Variable - 1-5 hours. Prerequisite: consent of instructor. Directed group study of topic in English as a Second Language (ESL). May be repeated for credit by consent of the ESL coordinator. (P/NP grading

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. Intended for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor. Intended for lower division students. (P/NP grading only.)

Upper Division Courses

103A. Linguistic Analysis I: Phonetics, Phonology, Morphology (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 1. Introduction to fundamental methods and concepts used in linguistic analysis, focusing on phonetic, phonological, and morphological pheno ena. Emphasizes development of analytical skills and appreciation of structural regularities and differences among languages. Not open for credit to students who have completed course 139. GE credit: AH.-I. Farrell, Orgun

103B. Linguistic Analysis II: Morphology, Syntax, Semantics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 1. Introduction to fundamental methods and concepts used in linguistic analysis, focusing on morphological, syntactic, and semantic phenomena. Emphasizes development of analytical skills and appreciation of structural regularities and differences among languages. Not open for credit to students who have completed course 140. 103B GE credit: AH.—II. Farrell, Aranovich

105. Topics in Language and Linguistics (4)

Lecture—3 hours; term paper. Prerequisite: course 1 and consent of instructor. Detailed examination of a major contemporary linguistic theory, a major contemporary issue or related set of issues in linguistics, or the structure of a particular language or language family. May be repeated for credit when topic differs. Offered irregularly

106. English Grammar (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 1 or English 3 or University Writing Program 1 or consent of instructor. Survey of present day English grammar as informed by contemporary linguistic theories. The major syntactic structures of English; their variation across dialects, styles, and registers, their development, and their usefulness in describing the conventions of English. (Same course as English 106.) Not open for credit to students who have completed course 104. GE credit: ArtHum | AH.

111. Introduction to Phonological Theory (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 103A. Contemporary phonological theory with emphasis on syllable structure, metrical structure, phonology-morphology interaction, and typological variation in these areas, from the perspective of optimality-theoretic approaches. GE credit: AH. -

112. Phonetics (4)

Lecture - 3 hours; term paper. Prerequisite: course 1. Detailed examination of articulatory and acoustic phonetics. GE credit: SE.-I. Orgun

121. Morphology (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: courses 103A, 103B. Introduction to the analysis of word structure and the relation of word structure to the lexicon and other grammatical components. GE credit: AH.—III. Aranovich

131. Introduction to Syntactic Theory (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 103B. Introduction to syntactic theory, primarily through the examination of a major theory of syntax, emphasizing theoretical reasoning, argumentation, and problems of theory building in syntax. GE credit: AH. — III. Aranovich, Farrell

141. Semantics (4)

Lecture—3 hours; term paper. Prerequisite: course 103B. The linguistic study of meanings of words and phrases. Meanings expressed by lexical items and derivational and inflectional morphology. Contribution of argument structure, quantification, and coordination to meaning. GE credit: Wrt | AH.—I. Oieda

150. Languages of the World (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 1 or Anthropology 4. Survey of the world's languages, their geographical distribution and classification, both genetic and typological. Illustrative descriptions of several major languages from different geographical areas; pidgins and creoles, lingua francas and other languages of widespread use. Not open for credit to students who have completed course 50. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC.-II.

151. Historical Linguistics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 103A. Description and methods of the historical study of language, including the comparative method and internal reconstruction; sound change, morphological change, syntactic change, semantic change. Offered irregularly. GE credit: AH. - Hawk-

152. Language Universals and Typology (4)

Lecture—3 hours; term paper. Prerequisite: course 103B. Investigation into common features of all human languages and the classification of languages in terms of their structural features. Theories of universal grammar. Detailed discussion of non-Indo-European languages and comparison with English. GE credit: Wrt | AH.—III. Farrell, Hawkins

160. American Voices (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or Anthropology 4 or upper division standing recommended. Explores the forms of American English; traditional notions of regional dialects and increasingly important social dialects, reflecting age, class, gender, race, ethnicity, and sexual orientation. The influence of language attitudes on perception of dialect speakers; dialect in media, education, and literature. GE credit: SocSci, Div, Wrt | SS, WE.-III. Ward

163. Language, Gender, and Society (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or Anthropology 4. Investigation of real and putative (stereotyped) gender-linked differences in language structure and usage, with a consideration of some social and psychological consequences of such differences. Focus is on English, but other languages are also discussed. GE credit: Soc-Sci, Div, Wrt | ACGH, DD, SS, WE.—II. Timm, Menard-Warwick

165. Introduction to Applied Linguistics (4)

Lecture — 3 hours; discussion — 1 hour. Applications of linguistic principles and the analysis of languagerelated issues in the world. Exploration of a range of language-related problems including issues related to language learning and teaching to issues concerning language and gender, race, class and the media. GE credit: SS, WE. — (III.) Ramanathan

166. The Spanish Language in the United States (4)

Lecture-3 hours; term paper. Prerequisite: course 1 or Spanish 111N; and Spanish 23 or the equivalent. Linguistic features of the varieties of the Spanish language spoken throughout the United States; phonology, morphology, syntax, vocabulary. Focus on the relationship between United States Spanish and other world varieties of Spanish, within a historical framework. GE credit: Div, Wrt | SS.

171. Introduction to Psycholinguistics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 1; courses 103A, 103B recommended. Introduction to psychological issues relating to the implementation of language and linguistic structure during speech production and comprehension and to the implications of research in psychology and related fields for linguistic theory. Offered in alternate years. GE credit: ŠŠ. – Corina

173. Language Development (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 1 or consent of instructor; courses 103A 103B. Theory and research on children's acquisition of their native language, including the sound system, grammatical systems, and basic semantic categories. (Same course as Education 173.) GE credit: SS. — (I.) Uchikoshi

175. Biological Basis of Language (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 1 or consent of instructor. Overview of issues in the field of neurolinguistics and techniques used to explore representation of language in the human brain. GE credit: SciEng | SE. – I. Corina

177. Computational Linguistics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 1 or consent of instructor. Understanding the nature of language through computer modeling of linguistic abilities. Relationships between human cognition and computer representations of cognitive processing. Not open for credit to students who have completed course 7. GE credit: SocSci | SE.—II. Ojeda

180. Second Language Learning and Teaching (4)

Lecture/discussion-4 hours; fieldwork; project. Prerequisite: course 1 or equivalent. Psycholinguistic and sociolinguistic theories of second language learning. Connections between theoretical perspec tives and pedagogical practices in formal and informal second language settings, with focus on tutoring. Impact of sociocontextual factors (e.g., gender, ethnicity). Fieldwork requirement. GE credit: Div, Wrt | SS, WE.—I. Menard-Warwick

182. Multilingualism (4)

Lecture/discussion-4 hours. Issues in multilingualism from a global perspective: e.g., multilingual communities; multilingualism and identity (gender, ethnicity, nationality); language ideologies and edu-cational and sociopolitical policies surrounding multilingualism; acquisition of multilingualism; discursive practices of multilinguals. Limited enrollment. GE credit: GE credit: ArtHum or SocSci, Div, Wrt | SS, WC, WE.-III. Ramanathan, Timm

192. Internship in Linguistics (1-12)

Internship-3-36 hours; two written reports. Prerequisite: course 1 or the equivalent. Internship applying linguistic-related skills to a fieldwork project in areas such as media, law, or industry, in approved organizations or institutions. Maximum of 4 units applicable toward major. (P/NP grading only.)

194H. Special Study for Honors Students (1-5)

Independent study—1-5 hours. Prerequisite: open only to linguistics majors of senior standing who qualify for honors program. Guided research, under the direction of a faculty member approved by the Program Director, leading to a senior honors thesis. May be repeated for credit for up to 6 units. (P/NP grading only.)

197T. Tutoring in Linguistics (1-4)

Discussion — 1-4 hours. Prerequisite: upper division standing, consent of instructor, and consent of department chairperson. Leading of small voluntary discussion groups affiliated with one of the department's regular courses. May be repeated for credit. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

200A. Foundations of Linguistics I (4)

Lecture/discussion-3 hours; term paper. Prerequisite: graduate standing. Survey of fundamental issues raised by pre-generative linguistics in the twentieth century, with emphasis on issues crucial to applications of linguistics. Not open for credit to students who have completed course 203A

200B. Foundations of Linguistics II (4)

Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing. Survey of fundamental issues raised by orthodox generative linguistics, with emphasis on issues crucial to applications of linguistics. Not open for credit to students who have completed course 203B.

200C. Foundations of Linguistics III (4)

Lecture/discussion-3 hours; term paper. Prerequisite: graduate standing. Survey of fundamental issues raised by contemporary linguistic theories lying outside the generative grammar orthodoxy, with emphasis on issues crucial to applications of lin-

205A-205B-205C-205D. Topics in Linguistic Theory and Methods (4)

Seminar-3 hours; term paper. Prerequisite: consent of instructor. Advanced study of current problems in linguistic theory and methodology. May be repeated for credit when topic differs.

211. Advanced Phonological Theory and Analysis (4)

Lecture—3 hours; term paper. Prerequisite: course 111. Critical examination of current phonological theories. - Orgun

212. Advanced Phonetics (4)

Lecture - 3 hours; term paper. Prerequisite: course 112. Advanced investigation of the physiological basis of speech articulation and acoustic phonetics. Offered in alternate years. - Orgun

231. Advanced Syntactic Theory and Analysis (4)

Lecture - 3 hours; term paper. Prerequisite: course 131. Critical survey of contemporary theories of syntax. Offered in alternate years. - Aranovich

241. Advanced Semantic Theory and Analysis (4)

Lecture—3 hours; term paper. Prerequisite: course 141 or consent of instructor. Advanced critical exploration of contemporary theories of linguistic semantics. Offered in alternate years.—II. Öjeda

251. Principles of Historical Linguistics (4)

Lecture - 3 hours; term paper. Prerequisite: course 151. Advanced analysis of the theory and methods of historical linguistics. Offered in alternate years

252. Romance Linguistics (4)

Lecture - 3 hours; term paper. Prerequisite: course 151. Examination of the development of the Romance languages from Proto-Romance to the modern era. Application and critical examination of methods of historical and comparative linguistics in particular areas of structural change in Romance. . Offered irregularly.

260. Variation in Speech Communities (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 281 or consent of instructor. Linguistic variability in time, space, and society. Theoretical issues related to social and linguistic constraints in variation; issues and methods in the quantitative analysis of variation. Speech community, quantitative analytic methods, and the scope of sociolinguistic competence. - Bayley

263. Discourse Analysis: Text in Context (4)

Lecture/discussion-3 hours; term paper. Prerequisite: graduate standing. Introduction to and application of leading theoretical approaches to the

analysis of discourse. Approaches to the analysis of (spoken and written) text in context, tools for analyzing different types of texts (narration, conversation, etc.). Theme/rheme, given/new, anaphora, discourse markers, and other lexical/grammatical fea-

264. Current Issues in Language and Gender (4)

Seminar — 3 hours; term paper; project. Prerequisite: graduate standing; prior coursework in Linguistics, Gender Studies, or Cultural Studies is desirable; no expectation of bilingual proficiency. Exploration of the construction and performance of gender through language in cross-cultural perspective and in a variety of contexts: informal conversations, narratives, workplaces, schools, households, the mass media. Special topics may include: language acquisition; multilingualism; ecofeminism; queer theory. May be repeated for credit one time when topic differs. Offered in alternate years—Menard-Warwick, Timm

265. Language, Performance, and Power

Seminar-3 hours; term paper. Graduate standing or consent of instructor. Exploration of the intersec tion between linguistic and social theories in the language-state relation and the performance of identity. Ideological sources of language differentiation; nation-building and linguistic difference. Political economic, sociolinguistic, and ethnographic approaches to understanding linguistic inequality. (Same course as Anthropology 265.) Offered in alternate years. — Shibamoto Śmith

280. Theories of Second Language Acquisition (4)

Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Covers theoretical perspectives that direct or have directed research in second language acquisition; explores the relationship between linguistics and language teaching and deals with the individual variables that influence second language learning.—1. Ramanathan

281. Research Methods in TESOL/SLD (4)

Lecture—3 hours; term paper. Prerequisite: course 280. Research methods in second language research; evaluation of research designs and methods of analyses, formulation of research questions and hypotheses and design of study with thought to various kinds of data.—II. Menard-Warwick, Bayley

282. Individual and Social Aspects of Bilingualism (4)

Lecture — 3 hours; term paper. Broad overview of biand multilingualism, with focus on theoretical and descriptive research; topics covered range from lan-guage processing in bilinguals to code-switching to language as political issue in multilingual states.—III. Timm

283. Politics of Bi and Multilingual Literacies (4)

Lecture/discussion-3 hours; term paper. Anthropological, psycho-social, political, and educational perspectives on bi and multilingualism. Power, colonialism, "native/non-native" speakers, and varieties and the unequal distribution of social goods. Analysis of how competing factors keep peoples disenfranchised. — Ramanathan

289. Pedagogical Applications of Second Language Acquisition Theory (4)

Seminar-3 hours; term paper. Prerequisite: course 280. Pedagogical implications of various theories of second language acquisition, facilitation of language acquisition in classroom settings, and techniques for conducting classroom-based research in language learning. — Bayley

297T. English as a Second Language Teaching/Tutoring (1-4)

Tutoring — 1-4 hours. Prerequisite: course 300, 301, or 302 (may be taken concurrently). Teaching classes for ESL graduate students. Aiding the ESL undergraduate composition classes; tutoring foreign graduate student Teaching Assistants in pronunciation. Does not fulfill requirement toward the M.A. degree. May be repeated for credit. (S/U grading

298. Directed Group Study (1-5)

Prerequisite: graduate standing. (S/U grading only.)

299. Research (1-12)

(S/U grading only.)

Professional Courses 300. Language Pedagogy (4)

Lecture - 3 hours; tutorial; project; practice. Prerequisite: graduate standing; admission to MA in Applied Linguistics program or consent of instructor. Methods of teaching second languages to nonnative speak ers, stressing particularly recent linguistic methodology and techniques. Teaching and tutoring in the UC Davis ESL program.—I. Menard-Warwick

301. Teaching Academic Literacy (4)

Seminar — 3 hours; tutorial — 14 hours; project; practice. Prerequisite: graduate standing; course 300 or consent of instructor. Methods of teaching advanced academic literacy in a second language, with a focus on ESL composition. Lesson development, teaching and tutoring in the UC Davis ESL program. — II. Ramanathan

302. Recent Research and Special Projects in TESOL (4)

Lecture—4 hours. Prerequisite: courses 300 and 301. Review of recent research in second language acquisition and the teaching of English to speakers of other languages. Continued teaching and tutoring in the UC Davis ESL clinic. Each student also designs and reports on a classroom research project.

305. Second Language Literacy and Technology (4)

Lecture/discussion - 1.5 hours; web electronic discussion - 1.5 hours. Prerequisite: course 2, or equivalent coursework/experience in second language pedagogy; consent of instructor; graduate students only. Exploration of literacy theory and critical pedagogy in relation to new instructional and communication technologies. Practicum experience in teaching second language literacy; reflection on connections between theory and practice. Limited enrollment.—Menard-Warwick

310. Language Pedagogy for Teacher Educators (4)

Seminar—3 hours; tutorial; project; fieldwork. Prerequisite: admission to Ph.D. program in Linguistics or Foreign Languages, or permission of instructor; significant language teaching experience. Current issues in second language pedagogy, with a focus on communicative methodology, participatory curriculum design, academic literacy, and the social contexts of teaching. Emphasis on reflective teaching and action research. May be repeated up to 12 units for credit. - I. Menard-Warwick, Ramanathan

391. Oral English for ESL Students (3)

Lecture — 2 hours; laboratory — 2 hours. Prerequisite: open only to non-native speakers of English with priority enrollment to international student teaching assistants; completion of any required ESL courses or consent of instructor. Course gives non-native English-speaking students, particularly international student teaching assistants, intensive work in oral English to increase fluency, accuracy, and use of appropriate discourse strategies in academic settings (e.g., seminar, discussion, laboratory). Course may be repeated for credit with consent of coordinator. (S/U grading only.)

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III.

Linguistics (A Graduate Group)

Janet Shibamoto-Smith, Chairperson of the Group

Group Office. 184 Kerr Hall (530) 752 3464

Faculty

Moradewun Adejunmobi, Ph.D., Professor (African American and African Studies) Raúl Aranovich, Ph.D., AssociateProfessor (Linguistics)

Carlee Arnett, Ph.D., Associate Professor (German) Robert Blake, Ph.D., Professor (Spanish) Travis G. Bradley, Ph.D., Associate Professor (Spanish)

Chengzhi Chu, Ph.D., AssociateProfessor (East Asian Languages and Cultures)

M.Cecilia Colombi, Ph.D., Professor (Spanish) David Corina, Ph.D., Professor (Linguistics)
Kerry Enright, PH.D., Assistant Professor (Education) Patrick Farrell, Ph.D., Professor (Linguistics) John A. Hawkins, Ph.D., Professor (Linguistics) Debra Long, Ph.D., Professor (Psychology)

Martha Macri, Ph.D., Professor (Native American Studies)

Robert May, Ph.D., Professor (Philosophy) Julia Menard-Warwick, Ph.D., Associate Professor (Linguistics)

Barbara Merino, Ph.D., Professor (Education) Flagg Miller, Ph.D, Associate Professor (Religious Studies)

Almerindo E. Ojeda, Ph.D., Professor (Linguistics) Vaidehi Ramanathan, Ph.D., Professor (Linguistics) Winfried Schleiner, Ph.D., Professor (English) Adam Sennet, Ph.D., Associate Professor (Philosophy)

Janet S. Shibamoto-Smith, Ph.D., Professor (Anthropology)
Tamara Swaab, Ph.D., Associate Professor

(Psychology)

Lenora A. Timm, Ph.D., Professor (Linguistics) Matthew Traxler, Ph.D., Professor (Psychology) Yuuko Uchikoshi, Ed.D, Assistant Professor (Education)

Karen A. Watson-Gegeo, Ph.D., Professor (Education) Distinguished Graduate Mentoring Award

Eric Russell Webb. Ph.D., Assistant Professor (French)

Aram Yengoyan, Ph.D., Professor (Anthropology)

Emeriti Faculty

Wilbur A. Benware, Ph.D., Professor Emeritus David L. Omsted, Ph.D. Professor Emeritus Mary Schleppegrell, Ph.D., Professor Emerita Gwendolyn Schwabe, M.A., Senior Lecturer Emerita Maximo Torreblanca, Ph.D., Professor Emeritus Benjamin E. Wallacker, Ph.D., Professor Emeritus

Graduate Study. The Graduate Group in Linguistics offers a program of study leading to the M.A. and the Ph.D. degree. The M.A. places emphasis on applied linguistics, especially TESOL. The program offers a strong foundation in linguistics and in the linking of the theory with practice. Students have the choice of pursuing one of two sets of degree requirements. Plan I requires a total of 38 units of course work plus a thesis. Plan II requires 42 units of course work and an examination consisting of two papers.

The Ph.D. degree offers advanced training and research in linguistic theories and methods. Second language acquisition and development is a particular emphasis of the program. Detailed information on both the M.A. and the Ph.D. degrees can be obtained from the graduate advisor, from the chair of the Graduate Group or the departmental chair.

Graduate Advisers. Robert Bayley (Linguistics), Vaidehi Ramanathan (Linguistics)

Literature in Translation

The following courses are open to students throughout the campus. The readings can be in English. See departmental listing for the course description.

10. Chinese American Literature (in

11. Great Books of China (in English) Introduction to the Literature of China 50. and Japan (in English)

100A. Daoist Traditions 101. Chinese Film

102. Chinese American Film

Modern Chinese Drama 103 104.

Twentieth-Century Chinese Fiction (in English)

105. Western Influences on Twentieth-Century Chinese Literature (in English)

106. Chinese Poetry (in English) 107.

Traditional Chinese Fiction (in English) 108. Poetry of China and Japan (in English) Topics in Chinese Literature (in English) Great Writers of China: Texts and 109A-I.

110. Context (in English)

Classics

10. Greek, Roman, and Near Eastern Mythology

Homer and Ancient Epic 140.

141. Greek and Roman Comedy 142. Greek and Roman Novel

143. Greek Tragedy

Comparative Literature

Great Books of Western Culture: The 1. Ancient World

2. Great Books of Western Culture: From the Middle Ages to the Enlightenment Great Books of Western Culture: The

3. Modern Crisis

4. Major Books of the Contemporary World

Fairy Tales, Fables and Parables Myths and Legends 5.

6. 7. Literature of Fantasy and the Supernatural

8. Utopias and their Transformations The Short Story and Novella

Master Authors of World Literature Introduction to Women Writers 10A-N. 12.

13. Dramatic Literature

Introduction to -Poetry 14.

Humans and the Natural World 20.

Ethnic Minority Writers in World 25. Literature

53A Literature of China and Japan

53B. Literature of India and Southeast Asia

53C Literatures of the Islamic World

100. World Cinema

Writing Nature: 1750 to the Present 120.

135. Women Writers

138. Gender and Interpretation

139. Shakespeare and the Classical World

140. Thematic and Structural Study of

141. Introduction to Critical Theoretical Approaches to Literature and Culture 142. Critical Reading and Analysis

144. The Grotesque

145. Representations of the City

146. Myth in Literature

Modern Jewish Writers 147.

151. Colonial and Postcolonial Experience in Literature

152. Literature of the Americas

153. The Forms of Asian Literature

154. African Literature

155. Classical Literature of the Islamic World

157. War and Peace in Literature

378 Luso-Brazilian Studies 158. The Detective Story as Literature Early Period Management, 159. Women in Literature 102. Japanese Literature in Translation: The 160A The Modern Novel Middle Period Graduate School of 160B. The Modern Drama Japanese Literature in Translation: The 103. Modern Period 161A. Tragedy 161B. Comedy 104. Modern Japanese Literature: War and Hemant K. Bhargava, Ph.D., Associate Dean Biography and Autobiography The Middle Ages 163. Revolution 164A 105 Modern Japanese Literature: Hero and Michael W. Maher, Ph.D., Associate Dean 164B. The Renaissance Anti-Hero James Stevens, M.B.A., Assistant Dean 164C. Baroque and Neoclassicism 106. Japanese Culture through Films School Office. Gallagher Hall 164D. The Enlightenment 107. Modern Japanese Autobiographies (in English) (530) 752-7658 165. Caribbean Literature Literature of the Modern Middle East 108. Poetry of China and Japan 166. Faculty Traditional Japanese Drama 166A 152. The Epic Shannon W. Anderson, Ph.D., Professor The Novel 166B. Native American Studies Ashwin Aravindakshan, Ph.D., Assistant Professor 167. Comparative Study of Major Authors Brad M. Barber, Ph.D., Professor Native American Literature (the novel 168A 181A Romanticism Beth Bechky, Ph.D., Associate Professor Realism and Naturalism and fiction) 168B. Nicole W. Biggart, Ph.D., Professor 181B. Native American Literature (non-fiction 169 The Avant-Garde David S. Bunch, Ph.D., Professor 170 The Contemporary Novel works by Native authors) Joseph Chen, Ph.D., Associate Professor Native American Literature (traditional Selected Topics in Comparative 181C. 180. Rachel Chen, Ph.D,. Assistant Professor and contemporary poetry) Literature Gina Dokko, Ph.D, Assistant Professor 184. 194H Special Study for Honors Students Contemporary Indigenous Literature of Roger Edelen, Ph.D., Associate Professor 195. Seminar in Comparative Literature Mexico Kimberly D. Elsbach, Ph.D., Professor Special Topics in Native American 188. **Dramatic Art** Paul A. Griffin, Ph.D., Professor Literary Studies Andrew Hargadon, Ph.D., Professor Introduction to Dramatic Art 20 Russian Greta Hsu, Ph.D., Associate Professor 156B. History of Theatre and Dance: 1650-Renna Jiang, Ph.D., Assistant Professor Prasad Naik, Ph.D., Professor 1900 Russian Fantasy 45 156C. History of Theatre and Dance: The 121. Nineteenth-Century Russian Prose Donald A. Palmer, Ph.D., Professor Twentieth Century 123. Twentieth-Century Russian Prose N.V. Ramanan, Ph.D., Assistant Professor 159. Contemporary Experimental Theatre 126. The Russian Theater Anna Scherbina, Ph.D., Assistant Professor and Drama 130. Contemporary Soviet Culture Olivier Rubel Ph.D., Assistant Professor Dostoevsky 140. French Victor Stango, Ph.D. Associate Professor Chih-Ling Tsai, Ph.D., Professor David L. Woodruff, Ph.D. Professor 141. Tolstoy French Film 50. Spanish 51. Major Works of French Catherine Yang, Ph.D., Assistant Professor Ayako Yasuda, Ph.D., Associate Professor Michelle Yetman, Ph.D., Associate Professor 52. France and the French-Speaking 149 Latin-American Literature in Translation Robert Yetman, Ph.D., Associate Professor German Luso-Brazilian Hema Yoganarasimhan, Ph.D., Assistant Professor 48. Myth and Saga in the Germanic Cúltures **Emeriti Faculty** Studies 49. Freshman Colloquium Richard P. Castanias, Ph.D., Professor Emeritus Peter K. Clark, Ph.D., Professor Emeritus Richard C. Dorf, Ph.D., Professor Emeritus 112 Topics in German Literature 113. Goethe's Faust (College of Letters and Science) German Literature since 1945 115 Eitan Gerstner, Ph.D., Professor 118A. Fin-de-siècle Vienna (The Swan Song The Department of Spanish and Portuguese sponsors Michael R. Hagerty, Ph.D., Professor Emeritus of the Habsburg Empire) the minor in Luso-Brazilian Studies, which offers stu-118B. Weimar Culture: Defeat, the Roaring Alexander F. McCalla, Ph.D., Professor Emeritus dents the opportunity to engage with the Portuguese-speaking world as a global space, as well as gain in-depth knowledge of Brazilian literature, culture Twenties, the Rise of Nazism Robert H. Smiley, Ph.D., Professor Emeritus Germany under the Third Reich Jerome J. Suran, B.S., Ph.D. (hon.), Senior Lecturer 118C. From German Fiction to German Film 119 and society. The minor is structured to facilitate Donald Topkis, Ph.D., Professor Emeritus 141. The Holocaust and its Literary engagement with Latin American, peninsular, and transatlantic topics, while ensuring that students mas-ter the essential skills of linguistic competence, and Representation The Graduate School of Management offers a minor New German Cinema: From 142 in Technology Management to undergraduate students with majors in engineering, agricultural, biological and physical sciences. This minor Oberhausen to the Present literary and cultural knowledge. Italian **Minor Program Requirements:** complements students' undergraduate studies with 50. Studies in Italian Cinema courses in the ways in which engineering and sci-107. Survey of Italian Culture and ence-based industrial enterprises manage and use Luso-Brazilian Studies......23-24 Institutions knowledge from science, engineering and technol-Portuguese 100, 161 8 108. Contemporary Issues in Italian Culture ogy. The minor also provides students with business and management skills that should enable them to Select one course in each of the following and Society Boccaccio, Petrarch and the use their engineering and science education more effectively in a technology environment. 139B. Spanish 111N, 115, or 116............ 3-4 Renaissance Portuguese 162 or 163...... 4 140. Italian Literature in English Translation: Due to limited enrollment, students need to apply to Select one elective course in each of the Dante, Divine Comedy the program. The primary admission process will be following categories: Culture, Gender and the Italian 141. conducted in the spring quarter before student regis-Portuguese 159, 162, or 163...... 4 Renaissance tration for fall courses. Subsequent admissions pro-History 159, 163A, or 163B...... 4 Masterpieces of Modern Italian 142. cesses will be held as needed for students to enter Note: Consult a departmental adviser if any Narrative the minor in winter and spring quarters. of these courses are to be taken abroad. 150. Studies in Italian Cinema Note: Additional courses may count toward **Minor Prerequisites:** Japanese the minor with prior approval by a Students must take these courses for a letter grade of departmental adviser. 10. Masterworks of Japanese Literature (in C- or better. English) Minor Advisers. L. Bernucci, R. Newcomb 15. Introduction to Traditional Japanese Management 11A..... **Education Abroad Program Options.** Mathematics 16A-16B, 17A-17B or Culture We highly recommend that students participate Introduction to the Literature of China 50. 21A-21B...... 6-8 units in study abroad in Salvador, Brazil; see Statistics any 100 level course or and lapan http://eac.ucdavis.edu. Courses taken abroad may

count toward the Luso-Brazilian Studies minor.

above......4 units

101.

Japanese Literature in Translation: The

Minor Program Requirements:

UNITS

Technology Management...... 20

Choose five courses from Management 120, 140, 150, 160, 170, 180.....

Courses in Management (MGT/MGB/MGP)

Lower Division Courses 11A. Elementary Accounting (4)

Lecture - 3 hours; discussion - 1 hour. Basic concepts of accounting; interpreting and using financial $% \left(1\right) =\left(1\right) \left(1\right)$ statements; understanding accounting principles.—I, II. (I, II.)

11B. Elementary Accounting (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 11A. Product costing; using accounting information for decision making; planning and performance evaluation. — III. (III.)

Upper Division Courses 100. Introduction to Financial Accounting

Lecture - 3 hours. Course is open to all upper division undergraduate and graduate students, except those in the Graduate School of Management. Introduction to the concepts, methods, and uses of accounting and financial reporting. Preparation of financial statements, including balance sheet and statements of income and cash flow, as well as their analysis by investors and managers.

120. Managing and Using Information Technology (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 11A, Mathematics 16B, 17B, or 21B, Statistics 100, 102, 103, or 108. Introduction to computer hardware, systems software, and information systems. Management of information technology and the impact of information systems on modern management.—III. Bhargava

140. Marketing for the Technology-Based **Enterprise (4)**

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 11A, Mathematics 16B, 17B, or 21B, Statistics 100, 102, 103, or 108. Marketing in technology-based companies, with emphasis on how scientists, engineers, and business people interact to develop and market products and services. - II.

150. Technology Management (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 11A, Mathematics 16B, 17B, or 21B, Statistics 100, 102, 103, or 108. Management of firms in high technology industries such as software devel opment and biotechnology research. Motivating and managing workers, organizing for innovation, and making decisions.—III.

160. Financing New Business Ventures (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 11A, Mathematics 16B, 17B, or 21B, Statistics 100, 102, 103, or 108. Concepts and methods used to structure and finance new business ventures. Topics include the evaluation of new investment projects, raising venture capital, the role of the venture capitalist, and the choice of organizational structure in new ventures.—II. Castanias

170. Managing Costs and Quality (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 11A, Mathematics 16B, 17B, or 21B, Statiscourse 11A, Mathematics 10B, 17B, 01 21B, 01ails-tics 100, 102, 103, or 108. Designing cost systems in high technology organizations and managing operations to maximize quality and minimize costs. Topics include activity based costing and management, managing quality and time to create value ethical issues in cost assignment, and differential costing for decision making.—I. Maher

180. Supply Chain Planning and Management (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 11A, Mathematics 16B, 17B, or 21B, Statistics 100, 102, 103, or 108. Quantitative techniques for analysis and management of modern supply chains for the production and delivery of goods and services. — I. Woodruff

Graduate Courses—Core Courses 200A. Financial Accounting (3)

to the concepts and objectives underlying the preparation of financial statements. Topics include understanding the accounting cycle, measurement and valuation problems associated with financial statement components, consideration of the usefulness of financial statements in the analysis of a corporation's operations.—I. (I.) Yetman

200B. Managerial Accounting (3)

Lecture-3 hours. Prerequisite: graduate student in the Graduate School of Management. Information managers should know to be effective, including: product costing, motivating people, and differential analysis for decision making. Includes team projects and written and oral presentations.—II, IV. (II, IV.) Ramanan

201A. The Individual and Group Dynamics (3)

Lecture—3 hours. Prerequisite: graduate student in the Graduate School of Management. Examines basic psychological and social psychological processes shaping human behavior and applies knowledge of these processes to the following organizational problems: motivation, job design, commitment, socialization, culture, individual and group decision making, and team building.—I. (I.) Elsbach

201B. Organizational Structure and Strategy (3)

Lecture - 3 hours. Prerequisite: graduate student in the Graduate School of Management. Analysis o structural properties of organization including differentiation and vertical and horizontal integration. Alternative structural arrangements including functional, divisionalized, matrix, and hybrid structures. Relationship between environment, structure, and strategic objectives. Organization life cycle and changes.—II. (II.) Biggart, Hsu

202A. Markets and the Firm (3)

Lecture - 3 hours. Prerequisite: graduate student in the Graduate School of Management. Examines the interaction of consumers, firms and government, and the effect this interaction has on the use of resources and firm profitability. Fundamental economic concepts such as marginal analysis, opportunity cost, pricing, and externalities are introduced and applied.—II. (II.)

202B. Business, Government, and the International Economy (3)

Lecture - 3 hours. Prerequisite: course 202A. Examines the influence of government and international factors on business. Topics include distribution of income, business cycles, inflation and interest rates, the federal debt, monetary policy and international trade and finance. —II. (II.)

203A. Data Analysis for Managers (3)

Lecture-3 hours. Prerequisite: graduate student in the Graduate School of Management MBA program or consent of instructor. Introduction to statistics and data analysis for managerial decision making. Descriptive statistics, principles of data collection, sampling, quality control, statistical inference. Application of data analytic methods to problems in marketing, finance, accounting, production, operations, and public policy.—II. (II.) Tsai

203B. Forecasting and Managerial Research Methods (3)

Lecture - 3 hours. Prerequisite: course 203A. Practical statistical methods for managerial decision making covers regression analysis, time series analysis and forecasting, design and analysis of experiments in managerial research and contingency table analysis. Application of these methods to marketing, finance, accounting, production, operations, and public policy.—II. (II.) Tsai

204. Marketing Management (3)

Lecture-3 hours. Prerequisite: graduate student in the Graduate School of Management. Analysis of market opportunities, elements of market research, development of marketing strategies, market planning and implementations, and control systems. Consumer and industrial markets, market segmentation, pricing strategies, distribution channels, promotion, and sales. — III. (III.)

205. Financial Theory and Policy (3)

Lecture - 3 hours. Prerequisite: graduate student in the Bay Area MBA Program. Corporate financial policy and investment management. Covers capital budgeting, optimal financial structure, cost-of-capital determination, risk measurement. Develops basic valuation principles for investments with long-lived and risky cash-flows, and extends these to derivative securities, asset portfolios, investment management and hedging. - III. (III.) Barber

206. Decision Making and Management Science (3)

Lecture - 3 hours. Prerequisite: graduate student in the Graduate School of Management MBA program or consent of instructor. Develops decision-making and problem-solving skills in conjunction with a quantitative model-building approach. Emphasizes how structured modeling techniques, probability forecasts, simulations, and computer optimization models are used in the overall process of making decisions in an uncertain environment.—II. (II.)

207. Management Information Systems (3)

Lecture — 3 hours. Prerequisite: graduate student or consent of instructor. Introduction to computer programming and data handling skills. Use of computer in organizations, emphasis on managerial aspects of computing. Standard and nonstandard uses of data files, centralization versus decentralization of computing, office automation, computer security.—I, II, III. (I, II, III.) Bhargava, Woodruff

210T. Policing Seminar (2)

Seminar-2 hours. What are the expectations and roles of the police in a democratic society? We need order maintenance and crime control, but to assume these tasks the police sometimes intrude upon interests considered fundamental to free societies. Limited enrollment.

Elective Courses

Students must complete the Management core course requirement before enrolling in any of the following courses, or petition with consent of the

215. Business Law (3)

Lecture - 3 hours. Prerequisite: completion of Administration core requirements or petition with consent of instructor. Introduction to law and legal process in the United States. Sources of law. Structure and operation of courts, federal-state relationships, fundamentals of administrative law, fundamentals of business law. IV. (IV.)

216. Managing Professionals, Budgets, Controls and Ethics (3)

Lecture—3 hours. Prerequisite: graduate standing. Performance measures, budgetary controls and ethical pressures which occur at middle management levels in service-type operations. Addresses such organizations as engineering, medical groups, law offices, management consultants. - I. (I.) Suran

220. Management of Social Networks (3)

Lecture/discussion-3 hours. Prerequisite: course 201A; open to MBA students only. Principles and applications of social network theory: coordinating divergent interests to create value for individuals and organizations. Emphasis on conceptual models, web-based diagnostic tools, and practical applications. Offered in alternate years. — (I.)

+Discussion-3 hours. Advanced tax course designed to introduce students to issues of tax policy, with particular emphasis on tax distribution (i.e., who or what should pay taxes in society) and tax incidence (i.e., who or what ends up paying taxes in society).

223. Power and Influence in Management

Seminar—3 hours. Prerequisite: consent of instructor. Investigation of the bases of power in organizations and the tactics used to translate power into influence. Topics include the control of resources (including information), social psychological processes (including commitment), the construction of meaning, and ethics.—I. (I.) Palmer

224. Managing People in Modern Organizations (3)

Lecture/discussion-3 hours. Modern systems for managing people. Examination of the changing workforce and workplace, emphasizing high-technology and knowledge-intensive organizations. The impact of firms environment (competition, product market, regulations) on choices for managing people. The consequences of these choices for firms and managers. Open to MBA students only.—II. (II.)

240. Management Policy and Strategy (3)

Lecture - 3 hours. Prerequisite: first-year core courses of M.B.A. program. Examines the scope of missions, objectives strategies, policies, structures, measure-ments and incentives which bear on the management of an organization. Real client organizations, in the private and public sectors, are assigned to student teams as the subjects of study. —I. (I.) Suran

241. New Product Development (3)

Lecture/discussion-3 hours. Prerequisite: course 249 or consent of instructor; restricted to graduate students in the Graduate School of Management. Disseminates state-of-the-art concepts and methods to enhance the effectiveness of new product develop ment activities. Focuses on the understanding of managerial issues and acquiring the ability to solve problems.—III. (III.) Naik

242. Marketing Communications (3)

Lecture - 3 hours. Issues in designing a marketing communications strategy. Topics include mass and direct communications, institutional aspects of advertising, consumer behavior, evaluating ad effectiveness, determining ad budget, creative strategy, and use and abuse of promotions.—III. (III.) Naik

244. New and Small Business Ventures (3)

Lecture-3 hours. Emphasizes starting a new business venture or managing a small, ongoing business during its formative stages. The business plan. Legal forms, financial considerations, the management team. The entrepreneur. Students develop a detailed business plan. — IV. (IV.)

246. Negotiation and Team Building (3)

Lecture - 3 hours. Prerequisite: courses 202, 205. Teaches basic theory of negotiation; applies theory to process of building teams to achieve business purposes. Covers integrative and distributive strategies of claiming value, how to recognize bargaining tricks, uncovering hidden agendas, brainstorming to extend Pareto frontier. — II. III. (II, III.) Elsbach

247. Customer Service as a Marketing Tool

Lecture-3 hours. Understanding the distinct features of services, how to create value through service, methods of building strong relationships with customers, methods of measuring and building customer satisfaction, and measuring the financial impact of service improvement. - I. (I.)

248. Marketing Strategies (3)

Lecture - 3 hours. Examines process by which organizations develop strategic marketing plans. Includes definition of activities and products, marketing audits, appraising market opportunities, design of new activities and products, and organizing marketing planning function. Applications to problems in private and public sector marketing. - I. (I.) Rubel

249. Marketing Research (3)

Lecture-3 hours. Course addresses the managerial issues and problems of systematically gathering and analyzing information for making private and public marketing decisions. Covers the cost and value of

information, research design, information collection, measuring instruments, data analysis, and marketing research applications. - III. (III.) Bunch

250. Technology, Competition and Strategy

Lecture - 3 hours. Prerequisite: completion of firstyear core courses at the Graduate School of Management or the equivalent. Restricted to students in the MBA program. Why is software typically so defective? Why do many firms in the IT industry give away their best products free? This course helps you analyze questions like these by modeling competi-tion and strategy in the network, technology and information industries.—II. (II.) Bhargava

251. Management of Innovation (3)

Lecture - 3 hours. Managing innovative enterprise in changing and uncertain environments. Covers technology forecasting and assessment, program selection and control, financial management, regulation, and ethics. - I. (I.) Biggert

252. Production and Operations Management (3)

Lecture-3 hours. Explores methods of increasing operational efficiency in production and service organizations through planning and scheduling, materials management, inventory control, quality control, and distribution. Methodologies employed include such techniques as programming, simulation, systems analysis, queuing, and network models.—IV. (IV.) Woodruff

260. Corporate Finance (3)

Lecture — 3 hours. Focuses on planning, acquiring, and managing a company's financial resources. Includes discussion of financial aspects of mergers and other forms of reorganization; analysis of investment, financial, and dividend policy; and theories of optimal capital structure. — III. (III.) Scherbina

261. Investment Analysis (3)

Lecture-3 hours. Examines asset pricing theories and relevant evidence, including the investment performance of stocks and bonds. Topics include the efficiency of markets, domestic and international portfolio diversification, factors influencing the value of stocks and other investments, and portfolio management and performance.—I. (I.) Chen

263. Derivative Securities (3)

Lecture/discussion-3 hours. The behavior of options, futures, and other derivative securities markets and how public agencies, business and others use those markets. Trading strategies involving options, swaps, and financial futures contracts. Pricing of derivative securities, primarily by arbitrage methods. Open to students enrolled in the MBA program.—III. Edelen

264. Business Taxation (3)

Lecture — 3 hours. Analysis of the impact of business taxation on investment, production, and finance decisions. Discussion of the relationship between business organization and tax liability. Course is not intended for tax specialists.—II. (II.) Yetman

266. International Finance (3)

Lecture-3 hours. Prerequisite: course 207 or the equivalent. Open economy macroeconomics, balance of payments theory, and financial decision making in multinational firms. —II. (II.)

267. Teams and Technology (3)

Lecture/discussion-3 hours. Restricted to working professional MBA students or consent of instructor. Theory and practice of managing teams with primary goals of: providing conceptual guidelines for analyzing and diagnosing group dynamics and determining strategic options as a manager; impart-ing interpersonal skills for implementing effective strategies; understanding how technological change affects team processes.—III. (III.)

268. Management Communications (3)

Laboratory/discussion-3 hours. Theories, strategies, and skills necessary for effective communication in management. Learn to improve their business writing, and will deliver business presentations

269. Business Intelligence Technologies-Data Mining (3)

Lecture/discussion-3 hours. Prerequisite: completion of core courses at the Graduate School of Management or the equivalent. Restricted to students in the MBA program. Data is a key source of intelligence and competitive advantage for business organizations. With the explosion of electronic data available to organizations and demand for better and faster decisions, the role of data driven intelligence is becoming central in organizations.-III. (III.) Y. Yang

270. Corporate Financial Reporting (3)

Lecture-3 hours. Analyzes and evaluates contemporary issues in financial reporting and develops implications of those issues for business decision makers, investment managers, and accounting policymakers. - IV. (IV.) Griffin

271. Strategic Cost Management (3)

Laboratory/discussion-3 hours. Theoretical frameworks and associated techniques for using organizational design and cost management to achieve a sustainable, profitable cost structure. Topics include: target costing, process design for low cost, total cost of ownership, cost of customers, implementing structural change, and incentives.—III. (III.) Anderson

272. Evaluation of Financial Information (3)

Lecture - 3 hours. Studies how investors, creditors, others use accounting and other information in making rational investment, lending decisions. Emphasis is placed on the analysis of financial information in a variety of contexts. Where applicable, recent research in finance and economics is discussed. – III. (III.) Griffin

273. Accounting and Reporting for Government Nonprofit Entities (3)

Lecture—3 hours. Concepts, methods, and uses of accounting and financial reporting by governmental and nonprofit entities. Introduction to budgeting and performance evaluation, and accounting for entities such as hospitals, universities, and welfare agencies. — III. (III.)

274. Corporate Governance (3)

Lecture—3 hours. Prerequisite: restricted to full-time MBA students or consent of instructor. Discusses how corporations can better operate in the interests of shareholders and public. Directly relevant to manag-ers, consultants in compensation and incentives, staff working on mergers and acquisitions, corporate regulators, shareholder rights activists, and board members. II, III. (II, III.)

276. Real Estate, Finance and Development

Lecture—3 hours. Prerequisite: courses 201A and 207. Focus on single family, attached, detached, multi-family, and light commercial development. Students will study factors which make up successful real estate developments. Course will consider financial aspects involved in land acquisition, land development, construction, and project lending.—II. (II.)

281. Systems Analysis and Design (3)

Lecture - 3 hours. Design and specification of computer-based information systems. Applications systems development life cycle, use requirements and feasibility assessment, logical and physical design, program development and testing, conversion and implementation.

282. Supply Chain Management (3)

Lecture/discussion-3 hours. Prerequisite: completion of first year core courses at the Graduate School of Management or the equivalent; knowledge of Microsoft Excel. Restricted to students in the MBA program. Matching supply with demand is a primary challenge for a firm: excess supply is too costly, inadequate supply irritates customers. Matching supply to demand is easiest when a firm has a flexible supply process, but flexibility is generally expensive.—II. (II.) Chen

284. Applied Linear Models for Management (3)

Lecture—3 hours. Covers regression, analysis of variance, and multivariate analysis. Topics will focus on applications to management and policy problems.—Tsai

285. Time Series Analysis and Forecasting (3)

Lecture—3 hours. Considers application of time series methods to evaluation and forecasting problems. Covers univariate and multivariate ARIMA models and transfer function models. Applications will be in such areas as economics, finance, budgeting, program evaluation, and industrial process control.—Tsai

286. Telecommunications and Computer Networks (3)

Lecture - 3 hours. Prerequisite: course 280. Communication system components; common carrier services: design and control of communications networks; network management and distributed environment; local area networks; data security in computer networks. - Topkis

287. Database Systems (3)

Lecture — 3 hours. Prerequisite: course 280. Hierarchical, network, and relational models for database systems. Design and implementation of models. Performance evaluation and benchmarking. Query structures and languages. Data security and integrity. Application to managerial decision making and decision support systems.—II. (II.) Yang

288. Special Topics in Management of Information Systems (3)

Lecture - 3 hours. Managerial aspects of information systems. Topics stressing applications in organizations chosen from: economics of computers and information systems, decision support systems, management of computer-based information systems, office automation.—Topkis

290. Topics in General Management (3)

Seminar—3 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Advanced topics in general management Varied topics to cover more extensively issues discussed in courses 201A and 201B, or current business interest topics in fields of business writing, business communications, development, or workplace processes. May be repeated for credit. – I, II, III. (I, II, III.) Woodruff

291. Topics in Organizational Behavior (3)

Seminar - 3 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Advanced topics in social psychology and sociology of organizations. Varied topics to cover more extensively issues discussed in courses 201A and 201B, or current business interest topics in fields of organization design, strategy, development, or workplace processes. May be repeated for credit. - II. (II.) O'Mahony

292. Topics in Finance (3)

Seminar-3 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Contemporary and emerging issues in finance. Application of modern techniques of finance to business problems. Use of appropriate electronic database and research techniques. May be repeated for credit.—I. (I.)

293. Topics in Marketing (3)

 ${\sf Seminar-3\ hours.\ Prerequisite:\ completion\ of\ all}$ first-year graduate courses at the Graduate School of Management or the equivalent. Advanced topics in marketing, which may include marketing research, new product development, brand management, pricing, distribution management, service marketing, hitech marketing, advertising, sales promotions, marketing through the Web. May be repeated for credit. - I. (I.)

294. Topics in Accounting (3)

Seminar-3 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Contemporary and emerging issues in financial management accounting. Application of modern techniques of evaluation and analysis of financial information. Use of appropriate electronic database and research techniques. May be repeated for credit. -1. (I.)

295. Topics in Information Technology (3)

Seminar-3 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Applications of information technology to management and management of information technology. Adaptation to the dynamic nature of the field. May be repeated for credit. - I. (I.)

296. Topics in Technology Management (3)

Seminar-3 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Cyclical nature of innovation and technological change, features of innovative firms and industries, national innovation systems, and impact of information technologies on innovation processes. May be repeated for credit. – III. (III.) Bhargava

297. Topics in International Management (3)

Seminar-3 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Broader environment in which U.S. firms and their foreign competitors operate. Integration of material from other topics courses (marketing, strategy, finance, accounting, information technology, technology management) into the international setting. May be repeated for credit. - IV. (IV.)

298. Directed Group Study (1-5)

Prerequisite: consent of instructor. (S/U grading

299. Individual Study (1-12)

Prerequisite: consent of instructor. (S/U grading

Professional Courses

401. Crisis Management (1)

Laboratory/discussion-1 hour. Establishes and explores the defining characteristics of crises. Will learn to anchor crisis management firmly within overall strategic management and also acquire a set of useful tools and techniques for planning for and handling actual crises. (S/U grading only.)—I. (I.) Biggs

402. Crisis Communications and Reputation Management (1)

Laboratory/discussion-1 hour. Intended to provide you with an understanding of the framework and tools necessary to successfully address communications and reputation management tasks in a variety of crisis situations. (S/U grading only.)—I. (I.) Fried-

403. Business Statistics Practicum (1)

Project - 1 hour. Prerequisite: MGT, MGP, or MGB 203A is a pre-requisite. In addition, students must be concurrently enrolled in (or completed) MGT, MGP, or MGB 203B. Restricted to students in the MBA program. Applies techniques and concepts in business statistics to real case studies.—I. (I.) Tsai

404. Organizational Change Management (1)

Laboratory/discussion - 1 hour. Challenges in getting significant changes made in organizations. Learn Organization Change Management (OCM) techniques and discuss case situations where OCM techniques play a role. (S/U grading only.)—II. (II.)

405. Business Literature (1)

Laboratory/discussion-1 hour. Will examine Business history - historical trends that might influence contemporary business. Some argue that the recent collapse of our financial system might have been averted if business leaders had a better sense of history. (S/U grading only.)-II. (II.) Biggart

406. Ethical Issues in Management (1)

Lecture/discussion - 1 hour. Explores the philosophical foundation of ethical theory and its recent applications to business situations. Professional codes of ethics, such as those promulgated by educational,

managerial, engineering, scientific, medical and legal professional societies, are presented. (S/U grading only.) - II. (II.)

407. Storytelling for Leadership (1)

Lecture/discussion-1 hour. Internalize the fundamental principles behind stories that educate, influence, motivate, inspire, persuade and connect. (S/U grading only.)—III. (III.)

424. Practicum for Managing People in Modern Organizations (1)

Project - 1 hour. Prerequisite: course 224. Restricted to students in the MBA program. Provides solid grounding in the management of work and the employment relationship. Examines firms' interrelated policies and practices for managing people. -II. (II.) Hsu

434. Practicum for Pricing (1)

Project - 1 hour. Prerequisite: course 234. Restricted to students in the MBA program. Enhance understanding of the principles and concepts learned in Pricing by (1) teaching the necessary statistical and mathematical skills, and (2) requiring a report for a real Pricing case. —II. (II.) Jiang

442. Practicum for Marketing Communication (1)

Project - 1 hour. Prerequisite: course 242. Restricted to students in the MBA program. Provides experience applying concepts learned in Marketing Communications to a realistic advertising or communication problem faced by firms.—III. (III.) Yoganarasimhan

443. Practicum for Customer Relationship Management (1)

Project — 1 hour. Prerequisite: course 243. Restricted to students in the MBA program. Hands-on training in applying Customer Relationship Management concepts and metrics to secondary data. Enhances ability to interpret results and decide the right type of marketing actions by requiring an executive report at the end of the quarter. —I. (I.) Aravindakshan

448. Practicum for Marketing Strategies (1)

Project - 1 hour. Prerequisite: course 248. Restricted to students in the MBA program. Provides opportunities to apply the concepts covered in the Marketing Strategies class through a group project involving the analysis of strategic marketing decisions based on business-related issues, simulation and modeling. - I. (I.) Rubel

449. Marketing Research Practicum (1)

Project - 1 hour. Prerequisite: course 249. Restricted to students in the MBA program, or in some cases with permission of instructor. Provides opportunities to apply the concepts and methods covered in the Marketing Research class. Hands-on and projectbased, work could be either individual or in groups depending on enrollments and/or interests of students. - III. (III.) Bunch

450. Practicum for Technology Strategy and Competition (1)

Project - 1 hour. Prerequisite: course 250. Restricted to students in the MBA program. In-depth practicum project course. Apply theories, concepts, and models, learned in course 250 to a real-world business problem, through data collection, data analysis, simulation, modeling and post-model interpretation.—II. (II.) Bhargava

460. Practicum for Corporate Finance and Real Estate (1)

Project - 1 hour. Prerequisite: course 260. Restricted to students in the MBA program. Work in groups to select and value a financial entity. It could be a firm, a sports player, a building, a project, or a patent. Grade based on an in-class presentation and a write-up. — III. (III.) Scherbina

461. Practicum for Investment Analysis (1)

Project — 1 hour. Prerequisite: course 261. Restricted to students in the MBA program. Provides practical experience applying concepts learned in Investment Analysis to a realistic portfolio management setting via a hypothetical exercise. Produce a realistic executive summary and presentation of an investment proposal for a hypothetical client. - I. (I.) Chen

464. Practicum for Taxes and Business Strategy (1)

Project - 1 hour. Prerequisite: course 264. Restricted to students in the MBA program. Practical applica-tion project drawing from the tax planning theory contained in course 264. Project consists of a business formation and operation, change in organization (incorporation), and movement into multinational and multi-jurisdictional tax.—I. (I.) Yetman

465. Practicum for Venture Capital (1)

Project - 1 hour. Prerequisite: course 265. Restricted to students in the MBA program. Provides an opportunity to apply concepts learned in Venture Capital in a realistic setting. Complete project analyzing a potential investment in a hypothetical venture and prepare an deal term sheet/investment agreement.—III. (III.) Yasuda

467. Practicum for Teams and Technology

Project - 1 hour. Prerequisite: course 267. Restricted to students in the MBA program. Groups investigate the performance, creativity, conflict, information sharing, and leadership behaviors of a real world team. Provide consulting advice to the team, which not only gives analytic skills, but also builds presentation skills.—III. (III.) Bechky

469. Practicum for Business Intelligence Technologies (1)

Project — 1 hour. Prerequisite: course 269. Restricted to students in the MBA program. Projects applying concepts learned in Business Intelligence Technologies to real business problems. — III. (III.) Yang

482. Practicum for Supply Chain Management (1)

Project - 1 hour. Prerequisite: MGT, MGP, or MGB 282 is a pre-requisite or co-requisite. Restricted to students in the MBA program. Provides experience applying concepts learned in Supply Chain Management to a realistic management setting via a project. - I. (I.) Chen

490. Directed Group Study Management Practicum (1)

Laboratory/discussion-3 hours. Prerequisite: consent of instructor; sponsorship of a GSM Academic Senate faculty member; approval of graduate advisor. Provides opportunity for students to gain experience in applying business methodologies previously acquired in other GSM courses. Offered irregularly. (S/U grading only.) - IV. (IV.)

498. Directed Group Study Management Practicum (1-12)

Project. Prerequisite: consent of instructor; sponsorship of a GSM Academic Senate faculty member, and approval of Graduate Advisor. Provides the opportunity for students to gain experience in applying business methodologies previously acquired in other GSM courses. (S/U grading only.)—I, II, III. (I,

499. Directed Individual Study Management Practicum (1-12)

Project. Prerequisite: consent of instructor; sponsorship of a Graduate School of Management Academic Senate faculty member and approval of graduate advisor. Provides the opportunity for students to gain experience in applying business methodologies previously acquired in other Graduate School of Management courses. (S/U grading only.)—I, II, III. (I, II, III.)

Managerial Economics

(College of Agricultural and Environmental Sciences) Faculty. See Agricultural and Resource Economics,

The Major Program

The Managerial Economics major at UC Davis is a disciplinary program combining strong preparation in microeconomic theory and quantitative methods. It prepares students for the analysis of management and policy issues in business, finance, marketing, production, agriculture, food distribution, natural resources, the environment, resource allocation, and international development. Students specialize in one of three options: (1) Managerial Economics focuses on the economic aspects of managerial decision-making. (2) Environmental and Resource Economics concentrates on issues related to the use of resources and environmental quality. (3) Agricultural Economics focuses on the economic and policy aspects of production and marketing of foods and fibers. Students in the Managerial Economics program develop valuable skills and strengths that lead to careers in business and government.

Internships and Career Alternatives. Students in managerial economics have opportunities to gain additional career information and preparation through internships in a variety of private business and governmental agencies. Graduates qualify for supervisory and management training positions in banking, finance, commodity and stock brokerages in the private sector, farm and ranch production, food and agricultural processing, agricultural sales and service, and a variety of agency career positions in local, state, and federal government. Graduates are well qualified to seek advanced degrees in agricultural and resource economics, economics, business administration, or law. For more information, see http://iccweb.ucdavis.edu.

Major Entrance Requirements. Students are encouraged to enter the Pre-Managerial Economics major while completing the entrance requirement.

Acceptance into the pre-major does not guarantee admission into the major. Before declaring a major in Managerial Economics, a student must complete the following courses with a combined grade point average (GPA) of at least 2.800. All of these courses must be taken for a letter grade. Check with an adviser if you have already taken these courses, or if you have received AP credit for them. In determining admission to the major, the Department of Agricultural and Resource Economics counts only the first repeat of any pre-major course.

or 21A and 21B 6-8 units Statistics 13......4 units If a student has taken Agricultural and Resource Economics (ARE) 100A and/or Economics (ECN) 101 before applying for admission to our major, ARE 100A will take the place of ECN 1A and ECN 101 will take the place of ECN 1B for calculation of the student's entrance GPA, provided the student has not already repeated ECN 1A or ECN 1B. Repeats of ARE 100A or ECN 101 will not be used in the entrance requirement calculation.

B.S. Major Requirements:

UNITS

English Composition Requirement 4

In addition to the College English Composition requirement, choose one course from English 3, University Writing Program 1, 18, 19, 101, 102A-G, 104A-F

Preparatory Subject Matter 35-37 Plant Sciences 21, Engineering Computer Science 10, 15 or 30 3-4 Economics 1A-1B 8 Management 11A-11B 8 Mathematics 16A-16B-16C or 21A-21B 8-9 Statistics 13, 103 8 Major Breadth 37
Major Breaam3/
Social Science, Natural Science, and Agricultural Science * See course requirements for the major at http://manecon.ucdavis.edu.
Total Depth Subject Matter 52
Core
Agricultural and Resource Economics 100A, 100B, 106, 155
Restricted Electives32

Choose at least one of the options below:

Managerial Economics option

Agricultural and Resource Economics Choose at least 12 units from Agricultural and Resource Economics 112, 118, 136, 157, 171A, 171B. Select the remaining 16 units from the aforementioned courses or from Agricultural and Resource Economics 115A, 120, 121, 130, 132, 138, 139, 140, 143, 144, 145, 146, 150, 156, 175, 176, 194HA-194HB, Economics 115A, 121A, 121B, 151A, 151B, 160A, 160B

Environmental and Resource Economics option

Agricultural and Resource Economics Choose at least 18 units from Agricultural and Resource Economics 15, 120, 138, 145, 146, 150, 156, Economics 123, 125, 130, Environmental Science and Policy 168A, 168B, 178. Select the remaining 6 units from the aforementioned courses or upper division courses in Agricultural and Resource Economics and/or Economics, Environmental Science and Policy 160, 161, 163, 165, 166, 167, 171, 172, 173, Environmental Toxicology 138

Agricultural Economics option

Choose at least 15 units from Agricultural and Resource Economics 120, 130, 132, 138, 139, 140, 145, 150. Select the remaining 17 units from the aforementioned courses, Agricultural and Resource Economics 18, or upper division courses in Agricultural and Resource Economics and/or Economics

*Students graduating with this major are required to attain at least a C average (2.000) in all upper division courses taken at the University in the depth subject matter. All core and restricted electives must be taken for a letter grade

Total Units for the Major 128-130

Student Advising for the major is in 1176-A Social Sciences and Humanities Building (530) 754-

Major Advisers. Contact Department office

Minor Program Requirements:

The Department of Agricultural and Resource Economics offers four minor options for students majoring in other disciplines who wish to complement their study programs with a minor in Managerial Economics. Each option requires Agricultural and Resource Economics 100A, which has prerequisites of Economics 1A-1B and Mathematics 16A-16B. For some courses, Statistics 13 and 103 may be required. Variable-unit courses and lower division courses are not accepted in any option.

To qualify for a minor in Managerial Economics, a student must complete the following courses with a combined grade point average (GPA) of at least

2.800. All of these courses must be taken for a letter grade. In determining admission to the minor, the Department of Agricultural and Resource Economics counts only the first repeat of any pre-minor course

Economics 1A and 1B	8 units
Mathematics 16A-16B or	
21A-21B	. 6-8 units
Statistics 13	4 units

The Department of Agricultural and Resource Economics offers four minor emphases open to students majoring in other disciplines who wish to complement their study programs with a minor in Managerial Economics. Each emphasis requires Agricultural and Resource Economics 100A, which has prerequisites of Economics 1A-1B and Mathematics 16A-16B. For some courses, Statistics 13 and 103 may be required. Variable-unit courses and lower division courses are not accepted for any emphasis.

Managerial Economics
General emphasis
Agricultural and Resource Economics 100A or the equivalent
Managerial Economics emphasis
Agricultural and Resource Economics 100A or the equivalent
Select additional upper division Agricultural and Resource Economics courses to complete the 18-unit total for the minor.

Environmental and Natural Resource Economics emphasis

Agricultural and Resource Economics 100A or the equivalent Additional upper division courses in Agricultural and Resource Economics..... 14 . Select 9 or more units from Agricultural and Resource Economics 175 and 176, and either 100B or 120. Select additional upper division Agricultural and Resource Economics courses to complete the 18-unit total for the minor.

Agricultural Economics emphasis

Agricultural and Resource Economics 100A or the equivalent..... Additional upper division courses in Agricultural and Resource Economics..... 14 Select 9 or more units from Agricultural and Resource Economics 120, 130, 132, 138, 139, 140, 145, 150. Select additional upper division Agricultural and Resource Economics courses to complete the 18-unit total for the minor.

Graduate Study. See Graduate Studies, on page

Master of Education (M.Ed.)(A Graduate Group)

The Master of Education (M.Ed.) program is no longer admitting students; admissions are suspended.

Master of Professional Accountancy (A Graduate Group)

Robert Yetman, Ph.D., Chairperson of the Group Group Office. Gallagher Hall

(530) 752-7658; Fax (530) 754-9355; http://gsm.ucdavis.edu/ master-professional-accountancy

Faculty

UNITS

18

Shannon W. Anderson, Ph.D., Professor (Graduate School of Management) Roger Edelen, Ph.D., Associate Professor (Graduate School of Management) Paul A. Griffin, Ph.D., Professor (Graduate School of Management) Donald A. Palmer, Ph.D., Professor (Graduate School of Management) N.V. Ramanan, Ph.D., Assistant Professor (Graduate School of Management) Michelle Yetman, Ph.D., Associate Professor (Graduate School of Management) Robert Yetman, Ph.D., Associate Professor (Graduate School of Management) Hema Yoganarasimhan, Ph.D., Assistant Professor (Graduate School of Management)

Affiliated Faculty

Will Snyder, MBA, CPA., Professor (Executive Director)

Graduate Adviser. Contact the Group office.

Courses in Master of Professional Accountancy (MPA)

Courses pending approval at the time of publication; see http://gsm.ucdavis.edu/ master-professional-accountancy.

Maternal and Child Nutrition (Department of Nutrition)

Charles E. Hess, Ph.D., Chairperson of the Depart-

Department Office. 3135 Meyer Hall (530) 752-4630;

http://www.extension.ucdavis.edu/macnutrition

Faculty

Faculty members are listed on the website.

Graduate Study. The Nutrition Department offers the degree of M.A.S. in Maternal and Child Nutrition. This program consists of three required six-unit core courses (Nutrition During Pregnancy, Lactation and Infant Nutrition, and Child and Adolescent Nutrition), six to eight units of special topics seminars, two units of electives, and a six-unit student project (produced in consultation with a three-member guidance committee) for a total of 36 units. Each of the core courses will comprise 10 weeks of inclass instruction twice per week for two-and-a-half hours per meeting. Classes will also include online discussion of related material and readings.

Each student will be assigned a three-member guidance committee consisting of two members of the teaching faculty and an additional qualified faculty member to advise the student in choosing an elective and identifying a student project.

Preparation. Admission to the program requires a bachelor's degree with prior course work that includes (or is comparable to): one year of general chemistry, two quarters of organic chemistry, a

course in statistics, one course in general physiology, and two quarters of the biochemistry of nutrition.

Graduate Advisors. Kathryn G. Dewey, Ph.D., Professor (Nutrition), Jane Heinig, Ph.D., Ácademic Administrator (Nutrition)

Courses in Maternal and Child Nutrition. See courses under Nutrition, on page 445.

Mathematical and **Physical Sciences**

(College of Letters and Science)

Louise H. Kellogg, Ph.D., Program Director

Program Office. 118 Everson Hall

Committee in Charge

Andreas J. Albrecht, Ph.D. (Physics) Sheila David, Ph.D. (Chemistry) Jacquelyn Gervay-Hague, Ph.Ď. (Chemistry) Joel Hass, Ph.D. (Mathematics) Isabel P. Montañez, Ph.D. (Geology) Motohico Mulase, Ph.D. (Mathematics) Academic Senate Distinguished Teaching Award Wolfgang Polonik, Ph.D. (Štatistics) Francisco J. Samaniego, Ph.D. (Statistics)

Academic Senate Distinguished Teaching Award Howard J. Spero, Ph.D. (Geology) Xiangdong Zhu, Ph.D. (Physics)

The Program of Study

The Division of Mathematical and Physical Sciences teaches students to use experimental studies and theoretical analyses to find solutions to real world problems. Students learn to address issues such as cleaning up the environment, preserving natural resources and creating innovative materials for the future. From the study of atoms to the examination of distant galaxies, from abstract number theory to the development of new chemical compounds, the division provides students with the skills to build the world of tomorrow.

The program in Mathematical and Physical Sciences provides an organizational structure within the College of Letters and Science for facilitating the development of innovative curricular initiatives across the mathematical and physical sciences, including offering broadly conceived, integrative undergraduate-and graduate-level courses. The program also may house resident faculty pursuing interdepartmental research and teaching in this area of inquiry.

Courses in Mathematical and Physical Sciences (MPS)

Lower Division Courses

1. General Science: Science in the News (4)

Lecture - 3 hours; laboratory/discussion - 1 hour. Prerequisite: lower division standing. Basic principles in science including numeracy, scale, energy, and time; the scientific method; good and bad science. Emphasis on science topics recently in the news. GE credit: SciEng. - III.

11A-11B. Mathematical and Physical Sciences Seminar (2-2)

Lecture - 2 hours. Prerequisite: mentorship for undergraduate research participants in the physical and mathematical sciences. Research and writing in the mathematical and physical sciences. Presentations by various science faculty members. — I-II. (I-II.)

Mathematics

See Mathematics; and Applied Mathematics (A Graduate Group), on page 162.

Mathematics

(College of Letters and Science) Joel Hass, Ph.D., Chairperson

Department Office. 1130 Mathematical Sciences Blda (530) 752-0827; studentservices@math.ucdavis.edu; http://www.math.ucdavis.edu

Faculty

Eric Babson, Ph.D. Professor Zhaojun Bai, Ph.D., Professor (Computer Science) Craig Benham, Ph.D., Professor Joseph Biello, Ph.D., Associate Professor James Bremer, Ph.D., Assistant Professor Angela Y. Cheer, Ph.D., Professor Jesus De Loera, Ph.D., Professor C. Albert Fannjiang, Ph.D., Professor Roland Freund, Ph.D., Professor Dmitry B. Fuchs, Ph.D., Professor Janko Gravner, Ph.D., Professor Robert Guy, Ph.D., Associate Professor Joel Hass, Ph.D., Professor John K. Hunter, Ph.D., Professor Michael Kapovich, Ph.D., Professor Matthias Koeppe, Ph.D., Professor Gregory J. Kuperberg, Ph.D., Professor Timothy Lewis, Ph.D., Associate Professor Fu Liu, Ph.D., Assistant Professor Alexander I. Mogilner, Ph.D., Professor Ben Morris, Ph.D., Professor Motohico Mulase, Ph.D., Professor

Academic Senate Distinguished Teaching Award Bruno L. Nachtergaele, Ph.D., Professor Brian Osserman, Ph.D., Associate Professor Alessandro Pizzo, Ph.D., Associate Professor E. Gerry Puckett, Ph.D., Professor Dan Romik, Ph.D., Associate Professor Naoki Saito, Ph.D., Professor Anne Schilling, Ph.D., Professor
Jennifer Schultens, Ph.D., Professor
Albert Schwarz, Ph.D., Professor
Steve Shkoller, Ph.D., Professor
Alexander Soshnikov, Ph.D., Professor Thomas Strohmer, Ph.D., Professor J. Blake Temple, Ph.D., Professor Becca Thomases, Ph.D., Assistant Professor Abigail Thompson, Ph.D., Professor

Academic Senate Distinguished Teaching Award Craig A. Tracy, Ph.D., Professor Monica Vazirani, Ph.D., Professor Samuel Walcott, Ph.D., Assistant Professor Andrew Waldron, Ph.D., Professor Qinglan Xia, Ph.D., Assistant Professor

Emeriti Faculty

David Barnette, Ph.D., Professor Emeritus Donald C. Benson, Ph.D., Professor Emeritus Carlos R. Borges, Ph.D., Professor Emeritus Robert J. Buck, Professor Emeritus Gulbank D. Chakerian, Ph.D., Professor Emeritus Academic Senate Distinguished Teaching Award Doyle O. Cutler, Ph.D., Professor Emeritus James R. Diederich, Ph.D., Professor Emeritus Allan L. Edelson, Ph.D., Professor Emeritus Robert D. Glauz, Ph.D., Professor Emeritus Kurt Kreith, Ph.D., Professor Emeritus
Arthur J. Krener, Ph.D., Professor Emeritus
Arthur J. Krener, Ph.D., Professor Emeritus
Gary J. Kurowski, Ph.D., Professor Emeritus David G. Mead, Ph.D., Professor Emeritus
Academic Senate Distinguished Teaching Award E. O. Milton, Ph.D., Professor Emeritus Academic Senate Distinguished Teaching Award Donald A. Norton, Ph.D., Professor Emeritus Washek F. Pfeffer, Ph.D., Professor Emeritus G. Thomas Sallee, Ph.D., Professor Academic Senate Distinguished Teaching Award

Sherman K. Stein, Litt.D. (hon.), Ph.D., Professor Emeritus, Academic Senate Distinguished Teaching Award

Howard J. Weiner, Ph.D., Professor Emeritus Roger Wets, Ph.D. Professor Emeritus

Affiliated Faculty

John Chuchel, Ph.D., Lecturer Ali Dad-del, Ph.D., Lecturer Academic Federation Excellence in Teaching Award Duane Kouba, Ph.D., Lecturer

Lawrence Marx, Ph.D., Lecturer

The Major Programs

Mathematics is the study of abstract structures, space, change, and the interrelations of these concepts. It also is the language of the exact sciences.

The Program. Students majoring in mathematics may follow a program leading to either the Bachelor of Arts or the Bachelor of Science degree. After completing basic introductory courses such as calculus and linear algebra, students plan an upper division program in consultation with a faculty adviser. The upper division course offering is grouped into entry level, core, and enrichment courses. Entry level courses are designed to serve as a bridge between the concrete mathematics of the lower division and the more abstract concepts taught in upper division courses. The core classes are intended to provide basic mathematical techniques, whereas the enrich-ment choices allow students to further mathematical knowledge and skills that feature their research or career interests. This individualized program can lead to graduate study in pure or applied mathematics, elementary or secondary level teaching, or to other professional goals. It can also reflect a special interest such as computational and applied mathematics, computer science, or statistics, or may be combined with a major in some other field.

Career Alternatives. A degree in mathematics provides entry to many careers in addition to teaching. For instance, operations research, systems analysis, computing, actuarial work, insurance, and financial services are only a few such careers. Mathematics is also a sound basis for graduate work in a variety of fields, such as law, engineering, and eco-

A.B. Major Requirements:

UNITS Preparatory Subject Matter43-46 Mathematics 12 (or high school eauivalent) Mathematics 21A, 21B, 21C, 21D, Computer Science Engineering 30 or Depth Subject Matter 34-38 A. Entry Level (Optional) 0-4 (Suggested choices: one course from Mathematics 108, 114, 115A, 141, 145) Mathematics 135A......4 (up to 4 of these 18 units may be approved upper division courses outside of the Department of Mathematics with extensive use of mathematics) 18 Plan 1: General Mathematics Additional upper division mathematics units selected in consultation with and subject to approval of an adviser18 Plan 2: Secondary Teaching Mathematics 111......4 Mathematics 115A.....4 Mathematics 141......4

Additional upper division mathematics units selected in consultation with and subject to approval of an adviser Note: Students who wish to satisfy the single subject matter waiver for the teaching credential should see an adviser as early as possible. Total Units for the Major77-84 **Applied Mathematics B.S. Major Requirements:** UNITS Preparatory Subject Matter......42-48 Mathematics 12 (or high school equivalent) Mathematics 21A, 21B, 21C, 21D, Computer Science Engineering 30, 40 8 One two-quarter sequence from Physics 9A-9B; Biological Sciences 1A-1B; Chemistry 2A-2B; Economics 1A-1B; Statistics 32, 102; or other applied preparatory courses approved by your adviser.....7-10 Depth Subject Matter48-52 A. Entry Level (Optional).....0-4 (Suggested choices: one course from Mathematics 108, 114, 115A, 141, 145)
 Mathematics 135A
 4

 Mathematics 125AB
 8
 Mathematics 128AB..... 8 Mathematics 185A 4 2. Choice of one course from Mathematics 111, 114, 115A, 116, 135B, 141, 145, 146, 147, 148, 150B, 165, 185B...... 4 3. One approved upper division course outside the Department of Mathematics with extensive use of mathematics 4 Total Units for the Major90-100 **Mathematics B.S. Major Requirements:** UNITS Preparatory Subject Matter.....34-38 Mathematics 12 (or high school Computer Science Engineering 30 or from Physics 7A, Statistics 13, 32, 100 or Depth Subject Matter 48-52 Choose one plan from the following two: Plan 1: General Mathematics A. Entry Level (Optional).....0-4 (Suggested choices: one course from Mathematics 108, 114, 115A, 141, 145) Mathematics 135A 4 Mathematics 125AB..... 8 Mathematics 185A 4 1. Choice of four courses from Mathematics 111, 114, 115AB, 116, 135B, 141, 145, 146, 147, 148, 165, 185B...... 16 2. Choice of one course from Mathematics 119A, 124, 128A, 128B, 129, 133, 167, 168 or one approved upper division course outside the Department of Mathematics with

Plan 2: Mathematics for Secondary
A. Entry Level (Optional)
Total Units for the Major82-90
Mathematical and Scientific
Mathematical and Scientific
Mathematical and Scientific Computation B.S. Major Requirements:
Mathematical and Scientific Computation B.S. Major Requirements: UNITS Preparatory Subject Matter35-38
Mathematical and Scientific Computation B.S. Major Requirements: UNITS Preparatory Subject Matter
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Mathematical and Scientific Computation B.S. Major Requirements: UNITS Preparatory Subject Matter

two	8
Computational and Biology Emphasis	Mathematical

118ABC, 119AB, 129, 133, 167,

2. Choice of one course from Mathematics

111, 114, 115A, 116, 135B, 141, 145, 146, 147, 148, 150B, 165......4

D. Choose one Emphasis from the following

185A

Mathematics 124...... 4 One approved upper division course in Biology 4

Computational and Mathematics Emphasis

Mathematics 168......4 One approved upper division course involving extensive computation or theory of computation......4

Total Units for the Major 83-90

Recommended Language Preparation. Bachelor of Science degree candidates are advised, but not required, to satisfy the same language requirement as that for a Bachelor of Arts degree candidate, and to fulfill it in French, German, or Russian.

Major Advisers. For a current list of faculty advisers, contact the Student Services office at studentservices@math.ucdavis.edu, or our see web-

Depth Subject Matter Requirements. Certain mathematically oriented courses given by other departments are admissible in partial satisfaction of the depth subject matter requirements with prior departmental approval. Up to three units of Math 194 may be counted toward the depth subject matter requirements. Additionally, up to three units of

Math 189, Math 198, and Math 199, can be

Statement of Objectives. As early as possible, but no later than the last quarter of the sophomore year or no later than the beginning of the first quarter of the junior year for transfer students, each prospective mathematics major, in consultation with a faculty adviser, should file a formal program of study in one of the majors offered in mathematics. Forms to be used for this are available on our website or from the Department office. Failure to file a formal program could lead to a delay in graduation.

Information for Undergraduates. Assistance in planning an undergraduate major program in mathematics is available on our website, as well as by consulting a faculty adviser. Information about the Department's faculty advisers can be found on our

Mathematics Placement Requirement. Students who wish to enroll in Mathematics 12, 16A, 17A, 21A, 21AH, and 36 must satisfy the mathematics placement requirement by taking an online exam. Students who do not satisfy the requirement will be administratively dropped from these courses. For more information, including preparation tips and how to access the online exam, please see the Department of Mathematics' website (http:// www.math.ucdavis.edu/undergrad/ math_placement) well in advance of enrolling.

Honors and Honors Program. Students who have completed at least 135 units with a minimum GPA of 3.500 in courses counted towards their major are automatically admitted to the Honors Program. Students who are eligible will be notified of their standing by the department at the beginning of the Fall quarter of their senior year.

Students in the Honors Program who meet the minimum GPA requirement and who complete a senior project in consultation with their faculty adviser may also be recommended by the department for graduation with High Honors or Highest Honors. Recommendations will be based on evaluations of students' academic achievements in their major and the quality of their senior project. For complete details, see our website at http://www.math.ucdavis.edu.

Minor Program Requirements:

UNITS

Mathematics 20

Upper division units in mathematics (exclusive of Mathematics 192, 197TC, 198,

Teaching Credential Subject Representative. Ali Dad-del

Graduate Study. The Department offers programs of study and research leading to the M.A. and Ph.D. degrees in Mathematics. Information regarding graduate study may be obtained by consulting our website, and by sending an e-mail to studentservices@math.ucdavis.edu.

Courses in Mathematics (MAT)

Lower Division Courses

B. Elementary Algebra (no credit)

Lecture - 3 hours. Basic concepts of algebra, including polynomials, factoring, equations, graphs, and inequalities. Offered only if sufficient number of students enroll. Not open to Concurrent student enrollment. (P/NP grading only.) (There is a fee of \$45.)—I. (I.)

C. Trigonometry (no credit)

Lecture - 2 hours. Basic concepts of trigonometry, including trigonometric functions, identities, inverse functions, and applications. Offered only if sufficient number of students enroll. Not open to Concurrent student enrollment. (P/NP grading only.) (There is a fee of \$30.)—I. (I.)

D. Intermediate Algebra (no credit)

Lecture - 3 hours. Basic concepts of algebra, prepares student for college work in mathematics, such as course 16A or 21A. Functions, equations,

graphs, logarithms, and systems of equations. Offered only if sufficient number of students enroll Not open to Concurrent student enrollment. (P/NP grading only.) (There is a fee of \$15.)—I, II. (I, II.)

12. Precalculus (3)

Lecture - 3 hours. Prerequisite: two years of high school algebra, plane geometry, plane trigonome try; and obtaining required score on the Precalculus Diagnostic Examination. Topics selected for their use in calculus, including functions and their graphs, slope, zeroes of polynomials, exponential, logarithmic and trigonometric functions, sketching surfaces and solids. Not open for credit to students who have completed any of courses 16A, 16B, 16C, 17A, 17B, 17C, 21A, 21B, or 21C with a C- or better. GE credit: QL, SE, SL.-I, II, III. (I, II, III.)

Note: Mathematics 16A, 16B, and 16C are intended for students who will take no more Mathematics courses. Mathematics 17A, 17B, and 17C have the same level of rigor as 16A, 16B, and 16C, yet are much more broad mathematically (containing algebra, differential equations and probability, besides traditional calculus), and are intended for biology students who do not wish to take more rigorous Mathematics courses.

16A. Short Calculus (3)

Lecture — 3 hours. Prerequisite: two years of high school algebra, plane geometry, plane trigonometry, and satisfying the Mathematics Placement Requirement. Limits; differentiation of algebraic functions; analytic geometry; applications, in particular to maxima and minima problems. Not open for credit to students who have completed course 17B, 17C, 21A, 21B, or 21C. Only 2 units of credit to students who have completed course 17A. GE credit: SciEng | QL, SE, SL.—I, II, III. (I, II, III.)

16B. Short Calculus (3)

Lecture-3 hours. Prerequisite: course 16A, 17A, or 21A. Integration; calculus for trigonometric, exponential, and logarithmic functions; applications. Not open for credit to students who have completed courses 17C, 21B, or 21C. Only 2 units of credit to students who have completed course 17B. GE credit: SciEng | QL, SE, SL.-1, II, III. (I, II, III.)

16C. Short Calculus (3)

Lecture — 3 hours. Prerequisite: course 16B, 17B, or 21B. Differential equations; partial derivatives; double integrals; applications; series. Not open for credit to students who have completed course 21C. Only 2 units of credit to students who have completed course 17C. GE credit: SciEng | QL, SE, SL.—I, II, III. (I, II, III.)

Note: Mathematics 16A, 16B, and 16C are intended for students who will take no more Mathematics courses. Mathematics 17A, 17B, and 17C have the same level of rigor as 16A, 16B, and 16C, yet are much more broad mathematically (containing algebra, differential equations and probability, besides traditional calculus), and are intended for biology students who do not wish to take more rigorous Mathematics courses.

17A. Calculus for Biology and Medicine (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: two years of high school algebra, plane geometry, plane trigonometry, and analytical geometry, and satisfying the Mathematics Placement Requirement. Introduction to differential calculus via applications in biology and medicine. Limits, derivatives of polynomials, trigonometric, and exponential functions, graphing, applications of the derivative to biology and medicine. Not open for credit to students who have completed course 16B, 16C, 21A, 21B, or 21C. Only 2 units of credit to students who have completed course 16A. GE credit: SciEng | QL, SE. -I, II, III. (I, II, III.)

17B. Calculus for Biology and Medicine (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 16A, 17A, or 21A. Introduction to integral calculus and elementary differential equations via applications to biology and medicine. Fundamental theorem of calculus, techniques of integration including integral tables and numerical methods, improper integrals, elementary first order differential equa-

tions, applications in biology and medicine. Not open for credit to students who have completed course 16C, 21B, or 21C. Only 2 units of credit for students who have completed course 16B. GE credit: SciEng | QL, SE, SL.-II. (II.)

17C. Calculus for Biology and Medicine (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 16B, 17B, or 21B. Matrix algebra, functions of several variables, partial derivatives, systems of differential equations, and applications to biology and medicine. Not open for credit to students who have completed course 21C. Only 2 units of credit to students who have completed course 16C. GE credit: SciEng | QL, SE.—I, II, III. (I, II, III.)

21A. Calculus (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: two years of high school algebra, plane geometry, plane trigonometry, and analytic geometry, and satisfying the Mathematics Placement Requirement. Functions, limits, continuity. Slope and derivative Differentiation of algebraic and transcendental functions. Applications to motion, natural growth, graphing, extrema of a function. Differentials. L'Hopital's rule. Not open for credit to students who have completed course 16B, 16C, 17B, or 17C. Only 2 units of credit to students who have completed course 16A or 17A. GE credit: SciEng | QL, SE, SL.-I, II, III. (I, II, III.)

21AH. Honors Calculus (4)

Lecture/discussion-4 hours. Prerequisite: a Precalculus Diagnostic Examination score significantly higher than the minimum for course 21A is required. More intensive treatment of material covered in course 21A. Offered irregularly. GE credit: SciEng | QL, SE.

21AL. Emerging Scholars Program Calculus Workshop (2)

Workshop-6 hours. Prerequisite: concurrent enrollment in course 21A. Functions, limits, continuity. Slope and derivative. Same course content as course 21A. Enrollment for students in the Emerging Scholars Program by instructor's invitation only. Offered irregularly. (P/NP grading only.) GE credit: SE.

21B. Calculus (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 21A or 21AH. Continuation of course 21A. Definition of definite integral, fundamental theorem of calculus, techniques of integration. Application to area, volume, arc length, average of a function, improper integral, surface of revolution. Only 2 units of credit to students who have completed course 16B, 16C, 17B, or 17C. GE credit: SciEng | QL, SE, SL. — I, II, III. (I, II, III.)

21BH. Honors Calculus (4)

Lecture/discussion-4 hours. Prerequisite: a grade of B or better in course 21A or 21AH. More intensive treatment of material covered in course 21B. Students completing 21BH can continue with course 21CH or the regular 21C. Offered irregularly. GE credit: SciEng | SE.

21BL. Emerging Scholars Program Calculus Workshop (2)

Workshop-6 hours. Prerequisite: course 21A or 21AH; concurrent enrollment in 21B. Continuation of course 21A. Same course content as 21B. Enrollment for students in the Emerging Scholars Program by instructor's invitation only. Offered irregularly. (P/ NP grading only.) GE credit: SE.

21C. Calculus (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 16C, 17C, 21B, or 21BH. Continuation of course 21B. Sequences, series, tests for convergence, Taylor expansions. Vector algebra, vector calculus, scalar and vector fields. Partial derivatives, total differentials. Applications to maximum and minimum problems in two or more variables. Applications to physical systems. GE credit: SciEng | QL, SE.—I, II, III. (I, II, III.)

21CH. Honors Calculus (4)

Lecture/discussion-4 hours. Prerequisite: a grade of B or better in course 21B or 21BH. More intensive treatment of material covered in course 21C. Offered infrequently. GE credit: SciEng | SE.

21CL. Emerging Scholars Program Calculus Workshop (2)

Workshop-6 hours. Prerequisite: course 21B or 21BH; concurrent enrollment in 21C. Continuation of course 21B. Same course content as course 21C. Enrollment for students in the Emerging Scholars Program by instructor's invitation only. (P/NP grading only.) Offered irregularly. GE credit: SE.

21D. Vector Analysis (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 21C or 21CH. Continuation of course 21C Definite integrals over plane and solid regions in various coordinate systems. Line and surface integrals. Green's theorem, Stoke's theorem, divergence theorem. GE credit: QL, SE. - I, II, III. (I, II, III.)

21M. Accelerated Calculus (5)

Lecture/discussion-4 hours; discussion/laboratory—1 hour. Prerequisite: grade of B or higher in both semesters of high school calculus or a score of 4 or higher on the Advanced Placement Calculus AB exam, and obtaining the required score on the Precalculus Diagnostic Examination and its trigonometric component. Accelerated treatment of material from courses 21A and 21B, with detailed presentation of theory, definitions, and proofs, and treatment of computational aspects of calculus at a condensed but sophisticated level. Not open for credit to students who have completed course 21A or 21B; only 3 units of credit will be allowed to students who have completed course 16A and only 2 units of credit will be allowed to students who have completed course 16B. Offered irregularly. GE credit: SciEng | SE.

22A. Linear Algebra (3)

Lecture - 3 hours. Prerequisite: nine units of college mathematics and Engineering 6 or knowledge of Matlab or course 22AL (to be taken concurrently). Matrices and linear transformations, determinants, eigenvalues, eigenvectors, diagonalization, factorization. Not open for credit to students who have completed course 67. GE credit: QL, SE.-I, II, III. (I,

22AL. Linear Algebra Computer Laboratory (1)

Laboratory-2-3 hours. Prerequisite: nine units of college mathematics. Introduction to Matlab and its use in linear algebra. (P/NP grading only.) GE credit: QL, SE.—I, II, III. (I, II, III.)

22B. Differential Equations (3)

Lecture - 3 hours. Prerequisite: courses 21C; 22A or 67. Solutions of elementary differential equations. GE credit: QL, SE.-I, II, IIÍ. (I, II, III.)

25. Advanced Calculus (4)

Lecture/discussion-4 hours. Prerequisite: course 21B. Introduction to the rigorous treatment of abstract mathematical analysis. Proofs in mathematics, induction, sets, cardinality; real number system, theory of convergence of sequences. Not open for credit to students who have completed former course 127A. GE credit: SE.-I, III. (I, III.)

36. Fundamentals of Mathematics (3)

Lecture - 3 hours Prerequisite: satisfaction of the Mathematics Placement Requirement. Introduction to fundamental mathematical ideas selected from the principal areas of modern mathematics. Properties of the primes, the fundamental theorems of arithmetic, properties of the rationals and irrationals, binary and other number systems. Not open for credit to students who have completed course 108. GE credit: SciEng.-IV.

67. Modern Linear Algebra (4)

Lecture/discussion-4 hours. Prerequisite: course 21A or consent of instructor. Rigorous treatment of linear algebra; topics include vector spaces, bases and dimensions, orthogonal projections, eigenvalues and eigenvectors, similarity transformations, singular value decomposition and positive definiteness. Only one unit of credit to students who have completed course 22A. GE credit: SciEng | SE.-I, II. (I,

71A-71B. Explorations in Elementary Mathematics (3-3)

Lecture - 2 hours; laboratory - 3 hours. Prerequisite: two years of high school mathematics. Weekly explorations of mathematical ideas related to the elementary school curriculum will be carried out by cooperative learning groups. Lectures will provide background and synthesize the results of group exploration. (Deferred grading only, pending completion of sequence.) Offered irregularly.

89. Elementary Problem Solving (1)

Lecture - 1 hour. Prerequisite: high school mathematics through precalculus. Solve and present solutions to challenging and interesting problems in elementary mathematics. May be repeated one time for credit. (P/NP grading only.) Offered irregularly.

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) - I, II, III. (I, II, III.)

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading only.) - I, II, III. (I, II, III.)

Upper Division Courses 108. Introduction to Abstract Mathematics

Lecture/discussion-4 hours. Prerequisite: course 21B. A rigorous treatment of mathematical concepts with emphasis on developing the ability to understand abstract mathematical ideas, to read and write mathematical concepts, and to prove theorems. Designed to serve as preparation for the more rigorous upper division courses. GE credit: Wrt | SE.-I,

111. History of Mathematics (4)

Lecture - 3 hours; term paper or discussion. Prerequisite: eight units of upper division Mathematics; one of the following: course 25, 67, 108, 114, 115A, 141, or 145. History of mathematics from ancient times through the development of calculus. Mathematics from Arab, Hindu, Chinese and other cultures. Selected topics from the history of modern mathematics. GE credit: SE.—II. (II.)

114. Convex Geometry (4)

Lecture/discussion-4 hours. Prerequisite: courses 21C; 22A or 67. Topics selected from the theory of convex bodies, convex functions, geometric inequalities, combinatorial geometry, and integral geometry. Designed to serve as preparation for the more rigorous upper-division courses. Offered in alternate years. GE credit: SE. - (II.)

115A. Number Theory (4)

Lecture/discussion-4 hours. Prerequisite: course 21B. Divisibility and related topics, diophantine equations, selected topics from the theory of prime numbers. Designed to serve as preparation for the more rigorous upper division courses. GE credit: QL, SE. — I. (I.)

115B. Number Theory (4)

Lecture—3 hours; extensive problem solving. Prerequisite: courses 67, 115A. Euler function, Moebius function, congruences, primitive roots, quadratic reciprocity law. Offered in alternate years. GE credit: QL, SE.—II.

116. Differential Geometry (4)

Lecture — 3 hours; extensive problem solving. Prerequisite: course 125A. Vector analysis, curves, and surfaces in three dimensions. Offered in alternate years. GE credit: SE. - (III.)

118A. Partial Differential Equations: **Elementary Methods (4)**

Lecture—3 hours; extensive problem solving. Prerequisite: courses 21D; 22B; 22A or 67.Derivation of partial differential equations; separation of variables; equilibrium solutions and Laplace's equation; Fourier series; method of characteristics for the one dimensional wave equation. Solution of nonhomogeneous equations. GE credit: QL, SE.-I. (I.)

118B. Partial Differential Equations: Eigenfunction Expansions (4)

Lecture - 3 hours; extensive problem solving. Prerequisite: course 118A. Sturm-Liouville Theory; selfadjoint operators; mixed boundary conditions; partial differential equations in two and three dimensions; Eigenvalue problems in circular domains; nonhomogeneous problems and the method of eigenfunction expansions; Poisson's Equations. GE credit: QL, SE.—II. (II.)

118C. Partial Differential Equations: Green's Functions and Transforms (4)

Lecture - 3 hours; extensive problem solving. Prerequisite: course 118B. Green's functions for one-dimensional problems and Poisson's equation; Fourier transforms; Green's Functions for time dependent problems; Laplace transform and solution of partial differential equations. Offered irregularly. GE credit: QL, SE.

119A. Ordinary Differential Equations (4)

Lecture - 3 hours; extensive problem solving. Prereguisite: courses 21D; 22B; 22A or 67. Scalar and planar autonomous systems; nonlinear systems and linearization; existence and uniqueness of solutions; matrix solution of linear systems; phase plane analysis; stability analysis; bifurcation theory; Liapunov's method; limit cycles; Poincare Bendixon theory. GE credit: QL, SE.—II. (II.)

119B. Ordinary Differential Equations (4)

Lecture-3 hours; extensive problem solving. Prerequisite: course 119A. Lorentz equations; Poincare maps; center manifolds and normal forms; scalar and planar maps; phase space analysis for iterated maps; period-doubling bifurcation; Lyapunov exponent; chaos and symbolic dynamics; strange attractors; fractals. GE credit: QL, SE.-III. (III.)

124. Mathematical Biology (4)

Lecture — 3 hours; project. Prerequisite: courses 22A or 67; 22B. Methods of mathematical modeling of biological systems including difference equations, ordinary differential equations, stochastic and dynamic programming models. Computer simulation methods applied to biological systems. Applications to population growth, cell biology, physiology, evolutionary ecology and protein clustering. MATLAB programming required. Offered in alternate years. GE credit: QL, SE.—(III.)

125A. Real Analysis (4)

Lecture/discusssion—4 hours. Prerequisite: course 25. Functions, limits of functions, continuity and uniform continuity, sequences of functions, series of real numbers, series of functions, power series. Not open for credit to students who have completed former course 127B. GE credit: SE.-I, II. (İ, II.)

125B. Real Analysis (4)

Lecture/discusssion-4 hours. Prerequisite: course 67 and 125A. Theory of the derivative, Taylor series, integration, partial derivatives, Implicit Function Theorem. Not open for credit to students who have completed former course 127C. GE credit: SE.—II, III. (II, III.)

128A. Numerical Analysis (4)

Lecture - 3 hours; project. Prerequisite: Computer Science: Engineering 30 or equivalent; course 21C; Error analysis, approximation, interpolation, numerical differentiation and integration. Programming in language such as Pascal, Fortran, or BASIC required. GE credit: QL, SE. – I. (I.)

128B. Numerical Analysis in Solution of Equations (4)

Lecture — 3 hours; project. Prerequisite: Computer Science: Engineering 30 or equivalent; courses 21C; 22A or 67. Solution of nonlinear equations and nonlinear systems. Minimization of functions of several variables. Simultaneous linear equations. Eigenvalue problems. Linear programming. Programming in language such as Pascal, Fortran, or BASIC required. GE credit: QL, SE.—II. (II.)

128C. Numerical Analysis in Differential Equations (4)

Lecture—3 hours; project. Prerequisite: Computer Science: Engineering 30 or equivalent; courses 22A or 67; 22B. Difference equations, operators, numerical solutions of ordinary and partial differential equations. Programming in language such as Pascal, Fortran, or BASIC required. GE credit: QL, SE.—III. (III.)

129. Fourier Analysis (4)

Lecture — 3 hours; extensive problem solving. Prerequisite: courses 21D; 22A or 67; 22B; 25 or consent of instructor. Fourier series and integrals, orthogonal sets of functions. Topics selected from trigonometric approximation, orthogonal polynomials, applications to signal and image processing, numerical analysis, and differential equations. GE credit: QL, SE. — III. (III.)

133. Mathematical Finance (4)

Lecture—3 hours; extensive problem solving. Prerequisite: courses 67; 135A. Analysis and evaluation of deterministic and random cash flow streams, yield and pricing of basic financial instruments, interest rate theory, meanvariance portfolio theory, capital asset pricing models, utility functions and general principles. MATLAB programming required. Offered in alternate years. GE credit: QL, SE, SL.—III.

135A. Probability (4)

Lecture/discussion-4 hours. Prerequisite: course 125A. Probability space; discrete probability, combinatorial analysis; independence, conditional probability; random variables, discrete and continuous distributions, probability mass function, joint and marginal density functions; expectation, moments, variance, Chebyshev inequality; sums of random variables, random walk, large number law, central limit theorem. Not open for credit to students who have completed former course 131. GE credit: QL, SE. — I, II. (I, II.)

135B. Stochastic Processes (4)

Laboratory/discussion-4 hours. Prerequisite: courses 135A; 22A or 67. Generating functions, branching processes, characteristic function; Markov chains; convergence of random variables, law of iterated logarithm; random processes, Brownian motion, stationary processes, renewal processes, queueing theory, martingales. Not open for credit to students who have completed former course 132A. GE credit: QL, SE.-III. (III.)

141. Euclidean Geometry (4)

Lecture/discussion-4 hours. Prerequisite: courses 21B; 22A or 67. An axiomatic and analytic examination of Euclidean geometry from an advanced point of view. In particular, a discussion of its relation to other geometries. Designed to serve as preparation for the more rigorous upper division courses. GE credit: SE, VL.—III. (III.)

145. Combinatorics (4)

Lecture/discussion-4 hours. Prerequisite: course 21B. Combinatorial methods using basic graph theory, counting methods, generating functions, and recurrence relations. Designed to serve as preparation for the more rigorous upper division courses. GE credit: QL, SE.-II. (II.)

146. Algebraic Combinatorics (4)

Lecture/discussion-4 hours. Prerequisite: courses 25; 22A or 67; 145. Enumeration, Polya theory, generating functions, current topics in algebraic combinatorics. Not open for credit to students who have completed former course 149A. GE credit: SE.-III. (III.)

147. Topology (4)

Lecture—3 hours; extensive problem solving. Prerequisite: courses 67, 125A. Basic notions of point-set and combinatorial topology. GE credit: SE.-III. (III.)

148. Discrete Mathematics (4)

Lecture/discussion—4 hours. Prerequisite: course 67; or courses 22A and 25. Coding theory, error correcting codes, finite fields and the algebraic concepts needed in their development. Not open for credit to students who have completed former course 149B. GE credit: QL, SE.-II. (II.)

150A. Modern Algebra (4)

Lecture/discussion-4 hours. Prerequisite: course 67. Basic concepts of groups, symmetries of the plane. Emphasis on the techniques used in the proof of the ideas (Lemmas, Theorems, etc.) developing these concepts. Precise thinking, proof writing, and the ability to deal with abstraction. GE credit: SE.-I.

150B. Modern Algebra (4)

Lecture/discussion-4 hours. Prerequisite: course 150A. Bilinear forms, rings, factorization, modules. GE credit: SE.-II. (II.)

150C. Modern Algebra (4)

Lecture/discussion-4 hours. Prerequisite: course 150B. Group representations, fields, Galois theory. GE credit: SE.—III. (III.)

160. Mathematical Foundations of **Database Theory, Design and Performance**

Lecture — 3 hours; project. Prerequisite: course 22A or 67; one of the following courses: 25, 108, 114, 115A, 141, or 145. Relational model; relational algebra, relational calculus, normal forms, functional and multivalued dependencies. Separability. Cost benefit analysis of physical database design and reorganization. Performance via analytical modeling, simulation, and queueing theory. Block accesses; buffering; operating system contention; CPU intensive operations. Offered irregularly. GE credit: QL, SE.

165. Mathematics and Computers (4)

Lecture — 3 hours; project. Prerequisite: Computer Science Engineering 30 or equivalent; course 22B and one of the following courses: 25, 67, 108, 114, 115A, 141 or 145. Introduction to computational mathematics, symbolic computation, and computer generated/verified proofs in algebra, analysis and geometry. Investigation of rigorous new mathematics developed in conjunction with modern computational questions and the role that computers play in mathematical conjecture and experimentation. GE credit: QL, SE.-I. (I.)

167. Applied Linear Algebra (4)

Lecture—3 hours; extensive problem solving. Prerequisite: course 22A or 67; knowledge of a programming language. Applications of linear algebra; LU and QR matrix factorizations, eigenvalue and singular value matrix decompositions. GE credit: QL, SE.—I, II, III. (I, II, III.)

168. Optimization (4)

Lecture - 3 hours; extensive problem solving. Prerequisite: Computer Science: Engineering 30 or equivalent; courses 21C or 25; 22A or 67. Linear programming, simplex method. Basic properties of unconstrained nonlinear problems, descent methods, conjugate direction method. Constrained minimization. Programming language required. GE credit: QL, SE.—III. (III.)

180. Special Topics (3)

Lecture - 3 hours. Prerequisite: courses 25 and 67, or consent of instructor. Special topics from various fields of modern, pure, and applied mathematics. Some recent topics include Knot Theory, General Relativity, and Fuzzy Sets. May be repeated for credit when topic differs. Not offered every year. GE credit: SE.—I, II, III. (I, II, III.)

185A. Complex Analysis (4)

Lecture—3 hours; extensive problem solving. Prerequisite: courses 67, 125A. Complex number system, analyticity and the Cauchy-Riemann equations, elementary functions, complex integration, power and Laurent series expansions, residue theory. GE credit: SE. - II. (II.)

185B. Complex Analysis (4)

Lecture-3 hours; extensive problem solving. Prerequisite: course 185A. Analytical functions, elementary functions and their mapping properties, applications of Cauchy's integral theorem, conformal mapping and applications to heat flow and fluid mechanics. Offered in alternate years. GE credit: SE.—III.

189. Advanced Problem Solving (3)

Lecture-3 hours. Prerequisite: courses 21D; 22A or 67; 25. Solution and presentation of advanced problem solving techniques. Solve and present interesting and challenging problems of all areas of mathematics. Not offered every year. GE credit: Wrt | OL, QL, SE, WE.-II.

192. Internship in Applied Mathematics (1-

Internship; final report. Prerequisite: upper division standing; project approval by faculty sponsor prior to enrollment. Supervised work experience in applied mathematics. May be repeated for credit for a total of 10 units. (P/NP grading only.)—I, II, III. (I,

194. Undergraduate Thesis (3)

Prerequisite: consent of instructor. Independent research under supervision of a faculty member. Student will submit written report in thesis form. May be repeated with consent of Vice Chairperson. (P/NP grading only.) GE credit: SE.—I, II, III. (I, II, III.)

197TC. Tutoring Mathematics in the Community (1-5)

Seminar - 1-2 hours; laboratory - 2-6 hours. Prerequisite: upper division standing and consent of instructor. Special projects in mathematical education developing techniques for mathematics instruction and tutoring on an individual or small group basis. May be repeated one time for credit. (P/NP grading onlý.) — I, Iİ, III. (I, II, III.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) - I, II, III. (I, II, III.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.) GE credit: SE.-I, II, III. (I, II,

Graduate Courses 200A-200B. Problem-Solving in Analysis (1-1)

Lecture — 1 hour; extensive problem solving. Prerequisite: courses 201 ABC. Problem-solving in graduate analysis: continuous functions, metric spaces, Banach and Hilbert spaces, bounded linear operators, the spectral theorem, distributions, Fourier series and transforms, Lp spaces, Sobolev spaces. May be repeated two times for credit. (Deferred grading only, pending completion of sequence.)—III,

201A-201B-201C. Analysis (4-4-4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: graduate standing in Mathematics or Applied Mathematics, or consent of instructor. Metric and normed spaces. Continuous functions. Topological, Hilbert, and Banach spaces. Fourier series. Spectrum of bounded and compact linear operators. Linear differential operators and Green's functions. Distributions. Fourier transform. Measure theory. Lp. and Sobolev spaces. Differential calculus and variational methods.—I-II-III. (I-II-III.)

202. Functional Analysis (4)

Lecture—3 hours; term paper. Prerequisite: courses 201A and 201B. Hahn-Banach, Open mapping, Closed graph, Banach-Steinhaus, and Krein-Milman. Subspaces and quotient spaces. Projections. Weak and weak-star topologies. Compact and adjoint operators in Banach spaces. Fredholm theory. Functions of operators. Spectral theory of self-adjoint operators. Offered in alternate years. - II.

205. Complex Analysis (4)

Lecture - 3 hours; term paper or discussion - 1 hour. Prerequisite: course 185 or the equivalent, or consent of instructor. Analytic continuation, Riemann surfaces, conformal mappings, Riemann mapping theorem, entire functions, special functions, elliptic functions. - III. (III.)

205A. Complex Analysis (4)

Lecture - 3 hours; term paper or discussion - 1 hour. Cauchy's theorem, Cauchy's integral formulas, meromorphic functions, complex logarithm, entire functions, Weierstrass infinite product formula, the gamma and zeta functions, and prime number theo-

205B. Complex Analysis (4)

Lecture – 3 hours; term paper or discussion – 1 hour. Prerequisite: course 205A or consent of instructor. Conformal mappings, the Schwarz lemma, analytic automorphisms, the Riemann mapping theorem, elliptic functions, Eisenstein series, the Jacobi theta functions, asymptotics, Bessel functions, the Airy function, topics on special functions and Riemann surfaces. May be repeated two times for credit if topic varies—III. (III.)

206. Measure Theory (4)

Lecture - 3 hours; extensive problem solving. Prerequisite: course 125B. Introduction to measure theory. The study of lengths, surface areas, and volumes in general spaces, as related to integration theory. Offered in alternate years.—III.

207A-207B-207C. Methods of Applied Mathematics (4-4-4)

Lecture - 3 hours; term paper or discussion - 1 hour. Prerequisite: graduate standing or consent of instructor. Ordinary differential equations and dynamical systems. Variational principles. Eigenfunctions, integral equations and Green's functions. Complex analysis and contour integration. Laplace's equation. Diffusion equations. Wave phenomena. Dimensional analysis and scaling. Asymptotic expansions and perturbation theory. Stochastic processes and Brownian motion. — I-II-III. (I-II-III.)

215A-215B-215C. Topology (4-4-4)

Lecture — 3 hours; term paper or discussion — 1 hour. Prerequisite: graduate standing or consent of instructor. Fundamental group and covering space theory. Homology and cohomology. Manifolds and duality. CW complexes. Fixed point theorems. Offered in alternate years. — (I-II-III.)

216. Geometric Topology (4)

Lecture—3 hours; extensive problem solving—1 hour. Prerequisite: course 215A. Introduction to measure theory. Topology of two- and three-dimensional manifolds. Surfaces and their diffeomorphisms. Dehn twists. Heegaard surfaces. Theory of 3-dimensional manifolds. Knots and knot theory. Hyperbolic manifolds and geometric structures. May be repeated one time for credit. Offered in alternate years. - (II.)

218A-218B-218C. Partial Differential Equations (4-4-4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: 218A—201ABC; 218B—218A; 218C-218B; or consent of the instructor. A yearlong sequence on PDEs which covers linear transport, Laplace, heat, and wave equations, maximum principles, method of characteristics, Sobelev and Hölder space theory, weak derivatives, semilinear, quasilinear, and fully nonlinear elliptic/parabolic equations, nonlinear hyperbolic equations, and compensated compactness. Offered in alternate years. — İ-II-III. (I-II-III.)

221A. Mathematical Fluid Dynamics (4)

Lecture — 3 hours; term paper or discussion — 1 hour. Prerequisite: course 118B or consent of instructor Kinematics and dynamics of fluids. The Euler and Navier-Stokes equations. Vorticity dynamics. Irrotational flow. Low Reynolds number flows and the Stokes equations. High Reynolds number flows and boundary layers. Compressible fluids. Shock waves. Offered in alternate years. — (I.)

221B. Mathematical Fluid Dynamics (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 118B or consent of instructor. Kinematics and dynamics of fluids. The Euler and Navier-Stokes equations. Vorticity dynamics. Irrotational flow. Low Reynolds number flows and the Stokes equations. High Reynolds number flows and boundary layers. Compressible fluids. Shock waves. Offered irregularly. — (II.)

226A. Numerical Methods: Fundamentals

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 128AB or equivalent, or consent of instructor; familiarity with some programming language. Fundamental principles and methods in numerical analysis, including the concepts of stability of algorithms and conditioning of numerical problems, numerical methods for interpolation and integration, eigenvalue problems, singular value decomposition and its applications. Öffered in alternate years. - (I.)

226B. Numerical Methods: Large-Scale Matrix Computations (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 167 or equivalent, or consent of instructor; familiarity with some programming language. Numerical methods for large-scale matrix computations, including direct and iterative methods for the solution of linear systems, the computation of eigenvalues and singular values, the solution of leastsquares problems, matrix compression, methods for the solution of linear programs. Offered in alternate years. — (II.)

226C. Numerical Methods: Ordinary **Differential Equations (4)**

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 22B or equivalent, or consent of instructor; familiarity with some programming language. Numerical methods for the solution of ordinary differential equations, including methods for initial-value problems and two-point boundary-value problems, theory of and methods for differential algebraic equations, dimension reduction of largescale dynamical systems. Offered in alternate years. — (III.)

227. Mathematical Biology (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: graduate standing or consent of instructor. Nonlinear ordinary and partial differential equations and stochastic processes of cell and molecular biology. Scaling, qualitative, and numerical analysis of mathematical models. Applications to nerve impulse, chemotaxis, muscle contraction, and morphogenesis. Offered in alternate years. - I

228A-228B-228C. Numerical Solution of **Differential Equations (4-4-4)**

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 128C. Numerical solutions of initial-value, eigenvalue and boundary-value problems for ordinary differential equations. Numerical solution of parabolic and hyperbolic partial differential equations. Offered in alternate years. - I-II-III.

235A-235B-235C. Probability Theory (4-4-4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: 235A-courses 125B and 135A or Statistics 131A or consent of instructor; 235Bcourse 235A/Statistics 235A or consent of instructor; 235C-course 235B/Statistics 235B or consent of instructor. Measure-theoretic foundations, abstract integration, independence, laws of large numbers, characteristic functions, central limit theorems. Weak convergence in metric spaces, Brownian motion, invariance principle. Conditional expectation. Topics selected from martingales, Markov chains, ergodic theory. (Same course as Statistics 235A-235B-235Ć.) — I-II-III. (I-II-III.)

236A. Stochastic Dynamics and Applications (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 201C or course/Statistics 235B; course/Statistics 235A-235B-235C recommended. Stochastic processes, Brownian motion, Stochastic integration, martingales, stochastic differential equations. Diffusions, connections with partial differential equations, mathematical finance. Offered in alternate years.—I.

236B. Stochastic Dynamics and Applications (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 201C or course/Statistics 235B; course/Statistics 235A-235B-235C recommended.

Stochastic processes, Brownian motion, Stochastic integration, martingales, stochastic differential equations. Diffusions, connections with partial differential equations, mathematical finance. Offered irregularly.

239. Differential Topology (4)

Lecture—3 hours; extensive problem solving. Prerequisite: vector calculus, point-set topology, course 201A, or consent of instructor; course 250AB highly recommended. Topics include: differentiable manifolds, vector fields, transversality, Sard's theorem, examples of differentiable manifolds; orientation, intersection theory, index of vector fields; differential forms, integration, Stokes' theorm, deRham cohomology; Morse functions, Morse lemma, index of critical points.—I. (I.)

240A. Differential Geometry (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 201A and 239; 250AB highly recommended; intended primarily for 2nd-year graduate students. Riemannian metrics, connections, geodesics, Gauss lemma, convex neighborhoods, curvature tensor, Ricci and scalar curvature, connections and curvature on vector bundles.—II. (II.)

240B. Differential Geometry (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 240A; intended primarily for 2nd-year graduate students. Jacobi fields, conjugate points, completeness, Hopf-Rinow theorem, Cartan-Hadamard theorem, energy, variation theorems and their applications, Rauch comparison theorem and its applications.—III. (III.)

245. Enumerative Combinatorics (4)

Lecture—3 hours; extensive problem solving. Prerequisite: course 145, 150 or the equivalent, or consent of instructor. Introduction to modern combinatorics and its applications. Emphasis on enumerative aspects of combinatorial theory. Offered in alternate years.—I.

246. Algebraic Combinatorics (4)

Lecture—3 hours; extensive problem solving. Prerequisite: course 245 or consent of instructor. Algebraic and geometric aspects of combinatorics. The use of structures such as groups, polytopes, rings, and simplicial complexes to solve combinatorial problems. Offered in alternate years—II.

248A. Algebraic Geometry (4)

Lecture—3 hours; extensive problem solving. Prerequisite: courses 250ABC. Affine varieties and radical ideals. Projective varieties. Abstract varieties. Morphisms and rational maps. Smoothness. Algebraic curves and the Riemann-Roch theorem. Special topics. Offered in alternate years.—(I.)

248B. Algebraic Geometry (4)

Lecture—3 hours; extensive problem solving. Prerequisite: course 248A. Complex varieties and the analytic topology. Sheaves and schemes. Fiber products. Separatedness and properness. Applications of scheme theory. Offered in alternate years.—(II.)

249A. Problem-Solving in Algebra (1)

Lecture—1 hour; extensive problem solving. Prerequisite: courses 250A & B. Problem-solving in graduate algebra: groups, rings, modules, matrices, tensor products, representations, Galois theory, ring extensions, commutative algebra and homological algebra. May be repeated two times for credit. (Deferred grading only, pending completion of sequence.)—I.

249B. Problem-Solving in Algebra (2)

Lecture—1 hour; extensive problem solving. Prerequisite: courses 250A & B. Problem-solving in graduate algebra: groups, rings, modules, matrices, tensor products, representations, Galois theory, ring extensions, commutative algebra and homological algebra. May be repeated two times for credit. (Deferred grading only, pending completion of sequence.)—III.

250A-250B-250C. Algebra (4-4-4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: graduate standing in mathematics or consent of instructor. Group and rings. Sylow theorems, abelian groups, Jordan-Holder theorem. Rings, unique factorization. Algebras, and modules. Fields and vector spaces over fields. Field extensions. Commutative rings. Representation theory and its applications.—I-II-III. (I-II-III.)

258A. Numerical Optimization (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: courses 25, 167. Numerical methods for infinite dimensional optimization problems. Newton and Quasi-Newton methods, linear and sequential quadratic programming, barrier methods; large-scale optimization; theory of approximations; infinite and semi-infinite programming; applications to optimal control, stochastic optimization and distributed systems. Offered in alternate years.—(I.)

258B. Variational Analysis (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: courses 25 and 167, or consent of the instructor. Foundations of optimization theory. The design of solution procedures for optimization problems. Modeling issues, and stability analysis. Offered in alternate years.—(II.)

261A. Lie Groups and Their Representations (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: courses 215A, 240A, 250A-250B or the equivalent or consent of instructor. Lie groups and Lie algebras. Classification of semi-simple Lie groups. Classical and compact Lie groups. Representations of Lie groups and Lie algebras. Root systems, weights, Weil character formula. Kac-Moody and Virasoro algebras. Applications. Offered in alternate years.—(II.)

261B. Lie Groups and Their Representations (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: courses 215A, 240A, 250A-250B or the equivalent or consent of instructor. Lie groups and Lie algebras. Classification of semi-simple Lie groups. Classical and compact Lie groups. Representations of Lie groups and Lie algebras. Root systems, weights, Weil character formula. Kac-Moody and Virasoro algebras. Applications. Offered irregularly.

265. Mathematical Quantum Mechanics (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 201 or consent of instructor. Mathematical foundations of quantum mechanics: the Hilbert space and Operator Algebra formulations; the Schrödinger and Heisenberg equations, symmetry in quantum mechanics, basics of spectral theory and perturbation theory. Applications to atoms and molecules. The Dirac equation. Offered in alternate years.—(I.)

266. Mathematical Statistical Mechanics and Quantum Field Theory (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 265 or consent of instructor. Mathematical principles of statistical mechanics and quantum field theory. Topics include classical and quantum lattice systems, variational principles, spontaneous symmetry breaking and phase transitions, second quantization and Fock space, and fundamentals of quantum field theory. May be repeated one time for credit. Offered in alternate years.—[II.]

271. Applied and Computational Harmonic Analysis (4)

Lecture—3 hours; extensive problem solving. Prerequisite: courses 125B or 201C; and 128B or 167; and 129 or equivalent, or consent of instructor. Introduction to mathematical basic building blocks (wavelets, local Fourier basis, and their relatives) useful for diverse fields (signal and image processing, numerical analysis, and statistics). Emphasis on the connection between the continuum and the discrete worlds. Offered in alternate years.—(II.)

280. Topics in Pure and Applied Mathematics (3)

Lecture—3 hours. Prerequisite: graduate standing. Special topics in various fields of pure and applied mathematics. Topics selected based on the mutual interests of students and faculty. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)

290. Seminar (1-6)

Seminar—1-6 hours. Advanced study in various fields of mathematics, including analysis, applied mathematics, discrete mathematics, geometry, mathematical biology, mathematical physics, optimization, partial differential equations, probability, and topology. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

298. Group Study (1-5) 299. Individual Study (1-12)

(S/U grading only.)—I, II, III. (I, II, III.)

299D. Dissertation Research (1-12)

(S/U grading only.)—I, II, III. (I, II, III.)

Professional Courses

301A-301B-301C. Mathematics Teaching Practicum (3-3-3)

Fieldwork—5 hours; discussion—1 hour. Prerequisite: course 302A-302B-302C and 303A-303B-303C concurrently or consent of instructor. Specialist training in mathematics teaching. Teaching, training, and cross observing classes taught using large group Socratic techniques, small group guided inquiry experiences, and/or other approaches to teaching at various grade levels. Required for advanced degrees in mathematics education. May be repeated one time for credit. Offered irregularly.

302A-302B-302C. Curriculum Development in Mathematics (1-1-1)

Lecture/discussion—1 hour. Prerequisite: course 303A-303B-303C concurrently or consent of instructor. Mathematics curriculum development for all grade levels. Required for advanced degrees in mathematics education. May be repeated one time for credit. Offered irregularly.

303A-303B-303C. Mathematics Pedagogy (1-1-1)

Lecture/discussion—1 hour. Prerequisite: course 302A-302B-302C or 210L concurrently or consent of instructor. An investigation of the interplay of mathematical pedagogy and mathematical content, including a historical survey of past and present methods in view of some of the influences that shaped their development. May be repeated one time for credit. Offered irregularly.

390. Teaching Assistantship Training (3)

Lecture—3 hours. Prerequisite: graduate standing in the Department of Mathematics. Experience in methods of assisting and teaching of mathematics at the university level. Includes discussion of lecturing techniques, running discussion sessions, holding office hours, preparing and grading of examinations, student-teacher interaction, and related topics.

Required of departmental teaching assistants. (S/U grading only.)—I. (I.)

399. Individual Study (2-4)

Independent study—2-3 hours; discussion—1 hour. Individual study of some aspect of mathematics education or a focused work on a curriculum design project under supervision of a faculty member in mathematics. May be repeated one time for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Medical Informatics (A Graduate Group)

See Health Informatics (A Graduate Group), on page 331.

Medical Microbiology

See Medicine, School of, on page 390.

Medical Pharmacology and Toxicology

See Medicine, School of, on page 390.

Medicine

See Medicine, School of, on page 390; and Medicine and Epidemiology (VME), on page 523.

Medicine, School of

Claire Pomeroy, M.D., M.B.A., Vice Chancellor for Human Health Sciences and

Fred Meyers, M.D., Executive Assoc. Dean

Thomas Nesbitt, M.D., M.P.H., Executive Assoc. Dean

Tim Albertson, M.D., Ph.D.,

Assoc. Dean for Academic Clinical Programs

Lars Berglund, M.D., Ph.D., Assoc. Dean for Clinical Research

Edward Callahan, Ph.D.,

Assoc. Dean for Academic Personnel

Ralph de Vere White, M.D., Assoc. Dean for Cancer Center

Faith Fitzgerald, M.D.,

Assoc. Dean for Ethics and Humanities

James Goodnight, Jr., M.D.

Assoc. Dean for Clinical Affairs and Director of Prac-

tice Management Group

Mark Henderson, M.D.,

Assoc. Dean for Admissions and Outreach

James Nuovo, M.D.,

Assoc. Dean for Medical Education and Student

Affairs

Mark Servis, M.D.,

Assoc. Dean for Curriculum and Competency Devel-

opment

School of Medicine Dean's Office Education Building 4610 X Street Sacramento, CA 95817

http://www.ucdmc.ucdavis.edu/medschool/

Faculty

To search for current faculty, see http://www.ucdmc.ucdavis.edu/search/faculty/searchdetail.asp?searchtype=3

Admission Requirements and Professional Curriculum

Detailed information can be obtained from the School of Medicine; see School of Medicine, on page 127.

Courses in the School of Medicine Curriculum for the School of Medicine

The curriculum for the M.D. degree at the UC Davis School of Medicine is a four-year program providing comprehensive preparation for graduate medical training (internships and residencies) and the practice of medicine. It offers a blend of basic science training and clinical experience with opportunities for research.

The first year curriculum begins in August and extends into May and is organized into two blocks. The basic science portion of the first block includes courses in Molecular Biology, Cell and Tissue Biology, Genetics, Gross Anatomy/Embryology/Radiology, and Human Physiology. The major organizing theme is structure-function along the continuum of hierarchical biologic structure from molecule to cell, tissue and major organ systems. The three year Doctoring curriculum begins with Doctoring 1, which is presented concurrently with the other courses. The focus of Doctoring 1 is physical examination training using standardized patients and models, correlated with concurrent gross anatomy and physiology by organ system. Behavioral medicine, epidemiology, biostatistics, cross-cultural medicine, and ethics are woven into the cases and didactic presentations and team-based learning modules. Students are required to attend preceptorships in the community and par-ticipate in home visits. Periodic quizzes and review sessions are used in the basic science courses throughout the block for formative assessment, and all courses administer comprehensive summative final examinations in December.

The second block of the first year curriculum begins in January and extends through April, with fina exams in early May. There are two major threads, each of which is composed of several integrated courses. The Doctoring 1 course is offered concurrently. The Immunology/Microbiology/Pharmacology/Pathology thread presents an introduction to host defense, infection, basic pharmacologic principles, and general pathologic processes. The Metabolism/Endocrinology/Nutrition/Reproduction (MERN) thread covers essential concepts in metabolism, basic and clinical nutrition, reproductive medicine, and clinical endocrinology. The general pathology course also includes male-female GU and endocrine pathology, and the pharmacology course covers antibiotics and endocrine pharmacology, with the goal of integration with concurrent courses. Periodic quizzes and review sessions provide formative feedback, and final examinations are used for summative assessment. The Doctoring 1 course continues with an emphasis on interviewing skills and clinical assessment. Cases are used in the problembased learning approach for basic-science-clinical correlation, and for the exploration of psychosocial issues. Preceptorships and home visits continue. The Doctoring 1 course concludes with a comprehensive final examination, and also includes an observed complete history and physical examination.

The first year curriculum ends with a six week unscheduled block that may be used for vacation, remediation, electives, research, and international experiences.

The second year curriculum is composed of three blocks (Blocks 3-5). Block 3 begins in late June and extends through August with a neurosciences block composed of integrated neuroanatomy-clinical neurosciences. The latter emphasizes the pathophysiology of common neurological disorders. The systemic pathology curriculum continues with a focus on neuropathology, and the pharmacology course covers neuropharmacology. A clinical psychiatry course is also presented during this period. The Doctoring 2 course begins, focusing on advanced clinical skills and clinical reasoning using a combination of standardized patient assessments, problem-based learning, subspecially physical examination sessions, preceptorships, and didactics in clinical epidemiology, medical economics, and socio-behavioral medicine. The remainder of the second year is devoted to

two major blocks composed of pathophysiology courses with tight integration of the systemic pathology and pharmacology courses. The courses are organized according to organ system (cardiovascular, pulmonary, renal, musculoskeletal system, hematology, gastroenterology, oncology, and dermatology). The Doctoring 2 curriculum continues concurrently with its focus on advanced clinical skills, epidemiology, ethics, and problem based assessment. History taking and physical diagnosis skills are correlated with the ongoing pathophysiology courses. Like the first year, all of the second year courses utilize periodic quizzes and review sessions and a comprehensive final examination. The Doctoring 2 course includes an objective structured clinical examination (OSCE) using standardized patients at the end of the course series.

The second year curriculum ends in February and is followed by a six week, unscheduled block for preparation for USMLE Step 1, remediation, electives, and vacation.

The third-year program begins in April and includes six required clerkship rotations in the clinical specialties: eight weeks each of surgery, medicine, obstetrics/gynecology, pediatrics, primary care (jointly administered by Family and Community Medicine and Internal Medicine) and psychiatry. Students may elect to defer one of the required clerkships to the fourth year. The third year Doctoring program consists of longitudinal small groups led by faculty members who remain with their group throughout the year as the students rotate through their clerkships. Doctoring 3 themes include advanced interviewing techniques, clinical reasoning, clinical epidemiology, evidence-based medicine, and ethics/jurisprudence. Students must take a comprehensive clinical skills examination at the end of the third year which features self-assessment and faculty feedback.

The fourth year curriculum features built-in flexibility to allow students to individualize their medical careers. The early start to the fourth year in May allows students to pursue electives for early exposure to clinical specialties or to complete clerkships which may have been deferred. All students are required to select a minimum of 32 weeks of clinical electives in addition to a single 4-week special study module or scholarly project. The Special Study modules are designed to integrate basic sciences with clinical sciences, provide opportunities for students to practice and refine fundamental skills in critical appraisal and analysis of emerging scientific developments, and to allow students to focus in-depth on a multidisciplinary topic of special interest to the student. The Scholarly Project requires independent inquiry with faculty mentorship and leads to a publishable manuscript and student presentation of the project at a research forum held in the winter.

Individual student programs are designed under the guidance of college directors, mentors and faculty advisors, with the support of the Career Advising Office. Each student's fourth year program must be approved by the Fourth Year Oversight Committee to ensure appropriate breadth, depth, and vigor. There are strict guidelines for the choices and time allowed away from the home institution. To satisfy the M.D. degree program, the student must successfully complete the required course work, clerkships, and fourth year requirements. Students must pass USMLE Step 1, USMLE Step 2 CS and CK, and complete the fourth year clinical performance examination. In addition to the fourth-year elective program available, there is the opportunity for students to select from a variety of electives during the first two years. Examples include electives in history of ethics and medicine, medical Spanish and insights in clinical research. Most students also participate in one of several student-run, community clinics for elective credit during their first and second years

Coordination with other Advanced Degree Programs

The curriculum for the M.D. degree provides flexibility and encourages coordination with other advanced degree programs (Ph.D., M.S., M.A.,

M.B.A., and M.P.H.). These programs offer a wide breadth of study areas and draw upon the considerable expertise of the entire campus faculty. The Department of Public Health Sciencesoffers an M.P.H. program in conjunction with the M.D. program. This program is designed for students interested in disease prevention and community health, health professionals and State Health Department employees.

School of Medicine administrators enthusiastically support students interested in pursuing advanced degree programs. The dual-degree program for the M.D./Ph.D. is targeted to train physicians to meet, respond to and solve the broad diversity of problems and dilemmas facing current and future health care. Students are encouraged to seek degrees in any of the campus wide Ph.D. programs, including those in social sciences and humanities. The UC Davis School of Medicine awards competitive fellowships each year to students enrolled in the M.D./Ph.D.

Required Curriculum for the M.D. Degree

The following listing is the typical sequencing of all courses required for earning the M.D. degree. Course descriptions are given under the individual departmental course offerings.

First-Year Required Courses

Year 1, Block 1

Molecular Medicine, BCM 410A Gross-Radiologic-Developmental Anatomy, CHA 400 Human Physiology, HPH 400 Human Microscopic Anatomy, CHA 402

Genetics, PED 420 Doctoring 1, MDS 411A Year 1, Block 2

Medical Immunology, MMI 480A Medical Microbiology, MMI 480B General and Endocrine Pathology, PMD

Pharmacology, PHA 400A Metabolism-Endocrine-Reproduction-Nutrition, "MERN," IMD 405 Doctoring 1, MDS 411B

Second-Year Required Courses

Year 2, Block 3

Neuroanatomy, CHA 403 Systemic Pathology, PMD 410B Pharmacology, PHA 400B Clinical Neurosciences, NEU 420 Fundamentals of Clinical Psychiatry, PSY 403

Doctoring 2, MDS 421A

Year 2, Block 4

Cardiovascular System, IMD 420D Pulmonary and Critical Care, IMD 420C Nephrology, IMD 420E Hematology, IMD 420A Systemic Pathology, PMD 410C Pharmacology, PHA 400C Doctoring 2, MDS 421B

Year 2, Block 5

Integumentary System, DER 420 Muscoloskeletal System, OSU 421 Systemic Pathology, PMD 410C Pharmacology, PHA 400C Doctoring 2, MDS 421B Oncology, HON 420 GI System, IMD 420B Doctoring 2, MDS 421C

Third- and Fourth-Year Required Courses Third-Year Clerkships

Internal Medicine	
Clerkship—IMD 430	8 weeks
Surgery	
Clerkship—SUR 430	8 weeks
Pediatrics	
Clerkship—PED 430	8 weeks
Primary Care Clerkship—	
FAP 430	8 weeks
Obstetrics and Gynecology	
Clerkship—OBG 430	8 weeks
Psychiatry	
Clerkship—PSY 430	8 weeks
Doctoring 3, MDS 430A-D	

Fourth-Year Requirements

36 Weeks of Required Course work comprised of the following specifics:

- 4 weeks of an Inpatient Acting Internship from one of the following departments: Internal Medicine, OB-GYN, Pediatrics, Surgery, Family & Community Medicine and Psychiatry
- · 4 weeks of Inpatient or Ambulatory Acting Internship in any department/discipline
- 4 weeks of Special Studies Module or Scholarly Project
- 4 weeks of Undifferentiated Patient Experience (see 4th Year Guide for requirement guidelines)
- 20 weeks of additional Acting Internships Advanced Clinical Clerkships or Clinical Didac-
- 16 weeks must be taken at UC Davis

Medical Sciences (MDS)

Lower Division Course

99. Special Study in Medicine for Undergraduates (1-5)

Independent study—3-15 hours. Prerequisite: consent of instructor. Participate in research projects relating to medicine with faculty in the School of Medicine. (S/U grading only.)-I, II, III, IV. (I, II, III, IV.) Kumari

Upper Division Course 192. Medical Education Internship for Advanced Undergraduates (1-12)

Internship - 3-36 hours. Prerequisite: competency with computers. Enrollment dependent on availability of intern positions. Participate in projects related to curriculum development in support of curriculum for M.D. degree. Gain work experience and appreciation for innovative approaches to learning in basic and clinical sciences of medical education. May be repeated for credit for up to 12 units. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.) Kumari

Professional Courses

401. Applications of Computers to Medical Practice (2)

Autotutorial — 2 hours. Prerequisite: enrollment in medical school. Proficiency in computer applications relative to practice of medicine, with emphasis on email, literature searching, file transfer, and hospital information services. Course given online, at home or in lab; time and place determined by student. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Huntley

411A. Doctoring 1 (4)

 $\begin{array}{ll} {\sf Discussion-1\ hour;\ clinical\ activity-1\ hour;\ lecture/discussion-1\ hour.\ Prerequisite:\ approval\ of} \end{array}$ committee on student progress. Medical students only. Small, case-based learning groups with training in patient communication and interviewing techniques, clinical identification and problem solving, applications of social, psychological, cultural, bioethical, and basic science concepts to patient case scenarios, outpatient clinical experiences and didactic presentations. (P/F grading only; deferred grading only, pending completion of sequence.)—II, III. (II, III.) Eidson-Ton, Henderson, Onate

411B. Doctoring 1 (5)

Discussion - 1.5 hours; clinical activity - 1.5 hours; lecture/discussion - 1.8 hours. Medical students only. Small, case-based learning groups with training in patient communication and interviewing techniques, clinical identification and problem solving, applications of social, psychological, cultural, bioethical, and basic science concepts to patient case scenarios, outpatient clinical experiences and didactic presentation. (P/F grading only; deferred grading only, pending completion of sequence.)—II, III. (II, III.) Eidson-Ton, Henderson, Onate

421A. Doctoring 2 (6)

Discussion-1 hour; lecture/discussion-1 hour; internship - 0.5 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress; medical students only. Application of multidisciplinary basic, social and clinical science to clinical cases in small groups. History, physical examination with preceptors. Didactics in epidemiology, ethics, sexuality and clinical reasoning. Evaluation of pro-fessional competencies, attitudes and skills needed in the practice of medicine. (Deferred grading only, pending completion of sequence. P/F grading only.)—IV. (IV.) Lee

421B. Doctoring 2 (6)

Discussion—1 hour; lecture/discussion—1 hour; internship—0.5 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress; medical students only. Application of multidisci-plinary basic, social & clinical science concepts to cases in small groups. History, physical examination with preceptors. Didactics in epidemiology, ethics, sexuality, and clinical reasoning. Evaluation of professional competencies, attitudes and skills needed in the practice of medicine. (Deferred grading only, pending completion of sequence. P/F grading only.) — I. (I.) Lee

421C. Doctoring 2 (6)

Discussion-1 hour; lecture/discussion-1 hour; internship - 0.5 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress; medical students only. Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (P/F grading only.)—II. (II.) Lee

430. Introduction to Doctoring 3 (1)

Discussion—2 hours. Prerequisite: approval by SOM Committee on Student Progress. Restricted to Medical students only. Introductory course for the Doctoring 3 Program. All students enrolling in Medical Sciences 430 A-D should complete this course prior to beginning their work in Doctoring 3. (H/P/F grading only.)—III. (III.) Wilkes

430A. Doctoring 3 (2)

Discussion-3 hours. Prerequisite: approval by SOM Committee on Student Progress. Restricted to Medical students only. Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (Deferred grading only, pending completion of sequence. H/P/F grading only.)—IV. (IV.) Wilkes

430B. Doctoring 3 (2)

Discussion - 2 hours. Prerequisite: approval by SOM Committee on Student Progress. Restricted to Medical students only. Application of multidisciplinary basic, social & clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (Deferred grading only, pending completion of sequence. H/P/F grading only.)—I. (I.) Wilkes

430C. Doctoring 3 (2)

Discussion - 2 hours. Prerequisite: approval by SOM Committee on Student Progress. Restricted to Medical students only. Application of multidisciplinary

basic, social & clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (Deferred grading only, pending completion of sequence. H/P/F grading only.)—II. (II.) Wilkes

430D. Doctoring 3 (2)

Discussion—2 hours. Prerequisite: approval by SOM Committee on Student Progress. Restricted to Medical students only. Application of multidisciplinary basic, social & clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (Deferred grading only, pending completion of sequence. H/P/F grading only.)—III. (III.) Wilkes

440A. Doctoring 4 Teaching Fellowship (1)

Discussion—0.5 hours; seminar—0.25 hours. Prerequisite: courses 430ABCD and approval by Instructor of Record. Restricted to Medical students only. Instruction on teaching methodology and pedagogy. Mentored teaching of junior medical students in seminar, lecture, and bedside. (Deferred grading only, pending completion of sequence. H/P/F grading only.)—IV. (IV.) Wilkes

440B. Doctoring 4 Teaching Fellowship (1)

Discussion—0.5 hours; seminar—0.25 hours. Prerequisite: courses 430ABCD and approval by Instructor of Record. Restricted to Medical students only. Instruction on teaching methodology and pedagogy. Mentored teaching of junior medical students in seminar, lecture, and bedside. (Deferred grading only, pending completion of sequence. H/P/F grading only.)—I. (I.) Wilkes

440C. Doctoring 4 Teaching Fellowship (1)

Discussion—0.5 hours; seminar—0.25 hours. Prerequisite: courses 430ABCD and approval by Instructor of Record. Restricted to Medical students only. Instruction on teaching methodology and pedagogy. Mentored teaching of junior medical students in seminar, lecture, and bedside. (Deferred grading only, pending completion of sequence. H/P/F grading only.)—II. (II.) Wilkes

441. Combined Ophthalmology and Otolaryngology Clerkship (6)

Clinical activity—4 weeks. Prerequisite: approval by Committee on Student Promotion and Evaluation. Fundamental knowledge of ophthalmology and otolaryngology for the treatment of eye, ear, nose and throat problems at a level of training of general physicians, including when to refer patients to a specialist. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Brandt, Strong

450. Introduction to UC Davis Medical Center (1)

Seminar—20 hours total. Prerequisite: second-year medical student. Designed to assist medical student in transition from classroom to hospital setting. (H/P/F grading only.)—III. (III.)

455. Student Run Clinics (1-3)

Clinical Activity—3-9 hours. Open to medical students in good standing. Will learn counseling, diagnosis and treatment of patients with chronic and acute disease under supervision of physician. Meet all requirements and prerequisites of the particular clinic within which they work. May be repeated for credit. (P/F grading only.)—I, II, III, IV. [I, II, III, IV.] Latimore, Servis

460CR. Introduction to Clinical Research (2)

Lecture—2 hours; independent study—3 hours. Pre-requisite: consent of instructor; completed one of the following degrees: M.D., D.D.S., D.M.D., O.D., N.D., D.O., Pharm.D., D.V.M., Ph.D. or D.N.S. in nursing. Application and acceptance into the Clinical Research Graduate Group, K30 program. Introduction to the CRGG program and overview of major clinical research topics. Overview of basic clinical skills needed to accomplish CRGG mentored research project. (P/F grading only.)—IV. (IV.) Frederick

461CR. Strategies for Grant Writing (2)

Lecture/discussion—2 hours. Prerequisite: consent of instructor; completed M.D., D.D.S, D.M.D., O.D., N.D., Pharm.D., D.V.M., Ph.D., or D.N.S. in nursing; application and acceptance into the Clinical Research Graduate Group, K30 program. Practical skills and strategies to create successful grant proposals in the NIH style and format. Generating ideas, identifying and accessing research resources, grant components, specific aims, background and significance, preliminary studies, budgets, and bios. Matriculation through UC system, and resubmissions. (S/U grading only.)—IV. (IV.) Rutledge

462CR. Introduction to Clinical Epidemiology and Study Design (3)

Lecture—25 hours; discussion—10 hours. Prerequisite: completed M.D., D.D.S, D.M.D., O.D., N.D., Pharm.D., D.V.M., Ph.D., or D.N.S. in nursing; application and acceptance into Clinical Research Graduate Group, K30 program. Anatomy and physiology of conducting clinical epidemiologic research. Familiarity with three basic study designs (cross-sectional, case-control, and cohort). Discussion of principles of measurements in clinical epidemiological studies, basic methods for analyzing data, and ethical issues involved in conducting research. (S/U grading only.)—IV. (IV.) McCurdy, Romano

463CR. Methods in Clinical Research (5)

Lecture—3 hours; discussion—2 hours. Prerequisite: consent of instructor; completed M.D., D.D.S, D.M.D., O.D., N.D., Pharm.D., D.V.M., Ph.D., or D.N.S. in nursing; application and acceptance into Clinical Research Graduate Group, K30 program. Overview of major approaches to clinical research, including health services research techniques, informatics, the GCRC, and preclinical methodologies to enhance clinical projects. Overview of UC Davis clinical research support infrastructure. Methodologies applicable to clinical research and its multi-disciplinary perspective. (S/U grading only.)—IV. (IV.) Berglund, Lloyd, Kravitz

464CR. Responsible Conduct of Research (3)

Lecture—3 hours. Prerequisite: completed M.D., D.D.S, D.M.D., O.D., N.D., Pharm.D., D.V.M., Ph.D., or D.N.S. in nursing; application and acceptance into Clinical Research Graduate Group, K30 program. The nine NIH-mandated modules: Data Acquisition and Reporting, Mentor Training, Publication Practices and Authorship, Peer Review/Grant Process, Collaborative Science, Human Subjects, Research with Animals, Conflict of Interest, Research Misconduct, and Entrepreneurship/Industry Collaborations/Intellectual Property/Technology Transfer. (S/U grading only.)—IV. (IV.) Wun

465CR. Introduction to Medical Statistics (4)

Lecture—3 hours; laboratory—2 hours. Prerequisite: completed M.D., D.D.S, D.M.D., O.D., N.D., Pharm.D., D.V.M., Ph.D., or D.N.S. in nursing; application and acceptance into Clinical Research Graduate Group, K30 program. Biomedical applications of statistical methods in clinical, laboratory and population medicine. Graphical/tabular data presentation, probability, binomial, Poisson, normal, t-, F-, and Chi-square distributions, elementary non-parametric methods, simple linear regression/correlation, life tables. Microcomputer applications of statistical procedures in population medicine. (S/U grading only.)—IV. (IV.) Becket, Wegelin

468. Multidisciplinary International Preceptorship (1-9)

Clinical activity—30 hours. Prerequisite: medical students with consent of instructor. Multidisciplinary preceptorship in a foreign country. Participate in clinical and didactic learning experiences. (H/P/F grading only.)—1, II, III, IV. (I, II, III, IV.)

470. Introduction to Dentistry (3-18)

Clinical activity—34 hours; lecture—6 hours. Prerequisite: fourth-year medical student in good standing; consent of instructor. Introduction to Dentistry and basic Oral and Maxillofacial Surgery. Course is

offered by the Oral and Maxillofacial Surgery department at UC San Francisco. (P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Pogrel, Wallach

480. Insights in Clinical Research (1)

Lecture—1 hour. Prerequisite: medical student in good standing. Seminars on research presented by Medical School faculty; overview of pertinent issues, including medical ethics, human subjects protocols, case control methods, etc. (P/F grading only.)—III. (III.)

481. Insights into Clinical Specialties (1)

Lecture/discussion—1 hour. Prerequisite: medical student in good standing. Exposure to various medical specialties, their residency programs and ways in which medical students can prepare for and improve their candidacy for such programs. (H/P/F grading only.)—IV. (IV.)

482. Lecture Series in Reproductive Health

Lecture—1 hour. Psychosocial and public health aspects of providing quality reproductive health care and application in student-run free clinics and in 3rd year clerkships. May be repeated two times for credit. (P/F grading only.)—II. (II.) Paik

483. Insights in Political, Legal and Business Aspects of Medicine (1)

Lecture—1 hour. Prerequisite: medical students in good standing. The practical aspects of a medical career. May be repeated two times for credit. (P/F grading only)—III. (III.)

485. Health Policy Lecture Series (1)

Lecture — 1 hour. Lecture series provides an overview of local, state, national and international health policy. The current challenges health care reform implementation is facing provides how medical students can successfully advocate for changes in health policy. May be repeated for credit. (P/F grading only.)—1. (I.) Romano

487. History and Ethics of Medicine (1)

Lecture — 1.25 hours. Introduction to ethical problems and events in health care in both modern and historical contexts. Historical topics in medicine and medical ethics. (P/F grading only.)—II. (II.) Fitzgerald

489. Directed Studies (1-9)

Prerequisite: consent of instructor; individual directed studies in extended preparation for modified curriculum, USMLE exams, and/or as required by Committee on Student Progress. Independent studies to accommodate modified curriculums, prepare for taking USMLE exams and for remediation course work directed by the Committee on Student Progress. May be repeated for credit. (P/F grading only.)—I, II, III, IV. (I, II, III, III, IV.)

489C. Clinical Reintroduction Experience (1-6)

Clinical activity—20 hours. Prerequisite: consent of instructor. Learn and practice basic clinical skills in a supervised clinical setting. Skills include patient interviewing, history, physical examination, diagnostic and clinical reasoning, case presentation, and medical records documentation. Direct observation and individual feedback on clinical skills development is provided. (P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Servis

489QA. Improving Quality in Health Care (3)

Lecture — 8 hours; discussion/laboratory — 10 hours, project — 10 hours. Prerequisite: consent of instructor. Working in interdisciplinary teams, will explore the theory and practical methods being employed to make improvement in health care systems while providing an opportunity for interprofessional educational experience. (H/P/F grading only; deferred grading only, pending completion of sequence.) — I. (I.) Bakerjian, Shaikh

489QB. Improving Quality in Health Care (3)

Lecture — 8 hours; discussion/laboratory — 10 hours, project — 10 hours. Prerequisite: consent of instructor. Working in interdisciplinary teams, will explore the theory and practical methods being employed to

make improvement in health care systems while providing an opportunity for interprofessional educational experience. (H/P/F grading only; deferred grading only, pending completion of sequence.)-II. (II.) Bakerjian, Shaikh

489R. USMLE Directed Remedial Studies (1-

Independent study - 20 hours. Prerequisite: recommendation by Committee on Student Progress. Independent studies to accommodate remediation for taking USMLE exams directed by the Committee on Student Progress. (P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Servis

490A. PRIME Seminar Series: Fall Quarter

Lecture - 1 hour. Weekly seminar series covering the following areas: community engagement, Health care to rural and under served populations, health policy and advocacy, leadership, technology and health equity and disparity. May be repeated for credit. (P/F grading only.)—I. (l.) Eidson-Ton,

490B. PRIME Seminar Series: Winter Quarter (1)

Lecture - 1 hour. Weekly seminar series covering the following areas: community engagement, Healthcare to rural and under served populations, health policy and advocacy, leadership, technology and health equity and disparity. May be repeated for credit. (P/F grading only.)—II. (II.) Eidson-Ton, Fancher

490C. PRIME Seminar Series: Spring Quarter (1)

Lecture - 1 hour. Weekly seminar series covering the following areas: community engagement, Health care to rural and under served populations, health policy and advocacy, leadership, technology and health equity and disparity. May be repeated for credit. (P/F grading only.)—III. (III.) Eidson-Ton, Fancher

490D. PRIME Seminar Series: Summer Quarter (1)

Lecture - 1 hour. Weekly seminar series covering the following areas: community engagement, Health care to rural and under served populations, health policy and advocacy, leadership, technology and health equity and disparity. May be repeated for credit. (P/F grading only.)—IV. (IV.) Eidson-Ton, Fancher

493. Independent Special Study Module (3-12)

Prerequisite: consent of instructor. FYOC approval required. Away education experience that meets Special Study Module requirements. (H/P/F grading only.)—I, II, İII, IV. (I, II, IIİ, IV.)

493A. International and Comparative Health Care-SSM (6)

Discussion - 20 hours; lecture - 10 hours. Prerequisite: consent on instructor. Restricted to UC Davis School of Medicine students only. Through a series of lectures, seminars and clinical experiences, all occurring in other nations, students will research how health care systems address critical health issues. In 2007, Chronic Disease is the focal issue. SSM Component. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Wilkes

493B. International and Comparative Health Care-Clinical (9)

Clinical activity—30 hours. Prerequisite: consent on instructor. Restricted to UC Davis School of Medicine students only. Through a series of lectures, seminars and clinical experiences, all occurring in other nations, students will research how health care systems address critical health issues. In 2007, Chronic Disease is the focal issue. Clinical Component. (H/ P/F grading only.)—II, III. (II, III.) Wilkes

495. Medicine Literature Review (1-9)

Discussion - 3-27 hours. Prerequisite: medical student in good academic standing and permission of the Associate Dean of Curricular Affairs. Independent study: topics for selection include, but are not

restricted to, medical ethics, economics and jurisprudence, culture and medicine, ethnicity and medicine, gender and medicine, history of medicine, health manpower, and medical education. A prepared paper on the selected topic will be required. (H/P/F grading only.) - I, II, III, IV. (I, II, III, IV.)

497A. Scholarly Project (2)

Seminar-0.25 hours; independent study-0.5 hours. Prerequisite: project proposal must be accepted by the Scholarly Project Executive Committee (SPEC). Restricted to fourth year medical school students only. Develop a research project on a focused topic area, implements the research, writes a publishable paper, and presents an oral summary of the project. (Deferred grading only, pending completion of sequence. H/P/F grading only.)—IV. (IV.) Schaefer

497B. Scholarly Project (2)

Seminar-0.25 hours; independent study-0.5 hours. Prerequisite: Project proposal must be accepted by the Scholarly Project Executive Committee (SPEC). Restricted to fourth year medical school students only. Develop a research project on a focused topic area, implements the research, writes a publishable paper, and presents an oral summary of the project. (Deferred grading only, pending completion of sequence. H/P/F grading only.)—I. (I.)

497C. Scholarly Project (2)

Seminar-0.25 hours; independent study-0.5 hours. Prerequisite: Project proposal must be accepted by the Scholarly Project Executive Committee (SPEC). Restricted to fourth year medical school students only. Develop a research project on a focused topic area, implements the research, writes a publishable paper, and presents an oral summary of the project. (Deferred grading only, pending completion of sequence. H/P/F grading only.)—II. (II.) Schaefer

499. Research in Medical Education and **Curriculum Development (4-9)**

Independent study - 10-36 hours. Prerequisite: medical student in good standing and competency with computers. Research and development of an independent project related to expanding computerassisted resources in support of the MD curriculum at UC Davis. (H/P/F grading only.)—I, II, III, IV. (I, II,

Departmental Courses:

Anesthesiology and Pain Medicine (ANE)

Upper Division Course

192. Internship in Anesthesiology (1-6)

Internship—3-18 hours. Prerequisite: upper division standing; approval of project prior to period of internship by preceptor. Supervised work experience in anesthesia and related fields. (P/NP grading only.)-I, II, III, IV. (I, II, III, IV.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Professional Courses

460. Anesthesiology Clinical Clerkship (3-

Prerequisite: medical student. In-depth exposure to anesthesia through informal lectures and mentoring by anesthesiologists. Emphasis on understanding and applying anesthetic principles in managing administration of general, regional, and specialized areas. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Rivera

461. Perioperative Medicine (3-12)

Clinical Activity-30 hours. Prerequisite: successful completion of third-year clerkships; consent of IOR. Two week rotation provides a broad exposure to various patient care services within the Department of

Anesthesiology and Pain Medicine to apply medical knowledge to safely care for patients. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Pitts

463. Multidisciplinary Pain Management

Clinical activity—30 hours; lecture/discussion—10 hours. Prerequisite: senior medical student in good standing. Senior clerkship to expose students to all facets of treating pain in all aspects of clinical care: outpatient and inpatient settings, acute and chronic pain, end of life issues, pediatrics, rehabilitation, etc. Daily clinics, rounds, and lectures. (H/P/F grading only.) - I, II, III, IV. (I, II, III, IV.) Singh

465. Away Acting Internship in Anesthesiology (3-18)

Clinical Activity—40 hours. Prerequisite: satisfactory completion of Anesthesiology Clerkship; consent of instructor. Work at the level of a sub intern in Inpatient and/or Outpatient settings. Expectation is to provide direct patient management. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Rivera

480. Brief Introduction to Clinical Anesthesiology and Chronic Pain Management (3)

Clinical activity - 25-30 hours (two weeks). Prerequisite: second-year medical student. Daily experience in clinical anesthesiology at the preoperative screening unit, operating room, post anesthesia care unit, chronic pain management clinic with daily clinical correlation case discussions, and one-on-one interaction with faculty anesthesiologists. (H/P/F grading only.)—II. (II.) Fishman

493A. Applied Physiology and Pharmacology (6)

Lecture - 5 hours; lecture/laboratory - 10 hours; laboratory—16 hours; clinical activity—4 hours. Prerequisite: consent of instructor; UC Davis School of Medicine students only. This course will review and demonstrate the application of basic physiology and pharmacology to patient care. There will be an indepth analysis of the physiology and pharmacology of the cardiovascular, pulmonary, nervous, renal and endocrine systems. Limited enrollment. (H/P/F grading only.)—II. (II.) Antogini

493B. Interdisciplinary Medicine in Pain Care (6)

Lecture - 5 hours; lecture/laboratory - 10 hours; laboratory-16 hours; clinical activity-4 hours. Prerequisite: consent of instructor; UC Davis School of Medicine students only. This course will integrate applied and practical neuroanatomy, physiology, pharmacology, psychology/psychiatry and social medicine in the care of patients who are receiving care for pain caused by acute or chronic medical disease or trauma. Limited enrollment. (H/P/F grading only.)—III. (III.) Fishman

498. Individual or Group Study (1-5)

Discussion - 1-5 hours; laboratory - 2-10 hours. Prerequisite: interns and residents with consent of instructor. Directed reading and discussion and/or laboratory investigation on selected topics. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

499. Anesthesiology Research (4-18)

Laboratory-12-54 hours. Prerequisite: third- or fourth-year medical students, advanced standing undergraduate and veterinary medicine students; or consent of instructor. Problems in clinical and/or lab-F grading only for medical students.)—I, II, III, IV. (I, II, III, IV.) oratory research. May be repeated for credit. (H/P/

Biological Chemistry (BCM)

Lower Division Course

92. Internship in Biological Chemistry (1-12)

Internship—3-36 hours; final report. Prerequisite: consent of instructor. Supervised work experience in biological chemistry and related fields. (P/NP grad-

Upper Division Courses 192. Internship in Biological Chemistry (1-12)

Internship - 3-36 hours; final report. Prerequisite: upper division standing; approval of project prior to internship by preceptor. Supervised work experience in Biological Characteristics in Biological Chemistry and related fields. (P/NP grading only.)

198. Group Study (1-5)

Prerequisite: consent of instructor. For undergraduate students desiring to explore particular topics in depth. Lectures and conferences may be involved. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading

Graduate Courses

209. Prostaglandins/Leukotrienes and Related Lipids (2)

Lecture—2 hours. Prerequisite: Biochemistry 101A-101B or Physiological Sciences 101A-101B or Physiology 100A-100B. Oxidative desaturation/elongation of poyunsaturated fatty acids. Biosynthesis of prostaglandins/leukotrienes from polyunsaturated fatty acids. Chemistry, biochemistry, and metabolism. Nutritional regulation. Physiological/ pathophysiological implications; pharmacological and clinical relevance. Offered in alternate years. -(II.) Ziboh

217. Molecular Genetics of Fungi (3)

Lecture - 3 hours. Prerequisite: graduate standing in a biological science; Biochemistry 101B; Genetics 100, 102A; Botany 119; Plant Pathology 130, 215X; Microbiology 215 recommended. Advanced treatment of molecular biology and genetics of filamentous fungi and yeasts, including gene structure, organization and regulation; secretion; control of reproduction; molecular evolution; transformation; and gene manipulation. Offered in alternate years. (Same course as Plant Pathology 217.)—II. Holland, Tyler

222. Mechanisms of Translational Control (2)

Lecture-1 hour; discussion-1 hour. Prerequisite: Biochemistry 201C or consent of instructor. Molecular mechanisms of protein synthesis and translational control in eukaryotic cells, with emphasis on mammalian cells and their viruses. An advanced graduate-level treatment of topics of current interest, with readings and discussion of primary papers from the literature. Offered in alternate years.—II. Hershey

230. Practical NMR Spectroscopy and Imaging (1)

Lecture-1 hour. Prerequisite: Chemistry 107A-107B, Physics 5A-5B-5C or 9A-9B-9C, or consent of instructor. Basic theory, experimental methods, and instrumentation of NMR. Enables students to understand NMR spectroscopy and imaging experiments. (S/U grading only.)—I. (I.)

231. Biological Nuclear Magnetic Resonance (3)

Lecture—3 hours. Prerequisite: Molecular and Cellular Biology 221A or the equivalent or consent of instructor. Principles and applications of magnetic resonance in biomedicine. Fundamental concepts and the biophysical basis for magnetic resonance applications in areas of tissue characterization/ imaging, metabolic regulation, and cellular bioenergetics. (Same course as Biophysics 231.)—III. (III.)

291. Seminar in Genetic Approaches to Pathogenesis of Human Disease (1)

Seminar - 1 hour. Prerequisite: student in Genetics Graduate Group of consent of instructor. Current genetic approaches to understanding the pathogenesis of disease and mammalian development presented and critically discussed by faculty, fellows and students. Topics include Mendelian and non-Mendelian diseases, imprinting, homologous recombination, statistical methods, genetic epidemiology

and cell cycle dependent expression. (Same course as course 491.) (S/U grading only.)—I, II, III, IV. (I,

298. Group Study (1-5)

Prerequisite: consent of instructor. For graduate students desiring to explore particular topics in depth. Lectures and conferences may be involved.

299. Research (1-12)

Prerequisite: consent of instructor. (S/U grading

Professional Courses

405. Metabolism, Endocrinology, Reproduction and Nutrition (9.5)

Lecture - 3.8 hours; discussion/laboratory - 2.8 hours. Prerequisite: consent of instructor. Medical Student only. Basic and pathophysiologic processes involved in human metabolic and nutritional regulation and in reproductive and endocrine control system across the lifespan. Integrate information across these systems and use the clinical reasoning process to identify and understand relevant perturbations and diseases. (Same course Human Physiology 405, Internal Medicine 405, and Obstetrics and Gynecology 405.) (P/F grading only; deferred grading only, pending completion of sequence.)—II, III. (II, III.) Long, Sweeney, Towner

410A. Molecular Medicine (3.5)

Lecture - 3 hours; discussion - 2 hours. Prerequisite: consent of instructor. Medical Students only. Biochemistry of proteins and nucleic acids, followed by molecular genetics, regulation of gene expression, biomembranes and structural proteins. Applications to clinically relevant systems are emphasized, particularly cysticic fibrosis, synaptic conductance, muscular dystrophy, and oncogenes and cell proliferation control. (Deferred grading only, pending completion of sequence. P/F grading only.)—I, IV. (I, IV.)

491. Seminar in Genetic Approaches to Pathogenesis of Human Disease (1)

Seminar - 1 hour. Prerequisite: student in Genetics Graduate Group of consent of instructor. Current genetic approaches to understanding the pathogenesis of disease and mammalian development presented and critically discussed by faculty, fellows and students. Topics include Mendelian and non-Mendelian diseases, imprinting, homologous recombination, statistical methods, genetic epidemiology and cell cycle dependent expression. (Same course as course 291.) (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

493. Medical Genomics (6)

Clinical activity—4 hours; lecture—4 hours; laboratory—12 hours. Prerequisite: consent of instructor. Four-week module will focus on the clinical methods and applications of medical genomics. Topics will include an introduction to the human genome and human genomics, genetic and epigenetic variation and the ethics of medical genomics. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Herman, Sega

497T. Tutoring in Biological Chemistry (1-5)

Tutoring - 3-15 hours. Prerequisite: advanced standing or consent of instructor. Assist instructor by tutoring medical students in preparation for one of the departmental courses that is a component of the required curriculum of the School of Medicine. (H/ P/F grading only.)

498. Group Study (1-5)

Prerequisite: medical students with consent of instructor. (H/P/F grading only.)

499. Research (1-12)

Prerequisite: medical students with consent of instructor. (H/P/F grading only.)

Courses in Cell Biology and Human Anatomy (CHA)

Upper Division Courses

101. Human Gross Anatomy (4)

Lecture-4 hours. Prerequisite: Biological Sciences 2A, concurrent enrollment in Exercise Biology 106L or course 101L strongly recommended. Upper divi-

sion students only; Pass 1 open to upper division Exercise Biology or Anthropology majors only; Pass 2 open to Seniors in any major; Open enrollment at the start of the quarter for upper division students in any major. Detailed study of the gross anatomical structure of the human body, with emphasis on function and clinical relevance to students entering health care professions. (Same course as Exercise Biology 106.) GE credit: SciEng | SE.—II. (II.) Gross

101L. Human Gross Anatomy Laboratory (3)

Laboratory-9 hours. Prerequisite: Biological Sciences 2A; must take Exercise Biology 106 or course 101 concurrently (or have already completed). Upper division students only; Pass 1 open to upper division Exercise Biology or Anthropology majors only; Pass 2 open to Seniors in any major; Open enrollment at the start of the quarter for upper division students in any major; mandatory attendance on first day of lab. Detailed study of prosected human cadavers in small group format with extensive hands-on experience. (Same course as Exercise Biology 106L.) ĠE credit: ŚciEng | SE.—II. (II.)

192. Internship in Morphology (1-12)

Internship - 3-36 hours; final report. Prerequisite: upper division standing; laboratory science experience including some chemistry; approval of project by preceptor prior to period of internship. Experience of supervised internship in research laboratories of members of the department. (P/NP grading only.)

197T. Tutoring in Cell Biology and Human Anatomy (1-5)

Discussion—1 hour; laboratory—6-9 hours. Prerequisite: completion of course 101 with a grade of B or better and consent of instructor. Provides laboratory instruction in gross and microscopic human anatomy, with small groups of undergraduates under the supervision of the instructor. (S/U grading only.)

198. Directed Group Study (1-5)

Discussion - 1-10 hours. Prerequisite: consent of instructor. Directed reading, discussion, and/or laboratory experience on selected topics. (P/NP grad-

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

200. Graduate Human Gross Anatomy (6)

Lecture — 4 hours; laboratory — 6 hours. Prerequisite: consent of instructor. Lectures on human gross anatomy and cadaver dissection laboratory. Topics arranged by region; emphasis on osteology, neuromuscular anatomy, cardiovascular anatomy, gastrointestinal anatomy and anatomy of reproductive systems. Only two units of credit for students who have completed course 101. Open only to full-time graduate students. — II. (II.) Blankenship, Gross,

202. Human Microscopic Anatomy (5)

Lecture-3 hours; laboratory-6 hours. Examines the normal microscopic structure of the basic cells, tissues, and organs of the body. Lectures emphasize morphology and structure-function relationships. Accompanying laboratories involve analysis and identification of sectioned material at the light microscopic and ultrastructural levels.—II. (II.) Beck

203. Neurobiology (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: two upper division or one graduate course in Neurobiology, consent of instructor. Physiology and anatomy of the normal human nervous system in an integrated format.—III. (III.) Blankenship, Gross

290. Seminar (1)

Seminar — 1 hour. Prerequisite: consent of instructor. (S/U grading only.)—I, III. (I, III.)

290C. Research Group Conference (1)

Discussion - 1 hour. Prerequisite: graduate student with research experience (may be taken concurrently); consent of instructor. Discussion of problems, progress and literature relevant to current research undertaken by laboratory groups in Human Anatomy. (S/U grading only.)—I, II, III. (I, II, III.)

298. Advanced Group Study (1-5)

Prerequisite: consent of instructor

299. Research (1-12)

Prerequisite: consent of instructor. (S/U grading only.)

Professional Courses

400. Developmental, Gross, and Radiologic Anatomy (7.5)

Lecture—3 hours; laboratory—5 hours. Prerequisite: consent of Committee on Educational Progress. Medical Students only. An integrated presentation of developmental, gross and radiologic anatomy. Embryology and radiology correlated with the dissection of the entire body. Embryology from implantation to birth. (Deferred grading only, pending completion of sequence.) (P/F grading only.)—I, IV. (I, IV.) Tucker

402. Cell and Tissue Biology (4.5)

Lecture—2 hours; laboratory—4 hours. Prerequisite: approval of the Committee on Student Progress. Medical Students only. Microscopic structure of the basic cells, tissues and organs of the body with an emphasis on how structure explains function. Analysis and identification of sectioned material at the light microscopic and ultrastructural levels. (Deferred grading only, pending completion of sequence.) (P/F grading only.)—I, IV. (I, IV.) Beck

403. Medical Neuroanatomy (5)

Lecture — 3 hours; laboratory — 1 hour; discussion/ laboratory—1 hour. Prerequisite: successful completion of course 400, block 1; restricted to medical students only. Anatomy of the normal human nervous system, to include gross external and internal morphology of brain and spinal cord, and function neuroanatomy of motor, sensory and cognitive systems. Incorporates application of neuroanatomy to clinical problem solving. (Same course as Human Physiology 403.) (P/F grading only.)—IV. (IV.) Blankenship, Gross

493. Clinically-Oriented Anatomy Special Study Module (6)

Lecture-5 hours; lecture/laboratory-10 hours; laboratory - 16 hours; clinical activity - 4 hours. Prerequisite: consent of instructor. Restricted to School of Medicine students only. Reviews aspects of the anatomy of the head and neck, thoracic cavity, abdomen, pelvis, extremities, vascular system, peripheral nervous system and central nervous system. Focus on the understanding of anatomy related to common surgical procedures. (Same course as Surgery 493.) (H/P/F grading only.)—III. (III.) Blankenship, Khatri

493B. Anatomy Medical Education Special Study Module (6)

Seminar-10 hours; clinical activity-14 hours; autotutorial—6 hours; independent study—10 hours. Prerequisite: consent of instructor; UC Davis School of Medicine students only. Attend all of the lectures and laboratory sessions for courses 400 and 402 during the four-week section (approximately seven anatomy labs and three to four histology labs); tutor first-year students during the laboratory sessions; pre pare and present a clinical correlate session. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Beck, Gross, Fitzgerald, Tucker

497T. Tutoring in Human Anatomy (1-5)

Tutoring - 3-15 hours. Prerequisite: advanced standing or consent of instructor. Assist instructor by tutoring medical students in preparation for one of the departmental courses that is a component of the required curriculum for the School of Medicine. (H/ P/F grading only.)

498. Advanced Group Study (1-12)

Prerequisite: medical students, interns, and residents with consent of instructor. Directed reading and group discussion and/or laboratory experience on selected topics. (H/P/F grading only.)

499. Research (1-12)

Prerequisite: consent of instructor. (H/P/F grading

Clinical Research (CLH)

Graduate Courses

200. Introduction to Clinical Research (3)

Lecture - 2 hours; independent study - 3 hours. Prerequisite: one of the following degrees: MD, DDS, DMD, OD, ND, DO, PharmD, DVM, PhD or DNS in nursing. Application and acceptance into the Clinical Research Graduate Group, K30 program or other SOM/CTSC training programs; consent of instructor. Introduction to the CRGG program and overview of major clinical research topics. Overview of basic clinical skills needed to accomplish CRGG mentored research project. (Formerly Medical Science 460CR.) (S/U grading only.)—IV. (IV.) Meyers

201. Strategies for Grant Writing (2)

Lecture - 2 hours. Prerequisite: consent of instructor; completed one of the following degrees: MD, DDS, DMD, OD, ND, DO, PharmD, DVM, PhD or DNS in nursing. Application and acceptance into the Clinical Research Graduate Group, K30 program or other SOM/CTSC training program. Practical skills and strategies to create successful grant proposals in NIH style/format. Generating ideas, identifying and accessing research resources, grant components specific aims, background and significance, preliminary studies, budgets, and bios. Matriculation through UC system, and resubmissions. (Former course Medical Sciences 461CR.) (S/U grading only.) - IV. (IV.) Rutledge

202. Introduction to Clinical Epidemiology and Study Design (3)

Lecture - 25 hours; discussion - 10 hours. Prerequisite: completed one of the following degrees: MD, DDS, DMD, OD, ND, DO, PharmD, DVM, PhD or DNS in nursing; application and acceptance into the Clinical Research Graduate Group, (K30) program, or other SOM/CTSC training programs; consent of instructor. Anatomy and physiology of conducting clinical epidemiologic research. Familiarity with three basic study designs (cross-sectional, case-control, and cohort). Discussion of principles of measurements in clinical epidemiological studies, basic methods for analyzing data, and ethical issues involved in conducting research. (Formerly Medical Sciences 462CR.) (S/U grading only.)—IV. (IV.) McCurdy, Romano

203. Methods in Clinical Research (5)

Lecture — 3 hours; discussion — 2 hours. Prerequisite: completed one of the following degrees: MD, DDS, DMD, OD, ND, DO, PharmD, DVM, PhD or DNS in nursing; application and acceptance into the Clinical Research Graduate Group, K30 program or other SOM training programs; consent of instructor. Overview of major approaches to clinical research, including health services research techniques, informatics, GCRC, and preclinical methodologies to enhance clinical projects. Overview of UCD clinical research support infrastructure. Methodologies applicable to clinical research and its multi-disciplinary perspective. (Formerly Medical Sciences 463CR.) (S/U grading only.) - IV. (IV.) Berglund, Kravitz, Murphy

204. Responsible Conduct of Research (3)

Lecture—3 hours. Prerequisite: consent of instructor; completed one of the following degrees: MD, DDS, DMD, OD, ND, DO, PharmD, DVM, PhD or DNS in nursing. Application and acceptance into the Clinical Research Graduate Group, K30 program or other SOM training program. The nine NIH-mandated modules: Data Acquisition and Reporting, Mentor Training, Publication Practices and Authorship, Peer Review/Grant Process, Collaborative Science, Human Subjects, Research with Animals Conflict of Interest, Research Misconduct, and Entre-

preneurship/Industry Collaborations/Intellectual Property/Technology Transfer. (Former course Medical Sciences 464CR.) (S/U grading only.)—IV. (IV.) Kon, Wun

205. Introduction to Medical Statistics (4)

Lecture — 3 hours; laboratory — 2 hours. Prerequisite: completed one of the following degrees: MD, DDS, DMD, OD, ND, DO, PharmD, DVM, PhD or DNS in nursing; application and acceptance into the Clinical Research Graduate Group, K30 program or other SOM training program; consent of instructor. Biomedical applications of statistical methods in clinical, laboratory, population medicine. Graphical/ tabular data presentation, probability, binomial, Poisson, normal, t-, F-, and Chi-square distributions, elementary nonparametric methods, simple linear regression/correlation, life tables. Microcomputer applications of statistical procedures in population medicine. (Formerly Medical Sciences 465CR.) (S/U grading only.) — IV. (IV.) Yang

220. Basics of Stem and Progenitor Cells (1)

Lecture-1 hour. Prerequisite: Molecular, Cellular, and Integrative Physiology 200, 200L; consent of instructor; graduate standing. This is a lecture course designed for graduate students who have experience in cell culture techniques. It is designed to give a broad overview of the field and current cells o interest to the greater research community. (S/U grading only.) — III. (III.) Tarantal

222. Ethical Issues in Stem Cell Biology (1)

Lecture/discussion - 1 hour. Prerequisite: consent of instructor; graduate standing. Critical presentation and analysis of recent articles in stem cell biology and small group discussions of the ethical issues surrounding this area of research. (S/U grading only.)—II. (II.) Ikemoto, Rich

230. Congestive Heart Failure, Mechanism of Disease (3)

 $\label{lecture} \mbox{Lecture/discussion-2 hours; project. Prerequisite:}$ consent of instructor; graduate standing. Underlying mechanisms of cardiomyopathy and heart failure Presentation of fundamental knowledge of and recent basic research on heart failure. Student team projects: investigation and presentation of a research topic and bench research project to advance research in the same area. - II. (II.) Knowl-

231. Current Techniques in Clinical Research (2)

Lecture - 1 hour; clinical activity - 3 hours. Prerequisite: consent of instructor and graduate standing; completion of course 250. Current techniques used in clinical research such as electrophysiology, cardiovascular surgery, cardiac catheterization and echocardiography, team science, and patient management. Lectures are presented by experts on each technique, with an emphasis on use in translational research. (S/U grading only.)—I, II, III, IV. (I, II, III,

240. Predoctoral Clinical Research Training **Program Research Integration (1)**

Seminar - 0.5 hours; discussion - 0.5 hours. Prerequisite: consent of instructor and enrollment in the Predoctoral Clinical Research Training Program in the CTSC, School of Medicine. Alternating sessions: journal club, seminar/discussion, and research integration sessions. May be repeated three times for credit (S/U grading only.)—I, II, III. (I, II, III.) Kenyon

250. Integrating Medicine Into Basic Science (6)

Lecture - 3.75 hours; discussion - 6 hours; seminar-2.5 hours; clinical-8 hours. Prerequisite: consent of instructor; graduate standing; acceptance into HHMI Integrating Medicine into Basic Science program. Four-week summer institute consisting of didactic lectures, reading assignments, group discussions, and clinical rotations to acculturate students to the human medical environment; integrate medical principles, physiology and pathophysiology into basic research; introduce high-impact clinical studies related to modifie and high-impact clinical studies related to medicine and health. (S/U grading only.)—IV. (IV.) Knowlton, Meyers, Robbins

290A. Hot Topics in Clinical Research (1)

Seminar - 1 hour. Prerequisite: graduate standing or consent of instructor. Seminars presented by guest lecturers on subjects of their own research activities. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

290B. Hot Topics in Stem Cell Biology (1)

Seminar — 1 hour. Prerequisite: graduate standing. Seminars presented by guest lecturers on subjects of their own research. (S/U grading only.)—I, II, III. (I,

290C. Literature in Translational Research

Discussion - 1 hour. Prerequisite: graduate standing and consent of instructor. Critical presentation and analysis of recent journal articles in translational research by students. May be repeated for credit. (S/U grading only.) - I, II, III. (I, İI, III.) Knowlton

290D. Literature in Translational Research

Discussion - 1 hour. Prerequisite: consent of instructor; graduate standing. Critical presentation and analysis of recent journal articles in translational research by students. May be repeated for credit. (S/U grading only.)—I. (I.) Knowlton

298. Group Study in Clinical Research (1-5)

Prerequisite: consent of instructor. Special topics in Clinical Research appropriate for group study at the graduate level. Restricted to students enrolled in the Mentored Clinical Research Training Program. (S/U grading only.)

299. Clinical Research (1-5)

Prerequisite: consent of instructor. Independent research and special topics in clinical research appropriate for graduate level. Restricted to students enrolled in the Mentored Clinical Research Training Program. (S/U grading only.)

Dermatology (DER)

Upper Division Courses 192. Internship in Cutaneous Biology (1-4)

Internship - 8-20 hours; final report. Prerequisite: upper division standing or consent of instructor. Approval of project prior to internship by preceptor. Supervised work experience involving résearch on the skin. (P/NP grading only.)—Isseroff, Izumiya, Liu, Murphy, Takada

199. Special Study in Cutaneous Biology

Prerequisite: advanced undergraduate standing and/or consent of instructor. Special study by individual arrangement of specialized topics in biology of skin. Work may be assigned readings, laboratory research or a combination. (P/NP grading only.) Isseroff, Izumiya, Liu, Murphy, Takada

Graduate Course

299. Research in Cutaneous Biology (1-12)

Laboratory-3-36 hours. Prerequisite: consent of instructor. Independent research in cellular and biochemical mechanisms of cutaneous biology and pathology. (S/U grading only.) Isseroff, Liu

Professional Courses

420. Integumentary System (2)

Lecture/discussion-4 hours. Prerequisite: approval of School of Medicine Committee on Student Progress; medical students only. Cell biology, pathology, and physical diagnosis of the skin. Recognition of normal variations, and common or important dermatoses. Patient demonstrations of select conditions. (P/ F grading only.)—IV. (IV.) Eisen, Isseroff

460. Dermatology Clinical Clerkship (6)

Clinical activity (inpatient/outpatient service)-40 hours for four weeks. Prerequisite: completion of three years of medical school; or consent of instructor. Observation and participation in dermatology clinics/practice and participation in Ward Rounds and Dermatology Clinics at UC Davis Medical Center, Kaiser, and private practitioner offices. Limited enrollment.—I, II, III, IV. (I, II, III, IV.) Fazel

465. Specialty Externship in Dermatology

Clinical Activity-30 hours. Prerequisite: consent of instructor. Externship provides in-depth exposure to one of a variety of subspecialties in Dermatology May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

466. Away Acting Internship in Dermatology (3-18)

Clinical Activity-40 hours; lecture-6 hours. Prerequisite: consent of instructor. Work at the level of a sub intern in Inpatient and/or Outpatient settings. Expectation is to provide direct patient management. May be repeated for credit. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.) Fazel

470. Introduction to Dermatopathology (6)

Clinical - 20 hours; independent study - 20 hours; lecture/discussion-6 hours. Prerequisite: previous rotation in a Dermatology Clerkship; consent of instructor. Restricted to fourth year medical student. Integrated, multi-specialty approach to the microscopic diagnosis of inflammatory and neoplastic skin disorders. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Barr, Fung, Konia

480. Insights in Dermatology (1-3)

Clinical activity—3-9 hours. Prerequisite: first- and second-year medical students in good academic standing; consent of instructor. Clinical experience limited to observation of delivery of dermatologi care and attendance at some conferences. (H/P/F grading only.) - I, II, III, IV. (I, II, III, IV.)

495. Wound Healing: From Bench to Bedside (6)

Clinical activity-12 hours; laboratory-8 hours; autotutorial-15 hours; term paper. Prerequisite: medical students only. An integrated, multi-specialty approach to clinical soft tissue wound healing. - I, II, III, IV. (I, II, III, IV.) Isseroff

498. Special Topics in Clinical Dermatology

Independent study-3-18 hours. Prerequisite: medical students with consent of instructor. Individually arranged study of special topics in clinical dermatology determined by student and instructor. Assigned readings and/or clinical examination of selected patients. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV) Armstrong

499. Research in Cutaneous Biology (1-12)

Laboratory — 3-36 hours. Prerequisite: consent of instructor. Research, either laboratory or clinical, on ongoing projects within the department under supervision of faculty. (H/P/F grading only.)—Armstrong

Emergency Medicine (EMR)

Lower Division Course

92. Emergency Medicine Clinical Research Internship (1-4)

Prerequisite: Undergraduate student in good academic standing at UC Davis; consent of instructor. This course is intended to give the undergraduate student an opportunity to conduct "hands-on" clinical research in the Emergency Department. Through the lecture/discussion, students will learn the basics of conducting and developing clinical research studies, using examples from ongoing studies. May be repeated for credit up to four units. Units awarded will depend on hours worked. — I, II, III, IV. (I, II, III, IV.) Panacek

Upper Division Courses 192. Emergency Medicine Clinical Research Internship (1-4)

Internship—6-12 hours. Prerequisite: undergraduate student in good academic standing at UC Davis; consent of instructor. Intended to give the upper division undergraduate student an opportunity to conduct "hands-on" clinical research in the Emergency Department. Through the lecture/discussion, students learn the basics of conducting and developing clinical research studies. May be repeated two times for credit. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.)

199A. Special Study for Advanced Undergraduates (4-12)

Prerequisite: open to experienced RA's who have successfully performed in the EMRAP program for a minimum of three quarters; consent of instructor. This course is for those are interested in working on specific EM projects in a more extensive way. Must commit at least 4 hours per week for two quarters. Must have database skills. Deferred grading only, pending completion of sequence.)—I, II, III, IV. (I, II, III, IV.) Panacek

Professional Courses

401. Preceptorship in Emergency Medicine (1-6)

Clinical activity-10 hours. Prerequisite: consent of instructor. Exposure to the specialty of Emergency Medicine and observation of a wide array of patients in the Emergency Department. May be repeated for credit. (P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

430. Introduction to Medical Toxicology (3-6)

Prerequisite: fourth-year medical student in good standing; consent of instructor. In-depth review of clinical and medical toxicologic emergencies. Rotation includes contact with toxicology trained emergency faculty, didactic lectures, journal club, simulation training and exposure to a very busy poison control center. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.) Owen

440. Emergency Medicine Clerkship (6)

Clinical activity-46 hours; lecture/discussion-4 hours. Prerequisite: satisfactory completion of Medicine, Surgery, and Pediatric Clerkship. Students complete clinical shifts in the Emergency Department, functioning as Acting Intern. Treat a wide variety of patients and problems under the supervision of the EM Attending. Students are expected to take focused histories and present in clear, concise fashion. (H/P/ F grading only.)—I, II, III, IV. (I, II, III, IV.) Laurin

445. Emergency Medicine Ultrasound for Fourth-Year Medical Student (3-6)

Prerequisite: fourth-year Medical Student in good standing; interest in Emergency Medicine or Critical Care is recommended; course 440 or equivalent is recommended prior to the rotation. Intended for students interested in learning both the technical and cognitive skills of bedside ultrasound. Emphasis will be on the use of ultrasound in emergency medicine as a diagnostic tool and in procedural guidance Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Cusick

450. Ambulatory Externship in Emergency Medicine (3-18)

Credit will be given for approved non-AI Emergency Medicine courses at other institutions to which there is not an equal learning experience at UC Davis. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.) Laurin

465. Externship in Emergency Medicine (4.5-6)

Clinical activity—36 hours; lecture/discussion—4 hours. Prerequisite: satisfactory completion of Medicine, Surgery and Pediatrics. Students complete clinical shifts in the Emergency Department, functioning as Acting Intern. Treat a wide variety of patients and problems under the supervision of the EM Attending. Students are expected to take focused histories and present in clear, concise fashion. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Laurin

470. Pediatric Emergency Medicine Clerkship (6)

Clinical activity—36 hours; lecture/discussion—4 hours. Prerequisite: satisfactory completion of Medicine, Surgery, Pediatrics. Restricted to fourth-year medical student in good standing only. See patients in the Pediatric area of the Emergency Department under the supervision of an Emergency Medicine Attending. Emphasis on recognition and management of the acutely ill pediatric patient and treatment of common pediatric complaints. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.) Vance

490. Emergency Procedures Elective (3)

Lecture/discussion-24 hours; web virtual lecture-8 hours; tutorial—4 hours; independent study—4 hours. Prerequisite: current basic life support (BLS) certification. Restricted to fourth-year medical student in good standing only. Simulator-based skills training for emergency procedures. Topics include airway management, central venous access, chest tube placement, and general critical care resuscitation skills. (P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

493A. Teaching the Basic Sciences SSM (2)

Lectrue-6 hours; lecture/laboratory-8 hours; laboratory—30 hours; tutorial—10 hours. Prerequisite: consent on instructor. Restricted to UC Davis School of Medicine students only. Special Studies Module, a yearlong in progress court to teach lecture and discussion education technique and theory. (Deferred grading only, pending completion of sequence. H/ P/F grading only.)—IV. (IV.) Wilkes

493B. Cardiac Arrest, Resuscitation and Repurfusion SSM (3)

Lecture—5 hours; lecture/laboratory—10 hours; laboratory—16 hours; clinical activity—4 hours. Prerequisite: consent on instructor. Restricted to UC Davis School of Medicine students only. Special Studies Module, a four week course specific to the topics of Cardiac Arrest, Resusciatation and Repurfusion. (Deferred grading only, pending completion of sequence. H/P/F grading only.)—II, III. (II, III.) Barnes, Laurin

493C. Teaching the Basic Sciences SSM (2)

Lectrue-6 hours; lecture/laboratory-8 hours; laboratory—30 hours; tutorial—10 hours. Prerequisite: consent on instructor. Restricted to UC Davis School of Medicine students only. Special Studies Module, a yearlong in progress court to teach lecture and discussion education technique and theory. (Deferred grading only, pending completion of sequence. H/P/F grading only.)—II. (II.) Wilkes

499. Research (2-18)

Laboratory—full time (1 to 12 weeks). Prerequisite: consent of instructor. Elective where topics may be selected in either basic or clinical research areas of Emergency and/or Critical Care Medicine. The goals will be tailored to each individual student. Enrollment requires prior discussion and consent of instructor. (H/P/F grading only.)

Family and Community Medicine (FAP)

Lower Division Course 92C. Primary Care Clinics (2)

Clinical activity-6-8 hours; seminar-2 hours; lecture - 1-2 hours. Prerequisite: consent of instructor, enrollment at the UC Davis campus, for freshman and sophomore students. Students must apply and interview with the Board of Clinica Tepati or İmani Clinic. Field experience exposes lower division students to health care delivery, patient histories, physical examinations, health promotion, disease prevention, diagnosis; treatment of episodic, acute, chronic illness; appropriate referral and follow-up. May be repeated for credit. (P/NP grading only.)-I, II, III, IV. (I, II, III, IV.) Edison-Ton, Hitzeman, Smith

Upper Division Courses 192C. Primary Care Clinics (1-2)

Clinical activity-6-8 hours; seminar-2 hours; lecture - 1-2 hours. Prerequisite: consent of instructor, enrollment at the UC Davis campus, upper-division standing. Students must apply and interview with the Board of Clinica Tepati or Imani Clinic. Field experience introduces students to health care delivery, patient histories and physical examinations, health promotions and disease prevention, diagnosis and treatment of episodic, acute and chronic illness, basic laboratory testing and appropriate referral and follow-up. May be repeated for credit. (P/NP grading only.)—I, ÍI, III, IV. (I, II, III, IV.) Edison-Ton, Hitzeman, Smith

195. Health Care to Underserved Populations (1)

Lecture — 1 hour. Prerequisite: sociology, political science, or applied behavioral science background recommended, or registration in medical school. Discusses sociocultural perspectives of underserved populations in California impacting their health; roles of family/interpersonal relationships in making health care decisions; and clinician's perspectives in treating people of cultures which are unfamiliar and/or uncomfortable with Western medicine. May be repeated for credit. (P/NP grading only.)-II, III. (II, III.) Nesbitt

Graduate Courses

The following courses are for students enrolled in the Family Nurse Practitioner (FNP) program.

240A-240B-240C-240D-240E-240F. Clinical Preceptorship (1-13)

Clinical activity—9-36 hours. Prerequisite: enrollment in the Master's Track of the FNP Certificate Program, and successful completion of each preceding 240A-F section. Diagnosis and treatment of patients of all ages in an ambulatory care setting, under the supervision of a preceptor. May be repeated two times for credit. (P/NP grading only.) - I, II, III, IV. (I, II, III, IV.) Long

242A-242B. Clinical Role Seminar (1.5-1.5)

Seminar - 1.5 hours. Prerequisite: course 240 concurrently and student in the Master's Track of the FNP certificate program. Accompanies course 240 and provides a small group forum for students to explore role development and clinical management issues based on nursing theories and research. (Deferred grading only, pending completion of sequence.)—I, II, III. (I, II, III.) DeAmicis, O'Rourkes

252A. Professional Role Development (1.5)

Lecture/discussion - 1.5 hours. Prerequisite: enrollment in the Master's Track of the FNP Certificate Program. Provides opportunity to discover strategies for promoting role development and role satisfaction via discussion of pertinent issues, theory, and research. (Deferred grading only, pending completion of sequence.)—I, II, III, IV. (I, II, III, IV.) Hass

252B. Nurse Practitioner as Leader (1.5)

Lecture/discussion - 1.5 hours. Prerequisite: course 252A and concurrent enrollment in Master's Track of the FNP Certificate Program. Study of advanced practice role of nurse practitioner. Overview of legal and regulatory issues, certification and malpractice liability issues. Includes critical analysis of theories. issues and research related to nurse practitioner role development and applied legislation through community involvement. (Deferred grading only, pending completion of sequence.)—I, II, III, IV. (I, II, III, IV.)

264. Psychosocial Concepts and Issues in Primary Care (2)

Lecture/discussion-2 hours. Prerequisite: B.S. degree in nursing and enrollment in the Master's Track of the FNP Certificate Program. Introduces the principles of effective communication in establishing the therapeutic provider-patient relationship. Provides an examination of relevant psychosocial concepts and issues related to primary care. Research and theory are emphasized.—I, II, III, IV. Hass

266A. Health Maintenance/Promotion (2)

Lecture - 2 hours. Prerequisite: B.S. degree in nursing and enrollment in the Master's Track of the FNP Certificate Program. Focuses on the health and wellness of individuals throughout the lifespan. Critical analyses of nursing interventions in health promotion and maintenance based on nursing and other theoretical frameworks and research data are emphasized. - I. (I.) DeAmicis

266B. Family Nursing Theory (1)

Lecture—1 hour. Prerequisite: enrolled in master's track of the FNP Certificate Program or consent of instructor. Exploration of family theories as related to advanced primary care nursing practices. - I, II, III. (I, II, III.) O'Rourke

266C. Family Nursing Interventions (2)

Lecture — 2 hours. Prerequisite: course 266B and enrollment in the Master's Track of the FNP Certificate Program. Course integrates family theoretical and therapeutic concepts to focus on nursing assessment and intervention strategies for family problems in health and illness.—III. (III.) O'Rourke

266D. Community Assessment and Intervention (1)

Lecture — 1 hour. Prerequisite: enrollment in the Master's Track of the FNP Certificate Program. The relationship between advanced primary care nursing practice and community is explored. Community assessment and intervention strategies appropriate for the family nurse practitioner are discussed. May be repeated two times for credit.-II. (II.) O'Rourké

290. Health Care to Rural and Urban Underserved Populations (1)

Lecture - 1 hour. Prerequisite: Sociology, Political Science, or Applied Behavioral Science background recommended, or registration in Medical School. Discusses sociocultural perspectives of underserved populations impacting health; roles of family/interpersonal relationships in making health care decisions; the nature of ethnic/racial/socioeconomic health care disparities; and clinicians' perspectives in treating people of cultures which are unfamiliar and/or uncomfortable with Western medicine. May be repeated for credit. (S/U grading only.)-I, II, III, IV. (I, II, III, IV.) Nesbitt

Professional Courses

The following courses are for students enrolled in the Family Nurse Practitioner/Physician Assistant (FNP/ PA) Program.

300. Health Assessment for Advanced Practice (4.5)

Lecture/discussion-4.5 hours. Prerequisite: enrolled in the FNP/PA Certificate Program, or consent of instructor. Advanced concepts and skills in health and physical assessment essential to the clinical decision making and caring process for the FNP, PA or advance practice nurse. Emphasis on eliciting an accurate and thorough history and performing a physical examination.—I, II, III, IV. (I, II, III, IV.) O'Rourke

331A. Scientific Basis of Diseases—A (4)

Independent study - 3 hours; lecture/discussionhour. Prerequisite: registered student in the FNP/PA Certificate Program or consent of instructor. Anatomy, physiology and concepts of pathophysiology.—I, II, III, IV. (I, II, III, IV.) Milton

331B. Scientific Basis of Disease—B (1)

Independent study-0.5 hours; lecture/discussion-0.5 hours. Prerequisite: course 331A, registered student in the FNP/PA Certificate Program or consent of instructor. Neurological and renal diseases and abnormalities of adrenal function. Builds on concepts covered in prior coursework; Web-enhanced course.—I, II, III, IV. (I, II, III, IV.) Milton

340A. Clinical Preceptorship for FNP/PA Students (1-13)

Clinical activity - 3-39 hours. Prerequisite: consent of instructor. Restricted to registered students in the Family Nurse Practitioner/Physician Assistant Program. Hands-on clinical experience including supervised patient care, development of clinical skills, assessment and management of patients in the medical ambulatory care setting. May be repeated two times for credit at instructor's recommendation. (\$/U grading only.)—I, II, III, IV. (I, II, III, IV.) Long

340B. Clinical Preceptorship for FNP/PA Students (1-13)

Clinical activity—3-39 hours. Prerequisite: consent of instructor. Restricted to registered students in the Family Nurse Practitioner/Physician Assistant Program. Hands-on clinical experience including supervised patient care, development of clinical skills, assessment and management of patients in the medical ambulatory care setting. May be repeated two times for credit at instructor's recommendation. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.) Long

340C. Clinical Preceptorship for FNP/PA Students (1-13)

Clinical activity-3-39 hours. Prerequisite: consent of instructor. Restricted to registered students in the Family Nurse Practitioner/Physician Assistant Program. Hands-on clinical experience including supervised patient care, development of clinical skills, assessment and management of patients in the medical ambulatory care setting. May be repeated two times for credit at instructor's recommendation. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.) Long

340D. Clinical Preceptorship for FNP/PA Students (1-13)

Clinical activity - 3-39 hours. Prerequisite: consent of instructor. Restricted to registered students in the Family Nurse Practitioner/Physician Assistant Program. Hands-on clinical experience including supervised patient care, development of clinical skills, assessment and management of patients in the medical ambulatory care setting. May be repeated two times for credit at instructor's recommendation. (S/U grading only.)-I, II, III, IV. (I, II, III, IV.) Long

341A. Advanced Clinical Preceptorship for FNP/PA Students (1-13)

Clinical activity—3-39 hours. Prerequisite: consent of instructor; successful completion of course 340. Restricted to registered students in the Family Nurse Practitioner/Physician Assistant Program. Dévelopment of clinical skills learned in course 340 through an approved clinical preceptorship. Assess and manage common medical problems under supervi sion of preceptor. May be repeated two times for credit. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.)

341B. Advanced Clinical Preceptorship for FNP/PA Students (1-13)

Clinical activity-3-39 hours. Prerequisite: consent of instructor; successful completion of course 340. Restricted to registered students in the Family Nurse Practitioner/Physician Assistant Program. Dévelopment of clinical skills learned in course 340 through an approved clinical preceptorship. Assess and manage common medical problems under supervision of preceptor. May be repeated two times for credit. (S/U grading only.)—İ, II, III, IV. (I, II, III, IV.)

341C. Advanced Clinical Preceptorship for FNP/PA Students (1-13)

Clinical activity-3-39 hours. Prerequisite: consent of instructor; successful completion of course 340. Restricted to registered students in the Family Nurse Practitioner/Physician Assistant Program. Development of clinical skills learned in course 340 through an approved clinical preceptorship. Assess and manage common medical problems under supervision of preceptor. May be repeated two times for credit. ((S/U grading only.)—I, II, III, IV. (I, II, III, IV.)

341D. Advanced Clinical Preceptorship for FNP/PA Students (1-13)

Clinical activity-3-39 hours. Prerequisite: consent of instructor; successful completion of course 340. Restricted to registered students in the Family Nurse Practitioner/Physician Assistant Program. Dévelopment of clinical skills learned in course 340 through an approved clinical preceptorship. Assess and manage common medical problems under supervision of preceptor. May be repeated two times for credit. (S/U grading only.)-I, II, III, IV. (I, II, III, IV.)

344. Inpatient Surgical Experience for FNP/ PA Students (3)

Clinical activity-9 hours. Prerequisite: Registration in the FNP/PA program. Course 340, 240A, 240B, 240C, 354A, 354B, 354C, or consent of instructor. Student clerkships in the inpatient setting in surgery at UCDMC and/or affiliated institutions. Designed to expose the students to inpatient management of surgical patients; acquaint student with FNP/PA role in surgical setting. May be repeated two times for credit (Deferred grading only, pending completion of sequence. S/U grading only.)—I, II, III, IV. Long

346. Clinical Geriatrics (3)

Clinical activity—90 hours. Prerequisite: registered student in the FNP/PA program and successful completion of course 340A-340B-340C and 354A-. 354B-354C and 365A-365B-365C or consent of instructor. Application of principles of geriatric care in the outpatient, nursing home, acute hospitals and community settings that provide services for the elderly, including visits to patients' homes. (P/NP grading only; Deferred grading only, pending completion of sequence.)—I, II, III, IV. (I, II, III, IV.) Long

347. Inpatient Medical Experience for FNP/ PA Students (4)

Clinical activity-12 hours. Prerequisite: Registration in the FNP/PA program. Course 340, 240A, 240B, 240C, 354A, 354B, 354C, or consent of instructor. Student clerkships in the inpatient setting in Family Practice at UCDMC and/or affiliated institutions. Designed to expose the students to inpatient management; acquaint student with FNP/PA role in the inpatient setting. May be repeated two times for credit. (Deferred grading only, pending completion of sequence. S/U grading only.)—I, II, III, IV. Long

350. Ethics and Trends in Health Care for FNP/PA Students (2)

Lecture/discussion - 2 hours. Prerequisite: registered student in the FNP/PA Program. Trends and ethical issues in health care, review of the process and policies for ethical decisionmaking in patient care. These issues, trends, and processes will be related to the role of the Family Nurse Practitioner/Physician Assistant.—I. II, III, IV. (II.) Dehn

353. Geriatric Medicine for FNP/PA Students (1)

Lecture - 1 hour. Prerequisite: registered student in the FNP/PA Program. Introduction to advanced concepts in geriatric medicine. Comprehensive assessment, decision making, and management of selected medical problems encountered in primary care. Appropriate consultation and referral are discussed May be repeated two times for credit. - I, II, III, IV. (I, II, III, IV.) O'Rourke

354A-354B-354C. Fundamentals of Primary Health Care for FNP/PAs (3-8)

Lecture/discussion-2 hours; web virtual lecture-1 hour. Prerequisite: enrollment in the Family Nurse Practitioner/Physician Assistant Program. Restricted to students in the Family Nurse Practitioner/Physician Assistant Program only. Anatomy and physiology, pathophysiology, diagnostic criteria, approaches to assess and manage medical problems common in primary care. May be repeated two times for credit.—I, II, III, IV. (I, II, III, IV.) Hass, Milton, Slater

355A. Advanced Principles of Family Health Care (3-8)

Lecture/discussion-2 hours; web virtual lecture-1 hour. Prerequisite: enrollment in the Family Nurse Practitioner/Physician Assistant Program. Restricted to students in the Family Nurse Practitioner/Physician Assistant Program only. Management of infectious disease and reproductive problems in primary health care. Emphasis on comprehensive assess ment, appropriate clinical decision making and management of selected medical problems commonly encountered in primary care settings, appropriate consultation and referral. May be repeated two times for credit. - I, II, III, IV. (Í, II, III, IV.) DeAmicis

355B. Advanced Principles of Primary Health Care (5)

Lecture/discussion - 5 hours. Prerequisite: registered student in the FNP/PA Program; successful completion of course 354A-354B-354C. Anatomy and physiology, pathophysiology, diagnostic criteria, approaches to assessment and management of patients with complex and/or multiple health care problems in primary care settings. – I, II, III, IV. (I, II, III, IV.) Milton

355C. Advanced Principles of Health Care for FNP/PA Students (4)

Lecture/discussion—4 hours. Prerequisite: registered student in the FNP/PA Program; course 354A-354B-354C. Study of anatomy and physiology,

pathophysiology, diagnostic criteria and approaches to assess and manage patients with complex and/or multiple health care problems in primary care settings, and to learn the management of patients in inpatient settings. May be repeated for credit.-I, II, III, IV. (I, II, III, IV.) DeAmicis

355D. Advanced Principles of Health Care for FNP/PA Students (4)

Lecture/discussion-4 hours. Prerequisite: registered student in the FNP/PA Program; course 354A-354B-354C. Study of anatomy and physiology, pathophysiology, diagnostic criteria and approaches to assess and manage patients with complex and/or multiple health care problems in primary care settings, and to learn the management of patients in inpatient settings. May be repeated for credit. — I. (I.)

358A. Pharmacology (2)

Extensive problem solving - 1 hour; tutorial - 1 hour. Restricted to registered students in the Family Nurse Practitioner/Physician Assistant Program. Informs about core knowledge in pharmacokinetics and pharmacodynamics, autonomic nervous system principles, genetic variations, regulatory requirements, mechanism of action, adverse effects, contraindications and clinical therapeutics necessary to make rational and optimal therapeutic plans for patients in ambulatory settings. May be repeated two times for credit. – I, II, III, IV. (I, II, III, IV.) DeAmicis

358B. Pharmacology (2)

Extensive problem solving — 1 hour; tutorial — 1 hour. Restricted to registered students in the Family Nurse Practitioner/Physician Assistant Program. Provides core knowledge in pharmacology to include mechanism of action, dosages, adverse effects, contraindi-cations and clinical therapeutics necessary to make rational and optimal therapeutic plans for patients in ambulatory settings. Specific organ systems (i.e., cardiovascular, gastrointestinal) are reviewed. May be repeated two times for credit. - I, II, III, IV. (I, II, III, IV.) DeAmicis

358C. Pharmacology (2)

Extensive problem solving — 1 hour; tutorial — 1 hour. Restricted to registered students in the Family Nurse Practitioner/Physician Assistant Program. Provides core knowledge in pharmacology to include mechanism of action, dosages, adverse effects, contraindications and clinical therapeutics necessary to make rational and optimal therapeutic plans for patients in ambulatory settings. Specific organ systems (i.e., cardiovascular, gastrointestinal) are reviewed. May be repeated two times for credit. - I, II, III, IV. (I, II, III,

361. Family Theory and Assessment (1)

Lecture-1 hour. Prerequisite: registered student in the FNP/PA Program. Examines the family using a family system framework within the context of its internal dynamics, relationship to community and cultural variations. May be repeated two times for credit.-I, II, III, IV. (II.) O'Rourke

367A. Family Practice and Community Health for FNP/PA Students (2)

Lecture/discussion-2 hours. Prerequisite: registered student in the FNP/PA Program. Examines pediatric and adolescent concepts of growth and development as related to primary health care. Primary health care issues and needs will be assessed in relationship to family and community. Health promotion and disease concepts. May be repeated two times for credit. - I, II, III, IV. (I, II, III, IV.) DeAmicis

367B. Family Practice and Community Health for FNP/PA Students (1)

Lecture/discussion-1 hour. Prerequisite: registered student in the FNP/PA Program. Examines concepts of adult growth and development as related to primary health care. Issues and needs of the adult are examined in relationship to family and community, health promotion, disease prevention and wellness concepts. May be repeated two times for credit.—I, II, III, IV. (I, II, III, IV.) O'Rourke

367C. Family Practice and Community Health for FNP/PA Students (1)

 $\begin{array}{c} \text{Lecture/discussion-1 hour. Prerequisite: registered} \\ \text{student in the FNP/PA Program. Examines concepts} \end{array}$ of development in the elderly as related to primary health care. Health care issues and unique needs are presented with an emphasis on health promotion and disease prevention. May be repeated two times for credit. - I, II, III, IV. (I, II, İII, IV.) O'Rourke

368A. Behavioral Science for FNP/PA Students (1)

Lecture/discussion—1 hour. Prerequisite: registered student in the FNP/PA Certificate Program or consent of instructor. Principles of effective communication in therapeutic provider-patient relationship. History taking techniques that foster empathy and respect. Biopsychosocial model of health care. - I, II, III, İV. (I, II, İII, İV.) Stewart

368B. Behavioral Science (1)

Lecture/discussion-1 hour. Prerequisite: completion of course 368A and registered student in the Family Nurse Practitioner/Physician Assistant Program. Exploration into a variety of addictive behaviors within diverse populations. Utilization of clinical case studies to develop skills in the identification, interview and management of these patients and recognition of how these behaviors impact the family system.—I, II, III, IV. (I, II, III, IV.) Hass

368C. Behavioral Science (1)

Lecture/discussion-1 hour. Prerequisite: registered student in the Family Nurse Practitioner/Physician Assistant Program. Multicultural perspectives of health. Traditional health, beliefs and healing practices of several California cultures. - I, II, III, IV. (I, II, III, IV.) Slater

368D. Behavioral Science for FNP/PA Students (1)

Lecture - 1 hours. Prerequisite: registered student in the FNP/PA Program. Basic principles of assessment, counseling and treatment of individual patients, their families and support systems as they experience the effects of chronic illnesses, chronic pain, terminal diseases, death and grieving, Students are strongly encouraged to explore their coping styles. May be repeated two times for credit.—I, II, III, IV. (I, II, III, IV.) Stewart

370A-370B-370C-370D-370E-370F. Clinical Case Seminars for FNP/PA Students (1.5-1.5-1.5-1.5-1.5)

Seminar — 1.5 hours. Prerequisite: registered student in the FNP/PA Program. Designed to increase critical thinking by utilizing the development and processing of the differential diagnoses of several cases based on the topics covered in the medicine course (course 354, 355) taught the same quarter. May be repeated two times for credit. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.) Himmerick

372A. Professional Development for FNP/ PA Students (1.5)

Lecture/discussion - 1.5 hours. Prerequisite: registered student in the Family Nurse Practitioner/Physician Assistant Program. Understanding the Family Nurse Practitioner (FNP) and Physician Assistant (PA) roles, history of the profession and impact of FNP and PA on health care systems; critical review of medical literature including introduction to evidence based medicine and statistics; managed care. (Deferred grading only, pending completion of sequence.)—I, II, III, IV. (I, II, III, IV.) Milton

372B. Professional Development for FNP/ PA Students (1.5)

Lecture/discussion - 1.5 hours. Prerequisite: registered student in the Family Nurse Practitioner/Physician Assistant Program. Roles of the Family Nurse Practitioner (FNP) and Physician Assistant (PA) including legal and regulatory issues affecting practice, licensing requirements, elements of negotiating a job, legislative and political awareness, and community involvement. (Deferred grading only, pending completion of sequence.) – I, II, III, IV. (I, II, III, IV.) Hass

390. Health Care of the Western Farmworkers (2)

Independent study—1.2 hours; clinical activity—2.4 hours. Prerequisite: Enrollment in the Family Nurse Practitioner/Physician Assistant Program. Basic concepts for providing primary health care to migrant and seasonal agricultural workers. (P/NP grading only; deferred grading only, pending completion of sequence.)—I, II, III, IV. (I, II, IV.) DeAmicis

395. Health Care to Underserved Populations (1)

Lecture - 1 hour. Prerequisite: Sociology, Political Science, or Applied Behavioral Science background recommended, or registration in medical school. Discusses sociocultural perspectives of underserved populations impacting health; roles of family/interpersonal relationships in making health care decisions; the nature of ethnic/racial/socioeconomic health care disparities; and clinicians' perspectives in treating people of cultures which are unfamiliar and/or uncomfortable with Western medicine. May be repeated for credit. (S/U grading only.)—II, III. (II, III.) Nesbitt

396. LGBTIQQA Healthcare Lecture Series (1)

Lecture-6 sessions. Increase awareness of medical issues surrounding the LGBTIQQA community and arm students with knowledge of the health disparities the community faces. Provide better quality care to the LGBTIQQA patients cared for as physicians. May be repeated for credit. (S/U grading only.)—II. (II.) Callahan, Latimore

399. Special Study (1-12)

Prerequisite: enrolled in the FNP/PA Certificate Program or consent of instructor. Research and clinical interests to enhance education in family practice. (S/ U grading only.)—I, II, III, IV. (I, II, III, IÚ.) Dehn

Professional Courses

401. Introductory Preceptorship in Family Practice (3-9)

Clinical activity - 20-40 hours. Prerequisite: completion of first year of medical training. Preceptorship in family practice offered as an introduction to clinical medicine. 20 hours or 40 hours per week in a family physician's office, doing patient interviews, historytaking, and performing physical exams. (H/P/F grading only.) - III, IV. (III, IV.) Eidson-Ton

405. The Healer's Art (1)

Lecture — 0.6 hours; workshop — 3 hours. Prerequisite: consent of instructor. Limited to first-year medical students. Learning to strengthen your humanity and remain open-hearted can make the difference between professional burnout and a fulfilling life Opportunity to learn tools for self care, healing loss, finding meaning, strengthening commitment and becoming a true physician. (P/F grading only.)—II. (II.) Eidson-Ton, Neyhart

411. Selected Studies of Systems for Chronic Illness Care (3)

Clinical activity-4 hours; discussion-4 hours. Prerequisite: course 400A, 400B, 400C, medical students with consent of instructor. Understanding of chronic illness, particularly diabetes, participation in patient care, alternative techniques. May be repeated one time for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Fong

430. Primary Care Clerkship (12)

Clinical activity-45 hours; lecture-2 hours; work shop-2 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Eight week primary care clerkship for third year medical students. Four week primary care experience with an additional four weeks in Internal Medicine clinics. (H/P/F grading only.)-I, II, III, IV. Eidson-Ton

434. Primary Care Clinics-Clínica Tepati (3-12)

Clinical activity - 32-36 hours; seminar - 0-2 hours; lecture - 1-2 hours. Open to medical students in all four years of medical school. Medical students will learn counseling, diagnosis and treatment of patients with chronic and acute disease under supervision of physician. Provides exposure to special health care

needs of various ethnic and poverty-level populations. May be repeated for credit. (P/F grading only.)-I, II, III, IV. (I, II, III, IV.) Hitzeman

435. Primary Care Clinics-Imani Clinic (3-12)

Clinical activity - 32-36 hours; seminar - 0-2 hours; lecture — 1-2 hours. Open to medical students in all four years of medical school. Learn counseling, diagnosis and treatment of patients with chronic and acute disease under supervision of physician. Provides exposure to special health care needs of various ethnic and poverty-level populations. May be repeated for credit. (P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Smith

436. Continuity Clinic in Primary Care— Shifa Clinic (3-12)

Clinical activity—32-36 hours; seminar—0-2 hours; lecture - 1-2 hours. Open to medical students in all four years of medical school. Learn counseling, diagnosis and treatment of patients with chronic and acute disease under supervision of physician. Provides exposure to special health care needs of various ethnic and poverty-level populations. May be repeated for credit. (P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Yasmeen

437. Primary Care Clinics-Knights Landing

Clinical activity - 2-3 hours; lecture - 1 hour. Must complete an application and interview prior to registering. Learn counseling, diagnosis and treatment of patients with chronic and acute disease under supervision of physician. Provides exposure to special health care needs of various ethnic and poverty-level populations in the community of Knights Landing. May be repeated for credit. (P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Eidson-Ton

439D. Directed Clinical Studies in Family Medicine (1-12)

Clinical activity-40 hours. Prerequisite: consent of instructor. Individual directed studies in extended preparation for modified curriculum or to complete a clinical rotation following a leave of absence. May be repeated for credit. (P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

439R. Directed Studies in Family Medicine (1-12)

Clinical activity-30 hours; independent study-10 hours. Prerequisite: consent of instructor. Individual directed studies in extended preparation for remediation of all or part of clinical rotation. Clinical studies to accommodate and satisfy remedial work as directed by the Committee on Student Progress and approved by the course IOR. May be repeated for credit. (P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

444. Advanced Preceptorship in Family Medicine (3-18)

Clinical activity—40 hours. Prerequisite: completion of third-year primary care plus clerkship or consent of instructor. Preceptorships with primary care physicians in a variety of settings. Acquisition skills to evaluate and develop a treatment plan for patients with common medical problems seen by primary care physicians in an out patient setting. May be repeated up to 18 units of credit. (H/P/F grading only.)-I, II, III, IV. Eidson-Ton

450. CAM in Family & Community Health (3-18)

. Variable – 20-40 hours. Intended to grant units for away rotations; not offered at the UC Davis Medical Center. Complementary and alternative medicine courses at away institutions that cover various aspects of integrative medicine, including but not limited to: botanicals, homeopathy, mind/body, naturopathy, nutrition, traditional Chinese medicine, osteopathy, and energy medicine. Offered irregularly. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

460. Geriatrics in Community Health (3-6)

Fieldwork-24 hours; clinical activity-12 hours; lecture-4 hours. Prerequisite: course 430. Visits to community agencies including mental health teams, adult day health centers, a diagnostic and research center, and case management specialists. Observation and participation in MMSE's, patient-family conferences, interdisciplinary team meetings, neuropsychiatric testing and home visit evaluations. (H/P/F grading only.)—I, II, III, IV. Lin

468. International Preceptorship (3-12)

Clinical activity-40 hours. Prerequisite: medical student with consent of instructor. Preceptorship with a family practitioner in a foreign country (arranged by student contact or with assistance of the Family and Community Medicine Department.) Participate in clinical activities, analyze and report characteristics of the practice. May be repeated up to 12 units of credit. (H/P/F grading only.)—I, II, III, IV. Edison-Ton

469. Inpatient Acting Internship in Family Medicine (3-12)

Clinical activity-40 hours. Prerequisite: completion of third-year of medical school or consent of instructor. Open to medical students only. Comprehensive primary medical care of inpatients on a family medicine hospital service. Available sites are universitybased family medicine residency programs and programs within the UC Davis Network of Affiliated Family Medicine Residency Programs. May be repeated up to 12 units of credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Eidson-Ton

470. Inpatient Clinical Elective in Family Medicine (3-12)

Clinical activity-40 hours. Prerequisite: completion of third-year of medical school or consent of instructor. Open to medical students only. Comprehensive primary medical care of patients on a family medicine hospital service. Usually includes inpatient and outpatient experience. May be repeated up to 12 units of credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Eidson-Ton

475. Combined Inpatient/Outpatient Clinical Elective in Family Medicine (3-12)

Clinical activity—40 hours. Prerequisite: completion of third-year of medical school or consent of instructor. Open to Medical students only. Combined inpatient and outpatient elective. Consists of comprehensive primary medical care of patients on a family medicine hospital service and in a family medicine outpatient clinic. May be repeated up to 12 units for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Eidson-Ton

488. Selected Studies in Family Practice (1-

Prerequisite: medical students with consent of instructor. Assigned readings in family practice to increase understanding on selected topics relating to family medicine and primary health care delivery; visits to and written analysis of selected health care programs; and/or exposure to family practice with a community physician preceptor who is a member of the clinical faculty. May be repeated up to 9 units of credit.—I, II, III, IV.

490. Health Care to Underserved Populations (1)

Lecture - 1 hours. Prerequisite: Sociology, Political Science, or Applied Behavioral Science background recommended, or registration in medical school. Discusses sociocultural perspectives of underserved populations impacting health; roles of family/interpersonal relationships in making health care decisions; the nature of ethnic/racial/socioeconomic health care disparities; and clinicians' perspectives in treating people of cultures which are unfamiliar and/or uncomfortable with Western medicine. May be repeated for credit. (P/F grading only.)—I, II. (I,

493. Aging and Health (6)

Seminar - 12 hours. Prerequisite: consent of instructor. Is disease and infirmity the inevitable consequence of aging? We will spend four weeks exploring this question by reviewing the biology of aging, physiologic changes seen in aged individuals and disease processes commonly found in elderly persons. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Lin, Neyhart

495. LGBTIQQA Healthcare Lecture Series

Lecture - 6 sessions. Increase the awareness of medical issues surrounding the LGBTIQQA community and arm students with knowledge of the health disparities the community faces. Provide better quality care to the LGBTIQQA patients cared for as physicians. May be repeated for credit. (P/F grading only.)—II. (II.) Callahan, Latimore

498. Directed Group Study (1-5)

Variable - 3-15 hours. Explore in-depth various topics in primary care. Extensive contact with and oversight by instructor. May be repeated for credit. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.) Edi-

499. Research (1-12)

Prerequisite: medical students with consent of instructor. Research in various aspects of the health care delivery system. (H/P/F grading only.)

Human Physiology (HPH)

Lower Division Course

99. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses 192. Internship in Human Physiology

Internship—3-36 hours; final report. Prerequisite: upper division standing; approval of project prior to period of internship by preceptor. Supervised work experience in physiology and related fields. (P/NP grading only.)

198. Directed Group Study (1-5)

To be arranged. Prerequisite: consent of instructor. Directed reading, discussion and/or laboratory experience on selected topics. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Laboratory—3-15 hours; undergraduate research project. Prerequisite: senior standing in biology, chemistry, physics, psychology, or engineering. (P/ NP grading only.)

Graduate Courses

210A. Advanced Physiology (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: Physiology Ph.D. program, or consent of instructor. Advanced course in general principles of physiology, surveying homeostasis, cellular and selected topics, and neurophysiology. (Same course as Physiology 210A.)—I. (I.) Cala, Payne

298. Group Study (1-5)

Prerequisite: consent of instructor. For graduate students desiring to explore particular topics in depth. Lectures and conferences may be involved.

299. Research (1-12)

Prerequisite: consent of instructor. (S/U grading

Professional Courses

400. Human Physiology (6)

Lecture—3 hours; laboratory—2 hours. Medical student only. General and cellular physiology of neurons, muscle, and epithelial cells and systemic physiology of cardiovascular, respiratory, gastrointestinal, and renal systems. (Deferred grading only, pending completion of sequence.) (P/F grading only.)—I, IV. (I, IV.) Payne, Widdicombe

403. Medical Neuroanatomy (5)

Lecture-3 hours; laboratory-1 hours; discussion/ laboratory—1 hour. Prerequisite: Successful completion of course 400, block 1; restricted to medical students only. Anatomy of the normal human nervous system, to include gross external and internal morphology of brain and spinal cord, and function neuroanatomy of motor, sensory and cognitive systems. Incorporates application of neuroanatomy to clinical problem solving. (Same course as Cell Biology and Human Anatomy 403.) (P/F grading only.)—IV. (IV.) Blankenship, Gross

405. Metabolism, Endocrinology, Reproduction and Nutrition (9.5)

Lecture - 3.8 hours; discussion/laboratory - 2.8 hours. Prerequisite: consent of instructor. Medical Student only. Basic and pathophysiologic processes involved in human metabolic and nutritional regulation and in reproductive and endocrine control system across the lifespan. Integrate information across these systems and use the clinical reasoning process to identify and understand relevant perturbations and diseases. (Same course Biological Chemistry 405, Internal Medicine 405, Obstetrics and Gynecology 405.) (P/F grading only; deferred grading only, pending completion of sequence.)-II, III. (II, III.) Long, Sweeney, Towner

493. Physiological Principles in SICU SSM

Lecture - 5 hours; lecture/laboratory - 10 hours; laboratory—16 hours; clinical activity—4 hours. Prerequisite: consent of instructor; restricted to UC Davis School of Medicine students only. Special Study Module, a four week course on the topic: Care of the Critically III Surgical Patient: Use of Physiological Principles to Guide Treatment of Patients with Common Surgical Problems. (Same course as Surgery 493C.) (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Cala, Holcroft

497T. Tutoring in Human Physiology (1-5)

Tutoring — 3-15 hours. Prerequisite: advanced standing or consent of instructor. Assist instructor by tutoring medical students in preparation for one of the departmental courses that is a component of the required curriculum of the School of Medicine. (H/ P/F grading only.)—Cala

498. Directed Reading and Group Study (1-4)

Discussion – 2-8 hours. Prerequisite: medical student. Directed reading and discussion on selected topics in human physiology. (H/P/F grading only.)

499. Research (1-6)

Prerequisite: medical students with consent of instructor. Laboratory investigation on selected topics. (H/ P/F grading only.)

Internal Medicine (IMD)

Lower Division Courses 92. Internship (1-4)

Internship—3-12 hours. Prerequisite: lower division standing and consent of instructor. Supervised internship in internal medicine and related fields. (P/NP grading only.)—Last

98. Directed Group Study (1-2)

Seminar — 1-2 hours. Prerequisite: lower division standing and consent of instructor. Directed group study in medicine and related fields. (P/NP grading only.)—Last

99. Undergraduate Research in Medicine: Molecular and Cell Biology (1-3)

Prerequisite: consent of instructor. (P/NP grading only.) — Last

Upper Division Courses

192. Internship in Internal Medicine (1-12)

Internship - 3-36 hours; final report. Prerequisite: upper division standing. Supervised work experi ence in internal medicine and related fields. (P/NP grading only.)

194. Practicum in Community Health Clinics (1-3)

Clinical activity—5-15 hours on Saturday mornings and during the week as necessary, excluding holidays. Prerequisite: consent of instructor. The undergraduate student, through active participation in the medical aspects of community health clinics, gains knowledge of the organization, administration, and problem-solving capabilities of these primary care facilities. May be repeated for credit. (P/NP grading only.)—I, II, IÍI, IV. (I, II, III, IV.) Kumagai

198. Directed Group Study (1-2)

Seminar - 1-2 hours. Prerequisite: consent of instructor. Directed group study in medicine and related fields. (P/NP grading only.)—Last

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: upper division standing; consent of instructor. (P/NP grading only.)

Graduate Courses

214. Topics in Medical Ethics (1)

Seminar-1 hour. The complex moral, legal, and ethical dilemmas that patients, families, and health care providers face in today's clinics. May be repeated one time for credit. (S/U grading only.)—I.

220D. Cardiovascular System (2.5)

Lecture/discussion-5.5 hours. Prerequisite: Human Physiology 200, graduate student status and consent of instructor. Principles of etiology, mechanisms, diagnosis and management of the major diseases of the cardiovascular system. Included are ischemic, valvular, hypertensive, cardiomyopathic, pericardial, and electrical disorders. —II. (II.) Laslett

250. Medicine and the Law (3)

Lecture/discussion-2 hours; project-2 hours. Legal and bioethical principles and concepts in medicine. Topics include standard of care, informed consent, reproductive medicine, and end-of-life issues. (S/U grading only.)—II. Rich

290C. Controversies in Clinical Research (1)

Seminar-3 hours. Clinical Research Study design and data analysis related to controversial research areas. Presentations assigned to and given by faculty/student teams. May be repeated for credit. (S/U grading only.)—III. (III.) Lane, Meyers

Professional Courses

405. Metabolism, Endocrinology, Reproduction and Nutrition (9.5)

Lecture - 3.8 hours; discussion/laboratory - 2.8 hours. Prerequisite: consent of instructor. Medical Student only. Basic and pathophysiologic processes involved in human metabolic and nutritional regulation and in reproductive and endocrine control system across the lifespan. Integrate information across these systems and use the clinical reasoning process to identify and understand relevant perturbations and diseases. (Same course Biological Chemistry 405, Human Physiology 405, and Obstetrics and Gynecology 405.) (P/F grading only; deferred grading only, pending completion of sequence.)—II, III. (II, III.) Long, Sweeney, Towner

414. One Health: A Course on Global Health (1)

Conference - 8 hours. Global health problems are complex and require culturally-sensitive, sociallyacceptable, and action-oriented approaches to create practical and cost-effective solutions. Will examine major health problems created by the convergence of human, animal, and environmental influences. May be repeated for credit. (P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Wilkes

416. Summer Institute on Race and Health (6)

Independent study-30 hours. Prerequisite: consent of instructor. Limited enrollment. Using field trips media, readings, and clinical experiences, 8-10 first year medical students will explore issues of race, health disparities and related issues in a 4 week institute during the summer break. (P/F grading only.)—II. (II.) Fancher, Fernandez, Garcia, Murray-

420A. Hematology (2)

Lecture/discussion-1 hour; discussion-1 hour. Prerequisite: consent of instructor. Restricted to Medical students only. Malignant disorders of blood cells and transfusion therapy. Covers acute leukemia, myelodysplasia, myeloproliferative disorders, lymphoma, and myeloma. (P/F grading only.)—I. (I.) O'Donnell

420B. Gastrointestinal System (2.5)

Lecture - 2 hours; discussion - 2 hours. Prerequisite: approval of Committee on Student Progress; medical student only. Basic pathophysiologic principles of digestive diseases on which clinical concepts and judgments can be developed. Emphasis on pathophysiologic basis of gastroenterological and

hepatic disorders with discussion of major disorders and their diagnosis and management. (P/F grading only.)—II. (II.) Terrado

420C. Pulmonary and Critical Care Medicine (2.5)

Laboratory/discussion-5.5 hours. Prerequisite: approval of Committee on Student Progress. Clinical aspects of respiratory anatomy, physiology, and pathology. Diagnostic procedures and a description of the major pulmonary diseases and disorders, and critical care medicine. (P/F grading only.)—II. Stollenwerk

420D. Cardiovascular System (2.5)

Lecture/discussion - 5.5 hours. Prerequisite: approval of the School of Medicine Committee on Student Progress. Principles of etiology, mechanisms, diagnosis and management of the major diseases of the cardiovascular system. Included are ischemic, valvular, hypertensive, cardiomyopathic, pericardial, and electrical disorders. (P/F grading only.)-II. Venugopal

420E. Nephrology (2)

Lecture - 2 hours; discussion - 2 hours; laboratory -2 hours. Prerequisite: approval of Student Progress Committee. Fundamental aspects of disorders of body water, electrolytes and acid/base balance; major categories and mechanisms of parenchymal renal diseases; urinary tract infections. (P/F grading only.)-II. Yeun

430. Medicine Clerkship (12)

Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Clerkship is divided into two, four-week blocks, one each at UCDMC and at Kaiser Hospitals. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. (H/P/F grading only.)-I, II, III, IV. Prescott

439D. Directed Clinical Studies in Internal Medicine (1-12)

Clinical activity-40 hours. Prerequisite: consent of instructor. Individual directed studies in extended preparation for modified curriculum or to complete a clinical rotation following a leave of absence. May be repeated for credit. (P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

439R. Directed Studies in Internal Medicine

Clinical activity—30 hours; independent study—10 hours. Prerequisite: consent of instructor. Individual directed studies in extended preparation for remediation of all or part of clinical rotation. Clinical studies to accommodate and satisfy remedial work as directed by the Committee on Student Progress and approved by the course IOR. May be repeated for credit. (P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

450A. Medicine and the Law (1.5)

Seminar-2 hours; discussion-2 hours. Prerequisite: consent of instructor. Restricted to Medical students only. Legal and bioethical principles and concepts in medicine. Topics include standard of care, informed consent, reproductive medicine, and end-of-life issues. Offered irregularly. (Deferred grading only, pending completion of sequence. H/P/F grading only.) - II. (II.) Rich

450B. Medicine and the Law (1.5)

Seminar-2 hours; discussion-2 hours. Prerequisite: consent of instructor. Restricted to Medical students only. Legal and bioethical principles and concepts in medicine. Topics include standard of care, informed consent, reproductive medicine, and end-of-life issues. Offered irregularly. (Deferred grading only, pending completion of sequence. H/P/F grading only.)—III. (III.) Rich

459. Oncology: Research and Treatment of Cancer (2)

Lecture/discussion - 2 hours. Prerequisite: second-, third-, or fourth-year medical student and/or consent of instructor. Comprehensive review of current treatment practices of cancer and state-of-the-art research impacting treatment and prevention of cancer. Emphasis on epidemiology, molecular biology, and pharmacology. (H/P/F grading only.)—I. (I.)

460. Correctional Health Care Clerkship (1-4)

Clinical activity—full time. Prerequisite: fourth-year medical student in good academic standing. Covers Correctional Health delivery and the effects of detention and incarceration on health status. Special emphasis on problems unique to health care delivery in a prison setting. Student will spend time in clinical settings at three prison facilities. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Silva

462. Externship in Medicine (6)

Clinical activity—40 hours. Prerequisite: Medical Sciences 431; consent of Instructor; demonstrated ability to accept responsibility. Limited enrollment. Assume role of acting intern and be primary physician on medical ward under direction of medical resident and staff. Teams I-V take call every fifth night. Emphasis on evidence-based inpatient care. (H/P/F grading only.) - I, II, III, IV. (I, II, III, IV.) Henderson

463. Acting Internship in Medicine Intensive Care Unit (MICU) (6)

Clinical activity—40 hours. Prerequisite: completion of third year in medical school; consent of Director of MICU. Limited enrollment. At UCDMC, student functions as acting intern on MICU service under direction of medical resident and staff. Responsibility for patients admitted to MICU. On call in hospital every fourth night. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Albertson

464. Bayanihan Primary Care Clinic (3)

Clinical activity-6 hours. Prerequisite: consent of instructor. Restricted to medical students in all four years of medical school. Under the guidance and supervision of a physician, medical students will learn patient history taking, medical documentation, counseling, diagnosis and treatment of patients with chronic and acute disease. Provides exposure to the special needs of various ethnic and socioeconomic groups. May be repeated for credit. (P/F grading only.)-I, II, III, IV. (I, II, III. IV.) Guerrero

465. Medicos-Global Health Sciences (9)

Lecture-5 hours; clinical activity-25 hours; fieldwork-5 hours; project-5 hours. Prerequisite: consent of instructor; medical students only. Travel to foreign country for four weeks to collaborate with faculty from local universities and work in urban and rural environments, including hands-on experience with clinic patients. Cultural exchange and awareness of global health care. (P/F grading only.)—IV. (IV.) Wilkes

468. Ambulatory Internal Medicine Externship (3-18)

Clinical activity—40 hours. Prerequisite: course 430; consent of instructor; demonstrated ability to accept responsibility. Limited enrollment. Hands-on primary care clinical experience in the ambulatory setting supervised by a general internist. Emphasis on evidence-based outpatient care. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.) Henderson

470. Landmark Clinical Trials and Evidence-Based Medicine (3)

Lecture/discussion-10 hours; clinical activity-8 hours. Prerequisite: fourth-year medical student. Ten landmark clinical trials from a historical, clinical, and epidemiological/research perspective. Principals of evidence-based medicine. (H/P/F grading only.)—III. Kravitz, Amsterdam

480. Person Centered Assessment (1)

Lecture-1 hour. Prerequisite: open to all medical students. Person-centered assessment modalities and diagnostic approaches with regards to Internal Medicine and its different subspecialties. (P/F grading only.)—I. Fitzgerald

494. Practicum in Community Health Clinics (1-3)

Clinical activity – 15-40 hours. Prerequisite: medical student with consent of instructor. Students are assigned to clinical settings that demonstrate ethnic, urban/rural, or other related aspects of clinical community health. Through active participation in health care delivery, students are able to relate conceptual with practical aspects of primary health care. May be repeated for credit. (H/P/F grading only.)-I, ÍI, III. (I, II, III.) Kumagai

497. Medicine, Bioethics and the Holocaust

Lecture/discussion—10 hours. Prerequisite: medical students only, consent of instructor. The concept of "evil" and the role of collaborators, bystanders and participants exemplified by the holocaust and compared to problems physicians face in practice today. Demonstration that evil emerges incrementally until taken for granted. (P/F grading only.) Not offered every year.--I, II, IÌI.

498. Group Study in Internal Medicine

Prerequisite: consent of instructor. Special study for medical students which may involve laboratory or library research, ambulatory or inpatient care responsibility on campus, at UCDMC or off campus by specific arrangement. (H/P/F grading only.)-I, II, III, IV. (I, II, III, ĬV.)

499. General Medicine Research (1-18)

Independent study—20 hours. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Meyers

Internal Medicine—Cardiology (CAR)

Upper Division Courses 192. Internship in Cardiology (1-12)

Internship - 3-36 hours; final report. Prerequisite: upper division standing; approval of project by preceptor prior to internship. Supervised work experience in cardiology. May be repeated for credit up to 12 units. (P/NP grading only.)

199. Cardiology Research (1-5)

Prerequisite: consent of instructor. Special study by individual arrangement in cardiovascular medicine. Work will include directed readings, laboratory and discussions. (P/NP grading only.)

Graduate Course

220. Basic Science in Cardiology (1)

Lecture — 1 hour. Prerequisite: graduate or medical student status. Fundamentals underlying cardiovascular medicine. Including hemodynamics, neural control of the circulation, biochemistry and some experimental design and statistics. Experts in each of these fields will give current information in their areas. Offered in alternate years. (S/U grading only.) - III. Kaufman

Professional Courses 401. Clinical Cardiology Clerkship: Kaiser (3-18)

Clinical activity (4 weeks) -8-12 hours (hospital); 1-5 hours (clinics). Prerequisite: third- and fourth-year medical students with advance approval by Division of Cardiology. Emphasis placed on history taking and physical examination of pediatric and adult patients with congenital and acquired cardiovascular disease. Hospital rounds in CCU and elsewhere. The roles of ECG, PCG, and cardiac fluoroscopy, etc., in office cardiology will be evaluated. May be repeated for credit. Limited enrollment. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.)

460. Cardiology Clinical Clerkship (3-18)

Clinical activity—full time (2-12 weeks). Prerequisite: Internal Medicine 430, third- and fourth-year medical students in good academic standing with consent of instructor. Participation with members of subspecialty consultation service in initial clinical evaluation, work-up, management, and follow-up of patients with cardiologic disorders. Two outpatient clinics per week. May be repeated for credit. Limited enrollment. (H/P/F grading only.)—I, II, III, IV.

461. Management of Coronary Artery Disease: Coronary Care Unit (3-18)

Clinical activity (inpatient service)—full time (4 weeks). Prerequisite: completion of second year of medical school and advance approval by Division of

Cardiology. Research in laboratory and exercise testing to be determined by instructor. Current methods of clinical research involving certain aspects of diagnosis and treatment. Includes acute coronary care, hemodynamic monitoring, stress testing, cardiac catheterization, pathologic correlations and the modern approach to therapy, both medical and surgical, based on pathophysiologic mechanisms. May be repeated for credit. Limited enrollment. (H/P/F grading only.) — I, II, III, IV. (I, II, III, IV.)

464. Preventive Cardiology (3-6)

Seminar - 2 hours (for 2-4 weeks); clinical activityfull time (2-4 weeks). Prerequisite: completion of third year of medical school. Clinical experience, weekly seminar and reading on primary and secondary prevention of cardiovascular disease. Will be carried out in Lipid and Hypertension Clinics, Exercise Laboratory, Cardiac Care Unit, Cardiac Catheterization, and Cardiac Surgery services. (H/P/F grading only.)—II, III, IV. (II, III, IV.) Amsterdam

480. Insights in Cardiology (1-3)

Clinical activity - 3-9 hours. Prerequisite: medical student in good academic standing and approval by Division of Cardiology. Students attend one or more cardiovascular medicine clinics: general, hypertension, arrhythmia. Introduction to the diagnosis/treatment of common cardiovascular problems. (H/P/F grading only.) - I, II, III, IV. (I, II, İİI, IV.)

493. Gender Specific Medicine SSM (6)

Lecture - 5 hours; lecture/laboratory - 10 hours; laboratory-16 hours; clinical activity-4 hours. Prerequisite: consent of instructor; restricted to UC Davis School of Medicine students only. Special Studies Module, a four week course on the topic: Basic Science Principles Relating to Gender Specific Medicine. (Same course as Obstetrics & Gynecology 493.) (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Sweet, Villablanca

498. Special Group Study: EKG Unit (1-12)

Special study-2-week sessions. Prerequisite: medical students with advance approval by monthly attending faculty. Special group study in cardiology for medical students in EKG unit. May include lectures, directed reading, and/or discussion groups. May be repeated for credit. Limited enrollment. (H/ P/F grading only.)

499. Research (1-12)

Prerequisite: approval by Division of Cardiology. (H/P/F grading only.)

Internal Medicine—Endocrinology, Diabetes and Metabolism (ENM)

Upper Division Course

192. Internship in Endocrinology (1-12)

Internship - 3-36 hours; final report. Prerequisite: upper division standing; approval of project by preceptor prior to internship. Supervised work exper ence in endocrinology. May be repeated for credit up to 12 units. (P/NP grading only.)

Graduate Course

299. Research (1-12)

Prerequisite: consent of instructor. Endocrinology research. (S/U grading only.)

Professional Courses

460. Endocrinology Clinical Clerkship (3-18)

Clinical activity (inpatient-outpatient service) - full time (3 days per unit). Prerequisite: Internal Medicine 430 and/or consent of instructor. Participation with members of subspecialty service in the initial evaluation, work-up, management and follow-up of patients with endocrinologic disorders. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

465. Clinical Nutrition Clerkship (3-18)

Clinical activity—30 hours. Prerequisite: completion of Internal Medicine 430; consent of IOR. In-depth experience in assessment and monitoring of nutritional support of patients whose illnesses are complicated by malnutrition and of patients with problems in under-nutrition due to various illnesses. May be repeated for credit. (H/P/F grading only).-I, II, III, IV. (I, II, III, IV.) Prescott

480. Insights in Endocrinology (1-3)

Clinical activity - 3-9 hours; oral presentation. Prerequisite: student in good academic standing and consent of instructor. First- or second-year students observe in morning Endocrine and Diabetes clinics and attend bi-weekly noon and afternoon endocrine conferences. They also give brief endocrine physiology oral presentation to the endocrine group. (H/P/F grading only).—I, II, III, IV. (I, II, III, IV.)

499. Research (1-12)

Prerequisite: consent of instructor. (H/P/F grading only.)

Internal Medicine— **Gastroenterology (GAS)**

Upper Division Course

192. Internship in Gastroenterology (1-12)

Internship - 3-36 hours; final report. Prerequisite: upper division standing; approval of project by preceptor prior to internship. Supervised work experience in gastroenterology. May be repeated for credit up to 12 units. (P/NP grading only.)

Graduate Course

299. Research (1-12)

Research in gastroenterology. (S/U grading only.)

Professional Courses

460. Clinical Clerkship (3-18)

Clinical activity-full time (2 to 12 weeks). Prerequisite: completion of third year of medical school. Work-up, manage, and follow-up new patients on active inpatient consulting service. Gastroenterology/Hepatology patients. Daily rounds with attending physician. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

480. Insights in Gastroenterology (1-3)

Clinical activity—3-9 hours. Prerequisite: student in good academic standing and consent of instructor. To gain insight in clinical activities of Gastroenterology Division through attendance at any of the following: endoscopic procedures, ward rounds, outpatient clinic, and G.I. grand rounds. (H/P/F grading only.) - I, II, III, IV. (I, II, III, IV.) Leung

499. Research (1-12)

Clinical activity-varied. Prerequisite: medical student status; consent of instructor. Part-time participation in active clinical and basic research projects. Some will involve both patient care and relevant laboratory procedures. Basic research includes liver metabolism, cancer markers, porphyrias diet and cancer, folate metabolism. May be repeated for credit. (H/P/F grading only.)

Internal Medicine—General Medicine (GMD)

Upper Division Course

192. Internship in General Medicine (1-12)

Internship - 3-36 hours; final report. Prerequisite: upper division standing; approval of project by preceptor prior to internship. Supervised work experi ence in general medicine. May be repeated for credit up to 12 units. (P/NP grading only.)

Graduate Course

291. Seminars in Human Health Services Research and Clinical Epidemiology (1)

Seminar-1 hour. Critical review, evaluation, and discussion of research in health services and clinical epidemiology. Presentation of statistical, epidemiologic, and econometric methods. Students present their own research and critique the work of others. May be repeated for credit. (Same course as Epidemiology 291.) (S/U grading only.)—I, II, III. (I, II, III.)

Professional Courses

460. General Medicine Consults (1-18)

Clinical activity (inpatient-outpatient service) - 40 hours. Prerequisite: fourth-year medical students with consent of instructor; a general medicine clerkship. Supervised opportunity to see entire spectrum of medical problems encountered by a general inter-nist. Student spends time in General Medicine Clinic and on the General Medicine Consult Service. Consultation Service is particularly concerned with medical evaluation of surgical patients. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) White, Robbins, Hirsch, Kravitz, Bach, Hogarth, Melenderes, Fancher, Garcia, Mitchell, Keenan, Newell, Romano

470. Health Care Ethics (3-9)

Discussion and conference—full time (2-6 weeks). Prerequisite: consent of instructor. Guided independent study of issues in biomedical ethics, with discussion of readings that are based on student interests and needs. Student participation in ethics rounds. (H/P/F grading only.)—I, İI, III, IV. (I, II, III, IV.)

485. Introduction to Health Care Ethics (1)

Lecture - 10 weeks. Prerequisite: medical student in good standing. Introduction to concepts and methods of healthcare ethics. Emphasis on problems and methods. (H/P/F grading only.)—I. (I.) Loewy

493A. Teaching the Basic Sciences SSM (6)

Lectrue-6 hours; lecture/laboratory-8 hours; laboratory—30 hours; tutorial—10 hours. Prerequisite: consent on instructor; concurrent registration in Medical Sciences 440. Restricted to UC Davis School of Medicine students only. Special Studies Module, a yearlong in progress court to teach lecture and discussion education technique and theory. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Stevenson

499. General Medicine Research (1-18)

Discussion - 3 hours; clinical research - 8-40 hours. Prerequisite: consent of instructor. Student will be involved in a clinical research problem within the areas, interest and expertise of members of Division of General Internal Medicine. Alternatively, the research effort will be directed toward investigation of a clinical problem of general medical interest. May be repeated for credit. (H/P/F grading only.)

Internal Medicine— **Hematology-Oncology (HON)**

Upper Division Course

199. Research in Hematology-Oncology

Laboratory-hours variable. Prerequisite: upper division standing and consent of instructor. Experience in laboratory research. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.)

Graduate Courses

298. Topics in Hematology (1-4)

Prerequisite: one year of graduate work and/or consent of instructor. Basic concepts of the physiology of the hematopoietic organ, the pathophysiology of hematopoietic disease, and concepts of therapeutics will be offered for study. The specific topics to be dictated by the interest and background of the students.

299. Research (1-12)

Prerequisite: consent of instructor. Laboratory investigation contributing to the dissertation for a graduate degree. (S/U grading only.)

Professional Courses

420A. Oncology (4)

Lecture—2 hours. Prerequisite: consent of instructor. Restricted to Medical student only. Covers the princi-ples of oncology and the pathophysiology of spe-cific, common cancers correlated with organ systems pathophysiology and systemic pathology courses. (P/F grading only.)—II. (II.) Welborn

460. Hematology-Oncology Acting Internship (6-18)

Clinical activity—full time (4-12 weeks). Prerequisite: fourth-year medical student in good academic standing. Acting intern on inpatient hematology/oncology ward service. May be repeated for credit. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II,

461. Hematology-Oncology Consult Clerkship (6-12)

Clinical activity—full time (4-8 weeks). Prerequisite: fourth-year medical student in good academic standing. Student is an integral member of the inpatient hematology and oncology consult service, the bone marrow service, and will attend all conferences sponsored by the Division. May be repeated for credit. Limited enrollment. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.)

462. Hematology-Oncology Ambulatory Clerkship (3-18)

Clinical activity - 30 hours. Prerequisite: fourth-year medical student in good academic standing; consent of instructor. Limited enrollment. Outpatient rotations in related clinics. Participation with members of the subspecialty service in the initial clinical evaluation, work-up, management and follow-up of the patient with hematologic or oncologic disorders. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

493. Cancer as a Process (1-6)

 $Seminar-10\ hours;\ clinical\ activity-14\ hours;$ autotutorial-6 hours; independent study-10 hours. Prerequisite: consent on instructor. Restricted to UC Davis School of Medicine students only. Covers cancer as a process, beginning with risks and prevention, preneoplasia, microinvasion, treatment options, metastases and systemic therapy, pain medicine and palliative care, and cancer communication. Format includes traditional lectures, student-led case discussions, and problem-based learning. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.) Meyer, von Friederichs Fitzwater

499. Research (1-12)

Prerequisite: consent of instructor. (H/P/F grading only.)

Internal Medicine—Infectious Diseases (IDI)

Upper Division Courses

141. Infectious Diseases of Humans (1)

Lecture - 1 hour. Prerequisite: introductory knowledge in biology and chemistry recommended. Course integrates information on biological and molecular nature of the causative organism, modern diagnostics, treatment and prevention strategies, and the role of infectious diseases in contemporary society and throughout human history. (P/NP grading only.)—I. (I.) Danekar

192. Research Internship in Internal Medicine (1-12)

Internship - 3-36 hours; final report. Supervised work experience in the division of Infectious Diseases. Undergraduates will have an opportunity to acquire research experience in clinical settings. May be repeated for credit up to 12 units. (P/NP grading only.)

199. Infectious Diseases Research (1-5)

Prerequisite: chemistry through organic chemistry (in addition, physical and biochemistry preferred), biology through basic bacteriology (in addition, microbiology and immunology preferred); and consent of instructor. Discrete problem requiring reading and actual manual effort in solution will be assigned to each student. Progress and results will be reviewed at intervals with instructor and via seminar presentation. (P/NP grading only.)

Graduate Courses

211. Epidemiology and Prevention of Infectious Diseases (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: Epidemiology 205B, 207 or Internal Medicine 421. Infectious disease epidemiology and prevention,

with equal emphasis on human and veterinary diseases. Major categories of infectious diseases by mode of transmission. - III. DeRiemer, Sandrock

299. Research in Infectious Diseases (1-12)

Prerequisite: consent of instructor. Laboratory investigation contributing to the dissertation for a graduate degree. (S/U grading only.)

Professional Courses 440. Introduction to AIDS and Related Disorders (1.5-6)

Clinical Activity—30 hours; discussion—10 hours. Prerequisite: first and second year medical students must be in good academic standing and have consent from the instructor. Familiarizes students with the diagnosis and treatment of individuals infected with the human immunodeficiency virus. Students will interview patients, observe patient care and participate in ongoing clinic research as well as examine alternative lifestyles. May be repeated for credit. (H/ P/F grading only.)—I, II, IV.

450. Clinical and Social Care of the Injection Drug User (1-4)

Lecture—1 hour; clinical activity—3 hours. Prerequisite: first and second year medical students in good academic standing. Lecture and guided clinical practice in a supervised clinical setting, focusing on the social and medical aspects of health care for injection drug users. May be repeated for credit up to 24 units. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

460. Infectious Diseases Clinical Clerkship (3-6)

Clinical activity. Prerequisite: successful completion of two years of study in an accredited medical school. Limited enrollment with priority to fourth-year medical students. Patients ill with infectious diseases, including AIDS, will be evaluated and presented at rounds and case conferences. Patients are also seen in the Infectious Diseases Clinic. Instruction in clinical microbiology and the proper use of the laboratory will be provided. (H/P/F grading only.)—I, II, III, ÍV. (I, II, III, IV.) Cohen

499. Research Topics in Infectious Disease (2-12)

Prerequisite: successful completion of the first year of study in School of Medicine, graduate students (approved for graduate credit), and/or consent of instructor. Discrete problem requiring reading and actual manual effort in solution will be assigned to each student. Progress and results to be reviewed at intervals with instructor and via seminar presentation. (H/P/F grading only.)

Internal Medicine—Nephrology (NEP)

Upper Division Course 192. Internship in Nephrology (1-12)

Internship - 3-36 hours; final report. Prerequisite: upper division standing; approval of project by preceptor prior to internship. Supervised work experience in nephrology. May be repeated for credit up to 12 units. (P/NP grading only.)-I, II, III, IV. (I, II, III, IV.)

Graduate Course

299. Nephrology Research (1-12)

Prerequisite: consent of instructor. (S/U grading only.)

Professional Courses

444. Curriculum Design for Doctoring (1)

Project - 2 hours; seminar - 1 hour. Prerequisite: consent of instructor; second year standing in medical school. Design of Doctoring curriculum for medical students in focused topic areas to be announced annually. Students will design sessions, consider resource needs, and work with IORs to initiate the curriculum. (P/F grading only.)—IV. (IV.)

460. Nephrology and Fluid Balance (3-6)

Clinical activity-4 hours; lecture/discussion-10 hours. Prerequisite: completion of 3rd year medical school and medicine core clerkship, consent of instructor. Active participation in all inpatient/outpatient clinical activities, attendance at specific lectures and conferences at UC Davis Medical Center covering the field of nephrology and fluid-electrolyte disorders. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. Chin, Kaysen

499. Research in Nephrology (3-18)

Prerequisite: individual arrangement and consent of instructor. Independent laboratory research on a specific problem related to biochemical or immunologic causes of renal disease and/or uremic disorders in humans or animals. (H/P/F grading only.)—Kaysen

Internal Medicine—Pulmonary Medicine (PUL)

Upper Division Course 192. Internship in Pulmonary Medicine

Internship—3-36 hours; final report. Prerequisite: upper division standing; approval of project by preceptor prior to internship. Supervised work exp ence in pulmonary medicine. May be repeated for credit up to 12 units. (P/NP grading only.)

Graduate Course

299. Pulmonary Disease Research (1-12)

Laboratory. Prerequisite: by arrangement only. Pulmonary disease research activity with focus in inhalation toxicity, oxidants or lung biochemistry, and cell and molecular biology. (S/U grading only.)—

Professional Courses

460. Pulmonary and Critical Care Medicine Clinical Clerkship (6-18)

Clinical activity—full time (4-12 weeks). Prerequisite: Medical Sciences 431. At UC Davis Medical Center participating and rounding with Pulmonary/Critical Care Medicine fellows and consultation staff. Also includes pulmonary function test interpretation, outpatient assignments in outpatient clinic and preparation and presentation of material at weekly conferences. (H/P/F grading only.)—I, II, ÍII, IV. (I, II,

462. Pulmonary Clinical Clerkship (3-12)

Clinical activity—full time (2-8 weeks). Prerequisite: completion of second year of medical school and/or consent of instructor. Participation at the Sacramento VA clinic with members of the subspecialty service in initial clinical evaluation, workup, management, and follow-up of patients with pulmonary disorders. Includes experience in Pulmonary Function Laboratory, and pulmonary diagnostic processes. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Bonekat

475. Encounters in Ethics in the ICU (3-6)

Clinical Activity-12 hours; lecture/discussion-6 hours; independent study-6 hours. Prerequisite: 4th year Medical Student. Care for critically ill adults with complex medical disease carries with it unique ethical roles and duties for the physician. (H/P/I grading only.)—I, II, III. (I, II, III.) Black

480. Pulmonary-Critical Care Medicine Insights (1-3)

Clinical activity—3-9 hours. Prerequisite: student in good academic standing and consent of instructor.
Student will attend respiratory outpatient clinics and in-patient pulmonary consultation rounds and medical intensive care rounds. Introduction to diagnosis and treatment of common pulmonary problems. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Albertson

499. Research (1-12)

Prerequisite: consent of instructor. (H/P/F grading only.)

Internal Medicine—Rheumatology-Allergy (RAL)

Lower Division Course

99. Directed Research in Immunology (1-5)

Laboratory. Prerequisite: consent of instructor. Independent research will be encouraged in basic immunology, including the role of the cellular immune system in oncogenesis. (P/NP grading only.)—I, II, IIÍ, IV. (I, II, III, IV.) Gershwin

Upper Division Courses

192. Internship in Rheumatology-Allergy (1-12)

Internship - 3-36 hours; final report. Prerequisite: upper division standing; approval of project by preceptor prior to internship. Supervised work expe ence in rheumatology-allergy. May be repeated for credit up to 12 units. (P/NP grading only.)

199. Directed Research in Immunology

Laboratory. Prerequisite: consent of instructor. Independent research will be encouraged in basic immunology, including the role of the cellular immune system in oncogenesis. (P/NP grading only.)—Ger-

Graduate Courses

209. Current Topics in Immunology: From Presentations to Grants (3)

Lecture — 1 hour; term paper or discussion — 1 hour; project-1 hour. Prerequisite: Immunology 201. Current developments in various aspects of immunology and their interrelationships. Focus on areas of immunology not currently covered in the basic and advanced immunology courses. Oral presentation, written review and grant preparation.-II. (II.) Van

298. Topics in Rheumatology and Clinical Immunology (1-5)

Laboratory. Prerequisite: consent of instructor. Library and/or laboratory work as required. (S/U grading only.)—Gershwin

299. Research in Autoimmune Disease (1-12)

Laboratory. Prerequisite: consent of instructor. Independent research will be encouraged in both animal models of human disease (including congenitally athymic [nude], asplenic, and New Zealand mice) and the cellular immune system of patients with systemic lupus erythematosus, Sjögren's syndrome, polymyositis and drug hypersensitivity. (S/U grading only.) - Gershwin

Professional Courses

460. Rheumatology Clinical Clerkship (1-18)

Clinical activity—2-40 hours. Prerequisite: Medical Sciences 431 and consent of instructor. Participation with members of the subspecialty service in the diagnosis and therapeutic management of patients with rheumatologic diseases. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

461. Allergy Clinical Clerkship (3-18)

Clinical activity (inpatient-outpatient service) - full time (2 to 12 weeks). Prerequisite: completion of second year of medical school and consent of instructor. Student will work with practicing allergist in daily work with patients and participate in weekly allergy clinic and teaching conferences. Study of the literature. Will see patients with problems in clinical immunology, immunodeficiency, asthma, allergic rhinitis. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

470. Practicum in Care of the Terminally Ill

Clinical activity-35 hours; seminar-5 hours. Prerequisite: consent of instructor. Restricted to fourthyear Medical students in good standing. Work with hospice interdisciplinary team. Direct experience in the care of patients with illnesses where no cure is possible. Emphasis on symptom relief, end of life issues, physician assisted suicide. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.) McMillian

480. Insights in Rheumatology (1-3)

Clinical activity—3-9 hours. Prerequisite: student in good academic standing and consent of instructor. Participation in rheumatology consultation rounds, rheumatic disease clinics and conferences with supervised readings in rheumatology. (H/P/F grading only.) — I, II, III, IV. (I, II, III, IV.) Leek

499. Research (1-12)

Prerequisite: medical student with consent of instructor. Part-time participation in active clinical and basic research projects which can involve both patient care and relevant laboratory procedures. Students can gain experience in clinical medicine and clinical investigation. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III,

Medical Microbiology (MMI) **Lower Division Courses**

10. Parasitic Disease in Humans (2)

Lecture - 2 hours. Introduction to parasitic diseases in humans, including relationships between humans and parasites, symptoms, diagnosis, geographical distribution, treatment and prevention of parasitic disease. Not offered every year. - III.

Upper Division Courses

115. Ecological Parasitology (3)

Lecture-3 hours. Parasitism as a life style is explored from the ecological point of view, illustrating the way parasites utilize biotic habitats and the influence climate, geography, behavior, cultural change and alteration of habitat can have on the distribution and prevalence of parasites. - II. (II.)

116. Parasitology for Wildlife Biologists (3)

Lecture - 3 hours. Prerequisite: upper division standing or consent of instructor. Emphasis on the role infectious diseases play in wildlife dynamics. Lectures and demonstrations on techniques and methods for examining wild animals for evidence of infectious diseases, methods used in preserving and identifying parasites of wildlife, as well as what is known about their pathogenesis.—III. (III.)

130. Medical Mycology (2)

Lecture - 2 hours. Prerequisite: a course in pathogenic microbiology and consent of instructor. Various aspects of pathogenic fungi, particularly affecting humans, will be discussed including epidemiology, pathogenesis and pathology, diagnosis and therapy. Offered in alternate years. (Same course as 430.)—II. Pappagianis

188. Human Immunology (3)

Lecture—3 hours. Prerequisite: undergraduate level introductory biology course. Human immune system and mechanisms of immunity. Basic components and function of immune system. Molecular basis of immune response; basic cellular and molecular mechanisms. Interactions between cells of immune system producing immune responses; regulating molecules. - II. (II.) Torres

192. Internship in Medical Microbiology

Internship - 3-36 hours; final report. Prerequisite: upper division standing; approval of project prior to period of internship. Supervised work experience in medical microbiology and related fields. (P/NP grading only.)—I. II, III. (I, II, III.)

194H. Senior Honors Project in Medical Microbiology and Immunology (5)

Independent study - 15 hours. Prerequisite: course 199 and consent of instructor. Project in research related to immunology of medically important viruses. Development of a hypothesis-driven project, performance of experimental protocols and preparation of graphical representation of original data. Requires oral and written presentation of research results. May be repeated three times for credit with consent of instructor. (P/NP grading only.)—I, II, III. (1, 11, 111.)

198. Group Study in Medical Microbiology

Prerequisite: upper division standing and consent of instructor. Directed reading and discussion and/or laboratory investigation on selected topics. (P/NP grading only.)

199. Research in Medical Microbiology (1-5)

Prerequisite: upper division standing and consent of instructor. Individual research. (P/NP grading only.)

Graduate Courses

200D. Mechanisms for Microbial Interactions with Hosts (3)

Lecture/discussion - 3 hours. Prerequisite: Microbiology 200A or consent of instructor. Study of mechanisms involved in microbial interactions within a host environment. The following principles are basic to understanding these interactions: host recognition, invasion, competition and growth, and host defense.—II. (İI.) Baumler, Beaman

210. Animal Models of Infectious Disease Journal Club (1)

 $\label{lecture} Lecture/discussion-1\ hour.\ Prerequisite):\ students$ funded by the Animal Models of Infectious Diseases Training Grant; others by consent of instructor. Research articles in current literature. Topics/articles to include a broad range of frontiers in animal models of human infectious diseases. Limited enrollment. May be repeated for credit. (S/U grading only.)—II. (II.) Bevins, Solnick

215. Medical Parasitology (3)

Lecture - 1.5 hours; discussion - 1.5 hours. Prerequisite: graduate student with consent of instructor. Epidemiology, pathogenesis, diagnostic methods and current literature discussion of protozoa, helminths and arthropods of medical importance.—III. (III.) Dawson, Luckhart

280. Molecular Pathobiology for Diagnosis and Therapy of Human and Animal Diseases (3)

Lecture—3 hours. Prerequisite: graduate standing. Molecular pathobiology of phenotypes caused by human hereditary diseases and viruses. Emphasis on molecular diagnostics at cellular/tissue level, and therapy including vaccines and gene transfer using recombinant DNA technology. Not open for credit to students who have completed Internal Medicine: Infectious Diseases 280.—III. Tsolis

291. Seminar in Microbiology and Immunology (1)

Seminar-1 hour. Restricted to students with upper division or graduate standing. Research seminars on current topics in microbiology and immunology. May be repeated for credit if topic differs. (S/U grading only.) - I, II, III. (I, II, III.) George, Sankaran, Torres

298. Group Study in Medical Microbiology and Immunology (1-5)

Prerequisite: consent of instructor; open to graduate students. Directed reading and discussion and/or laboratory investigation on selected topics. (Sections 1, 2, 4, 5: S/U grading only.)

299. Research (1-12)

Prerequisite: consent of instructor; open to graduate students. Laboratory investigation contributing to the dissertation for a graduate degree. (S/U grading

Professional Courses

410. Physician Scientist Molecular Medicine Journal Club (1)

Lecture — 1 hour. Weekly seminars by students on research articles in current literature. Topics/articles to be selected by instructors to include a broad range of frontiers in biomedical literature. May be repeated for credit. (H/P/F grading only.)—I. (I.) Bevins

430. Medical Mycology (2)

Lecture — 2 hours. Prerequisite: a course in pathogenic microbiology and consent of instructor. Various aspects of pathogenic fungi, particularly affecting humans, will be discussed including epidemiology, pathogenesis and pathology, diagnosis and therapy. Offered in alternate years. (Same course as 130.) (H/P/F grading only.)—II. Pappagianis

480A. Medical Immunology (2.5)

Lecture - 2 hours; laboratory/discussion - 0.5 hours. Medical student only. Helping to understand the immune system, the nomenclature and functional significance of the tissues, cells, proteins and genes of the immune system, as well as the normal regulatory mechanisms and pathologic outcomes related to the immune response. (P/F grading only; deferred grading only, pending completion of sequence.)—II, III. (II, III.) Shacklett, Torres

480B. Medical Microbiology (5.5)

Lecture - 2.75 hours; laboratory/discussion-1 hour. Medical students only. Discussion of the diseases caused by infectious agents includes their pathogenesis, clinical manifestations, diagnosis, treatment epidemiology and prevention. Covers the general properties of and diagnostic techniques for bacteria, fungi and viruses. (P/F grading only; deferred grading only, pending completion of sequence.)—II, III. (II, III.) Luckhart, Mudryj, Tsolis

497T. Tutoring in Medical Microbiology (1-5)

Tutoring - 3-15 hours. Prerequisite: appropriate preparation in subject matter and consent of instructor. Assist instructor by tutoring medical students in one of the departmental courses that is a component of the required curriculum of the School of Medicine. (H/P/F grading only.)

498. Group Study in Medical Microbiology and Immunology (1-5)

Prerequisite: medical students with consent of instructor. Directed reading and discussion and/or laboratory investigation on selected topics. (H/P/F grading only.)

499. Research (1-12)

Prerequisite: medical students with consent of instructor. (H/P/F grading only.)

Master of Public Health (MPH)

The Department of Public Health Sciences offers the Master of Public Health (MPH) degree. The MPH degree is accredited by the Council on Education for Public Health. Students apply for admission through the Office of Graduate Studies. The following listing is all required core course work for the degree. Course descriptions are given under the individual course offerings. For Public Health Sciences courses, see the Public Health Sciences (SPH), on page 411.

Required Units for Master of Public Health

Core courses	0
Added-competence selectives	6
Elective units	0
Total units required for the degree 5	6

Core coursework

Biostatistics

Preventive Veterinary Medicine 402 5
Preventive Veterinary Medicine 403 3
Public Health Sciences 2102
Epidemiology
Epidemiology 205A 4
Environmental Health Science
Public Health Sciences 2623
Health Services Administration
Public Health Sciences 2733
Social and Behavioral Influences on Health
Public Health Sciences 2223

General Public Health

Public Health Sciences 201 Public Health Sciences 290	3
1 unit/quarter	4
Public Health Sciences 297	
Public Hedith Sciences 297	

For more information about the Master of Public Health, see http://mph.ucdavis.edu/.

Medical Pharmacology and Toxicology (PHA)

Lower Division Courses

92. Internship in Pharmacology (1-12)

Internship - 3-36 hours; final report. Prerequisite: lower division student with good academic standing; approval of project prior to period of internship. Supervised work experience in pharmacology and related fields. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) Prerequisite: lower division standing. (P/NP grading only.)

Upper Division Courses

192. Internship in Pharmacology (1-12)

Internship - 3-36 hours; final report. Prerequisite: upper division standing; approval of project prior to period of internship. Supervised work experience in pharmacology and related fields. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

207. Drug Discovery and Development (3)

Lecture/discussion-2 hours; extensive writinghour. Prerequisite: course 201, an equivalent course in general pharmacology, or knowledge of basic pharmacology. Intended for graduate students in Pharmacology and Toxicology, Chemistry and Clinical Research Graduate Groups; other students, including undergraduates, may be accepted with consent of instructors. Survey of the process by which a drug is discovered, developed and made available to the public. Topics include drug identification and optimization, safety testing, clinical evaluation, regulatory issues, intellectual property, formulation, and the global pharmaceutical industry. May be repeated for credit.—II. (II.) Horuk, Rogawski, Wulff

225. Gene Therapy (3)

Lecture/discussion-3 hours. Prerequisite: Genetics 201C/Molecular and Cellular Biology 221C or equivalent. Gene therapy from basic concepts to clinical applications. Topics include the human genome and genetic variation, genetic diseases, methods to manipulate gene expression, viral and non-viral delivery vectors, history and progress of gene therapy, case studies, and ethical issues. Offered in alternate years.—II. Anderson, Bauer, Nolta, Segal

250. Functional Genomics: From Bench to Bedside (3)

Lecture/discussion-3 hours. Prerequisite: Genetics 201C, Molecular and Cellular Biology 214, or equivalent. Functional genomics (how genetic variation and epigenomics affect gene expression), with an emphasis on clinical relevance and applications. Topics include genetic variation and human disease, cancer therapeutics, and biomarker discovery.—III. (III.) Diaz, LaSalle, Segal

291. Pharmacology Research Seminar Series (1)

Seminar — 1 hour; discussion — 1 hour. Prerequisite: consent of instructor; upper division or graduate standing. Research seminars on current topics in Pharmacology. May be repeated for credit when topic differs. (S/U grading only.)—I, II, III. (I, II, III.)

298. Group Study (1-5)

Prerequisite: consent of instructor.

299. Research (1-12)

Prerequisite: consent of instructor. (S/U grading only.)

Professional Courses

400A. Pharmacology (2)

Lecture-1 hour; discussion/laboratory-0.3 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; medical students only. Principles in pharmacology, including pharmacokinetics, drug metabolism and the actions, uses and toxicities of the major classes of drugs. (Deferred grading only, pending completion of sequence. P/F grading only.)—II, III. (II, III.) Gelli, Wulff

400B. Pharmacology (1.5)

Lecture—1 hour; discussion—.25 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress; medical students only. Principles in pharmacology, including autonomic pharmacology, general anesthetics, neuropharmacology and sedative/hypnotics. (P/F grading only.)—IV. (IV.) Diaz

400C. Pharmacology (1.5)

Lecture-1 hour; discussion-.25 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress; medical student only. Topics taught include the treatment of respiratory and cardiovascular disease. Specific topics include: asthma, chronic obstructive pulmonary disease, hypertension, congestive heart failure, and the treatment of arrhythmias. (P/F grading only.)—I. (I.) Segal

400D. Pharmacology (2)

Lecture - 3 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress; medical student only. Pharmacology topics covered include central nervous system drugs, GI drugs, toxicology/poisoning and cancer chemotherapy. Specific topics are: cancer chemotherapy, pain management, the treatment of depression and psychosis, acid reflux disease, irritable bowel syn drome, and general toxicology. (P/F grading only.)—II. (II.) Segal

445. Introduction to Integrative Medicine

Lecture/discussion-1 hour. Prerequisite: medical student in good standing. Basic principles of alternative medical systems (e.g., traditional Chinese, Ayurvedic, Tibetan), alternative practices (e.g., chiropractic, osteopathy, naturopathy, homeopathy, herbalism, guided imagery/meditation, massage therapy), and mind/body connection are presented as introduction to integrating alternative treatments into traditional medicinal practice. (H/P/F grading only.)—II. (II.) Diaz

490. Seminar in Pharmacology for Medical Students (1)

Seminar—1 hour. Prerequisite: consent of instructor. Seminar in pharmacology for medical students. (H/ P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

497T. Tutoring in Pharmacology (1-5)

Tutoring - 3-15 hours. Prerequisite: advanced standing or consent of instructor. Assist instructor by tutoring medical students in preparation for one of the departmental courses that is a component of the required curriculum of the School of Medicine. (H/ P/F grading only.)

498. Special Study for Medical Students (1-5)

Lecture, directed reading, and/or discussion groups - 3-15 hours. Prerequisite: consent of instructor. Special study in pharmacology for medical students. (H/P/F grading only.)

499. Directed Research for Medical Students (1-12)

Laboratory-3-36 hours. Prerequisite: consent of instructor. Directed research in pharmacology for medical students. (H/P/F grading only.)

Neurology (NEU)

Upper Division Course

199. Individual Special Study and Research (1-4)

Prerequisite: consent of instructor. Individual special study in neurophysiology and biomedical engineering is offered to qualified students. Studies on psychophysics, single-unit electrophysiology and instrumentation are offered in Davis. (P/NP grading

Graduate Courses

298. Group Study (1-5)

Prerequisite: consent of instructor. For graduate students desiring to explore particular topics in depth. Lectures and conferences may be involved. (S/U grading only.)

299. Individual Special Study and Research

Laboratory-3-36 hours. Prerequisite: consent of instructor. Individual special study and research in Neurophysiology and Biomedical engineering is offered at both Davis and Sacramento Medical Center. (S/U grading only.)

Professional Courses

420. Clinical Neurosciences (2)

Lecture/discussion-1 hour: lecture-1.5 hours. Prerequisite: medical students only. Pathophysiology underlying neurological disorders, including disorders of development, muscle, nerve, cerebral circulation, metabolism, myelin, cortical function, movement, cerebrospinal fluid, autonomic function and special senses. Anatomical basis of clinical testing, nervous system infection, neoplasia and trauma. (P/F grading only.)—IV. (IV.) Brass, Wheelock,

450. Clinical Neurology Clerkship (3-6)

Clinical activity-24 hours; conference-12 hours; seminar-4 hours; independent study-10 hours. Prerequisite: open to all fourth year medical students and third year medical students with consent of instructor. Restricted to six students per rotation. Critical elements of neurological clinical skills (history & exam) and basic and clinical neurological concepts expected for general residency preparation. Active, didactic, experiential and independent learning to encourage maturation of general professional competencies. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.) Malhado-Chang

452. Advanced Clinical Neurology (6)

Clinical activity—full time (4 weeks). Prerequisite: completion of four-week Neurology selective and consent of instructor. Extension of basic Neurology clerkship. Designed for students with special interest in medical disorders of nervous system. By arrangement with department, student may serve as an acting intern. Principles of neurological differential diagnosis and therapeutics emphasized. $(H/\bar{P}/F \text{ grading only}.)-I$, II, III, IV. (I, II, III, IV.)

455. Child Neurology (6)

Clinical activity—full time (4 weeks). Prerequisite: satisfactory completion of Internal Medicine 430, Obstetrics and Gynecology 430, Pediatrics 430 and consent of instructor. Student exposed to children with disorders of the nervous system, both in outpatient and inpatient services. Cases presented to a member of full-time faculty who will discuss clinical findings, differential diagnosis, management and therapy. This course satisfies the fourth year neuroscience requirement. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.) Chang

498NE. Group Study in Neurology (1-6)

Prerequisite: medical students with consent of instructor. Directed readings and discussions with a comprehensive written examination at the end of course. (P/F grading only.)—I, II, III, IV.

499. Research (1-12)

Laboratory-2-24 hours. Prerequisite: consent of instructor. Approved for graduate degree credit. Laboratory investigation on selected topics. (H/P/F grading only for graduate and medical students.)

Neurosurgery (NSU)

Upper Division Course

199. Special Study in Neurosurgery for Advanced Undergraduates (1-5)

Prerequisite: advanced undergraduate standing with consent of instructor. Students may participate in ongoing neurosurgical projects or may pursue and design independent projects. (P/NP grading only.)

Graduate Course

299. Neurosurgery Research (3-12)

Prerequisite: graduate student with consent of instructor. Student may participate in ongoing neurosurgical projects or may pursue and design independent projects. (S/U grading only.)

Professional Courses

451. Neurosurgical Critical Care Clerkship

Clinical activity—full time (2 weeks). Prerequisite: third- or fourth-year medical student having completed a neurosurgical clerkship or consent of instructor. Students participate in the care of neurosurgical patients in the NSICU and in the admission and surgical management of patients admitted through the Emergency Room. (H/P/F grading only.)—I, II, III. (I,

455. Clinical Pediatric Neurosurgery (6)

Clinical activity—full time (4 weeks). Prerequisite: third- or fourth-year medical students who have satisfactorily completed course 460; consent of instructor. Admission and follow-up of pediatric patients. Neurological history, examination, and diagnostic procedures are emphasized. Students will participate in surgical procedures and are required to attend all pediatric neurosurgery conferences. (H/P/ F grading only.)—I, II, III, IV. (I, II, III, IV.) Pang

460. Clinical Neurosurgery (6-18)

Clinical activity—full time (3 days per unit; 4 weeks minimum). Prerequisite: third- and fourth-year medical students; consent of instructor. Approved for graduate degree credit. Admission and follow-up of patients. Neurological history, examination and further diagnostic procedures emphasized. Students participate in meaningful aspects of surgical procedures and attend listed conferences, rounds, and seminars. (H/P/F grading only.)-I, II, III, IV. (I, II, III,

464. Externship (6-18)

Clinical activity—full time (4-12 weeks). Prerequisite: fourth-year medical student having completed a neurosurgical clerkship or consent of instructor. Clerkship in neurosurgery to be arranged at another institution with accredited residency program in neurosurgery under proper supervision. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

470. Advanced Clinical Neurosurgery (6-18)

Clinical activity—full time (4-12 weeks). Prerequisite: fourth-year medical student in good academic standing. Student will function as acting intern on neurosurgery service. Admission and management of patients. Neurological history, examination, diagnostic procedures, and surgical management are emphasized. Students participate in meaningful aspects of surgical procedures and attend required conferences and rounds. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

480. Insights in Neurosurgery (1-3)

Clinical activity - 3 to 9 hours. Prerequisite: first- and second-year medical students in good academic standing; consent of instructor. Observation of neurosurgical care in emergency room, operating room and hospital floors, including manner of treatment of a variety of chronic and acute neurological diseases. (H/P/F grading only.)—I, II, III, IV. (I, ĬI, III, IV.)

499. Neurosurgery Research (1-18)

Prerequisite: medical student with consent of instructor. Student may participate in ongoing neurosurgical projects or may pursue and design independent projects. (H/P/F grading only.)

Obstetrics and Gynecology (OBG) Upper Division Courses

192. Shifa Clinic/Student Volunteer (1)

Conference—2 hours; clinical activity—6-8 hours; discussion—1-2 hours. Supervised work experience in obstetrics and gynecology. May be repeated up to 3 times for credit. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.) Yasmeen

194. Shifa Clinic Student Volunteer (1)

Conference—1 hours; clinical activity—6 hours. Prerequisite: consent of instructor; the applications will be available for students. Selection of students will be made by selection committee of medical students coordinators and the IOR. Attend clinic every third Sunday performing duties of receptionist, intake, translation, monitor. Students attend a meeting immediately after end of clinic. There is a mandatory Monday meeting with Clinic co-directors. Students are expected to participate on various committees. May be repeated three times for credit. (P/NP grading only.)—1, II, III, IV. (I, II, III, IV.) Yasmeen

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

220. Genetics of Reproduction (3)

Lecture/discussion—3 hours. Introduction to genetics of mammalian reproduction for domestic species, species used in research, and the human. Mendelian and non-Mendelian modes of inheritance. Research paper. Offered in alternate years.—II. (II.) Towner

290. Current Topics in Research (1)

Seminar—1 hour. Prerequisite: graduate standing and consent of instructor. Selected topics in reproductive biology. (S/U grading only.)—I, II, III, IV. (I, II, III, IV)

298. Group Study (1-5)

Prerequisite: graduate standing; consent of instructor.

299. Research (1-12)

Prerequisite: graduate standing; consent of instructor. (S/U grading only.)

Professional Courses

405. Metabolism, Endocrinology, Reproduction and Nutrition (9.5)

Lecture—3.8 hours; discussion/laboratory—2.8 hours. Prerequisite: consent of instructor. Medical Student only. Basic and pathophysiologic processes involved in human metabolic and nutritional regulation and in reproductive and endocrine control system across the lifespan. Integrate information across these systems and use the clinical reasoning process to identify and understand relevant perturbations and diseases. (Same course Biological Chemistry 405.) (P/F grading only; deferred grading only, pending completion of sequence.)—II, III. (II, III.) Long, Sweeney, Towner

430. Obstetrics and Gynecology Clerkship (12)

Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Obstetrics, gynecologic and gynecological oncology experience in the delivery room, operating room, clinics and wards at UCDMC and affiliated sites. Rounds, conferences, interactive student presentations and seminars ongoing. (H/P/F grading only.)—I, II, III, IV. Dalrymple

439D. Directed Clinical Studies in OBGYN (1-12)

Clinical activity – 40 hours. Prerequisite: consent of instructor. Individual directed studies in extended preparation for modified curriculum or to complete a

clinical rotation following a leave of absence. May be repeated for credit. (P/F grading only.)—I, II, III, IV, II III IV)

439R. Directed Studies in OBGYN (1-12)

Clinical activity—30 hours; independent study—10 hours. Prerequisite: consent of instructor. Individual directed studies in extended preparation for remediation of all or part of clinical rotation. Clinical studies to accommodate and satisfy remedial work as directed by the Committee on Student Progress and approved by the course IOR. May be repeated for credit. (P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

460. Away Clinical Elective in OBGYN (3-18)

Clinical activity—30 hours. Prerequisite: third- or fourth-year medical student; course 430 or the equivalent; consent of instructor. Active participation in inpatient and/our outpatient care. Attendance at specified conferences; student-faculty member informal conferences. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Dalrymple

465. Away Acting Internship in OBGYN (3-18)

Clinical activity—40 hours. Prerequisite: satisfactory completion of course 430 and other third-year core clerkships; consent of instructor. Work at the level of a sub intern in Inpatient and/or Outpatient settings. Students are expected to provide direct patient management. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Dalrymple

470. Gynecologic Oncology Acting Internship (3-18)

Clinical activity—40 hours. Prerequisite: satisfactory completion of course 430 and the third-year core clerkships; consent of instructor. Four week elective primarily involves direct inpatient management of women on the UCDMC Gyn/Onc service. Students will be acting at the level of a sub-intern and will work under the supervision of house staff, fellows, and attendings. May be repeated up to 99 units for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Dalrymple

471. Ambulatory Gynecology and Obstetrics Elective (3-18)

Clinical activity—35 hours. Prerequisite: third- or fourth-year Medical Student having successfully completed course 430; consent of instructor of record. Conduct examinations, present patients and discuss treatment regimens at the following ambulatory clinics: General Obstetrics & Gynecology, New and Return Obstetrics (including Post-Partum), High-Risk Obstetrics, Pre-Operative Clinic, and other sub-specialty clinics as assigned. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Dalrymple

475. Labor & Delivery Acting Internship

Clinical activity—40 hours. Prerequisite: satisfactory completion of course 430 and the third-year core clerkships; consent of instructor. Four week elective primarily involves direct inpatient management of women on the UCDMC L&D unit. Students will be acting at the level of a sub-intern and will work under the supervision of house staff, fellows, and attendings. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Dalrymple

480. The Birthing Process (1)

Lecture/discussion—1 hour. Open only to UC Davis medical students. Training to assist in the birthing process as a Doula. Topics not covered in the summer course. (S/U grading only.)—1. Dalrymple

493. Gender Specific Medicine SSM (6)

Lecture — 5 hours; lecture/laboratory — 10 hours; laboratory — 16 hours; clinical activity — 4 hours. Prerequisite: consent of instructor; restricted to UC Davis School of Medicine students only. Special Studies Module, a four week course on the topic: Basic Science Principles Relating to Gender Specific Medicine. (Same course as Cardiology 493.) [H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Sweet, Villablanca

494. Shifa Clinic (6)

Clinical activity—8 hours. Prerequisite: medical student in good standing; restricted to medical student only. Interaction with patients from multiple ethnic and cultural backgrounds under the direct supervision of a physician/preceptor. Women's health issues and primary care issues in a diversely mixed population. May be repeated up to three times for credit. (P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Yasmeen

498. Group Study (1-5)

Prerequisite: consent of instructor. Explore particular topics in-depth in Obstetrics and Gynecology. Extensive contact with and oversight by instructor. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

499. Research in Obstetrics and Gynecology (2-12)

Clinical activity. Prerequisite: consent of instructor; fourth-year medical student. Research in Obstetrics and Gynecology arranged with instructor. May be repeated eight times for credit. (H/P/F grading only.)

Ophthalmology (OPT)

Upper Division Courses

192. Research Internship (1-12)

Internship—3-36 hours. Prerequisite: upper division standing; approval of project prior to period of internship by preceptor. Supervised work experience in ophthalmology research. Research staff in Ophthalmology have programs in cell biology, electron microscopy, biochemistry, immunology and visual psychophysics. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Course

299. Basic Research in Visual Science (1-12)

Prerequisite: consent of instructor. (S/U grading only.)

Professional Courses

442. Introduction to Ophthalmology (3)

Clinical activity—40 hours. Prerequisite: third- or fourth-year Medical Student with consent of instructor; consent of advisor; completion of third-year clerkships in Medicine and Surgery; consult Course Coordinator. Ocular disease diagnosis and management relevant to the clinical practice of future primary care physicians and others. [H/P/F grading only.]—I, II, III, IV. (I, II, III, IV.) Feiz

465. Advanced Subspecialty Ophthalmology (3-6)

Clinical activity—40 hours. Prerequisite: Medical students who have completed Internal Medicine 430 in third or fourth year; consent of instructor. Participation in disciplines of neuro-ophthalmology/pediatric ophthalmology, diseases of the cornea and external eye, glaucoma and retina. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Feiz

498. Group Study (1-3)

Prerequisite: medical students with consent of instructor. Directed reading and discussion. (H/P/F grading only.)

499. Research in Ophthalmology (1-12)

To be arranged—3-36 hours. Prerequisite: medical students with consent of instructor. Individual research on selected topics in optics and visual physiology, cornea and external disease. (H/P/F grading only.)

Orthopaedic Surgery (OSU)

Lower Division Course

99. Special Studies for Undergraduates (1-4)

Prerequisite: lower division standing and consent of instructor. (P/NP grading only.)

Upper Division Course 199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: upper division standing; consent of instructor. (P/NP grading only.)

Professional Courses

421. The Musculoskeletal System (2.5)

Lecture/discussion-6 hours. Prerequisite: consent of Committee on Student Progress. Basic and clinical science of orthopaedic surgery and rheumatology. (P/F grading only.)—I. Fyhrie

428. Ambulatory and Emergency Room Orthopaedics (3-6)

Clinical activity—full time (2-4 weeks). Prerequisite: 4th-year medical student in good academic standing and consent of instructor. Introduction to general orthopaedic problems and trauma and their management in an outpatient environment, including the emergency room. Student will conduct orthopaedic examinations, present patients to staff rotating through trauma, hand, pediatrics, adult and foot clinics. Orthopaedic physical examination and interpretation of x-rays. Limited enrollment. (H/P/F grading only.)—I, II, IİI, IV. (I, II, III, IV.) Yoo

462. Community Preceptorship (3-6)

Clinical activity—full time (2-4 weeks). Prerequisite: fourth-year medical student in good academic standing with consent of instructor. Acquaints student with private practice of orthopaedics in the community setting. Opportunity to observe and assist private practitioners in office, emergency room, operating room and inpatient environment. Student must provide own transportation. (H/P/F grading only.)-I, II, III, IV. (I, II, IİI, IV.) Boviİl, Yoo

464. Acting Internship (6)

Clinical activity—full time (4 weeks). Prerequisite: fourth-year medical student in good academic standing and consent of instructor. Rotation designed to increase basic knowledge of musculoskeletal abnormalities at clinical level. Attention focused on selective case material. For those students who demonstrate proficiency, responsibility will be similar to that of intern. Limited enrollment. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Yoo

480. Insights in Orthopaedic Surgery (1-3)

Clinical activity—3-9 hours. Prerequisite: first- and second-year medical students in good academic standing; consent of instructor. Exposure to aims, methods and procedures in orthopaedic surgery via attendance at grand rounds, patient care conferences, and group discussions. (H/P/F grading only.)—I, II, İII, IV. (I, II, III, IV.) Szabo

481. History of Medicine for Medical Students (1.5)

Lecture/discussion-2.5 hours (for six weeks). Prerequisite: third- or fourth-year students in the School of Medicine or second-year students with consent of instructor. Overview of the history of medicine throughout the world to introduce medical students to landmark accomplishments and key figures in the development of health care and to provide an expanded philosophical perspective on the everchanging field of modern medicine. (H/P/F grading only.)—I. (I.)

499. Orthopaedics Research (1-12)

Clinical activity—3 hours to full time (to be arranged with individual faculty). Prerequisite: third- or fourthyear medical student in good academic standing; consent of instructor. Laboratory or clinical investigation on selected topics. May be repeated for credit. (H/P/F grading only.)

Otolaryngology (OTO)

Lower Division Courses

192. Internship in Otolaryngology (1-12)

Internship - 3 to 36 hours. Prerequisite: upper division standing; approval of project prior to period of internship by preceptor. Supervised work experience in otolaryngology and related fields. Final project report. (P/NP grading only.)

199. Special Study in Otolaryngology for Advanced Undergraduates (1-5)

Prerequisite: advanced undergraduate with consent of instructor. (P/NP grading only.)—I, II, III, IV. Vasquez

Graduate Courses

290C. Research Conference in Otolaryngology (1)

Lecture/discussion - 1 hour. Prerequisite: graduate students; medical students; advanced undergraduates with consent of instructor. Presentation and discussion of faculty and student research in otolaryngology. (S/U grading only.) - I, II. (I, II.)

291. Principles of Speech, Hearing and Equilibrium (3)

Lecture/discussion - 3 hours. Prerequisite: graduate students; medical students; advanced undergraduates with consent of instructor. Presentations by faculty and guest lecturers on anatomy, physiology, and behaviors involved in speech production, hearing, and equilibrium. Each student will be expected to make one class presentation.—(I, II, III, IV.) Leonard

299. Individual Study in Otolaryngology for Advanced Graduate Students (1-12)

Prerequisite: advanced graduate student with consent of instructor. (S/U grading only.)

Professional Courses

403. Basic Principles of Reconstructive Surgery (1)

Lecture—four 2-hour sessions: laboratory—one 2hour session (4 weeks). Prerequisite: third- or fourthyear medical student with consent of instructor. Formal presentations covering basic principles of reconstructive surgery, including wound healing, treatment of lacerations, skin and bone grafts, flaps, Z-plasties and revision of scars. Laboratory session utilizing animal tissues.—II. (II.) Donald

440. Otolaryngology Required Clerkship (3-9)

Clinical activity—30 hours. Prerequisite: consent by Committee on Student Evaluation and Promotion. Provide fundamental knowledge of otorhinolaryngologic diagnosis and principles, develop facility with basic ENT instruments, provide an understanding of treatment for ear, nose and throat problems and provide knowledge of what patients should be referred for otorhinolaryngologic care. (H/P/F grading only.) - I, II, III, IV. (I, II, III, IV.) Enepekides

450. Fourth Year Otolaryngology Elective

Clinical activity—35 hours; lecture—2 hours; film-viewing—0.25 hours; discussion—1 hour. Prerequisite: third- or fourth-year medical student; consent of instructor. Participation in Otolaryngology Clinic and operating room. Evaluation and management of common Otolaryngologic diseases. (H/P/F grading only.)—(I, II, III, IV.) Diaz

460. Clinical Otolaryngology Elective (3-18)

Clinical activity—full time. Prerequisite: third- and fourth-year medical students with consent of instructor; open to graduate students. Approved for graduate degree credit. Total involvement in clinical activities of the department. (H/P/F grading only.)-(I, II, III, IV.) Diaz

490. Journal Seminar (1)

Lecture/discussion - 10 hours total (course given three times per quarter). Prerequisite: fourth-year medical students with consent of instructor; open to graduate students. Approved for graduate degree credit. Monthly review of current otolaryngologic and related literature and recent advances. (H/P/F grading only.) - I, II, III, IV. (I, II, III, IV.) Donald

498. Individual or Group Study (1-5)

Lecture/discussion - 1-2 hours; laboratory - 1-4 hours. Prerequisite: consent of instructor. Introduction to basic research in Otolaryngology. Lectures, discussion and laboratory study of sensory and motor systems. (H/P/F grading only.) Diaz

499. Research (1-12)

Prerequisite: medical students with consent of instructor; open to graduate students. Approved for graduate degree credit. Participation in ongoing projects. (H/P/F grading only.) Brodie

Pathology (PMD)

Upper Division Courses

192. Internship in Human Pathology (1-12)

Internship—3-36 hours; final project report. Prereguisite: upper division standing; approval of project prior to period of internship by preceptor. Super vised work experience in pathology and related fields. (P/NP grading only.)

199. Special Study in Pathology for Advanced Undergraduates (1-5)

Prerequisite: advanced undergraduates and consent of instructor. (P/NP grading only.)

Graduate Courses

290C. Research Group Conferences (1)

Seminar-1 hour. Prerequisite: graduate level standing. Seminar. Topics on animal models of human disease and infectious diseases. May be repeated for credit. (S/U grading only.)—I, II, İII. (I, II, III.)

298. Advanced Group Study (1-5)

Prerequisite: consent of instructor.

299. Research (1-12)

Prerequisite: consent of instructor. (S/U grading only.)

Professional Courses

405. Brain Cutting Conference (1-4)

Seminar - 1-4 hours. Prerequisite: third- and fourthyear medical students or consent of instructor. Current specimens are sectioned, discussed, and clinical correlations proposed. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Ellis

407. Advanced Neuropathology (1-12)

Discussion and laboratory. Prerequisite: consent of instructor. Study of pathologic reaction in human central and peripheral nervous systems and skeletal muscle by microscopic, light and electron microscopic examination of current and archival material. Discussions of clinical correlations and current medical literature. Individualized experience in neuropathologic techniques. (H/P/F grading only.)—I, II, İII, IV. (I, II, III, IV.)

410A. General and Endocrine Pathology (2.5)

Lecture - 4 hours; laboratory/discussion - 4.5 hours. Restricted to Medical students only. Pathologic mechanisms of human disease. Concepts of general pathologic processes, i.e., cell death, inflammation and neoplasia. Endocrine pathology in the context of clinical human disease. Emphasis on integration of clinical practice with gross and histologic images emphasizing team-based learning. (P/F grading only.) — II. (II.) Gandour-Edwards

410B. Systemic Pathology (1)

Lecture—1 hours; laboratory/discussion—0.5 hours. Prerequisite: Approval by SOM Committee on Student Progress. Restricted to Medical students only. Anatomic and clinical pathology of organ system human disease with an emphasis on integration with clinical medicine. Topics include hematopathology and neuropathology. (Deferred grading only, pending completion of sequence. P/F grading only.)—IV. (IV.) Gandour-Edwards

410C. Systemic Pathology (2)

Lecture - 1 hour; discussion - 2 hours. Prerequisite: approval by SOM Committee on Student Progress. Restricted to Medical students only. Anatomic and clinical pathology of organ system human disease with an emphasis on integration with clinical medicine. Topics include pulmonary pathology, cardiovascular pathology, hematopatology, oncologic pathology, and nephropathology. (Deferred grading only, pending completion of sequence. P/F grading only.) - I. (I.) Gandour-Edwards

410D. Systemic Pathology (2.5)

Lecture - 1 hour; discussion - 2 hours. Prerequisite: approval by SOM Committee on Student Progress. Restricted to Medical students only. Anatomic and clinical pathology of organ system human disease with emphasis on integration with clinical medicine. Course content parallels concurrent clinical courses with integration of lectures and discussions. Topics include gastrointestinal and gynecologic pathology, hepatopathology, oncologic pathology and musculoskeletal pathology. (Deferred grading only, pending completion of sequence. P/F grading only.)—II. (II.) Gandour-Edwards

464. Anatomic Pathology (3-6)

Clinical activity—40 hours. Prerequisite: fourth-year Medical Students with consent of instructor. Restricted to Medical Students only. Anatomic pathology with an emphasis on autopsy and surgical pathology with application to clinical practice. Specimen grossing, frozen sections, microscopic sign-out and conferences. Exposure to cytopathology, hematopathology, and clinical pathology is available. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Bishop

465. Applied Clinical Laboratory Medicine

Prerequisite: consent of instructor. Emphasis upon laboratory techniques, procedures, and interpretation of laboratory results. Students will be expected to participate fully and in all laboratory operations including bench techniques, laboratory management, and quality control. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Gregg

470. Sub-Specialty in Didactic Pathology (3-16)

Lecture/laboratory-25 hours. Prerequisite: consent of instructor. Externship provides in-depth exposure to one of a variety of subspecialties in Pathology. May be repeated for credit. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.) Gandour-Edwards

474. Anatomic Pathology Acting Internship

Clinical activity - 40-80 hours. Prerequisite: fourthyear medical student or consent of instructor. Restricted to medical students only. Anatomic Pathology AI will permit students to gain skills needed for first year Pathology Residency. Students will perform autopsies and take full responsibility for a variety of surgical pathology cases. A mix of outpatient and inpatient cases is expected. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Bishop

475. Anatomic and Clinical Pathology AI (3-9)

Clinical activity-40-80 hours. Prerequisite: fourthyear Medical Students or consent of instructor. Restricted to Medical Students only. Clerkship is to acquaint students contemplating a career in pathology with the activities of both anatomic (first two weeks) and clinical pathology (second two weeks) May be repeated for credit. (H/P/F grading only.) I, II, III, IV. (I, II, III, IV.) Bishop, Gregg

493. Interdisciplinary Study of Gastrointestinal Cancer (6)

Lecture-5 hours; clinical activity-12 hours; laboratory—3 hours; discussion/laboratory—20 hours. Prerequisite: consent of instructor. In-depth study of gastrointestinal, hepatic and pancreatic cancer. Emphasis on an integration of basic science and clinical medicine. Participating departments include pathology, surgical oncology, medical oncology, gastroenterology, radiology and radiotherapy. (Same course as Surgery 493D.) (H/P/F grading only.)—II, III. (II, III.) Khatri, Olson, Ruebner

497T. Tutoring in Pathology (1-5)

Tutoring - 3-15 hours. Prerequisite: advanced standing or consent of instructor. Assist instructor by tutoring medical students in preparation for one of the departmental courses that is a component of the required curriculum of the School of Medicine. (H/ P/F grading only.)

498. Advanced Group Study (1-5)

Prerequisite: medical student and consent of instructor. Group study in variety of advanced topics in general, special, experimental, or comparative pathology. (H/P/F grading only.)

499. Research (1-18)

Prerequisite: medical student with consent of instructor. Research in experimental, molecular, comparative, and applied pathology. Limited enrollment. (H/ P/F grading only.)

Pediatrics (PED)

Upper Division Course 199. Special Study in Pediatric Research (1-5)

Prerequisite: undergraduate student with consent of instructor based upon adequate preparation as determined by instructor. (P/NP grading only.)

Graduate Course

299. Pediatric Research (1-12)

Prerequisite: graduate students who are candidates for a degree in some area of biology or behavioral sciences; consent of instructor. (S/U grading only.)

Professional Courses

401. Preceptorship in Pediatrics (2)

Preceptorship—half time. Prerequisite: second-year medical student or first-year medical student with consent of instructor. Opportunity to observe and participate in primary medical care in a practicing pediatrician's office. Participation in history-taking and physical examination will be at discretion of preceptor and dependent on student's experience. Evaluation by student. (H/P/F grading only.)—I, II, III, IV. (I, II, IIÍ, IV.)

402. Clinical Experience in Private Practice (1-18)

Clinical activity—full time (2 to 12 weeks). Prerequisite: third-or fourth-year medical student; course 430; consent of preceptor and Chairperson. Opportunity to participate in practice of preceptor, performing such tasks as history taking, physical examination, and patient management. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

420. Human Genetics (2)

Lecture - 3 hours; conference - 2 hours. Restricted to Medical students only. Introduction to medical genetics and the clinical consequences of genetic abnormalities. (P/F grading only.)—I. (I.) Moghaddam

430. Pediatric Clerkship (12)

Clinical activity-45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Eight week clinical clerkship providing students with the opportunity to learn fundamentals of caring for the pediatric patient by participating in nursery, ambulatory and inpatient services at UCDMC and affiliated clinical sites. Rounds, conferences, student presentations ongoing. (H/P/F grading only.)—I, II, III, IV. Wold

439D. Directed Clinical Studies in Pediatrics (1-12)

Clinical activity-40 hours. Prerequisite: consent of instructor. Individual directed studies in extended preparation for modified curriculum or to complete a clinical rotation following a leave of absence. May be repeated for credit. (P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

439R. Directed Studies in Pediatrics (1-12)

Clinical activity—30 hours; independent study—10 hours. Prerequisite: consent of instructor. Individual directed studies in extended preparation for remediation of all or part of clinical rotation. Clinical studies to accommodate and satisfy remedial work as directed by the Committee on Student Progress and approved by the course IOR. May be repeated for credit. (P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

460A. Acting Internship: General Inpatient Pediatric Clerkship (6-18)

Clinical activity—full time (4 to 12 weeks). Prerequisite: completion of course 430 with grade of B or better; letter of recommendation from Pediatrics faculty member. The Ward Acting Intern functions in a manner similar to that of a pediatric intern. The Acting Intern takes admissions in the regular sequence and is expected to take night call. The Acting Intern can expect to manage between six and ten patients at a time. Limited enrollment. (H/P/F grading only.) - I, II, III, IV. (I, II, III, IV.) Sutter

460B. Acting Internship: Outpatient Pediatrics (3-18)

Clinical activity—full time (2 to 12 weeks). Prerequisite: completion of course 430 with grade of B or better; letter of recommendation from Pediatrics faculty member. Supervised experience in pediatric care on outpatient service at UCDMC. Student functions as "Acting Intern" with appropriate supervision by residents and attending faculty. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

461. Pediatric Inpatient AI in Hematology/ Oncology (6)

Clinical activity - 37.5 hours; lecture - 7.5 hours Prerequisite: satisfactory completion of course 430; consent of instructor. Inpatient and outpatient experience in diagnosis and management of oncologic and hematologic disorders in children. Laboratory experience and participation in clinical investigation may be arranged. Limited enrollment. (H/P/F grading only.) — I, II, III, IV. (I, II, III, IV.)

462. Elective in Pediatric Endocrinology (3-18)

Clinical activity-full time (2 to 12 weeks). Prerequisite: completion of second-year study or the equivalent; consent of instructor. Inpatient and outpatient experience in diagnosis and management of endocrine disorders in children. Laboratory experience and participation in clinical investigation may be arranged. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

463. Medical and Mental Health Evaluation of Children at Risk for Maltreatment (3-9)

Clinical activity—30 hours; discussion—4 hours. Elective for fourth-year medical students covers basic areas of knowledge needed for child abuse prevention and consultation. Rotation includes legals cases, abuse exams, child and parent interactive therapy and visits to community organizations. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Coulter, Urquiza

464. Acting Internship in Neonatology (6-18)

Clinical activity—full time (4 to 12 weeks). Prerequisite: completion of course 430 with grade of B or better; letter of recommendation from Pediatrics faculty member. Diagnostic and therapeutic aspect of the medical and surgical high-risk neonate. Student expected to take night call. Limited enrollment. (H/ P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Milstein

465. Pediatric Specialty Clinic Elective (3-18)

Clinical activity—full time (2 to 12 weeks). Prerequisite: satisfactory completion of course 430; consent of instructor. Supervised experience in a variety of pediatric subspecialty clinics. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

466. Elective in Pediatric Cardiology (3-18)

Clinical activity—full time (2 to 12 weeks). Prerequisite: satisfactory completion of course 430. Inpatient and outpatient experience in diagnosis and management of cardiologic disorders in children. Laboratory experience and participation in clinical investigation may be arranged. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

467. Elective in Pulmonary Medicine (3-18)

Clinical activity-full time (2 to 12 weeks); daily rounds, two weekly half-day clinics. Prerequisité: pediatric clerkship. Inpatient and outpatient management of pediatric patients with pulmonary diseases. These will include but will not be limited to cystic fibrosis, asthma, and other forms of chronic pulmonary diseases as well as congenital abnormalities. (H/P/F grading only.) - I, II, III, IV. (I, II, III, IV.) McDonald

468. Elective in Pediatric Nephrology (3-18)

Clinical activity—full time (2 to 12 weeks). Prerequisite: satisfactory completion of course 430; consent of instructor. Inpatient and outpatient experience in diagnosis and management of renal disorders in children. Laboratory experience and participation in clinical investigation may be arranged. Limited enrollment. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.) Butani

469. Elective in Pediatric Infectious Disease (3-18)

Clinical activity—full time (2 to 12 weeks). Prerequisite: satisfactory completion of course 430; consent of instructor. Inpatient and outpatient experience in diagnosis and treatment of infectious disease of infants and children. Laboratory and clinical investigation may be arranged. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Blumberg

470. Elective in Pediatric Neurology (3-18)

Clinical activity—full time (2 to 12 weeks). Prerequisite: satisfactory completion of course 430, Internal Medicine 430, Obstetrics and Gynecology 430, and Pediatrics 430 and consent of instructor. Inpatient and outpatient experience in diagnosis and management of neurological disorders in children. Students will also participate in other pediatric sub-specialty clinics which serve children with neurological disorders. This course does not satisfy the fourth year neurology requirement. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Chana

471. Elective in Pediatric Gastroenterology (3-18)

Clinical activity—full time (2 to 12 weeks). Prerequisite: satisfactory completion of course 430; consent of instructor. Inpatient and outpatient experience in diagnosis and management of gastroenterology disorders in children. Laboratory experience and participation in clinical investigation may be arranged. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

472. Clinical Rotation in Adolescent Medicine (3-9)

Clinical activity-39 hours; lecture-1 hour. Prereguisite: fourth year Medical Student; consent of instructor. Under supervision, students will see patients in the UCD clinic and at a number of community-based sites. Emphasis on the socially-mediated problems that face adolescents, including substance abuse, STD's, pregnancy, depression and suicide. One hour of lecture each week. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Wilkes

473. Away Acting Internship in Pediatrics (6-18)

Clinical activity-40 hours; lecture-6 hours. Prerequisite: satisfactory completion of Pediatrics Clerkship; consent of instructor. Work at the level of a sub intern in Inpatient and/or Outpatient settings. Expectation is to provide direct patient management. (H/ P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Butani

476. Acting Internship in Pediatric Intensive Care (6-18)

Clinical activity—full time (4 to 12 weeks). Prerequisite: completion of course 430 with grade of A or consent of instructor of record; letter of recommendation from Pediatrics faculty member. Evaluation and support of critically ill infants and children. In general, student expected to take night call every third night during rotation. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Murddock-Vlautin

493. Ethical, Legal and Social Issues in Clinical Genetics (6)

Seminar-12 hours; clinical activity-18 hours; autotutorial-8 hours; independent study-2 hours. Prerequisite: consent of instructor. Restricted to UC Davis School of Medicine students only. Develop advanced knowledge, communication skills and attitudes necessary to provide compassionate, knowledgeable, and expert care to patients who may be at increased genetic risk for disease. Seminars cover ethical and legal principles, epidemiology, and genetics. (H/P/F grading only.)—II. (II.) Řích, Wilkes

493B. Living with Intellectual & **Developmental Disability in the Community**

Clinical activity-4 hours; lecture-10 hours; fieldwork—4 hours; seminar—4 hours. Prerequisite: consent of instructor. In-depth experience with Intellectual & Developmental Disability across the lifespan. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.) Hansen

498. Directed Group Study (1-5)

Variable - 3-15 hours. Explore in-depth various topics in Pediatrics. Extensive contact with and oversight by instructor. May be repeated for credit. (H/P/F grading only.) — I, II, III, IV. (I, II, III, IV.) Li

499. Research Topics in Pediatrics (1-18)

Prerequisite: student in Medical School with consent of instructor. Individual research project in pediatric subspecialty areas (cardiology, endocrinology, hematology, metabolism, newborn physiology and others) may be arranged with faculty member. Independent research by student will be emphasized and long-term projects åre possible. (H/P/F grading

Physical Medicine and Rehabilitation (PMR)

Upper Division Courses

100. Research Approaches to Disability and Rehabilitation (2)

Lecture/discussion - 2 hours. Discussion and evaluation of research approaches to medical rehabilitation, community integration, and quality of life of disabled persons, with a focus on the progressive disabilities associated with neuromuscular diseases. Intent is to encourage interest in professions that serve the disabled community and increase awareness of rehabilitation goals. - II.

198. Directed Group Study (1-5)

Prerequisite: advanced standing and consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: advanced standing and consent of instructor. (P/NP grading only.)

Graduate Course

299. Research (1-12)

Prerequisite: consent of instructor. (S/U grading

Professional Courses

440. Rehabilitation Medicine Clerkship (3)

Clinical activity - 36 hours; lecture/discussion - 4 hours. Prerequisite: consent of instructor; completion of Internal Medicine 430, Surgery 430. Rehabilitation and comprehensive care of physically disabled and physical medicine management of neurologic, neuromuscular and musculoskeletal disorders. Emphasis on evaluation and conservative treatment of spinal disorders, sports injuries and neuromuscular disease. Emphasis on inpatient rehabilitation, pediatrics, spine or sports possible. (H/P/F grading only.)—I, İI, İII, IV. (I, İI, III, İV.) Davis

461. Rehabilitation Medicine (6)

Clinical activity—36 hours; lecture/discussion—4 hours. Prerequisite: consent of instructor; completion of Internal Medicine 430, Surgery 430. Four-week rotation designed as broad overview of PM&R practice for students interested in residency training in the specialty. Emphasis on evaluation and conservative treatment of spinal disorders, sports injuries, neuromuscular disease, neurological and non-operative orthopedic problems requiring rehabilitative management. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Davis

462. Rehabilitation Medicine Clinical Elective (5-18)

Clinical activity—full time. Prerequisite: Internal Medicine 430, Surgery 430; completion of third year in Medical School. Emphasis on evaluation of patients with neurological or orthopaedic problems requiring rehabilitative techniques for their management. Introduction to management of such patients. Physical Medicine and Rehabilitation at off-campus facility must be approved by Chairperson. (H/P/F grading only.)—I, İİ, III, IV. (I, II, III, IV.)

493. Applied Musculoskeletal Anatomy: Sports & Spine SSM (6)

Lecture - 5 hours; lecture/laboratory - 10 hours; laboratory—16 hours; clinical activity—4 hours. Prerequisite: consent of instructor; restricted to UC Davis School of Medicine students only. This four week module will review the anatomy and biomechanics of the musculoskeletal system as well as its associated pathology. The students will be instructed on appropriate musculoskeletal exam techniques and logical approach to the patient in the clinical setting. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Shin

498. Advanced Group Study (1-5)

Prerequisite: consent of instructor. Study and experience for medical students in any of a number of areas in physical medicine and rehabilitation. (H/P/ F grading only.)

499. Research for Medical Students (1-12)

Prerequisite: consent of instructor. Research on any of a variety of topics in physical medicine and rehabilitation. (H/P/F grading only.)

Psychiatry (PSY)

Lower Division Course

92. Willow Clinic (1-2)

Clinical activity—2-6 hours; seminar—1-2 hours. Open to lower division undergraduate students. Student run clinic for undergraduate students interested in learning about and meeting the unique health care needs for the homeless population. May be repeated for credit. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.) Clark, Han, McCarron

Upper Division Courses 192. Willow Clinic (1-2)

Clinical activity - 2-6 hours; seminar - 1-2 hours; lecture - 1-2 hours. Prerequisite: consent of instructor; UC Davis enrollment; upper-division standing. Student run clinic for upper division students interested in learning about and meeting the unique health care needs for the homeless population. May be repeated for credit. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.) Clark, Han, McCarron

198. Directed Group Study (1-5)

Prerequisite: advanced standing and consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: advanced standing and consent of instructor. (P/NP grading only.)

Graduate Courses

298. Directed Group Study For Graduate Students (1-5)

Prerequisite: graduate standing and consent of instructor

299. Special Study for Graduate Students (1-12)

Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

Professional Courses

403. Fundamentals of Clinical Psychiatry

Clinical activity—1 hour; lecture—3 hours. Prerequisite: approval of SOM Committee on Student Progress; restricted to medical students only. Psychiatric interviewing, Mental Status Exam and diagnosis. Major child and adult disorders, including substance abuse and dependence. Weekly student interviews of psychiatric patients in small group format. (P/F grading only.)—II. (II.) Minzenberg, Xiong

412. Psychiatry Grand Rounds (1)

Lecture-1 hour. Prerequisite: medical students or staff or other qualified mental health professionals with consent of instructor. Weekly conference at

UCDMC for presentation of selected clinical cases, presentation of lecture and research reports. (H/P/F grading only.)—II, III, IV. (II, III, IV.) Ton

413. Outpatient Psychiatry Clerkship (6)

Clinical activity—36 hours; conference—2 hours; lecture - 2 hours. Prerequisite: course 430 and/or consent of coordinator. Experience in clinical management/treatment of adult outpatients with psychiatric and substance abuse disorders; crisis management/intervention, evaluation/development of diagnosis and treatment plan; emphasis on outpatient psychopharmacology/brief psychotherapy; observation of group therapy. Individual supervision by faculty/residents. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Ton

414. Psychosomatic Medicine Clerkship (3-12)

Clinical activity—32 hours; discussion—8 hours. Prerequisite: Psychiatry Clerkship or consent of instructor; medical students only. A large university hospital service in which the student functions as a member of the team in evaluation, management and psychiatric liaison with other medical specialties Intensive supervision from senior staff and psychiatric residents. May be repeated two times for credit. (H/P/F grading only.) - I, II, III, IV. (I, II, III, IV.) Ton

415. Telemedicine Clinical Elective (3-9)

Clinical activity-20 hours. Prerequisite: MS 4 with consent of Instructor. Fourth-year medical student elective in Telemedicine focusing on psychiatric issues. Align with University, School and Center for Health and Technology mission of rural outreach and public health, particularly in primary care. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Hilty, Ton

416. Child Psychiatry Clerkship (6)

Clinical activity—36 hours; lecture/discussion—2 hours; conference—2 hours. Prerequisite: course 430 and/or consent of instructor. Didactic and clinical inpatient, outpatient, and consultation-liaison experiences with children, adolescents and families. Clinical observations, diagnostic assessment, and treatment will be undertaken with close supervision. Literature review and case conferences presented on a regular basis. (H/P/F grading only.) - I, II, III, IV. (I, II, III, IV.) Ton

417. Jail Psychiatric Clerkship (6)

Clinical activity—28 hours; conference—8 hours; lecture — 4 hours. Prerequisite: course 430 and/or consent of course coordinator. Students gain experience, under close faculty supervision, assessing acute and chronic mentally ill inmates in both inpatient and clinic settings. (H/P/F grading only.)—İ, II, III, IV. (I, II, III, IV.) Ton

418. Off-Campus Clinical Experience (3-9)

Clinical activity - 20-40 hours. Prerequisite: fourthyear medical students; consent of instructor. Clinical or research elective in off-campus medical school or mental approval of instructor and individual in charge of off-campus setting. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III,

420. Acting Internship in Psychiatry (62)

Clinical activity—40 hours. Prerequisite: course 430 and/or consent of course coordinator. Acting intern position with close faculty supervision with emphasis on biological psychiatry, psychopharmacology and psychodynamic aspects appropriate to diagnostic and long-term patient management. (H/P/F grading only.) — Ĭ, II, III, IV. (I, II, III, IŬ.)

421. Combined Medicine-Psychiatry Clerkship (3-6)

Clinical activity—32 hours; discussion—8 hours. Prerequisite: Psychiatry Clerkship or consent of instructor; medical students only. Students will rotate through the county Primary Care Clinic under the supervision of dual-boarded Psychiatry and Internal Medicine/Family Practice Faculty to provide medical care of indigent and uninsured patients as well as primary care for psychiatry patients. May be repeated for credit two times. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) McCarron, Onate,

422. Readings in Psychiatry (1-3)

Readings/discussion - 3-9 hours. Independent reading of a selected topic in psychiatry. Supervision and discussion with a psychiatry faculty member. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Ton

423. Willow Clinic (3-12)

Prerequisite: open to medical students in all four years of medical school. Student run clinic for medical students interested in learning about and meeting the unique health care needs for the homeless popu lation. May be repeated for credit. (P/F grading only.)-I, II, III, IV. (I, II, III, IV.) Clark, Han, McCarron

424. Functional Genomics (2)

Lecture-1 hour; discussion-1 hour. Prerequisite: graduate standing or consent of the instructor. The theory, methods and principles of functional neurogenomics with emphasis on the relationship to molecular mechanisms involved in development and disease of the nervous system. (H/P/F grading only.) - II. (II.) Choudary

430. Psychiatry Clinical Clerkship (12)

Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Assigned to clinical settings, students build upon the skills gained in preclinical years; emphasis on diagnostic, therapeutic and interpersonal skills. Areas of focus include patient management, interviewing skills, mental status exam, differential diagnosis, basic psychopharmacology, crisis assessment, intervention and case referrals. (H/P/F grading only.)-I, II, III, IV. Cox

439D. Directed Clinical Studies in Psychiatry (1-12)

Clinical activity-40 hours. Prerequisite: consent of instructor. Individual directed studies in extended preparation for modified curriculum or to complete a clinical rotation following a leave of absence. May be repeated for credit. (P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

439R. Directed Studies in Psychiatry (1-12)

Clinical activity—30 hours; independent study—10 hours. Prerequisite: consent of instructor. Individual directed studies in extended preparation for remediation of all or part of clinical rotation. Clinical studies to accommodate and satisfy remedial work as directed by the Committee on Student Progress and approved by the course IOR. May be repeated for credit. (P/F grading only.) - I, II, III, IV. (I, II, III, IV.)

480. Insights in Psychiatry (1-3)

Clinical activity - 3-9 hours. Prerequisite: first- or second-year medical student in good academic standing; consent of instructor. On individual basis, student provided with an opportunity for gaining insight into various clinical activities in the practice of psychiatry. (H/P/F grading only.)-I, II, III, IV. (I, II, İII, İV.) Cox

488. Acting Internship in Inpatient Psychiatry, Away Rotation (6)

Clinical activity-40 hours. Prerequisite: Psychiatry Clerkship and/or consent of course coordinator. Inpatient acting internship at approved non-UCDHS affiliated training program that provides experience and preparation for ambulatory medical care. Students perform as an intern, with a smaller number of patients, greater supervision, and responsibility for the ongoing care of assigned patients. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

489. Acting Internship in Ambulatory Psychiatry, Away Rotation (6)

Clinical activity—40 hours. Prerequisite: Psychiatry Clerkship and/or consent of course coordinator. Outpatient acting internship at an approved non-UCDHS affiliated training program that provides experience and preparation for ambulatory medical care. Students perform as an intern, with smaller number of patients, greater supervision, and responsibility for the ongoing care of assigned patients. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

493. Culture, Medicine and Society (6)

Seminar-12 hours; clinical activity-16 hours; independent study-8 hours; discussion-4 hours. Prerequisite: consent of instructor; UC Davis School

of Medicine students only. Students will learn about the epidemiological significance of health disparities and barriers to access to health care. The course will cover (1) Epidemiology/Health Disparities; (2) Society and Medicine; (3) Cinemeducation; (4) Reflection/Integration. (H/P/F grading only.)—III. (III.) Ton, Wilkes

498. Directed Group Study (1-5)

Prerequisite: consent of instructor. Approved for graduate degree credit. Medical students desiring to explore particular topics in depth. (H/P/F grading only for graduate or medical students.)

499. Research (1-12)

Prerequisite: consent of instructor. Approved for graduate degree credit. Individual research on selected topics or research projects. (H/P/F grading only for graduate or medical students.) - Ton

Public Health Sciences (SPH) **Lower Division Courses**

92. Internship in Community Health (1-12)

Internship—3.36 hours. Prerequisite: lower division standing; consent of instructor. Students apply theory and concepts learned in the classroom through field work in a community health agency. (P/NP grading only.)

Upper Division Courses

101. Perspectives in Community Health (3)

Lecture - 3 hours. Prerequisite: undergraduate standing. Covers comprehensively the responsibilities, obligations, roles and professional activities of various health care disciplines in the community; provides students with perspectives on preventive medicine in society.—III. (III.)

132. Health Issues Confronting Asian Americans and Pacific Islanders (4)

Lecture/discussion-4 hours. Health issues confronting Asian Americans and Pacific Islanders. (Same course as Asian American Studies 132.)—II. (II.)

160. General Health Education and Prevention (5)

Lecture - 4 hours; discussion - 1 hour. Restricted to students in the internship program for the Health Education Program only. Topics include addiction, substance abuse/prevention, nutrition, stress management, physical fitness, body image, reproductive anatomy and physiology, contraceptive options, safer sex, sexual health, healthy relationships, and other general wellness/health promotion topics. Practice in peer counseling and outreach presentations. Limited enrollment. (P/NP grading only.) - IV. (IV.) Ferguson

161. Campus Alcohol/Drug Abuse Prevention Program Peer Educator Training

Lecture/discussion—3 hours; practice—1 hour. Pre-requisite: course 160 (may be taken concurrently); consent of instructor. Preparation for internship in campus and community substance abuse prevention and educational intervention. Addiction and other physiological responses to alcohol and other drugs. Harm-reduction strategies for individuals and target populations. High risk behaviors. Practice in peer counseling skills and outreach presentations to small and large groups. (P/NP grading only.)—III. (III.)

162. Health Advocates Peer Educator Training (4)

Lecture/discussion-3 hours; practice-1 hour. Prerequisite: course 160 (may be taken concurrently); consent of instructor. Preparation for internship in campus and community health promotion and risk reduction. Nutrition, stress management, physical fitness, body image and disordered eating, skin cancer prevention, and other general wellness/health promotion topics. (P/NP grading only.)—III. (III.)

175W. Health Policy and Health Politics (4)

Seminar—3 hours; extensive writing or discussion-1 hour. Restricted to students attending UC Washington Center program. Following the model of a Congressional subcommittee, identification of four salient health policy issues for study, research, and

development of model policies to address them. (Same Course as UC Davis Washington Center 175.) GE credit: SocSci, Wrt | ACĞH, OL, SS, WE.-III. (III.) Wintemute

190C. Research Conference in Community and International Health (1)

Discussion - 1 hour. Prerequisite: consent of instructor. Weekly conference on research problems, progress, and techniques in Community and International Health. Critical discussion of recent journal articles. May be repeated for credit. (P/NP grading only.)-1, 11, 111. (1, 11, 111.)

192. Internship in Community Health Practice (1-12)

Internship - 3-36 hours. Prerequisite: upper division and graduate students; consent of instructor. The student, through fieldwork in a community health agency, learns to apply theory and concepts learned in the classroom. (P/NP grading only.)

198. Study in Community and International Health (1-5)

Prerequisite: undergraduate standing and consent of instructor. Study and experience for undergraduate students in any number of areas in community and international health. (P/NP grading only.)

199. Research in Community and International Health (1-5)

Prerequisite: undergraduate standing; consent of instructor. Student will work with faculty member in areas of research interest, including but not limited to injury control, international health, health policy, occupational and environmental health, health promotion and wellness, women's health, and health demographics. (P/NP grading only.)

Graduate Courses

201. Introduction to Public Health (3)

Lecture - 3 hours; laboratory/discussion - 2 hours. Prerequisite: graduate standing or consent of instructor. Provides an overview of public health. Covers the history of public health in the U.S.; defines its major functions and constituencies; and, introduces fundamental principles of epidemiology, biostatistics, behavioral sciences, environmental health, infectious diseases, and reducing health disparities. May be repeated one time for credit.—IV. (IV.) Cassady, McCurdy

203. Learning and Teaching in Public Health Contexts (2)

Lecture/discussion-2 hours. Prerequisite: graduate standing or consent of instructor. Aimed at current and future public health professionals interested in learning more about the educational potential for interactions with community members and other health professionals—all stakeholders in improving the health of communities.—III. (III.) Cassady, Ziegahn

210. Public Health Informatics (2)

Lecture-2 hours; laboratory-2 hours. Restricted to upper division or graduate standing. Collection, ve ification, and utilization of data related to populations; infrastructure, functions, and tools used to generate public health knowledge supporting public health practices and policy development/dissemination. (S/U grading only.)—IV. (IV.) Hogarth

211. Infectious Diseases and Global Health

Lecture-2 hours; discussion-1 hour. Infectious disease epidemiology and prevention, with emphasis on human and veterinary diseases of global health importance. Major global health epidemics and challenges of infectious diseases, by mode of transmission.—II. (II.) DeRiemer, Sandrock

212. Migration and Health (3)

Lecture/discussion-3 hours. Prerequisite: graduate standing. Principles of migration and health. Topics will include demographics, public health invention programs, health care delivery, occupational health, and effects of international migration on the health in

communities of origin, transit and destination. Guest presentations by outside experts. Offered in alternate years. — (IIÍ.) Schenker

222. Social & Behavioral Aspects of Public Health (3)

Lecture/discussion - 3 hours. Prerequisite: consent of instructor required; graduate standing, Statistics 102 and 106. Theories and strategies of health behavior change at the individual, group, community, and environmental levels. Examples include: transtheoretical model, social networks, and social marketing.
Theories are applied to solve common public health problems (cancer, obesity, smoking, and HIV/ AIDS.—II. (II.) Cassady

232. Health Communication (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Health communication theories and research traditions. Topics include consumer health information seeking; physician-patient interaction; information, social marketing, "edutainment," and media advocacy campaigns; social networks and coping; media influences on health; and new communication technologies in health promotion and healthcare delivery. (Same course as Communication 232.) Offered in alternate years. — (III.) Bell

244. Introduction to Medical Statistics (4)

Lecture/discussion-6 hours; laboratory/discussion - 3 hours. Introduction to statistical methods and software in clinical, laboratory and population medicine. Graphical and tabular presentation of data, probability, binomial, Poisson, normal, t-, F-, and Chi-square distributions, elementary nonparametric methods, simple linear regression and correlation, life tables. Only one unit of credit for students who have completed Statistics 100 or Preventive Veterinary Medicine 402.-IV. (IV.) Yang

245. Statistical Analysis of Laboratory Data (4)

Lecture — 3 hours; laboratory/discussion — 1 hour. Prerequisite: course 244 and 247; consent of instructor. Priority given to K30 training program in the School of Medicine. Analysis of data and design of experiments for laboratory data with an emphasis on gene expression arrays and other high-throughput biological assay technologies. Offered in alternate years.—III. Rocke

246. Biostatistics for Clinical Research (4)

Lecture - 3 hours; laboratory/discussion - 1 hour. Prerequisite: courses 244 and 247. Emphasizes critical biostatistics for clinical research and targets biomedical audience. Students will develop understanding for basic planning and analysis of clinical studies and learn to develop collaborations with biostatisticians. May be repeated for credit.—II. (II.) Qi

247. Biostatistics for Epidemiology (4)

Lecture - 3 hours; laboratory/discussion - 1 hour. Prerequisite: courses 246. Introduction to the principles and methods of statistical inference for categorical data and survival data in epidemiological studies. The major topics include contingency table methods, logistic regression, Kaplan-Meier and logrank methods, and Cox regression. — I. (I.) Kim

252. Social Epidemiology (2)

Lecture/discussion-2 hours. Prerequisite: Epidemiology 205A; consent of instructor. Social determinants of health; psychosocial and physiological pathways; health and social inequality; gender and racial/ethnic disparities in health; social support social cohesion and health; social gradient in behavioral risk factors; social ecological approaches to health intervention; interventions addressing social determinants. (Same Course as Epidemiology 252.)-III. (III.) Gibson

255. Human Reproductive Epidemiology (3)

Lecture — 3 hours. Prerequisite: Preventative Veterinary Medicine 405, 406, Physics 220, Physiology 222 or equivalents, or consent of instructor. Human reproductive effects and risk of reproductive disorders, examined from macro- and micro-environmental exposures in community and occupational settings, epidemiologic study designs and analyses. Offered in alternate years. - I. Hertz-Picciotto

262. Principles of Environmental Health Science (3)

Lecture - 3 hours. Prerequisite: consent of instructor required. Principles, approaches and issues related to environmental health. Recognizing, assessing, understanding and controlling the impact of people on their environment and the impact of the environment on the public.—I. (I.) Bennett

264. Public Health Econometrics (2)

Laboratory/discussion-3 hours. Prerequisite: consent of instructor. Principles of demand and supply; elasticity; benefits and costs; least squares regression; stepwise regression; economic and statistical significance; fixed and random effects; longitudinal data; non-linear relations; continuous and binary variables; instrumental variables; attrition bias; tobit regression; Two-part cost model. (S/U grading only.) - III. (III.) Leigh

266. Applied Analytic Epidemiology (3)

Lecture - 2 hours; laboratory - 2 hours. Prerequisite: Preventive Veterinary Medicine 404 or consent of instructor. Principles and applications in analysis of epidemiologic data. Methods of analyzing stratified and matched data, logistic regression for cohort and case-control studies, Poisson regression, survival-time methods. (Same course as Population Health and Reproduction 266.)—III. (III.) Kass

273. Health Services Administration (3)

Laboratory-3 hours. Prerequisite: consent of instructor required. Structure and function of public and private medical care. Topics include categories and trends in national medical spending, predictors of patient use, causes of death, managed care, HMOs, Medicare, Medicaid, costs of technology, and medical care in other countries. Limited enrollment.—II. (II.) Leigh

290. Topics in Public Health (1)

Seminar. Prerequisite: consent of instructor. Open to students in Master of Public Health program, or permission of instructor. Seminar on key issues and current topics in public health. Course begins in August SSII. Students must enroll in August, then Fall and Winter. The course is a series but grades and units are given at end of each quarter. May be repeated four times for credit. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.) Leistikow, Kass, McCurdy, Schenker

295. International Health (2)

Lecture/discussion-2 hours. Prerequisite: graduate standing or consent of instructor. Forum for learning health issues and health care systems in other countries. Topics include health care for refugees, the impact of political strife on health, the health care professional in international settings. (S/U grading only.)—III. (III.) Koga, Schenker

297. Public Health Practicum (1-16)

Prerequisite: consent of instructor. Open to Master of Public Health students. Practical fieldwork experience in public health. Placement site will vary based on the interest and experience of each student. May be repeated four times for credit. (S/U grading only.)-I, II, III, IV. (I, II, III, IV.) McCurdy

298. Study in Community and International Health (1-5)

Prerequisite: graduate student in good academic standing; consent of instructor. Study and experience for graduate students in any number of areas in community and international health. (S/U grading only.) – I, II, III, IV. (I, II, III, IV.)

299. Research in Community and International Health (1-12)

Prerequisite: graduate standing; consent of instructor. Student will work with faculty member in areas of research interest, including but not limited to injury control, international health, health policy, occupational and environmental health, health promotion and wellness, womens health, and health demographics. (S/U grading only.)—I, II, III, IV. (I, II,

Professional Courses

402. Introductory Medical Spanish (2)

Lecture - 2 hours. Prerequisite: medical student or consent of instructor. The vocabulary needed to conduct a basic history and physical examination in Spanish. (H/P/F grading only.)—III. (III.)

461. Clerkship in Community Health Group Practice (3-9)

Clinical activity—full time (2-6 weeks). Prerequisite: third- or fourth-year medical student. Overview of local community health in group practice situations. Students participate in treatment at several clinic sites in Yolo County. Topics include primary care, environmental health, maternal and child health, jail health, and preventive health care for the aged. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.)

465. Community Health Preceptorship (3-18)

Clinical activity—5-40 hours. Prerequisite: fourthyear medical student; consent of instructor. Participate at state or county health department or other public health organization in on-going investigations into current public health problems, e.g., birth defects, cancer control, diabetes, hypertension, injury control, infectious diseases, aging, Alzheimer's disease, and smoking and tobacco use control. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) McCurdy

466. Occupational and Environmental Medicine Elective (6-12)

Clinical activity; laboratory. Prerequisite: fourth-year medical student in good academic standing; consent of instructor. Participate in activities of Occupational and Environmental Health Unit. Major activity is involvement in an epidemiologic research project of the University. Participate in Occupational and Environmental Medicine Clinic at UC Davis Medical Center and other sites, as arranged. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.) McCurdy

470. Clinical Selective in Occupational and **Environmental Medicine (3-6)**

Clinical activity-9-18 hours. Prerequisite: fourthyear medical student in good academic standing; consent of instructor. Outpatient clinical experience in Occupational and Environmental Medicine at UCDMC and other sites, as arranged. Gain experience in evaluating occ/env medical conditions, use of medical literature resources, the worker's compensation system, and toxicological principles. Students may take up to four weeks for six units. (H/P/F grading only.) - I, II, III, IV. (I, II, III, IV.) McCurdy

480. Insights in Occupational and **Environmental Medicine (1-3)**

Clinical activity—3-9 hours. Prerequisite: first- or second-year medical student in good academic standing; consent of instructor. Observe and participate in research and clinical activities in occupational and environmental medicine which include conferences, occupational and environmental medicine clinical activities and field visits. Develop and present small individual research projects. (P/F grading only.)-I, II, III, IV. (I, II, III, IV.) McCurdy

495. International Health (2)

Lecture/discussion - 2 hours. Prerequisite: medical student in good academic standing; consent of instructor. Forum for learning health issues and health care systems in other countries. Topics include health care for refugees, the impact of political strife on health, the health care professional in international settings. (H/P/F grading only.)—III. (III.) Koga, Schenker

496. Current Issues in Public Health (1)

Lecture/discussion - 1 hour. Topical issues in public health. Speakers from the local public health community address issues such as disease control programs, access to care. May be repeated up to three times for credit. (P/F grading only.)—III. (III.) McCurdy

498. Study in Public Health Sciences (1-6)

Prerequisite: medical student in good academic standing and consent of instructor. Study and experience for medical students in areas in community and international health. (H/P/F grading only.)-I, II, III, IV. (I. II. III. IV.)

499. Research in Public Health Sciences

Prerequisite: medical students with consent of instructor. Work with faculty member in areas of research interest, including but not limited to public health, injury control, international health, health policy, occupational and environmental health, health promotion and wellness, women's health, and health demographics. (H/P/F grading only.)—I, II, III, IV. (I,

Radiation Oncology (RON)

Upper Division Course

199. Special Study for Advanced Undergraduates; Research in Radiation Biology (1-5)

Prerequisite: undergraduate standing; consent of instructor. Radiation Oncology is a unique discipline combining elements of clinical practice linked to complex physics based dosimetry and treatment planning. Included within this clinical environment is a strong basis in biology that underpins the clinical effectiveness of radiation treatment. (P/NP grading only.) - I, II, III, IV. (I, II, III, IV.) Vaughan

Graduate Courses

211. Introduction to Radiation Oncology Physics (3-6)

Prerequisite: consent of instructor; restricted to physics and engineering graduate students and senior undergraduate physics majors. Not more than three students total enrolled in course 211 at a time. Introduction to radiation oncology physics. Overview of treatment methodologies. Medical physics equipment. Treatment machine dosimetry, including calibration. Machine quality assurance. Patient dosimetry. Treatment planning. Simulation and treatment. Treatment quality assurance, including calculation checks and chart checks. Brachytherapy. (S/U grading only.)-I, II, III, IV. (I, II, III, IV.) Stern

299. Independent Study and Research (1-12)

Laboratory - 3-40 hours. Prerequisite: enrollment with a Graduate Group for Ph.D. candidacy and consent of Group Advisor and Sponsor. Research under supervision of Radiation Oncology faculty. Work must be appropriate to fulfill the requirements for the Ph.D. degree. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.) Coleman, Jian Li, Vaughan

Professional Courses

420. Radiobiology Lecture Course (1)

Lecture - 1 hour. Prerequisite: Biological Sciences 1A, Mathematics 12, Physics 1A. Radiobiology lectures are designed to engage the physician resi dents, physics residents and medical students in learning Radiobiology principles and concepts during the year the Radiation Physics course is taught. May be repeated two times for credit. (H/P/F grading only.) - I, II, III, IV. (I, II, III, IV.) Coleman, Li, Vaughan

463. Radiation Oncology Clerkship (3-9)

Clinical activity—full time (2-6 weeks). Prerequisite: completion of Medical Sciences 430, 431; thirdyear clinical clerkship, consent of instructor required. Introduction to radiation oncology. Students will par-ticipate in workup and treatment planning for radiation oncology patients and will be introduced to the concepts involved in clinical radiation oncolog radiation biology, and radiation physics. (H/P/F grading only.)—İ, II, III, IV. (I, II, IİI, İV.) Chen

499. Independent Study and Research in Therapeutic Radiology (1-12)

Prerequisite: consent of instructor. Advanced-level research seminar in clinical and/or translational radiation oncology. Work with the course instructor to generate a testable hypothesis. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.) Chen, Coleman, Fragoso, Li, Mayadev, Monjazeb, Vaughan

Radiology—Diagnostic (RDI)

Professional Courses

413. Radiological Diagnosis II (Physics of Diagnostic Radiology) (5)

Lecture—49 hours total; laboratory—6 hours total. Prerequisite: consent of instructor. Physics of diagnostic imaging; x-ray production and interaction; image formation; modulation transfer function; fluoroscopy; cine fluoroscopy; stereoscopy; xeroradiography; computerized and geometrical tomography; magnetic resonance and ultrasound. Principles of radiation protection in imaging will be covered. (H/ $\,$ P/F grading only.)—I. (I.) Seibert, Boone

414. Medical Radiation Biology (3)

Lecture - 27 hours total. Prerequisite: consent of instructor. Medical radiation biology; molecular cellular and organ system response to acute and chronic irradiation; radiation carcinogenesis and genetic effects; radiation risk assessment; diagnostic ultrasound and magnetic resonance imaging health effects. Medical/legal considerations of radiation exposure. Offered in alternate years. (H/P/F grading only.)—III. Bushberg

461. Clinical Clerkship in Diagnostic Radiology (6)

Clinical activity—35 hours; conference—4 hours; discussion/laboratory-1 hour. Prerequisite: satisfactory completion of second year medical school curriculum, and of third-year clerkships in Internal Medicine and General Surgery; consent of instructor of record. Restricted to eight students per rotation; open to visiting medical and osteopathic students from accredited programs. Work with clinical Radiologists in image interpretation, fluoroscopy, angiography, image-guided intervention, cardiac stress testing, radionuclide therapy. Daily conferences in Radiology Diagnosis and Therapy, Health Physics, Radiation Safety. Prepare three clinical cases for inclass presentation. Assigned readings. Comprehensive final examination. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Hagge

462. Diagnostic Imaging of Acquired and Congenital Heart Disease (2)

Lecture/discussion-5 hours (for 3 weeks). Prerequisite: fourth-year medical student in good academic standing and course 461 (may be taken concurrently). Main emphasis on radiology of acquired and congenital heart disease, but also on magnetic resonance, nuclear medicine, and echocardiography of heart diseases. (H/P/F grading only.)—III. 'mi.'

473. Advanced Clinical Clerkship in Neuroradiology (3-6)

Clinical activity-35 hours; conference-4 hours; independent study-1 hour. Prerequisite: fourth-year medical student with interest in Diagnostic Radiólogy, Neuroradiology, Neurology, Neurosurgery, Psychiatry, Psychology, or related field; satisfactory completion of course 461, or the equivalent, is strongly encouraged. Restricted to one student per 2/4 week rotation. Work with Neuroradiologists in image interpretation of CT, MRI, and fluoroscopy. Opportunity to participate in assessment of Neurointerventional patients, and to observe Neurointerventional procedures. Daily conferences in Neuroimaging, General Radiology, Health Physics, and Radiology Safety. Assigned readings. Credit limited to 3 units for 2 weeks; 6 units for 4 weeks. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Latchaw

474. Advanced Clinical Clerkship in Pediatric Radiology (3-6)

Clinical activity—30 hours; conference—5 hours; film viewing—3 hours; independent study—2 hours. Prerequisite: fourth-year medical students with interest in Radiology and/or Pediatrics; interested thirdyear medical students who have successfully completed Pediatrics clinical clerkships may enroll, given availability and consent of the instructor of record;

prior completion of course 461, or the equivalent, encouraged. Restricted to two students per two-week or four-week rotation. Participation in the radiological care of Pediatric patients; evaluate the patient receiving the radiographic study, including pertinent historical/physical findings. Student expected to write up case files on interesting cases encountered during their rotation. 3 units for 2 weeks, or 6 units for 4 weeks. (H/P/F grading only.) - I, II, III, IV. (I, II, III, IV.) Gorges

475. Advanced Clinical Clerkship in Musculoskeletal Radiology (MSK) (3-6)

Clinical activity—35 hours; conference—4 hours; discussion/laboratory—1 hour. Prerequisite: forth-year medical student with interest in Musculoskeletal Radiology, Orthopedic Surgery, Sports Medicine, PMNR, or related field; satisfactory completion of course 461, or the equivalent, is strongly encouraged. Restricted to one student per 2/4 week rotation. Work with Musculoskeletal Radiologists in interpretation of CT, MRI, radiography, and fluoroscopy. Opportunity to assess patients for, and to observe image-guided procedures. Daily conferences in Musculoskeletal Imaging, Genéral Radiology, Health Physics, and Radiology Safety. Assigned readings. Credit limited to 3 units for 2 weeks, 6 units for 4 weeks. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.) Hunter

476. Advanced Clinical Clerkship Vascular/ Interventional Radiology (IR) (3-6)

Clinical activity-35 hours; conference-4 hours; discussion/laboratory-1 hour. Prerequisite: forthyear medical student with interest in Diagnostic Radiology, Vascular/Interventional Radiology, Cardio vascular Imaging, Cardiology, Cardiovascular Surgery, Surgical Oncology, General Surgery, or related field; satisfactory completion of course 461, or the equivalent, is strongly encouraged. Restricted to one student per 2/4 week rotation. Medical student will work with Vascular/Interventional Radiologists in the evaluation of patients for interventional procedures. There will be opportunities to Daily conferences in Neuroimaging, General Radiology, Health Physics, and Radiology Safety. Assigned readings. Credit limited to 3 units for 2 weeks, 6 units for 4 weeks. (H/P/F grading only.)—I, II, III, IV. (I. II. III. IV.) Link

477. Advanced Clinical Clerkship in Ultrasound Radiology (3-6)

Clinical activity—30 hours; conference—5 hours; film viewing -3 hours. Prerequisite: forth-year medical student with interest in Radiology, OB/GYN, or in other medical or surgical subspecialties employing ultrasound in their clinical practice; prior completion of course 461, or the equivalent, is encouraged. Restricted to one student per 2/4 week rotation. Participation as an active team member on a busy clinical ultrasound service. Credit limited to 3 units for 2 weeks, 6 units for 4 weeks. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.) McGahan

478. Advanced Clinical Clerkship **Abdominal Imaging (3-6)**

Clinical activity—35 hours; conference—4 hours; discussion/laboratory-1 hour. Restricted to one student per 2/4 week rotation. Work with clinical Radiologists on abdominal and pelvic CT, MR, ultrasound, digital radiography, gastrointestinal and genitourinary procedures, image-guided intervention. Offered as a 2-week rotation for third-year medical students and a 4-week rotation for forth-year medical students. Credit limited to 3 units for 2 weeks, 6 units for 4 weeks. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.) Lamba

479. Specialty Externship in Radiology (3-16)

Clinical activity-25 hours; discussion-10 hours. Prerequisite: consent of instructor. Externship provides in-depth exposure to one of a variety of subspecialties in Radiology. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Hagge

498. Group Study in Diagnostic Radiology

Prerequisite: consent of instructor. (H/P/F grading only.)

499. Research in Diagnostic Radiology (1-12)

Prerequisite: consent of instructor. Approved for graduate degree credit. (H/P/F grading only for medical students.)

Radiology—Nuclear Medicine (RNU)

Upper Division Courses

198. Directed Group Study (1-5)

Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

Graduate Course

299. Research: Special Study for Graduate Students (1-12)

Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

Professional Courses

401. Biomedical Radiochemistry (3)

Lecture — 2 hours; laboratory — 3 hours. Prerequisite: open to graduate and medical students; consent of instructor. Approved for graduate degree credit. Course is designed to combine basic nuclear physics, chemistry, and biology into a comprehensive and vigorous lecture-laboratory experience in biomedical nuclear chemistry. Subjects include choice and purification of appropriate gamma and beta radioisotopes, compounding biological pharmacodynamics and radioimmunoassay. (H/P/F grading only.) — III. (III.)

411. Radiological Physics I (Physics of Nuclear Medicine) (5)

Lecture—43 hours total; laboratory—12 hours total. Prerequisite: consent of instructor. Physics of diagnostic and therapeutic nuclear medicine, nuclear physics, radioactive decay; interaction of ionizing radiation; dosimeters; attenuation; internal and external dosimetry; health physics; radiation detection and imaging, scintillation cameras, computerized planar and tomographic imaging. Offered at UC Davis Medical Center. Offered in alternate years. (H/P/F grading only.) — (I.) Bushberg, Vera

463. Clinical Clerkship in Nuclear Medicine (3-8)

Clinical Activity—full time (2-6 weeks). Prerequisite: satisfactory completion of second-year medical school; Radiology—Diagnostic 461 recommended; consent of instructor. Clerkship correlates radioisotopic methods with clinical, pathophysiological, and other diagnostic aspects of the patient's care. Each patient reviewed with student by faculty member. Reading assignments, informal projects, and research techniques available. Limited enrollment (H/P/F grading only.) - I, II, III, IV. (I, II, III, IV.) Shel-

498. Group Study in Nuclear Medicine (1-12)

Prerequisite: consent of instructor. Approved for graduate degree credit. (H/P/F grading only for medical students.)

499. Research in Nuclear Medicine (1-12)

Prerequisite: consent of instructor. Approved for graduate degree credit. (H/P/F grading only for medical students.)

Surgery (SUR)

Lower Division Course

99. Cardiovascular Tissue Engineering Research (1-5)

Laboratory — 3-15 hours. Multidisciplinary research in cardiovascular tissue engineering and regeneration for acquired and congenital cardiovascular disease. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.)

Upper Division Courses

192. Internship in General Surgery (1-12)

Internship—3-36 hours. Prerequisite: upper division standing; approval of project prior to period of internship by preceptor. Supervised work experience in general surgery and related fields. (P/NP grading

199. Special Study in General Surgery for Advanced Undergraduates (1-5)

Prerequisite: advanced undergraduate student with consent of instructor. (P/NP grading only.)

Graduate Course

299. Research (1-12)

Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

Professional Courses 430. Surgery Clerkship (12)

Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Eight week general surgery clerkship includes GI, Burn, Oncology, Plastics, Vascular Cardiothoracic, consult, transplant and trauma. Clerkship assignments are at UCDMC. Daily core material presentations and reading assignments. Student involvement includes work-up and care of surgical patients. (H/P/F grading only.)—I, II, III, IV. Wisner

439D. Directed Clinical Studies in Surgery (1-12)

Clinical activity-40 hours. Prerequisite: partial completion of a Clinical Rotation; consent of instructor. Individual directed studies in extended preparation for modified curriculum or to complete a clinical rotation following a leave of absence. May be repeated for credit. (P/F grading only.)—I, II, III, IV. (I, II, III,

439R. Directed Studies in Surgery (1-12)

Clinical activity - 30 hours; independent study - 10 hours. Prerequisite: consent of instructor. Individual directed studies in extended preparation for remediation of all or part of clinical rotation. Clinical studies to accommodate and satisfy remedial work as directed by the Committee on Student Progress and approved by the course IOR. May be repeated for credit. (P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

460A. Clinical Surgical Elective (6-18)

Clinical activity—full time. Prerequisite: fourth-year medical student or third-year medical student with completion of course 430. Rotation through Surgery Specialty Clinics: Vascular, GI, GU, Thoracic, Plastic, Radiotherapy. Student works up one new and two return visit patients. Presents consult to on-site faculty. Weekly review with preceptor and course director. Reading assignments to add perspective for in-depth discussions. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.) Young

461. Surgery Burn Unit Clerkship (6 or 9)

Clinical activity-full time (4 or 6 weeks). Prerequisite: fourth-year medical student, or third-year medical student with completion of course 430 Externship in the eight-bed Burn Unit, and the 80 bed Shriners Hospital for Children. Principles of critical care, fluid and electrolyte resuscitation and management of surgical wounds in both adults and children. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

462. Surgery Trauma Service Clerkship (6 or 9)

Clinical activity-full time (4 or 6 weeks). Prerequisite: fourth-year medical student, or third-year medical student with completion of course 430. Student

works as an extern on one of the two general surgery Trauma teams, participating in resuscitation and management of critically injured patients. Team hours consist of 24 hours on, and 24 hours off. (H/ P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

463. Surgery Intensive Care Unit (6 or 9)

Clinical activity—full time (4 or 6 weeks). Prerequisite: fourth-year medical student, or third-year medical student with completion of course 430. Student participates in direct supervision of critically ill surgical patients in a twelve-bed surgery ICU. Each student is closely supervised. Provides in-depth experience with management of critically ill patients. (H/P/F grading only.)—I, II, III, IV. (I, II, İII, İV.)

467. Surgical Oncology (3-9)

Clinical activity—full time (2 to 6 weeks). Prerequisite: fourth-year medical student, or third-year medical student with completion of course 430. Students actively participate in management of patients requiring surgery for cancer, endocrine disease and selected general surgical problems. Cases include malignant melanoma, sarcomas, gastrointestinal cancer, head and neck pathology, and metastatic malignancies. Attending rounds daily. Four teaching conferences weekly. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.)

468. Cardiothoracic Surgery Clerkship (6-9)

Clinical activity—full time (4 to 6 weeks). Prerequisite: fourth-year medical student, or third-year medical student with completion of course 430. Student works as an extern on the Cardiothoracic Surgical Service, participating in perioperative management and operations on the heart, lungs, mediastinum, and other thoracic structures. Regularly scheduled teaching conferences are conducted. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.) Young

471. Gastrointestinal Surgery (3-9)

Clinical activity—full time. Prerequisite: fourth-year medical student or third-year medical student with completion of course 430, Internal Medicine 430 and Pediatrics 430. Student participates on the GI Surgery Service, working under the immediate supervision of the faculty and surgical housestaff, involving the full spectrum of gastrointestinal diseases performed by the medical student. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.) Ho

472. Vascular Surgery (3-9)

Clinical activity—full time. Prerequisite: fourth-year medical student or third-year medical student with completion of course 430, Internal Medicine 430 and Pediatrics 430. Student participates on the vascular surgery service and in the management and operations of arterial and venous system, exclusive of diseases that require cardiopulmonary bypass for treatment. Includes patient care responsibilities with appropriate supervision. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Holcroft

475. Pediatric Surgery (6-9)

Clinical activity—full time (4-6 weeks). Prerequisite: fourth-year medical student or third-year medical student with completion of course 430. Care of patients with neonatal congenital surgical problems. Fluid and electrolyte management in infants. General experience with acquired surgical diseases in children. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Marr, Clifford

476. Surgical Consult Service (6-9)

Clinical activity—full time (4-6 weeks). Prerequisite: fourth-year medical student or third-year medical student with completion of course 430. Students function as acting interns working in parallel with the interns on the service. They consult on all non-trauma patients in the emergency room and on the wards and also participate in the operating room. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Wisner

477. Clinically Oriented Anatomy (3)

Clinical activity-40 hours. Prerequisite: completion of three years of medical school. Anatomy of selected regions of the body using cadaver dissection, prosections and interactive CD-ROMs. Anatomical relationships relevant to common surgical procedures. Surgical and interventional radiology procedures. (H/P/F grading only.)—II. Khatri

478. Surgical Preceptorship: Off Campus (6-18)

Clinical activity—full time. Prerequisite: fourth-year medical student and consent of instructor. Student participates in the preoperative, operative and postoperative care of surgical patients under the supervision of attending staff. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Holcroft

480. Insights in Surgery (1-3)

Clinical activity—3-9 hours. Prerequisite: medical student in good academic standing and consent of instructor. Individualized activities, including ward rounds, subspecialty clinics and conferences, grand rounds, and observation of a variety of surgical procedures. (H/P/F grading only.)—I, ÍI, III, IV. (I, II, III,

481. Interactive Clinical Case Presentation (ICCP) (3)

Clinical activity-1 hour. Prerequisite: fourth year medical students; open for third and fourth year student observers; maximum of 10-15 students in good standing. Case presentation of common clinical scenarios (i.e. chestpain/MI; fever/pneumonia; abdo pain/chlecy stites, etc.) from various discipline held in an auditorium with real patients exposure. Interactive session to review history, physical findings and case management. Students will be asked to perform H&P. Course taught as one session (4 hours) per month for three quarters (July to March). The students who enroll can earn up to three credits and the mini-mum requirements will be to attend at least six sessions. Students can do all nine sessions and work toward an honor. For the written part students will have to pick two of the nine case presentations and write a detailed paper with a literature review on "The Current management" of that disease-this can in fact be a manuscript submitted for publication with a faculty member as an advisor. (H/P/F grading only.)-I, II, IV. (I, II, IV.) Khatri

493. Clinically-Oriented Anatomy Special Study Module (6)

Lecture - 5 hours; lecture/laboratory - 10 hours; laboratory - 16 hours; clinical activity - 4 hours. Prerequisite: consent of instructor. Restricted to School of Medicine students only. Reviews aspects of the anatomy of the head and neck, thoracic cavity, abdomen, pelvis, extremities, vascular system, peripheral nervous system and central nervous system. Focus on the understanding of anatomy related to common surgical procedures. (Cell Biology and Human Anatomy 493.) (H/P/F grading only.)—III. (III.) Blankenship, Khatri

493. Interdisciplinary Study of Gastrointestinal Cancer (6)

Lecture-5 hours; clinical activity-12 hours; laboratory-3 hours; discussion/laboratory-20 hours Prerequisite: consent of instructor. In-depth study of gastrointestinal, hepatic and pancreatic cancer. Emphasis on an integration of basic science and clinical medicine. Participating departments include pathology, surgical oncology, medical oncology, gastroenterology, radiology and radiotherapy (Same course as Pathology 493.) (H/P/F grading only.)—II, III. (II, III.) Khatri, Olson, Ruebner

493B. Critically Ill Surgical Patients SSM (6)

Lecture - 5 hours; lecture/laboratory - 10 hours; laboratory-16 hours; clinical activity-4 hours. Prerequisite: consent of instructor; UC Davis School of Medicine students only. Special Study Module, a four week course on the topic: Application of Basic Cardiopulmonary Physiology to Problems Encountered in Critically III Surgical Patients. (H/P/F grading only.) - I, II, III, IV. (I, II, III, IV.) Holcroft

493C. Physiological Principles in SICU SSM (6)

Lecture — 5 hours; lecture/laboratory — 10 hours; laboratory — 16 hours; clinical activity — 4 hours. Prerequisite: consent of instructor; restricted to UC Davis School of Medicine students only. Special Study Module, a four week course on the topic: Care of the Critically III Surgical Patient: Use of Physiological Principles to Guide Treatment of Patients with Common Surgical Problems. (Same course as Human Physiology 493C.) (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Cala, Holcroft

493D. Interdisciplinary Study of Gastrointestinal Cancér (6)

Lecture - 5 hours; clinical activity - 12 hours; laboratory-3 hours; discussion/laboratory-20 hours. Prerequisite: consent of instructor, In-depth study of gastrointestinal, hepatic and pancreatic cancer. Emphasis on an integration of basic science and clinical medicine. Participating departments include pathology, surgical oncology, medical oncology, gastroenterology, radiology and radiotherapy. (Same course as Pathology 493.) (H/P/F grading only.)—II, III. (II, III.) Khatri, Olson, Ruebner

494H. Fourth-Year Surgical Honors Program (18)

Prerequisite: completion of third year of medical school with superior performance on course 430; consent of instructor. To provide intensive and comprehensive training in surgery to students interested in a postgraduate surgical career, that would enable them to succeed during the internship and residency training. (H/P/F grading only.)—I, Iİ, III, IV. (I, II, III, IV.) Holcroft

495. Intense Introduction to Cardiac Surgery (3)

Clinical activity - 16 hours; lecture/discussion - 4 hours. Prerequisite: consent of instructor. Restricted to Medical student between first and second year. Close contact with vascular surgeon for two-week period. Includes Sunday mornings. 100% mandatory attendance. Physiology of going on and off cardiopulmonary bypass. Atherosclerotic cardiovascular disease, structural and valvular heart disease and electrical and rhythmic heart disease. May be repeated one time for credit. (P/F grading only.)—IV. (IV.) Jan

498. Group Study (1-5)

Prerequisite: medical student; consent of instructor. Directed reading and discussion and/or laboratory investigation on selected topics. (H/P/F grading only.)—I, II, III, IV. (I, II, III, İV.)

499. Laboratory Research (1-12)

Laboratory-3-36 hours. Prerequisite: completion of second year of medical school; 6consent of instructor. Laboratory research on surgically related problems. Participation in projects to include the following: burn, nutrition, oncology, transplant and others. (H/P/F grading only.) - I, II, III, IV. (I, II, III,

Surgery—Plastic Surgery (PSU) **Professional Courses**

460. Clinical Plastic Surgery Elective (1-18)

Clinical activity—full time (approximately 40 hours per week). Prerequisite: third- or fourth-year medical students; Surgery 430; consent of instructor. Total involvement in patient care involving surgical preparation, treatment, operative care, and follow-up. Developing and understanding reconstruction and aesthetic plastic surgery. Microvascular surgery included. Student rotation. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Stevenson

Urology (URO)

Upper Division Course 199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) - deVere White

Professional Courses 400. Office Urology (1)

Clinical activity-4 hours in afternoons (6 weeks). Prerequisite: fourth-year medical students with consent of instructor. Introduction to ambulatory care of urologic patients including basic therapeutic and diagnostic procedures from case material referred to private clinic. Management of urinary tract infection will be emphasized. (H/P/F grading only.)-I, II, III, IV. (I, II, III, IV.) Low

460. Urology Clinical Clerkship (5-18)

Clinical activity—full time. Prerequisite: second-year medical student; physical diagnosis or the equivalent; consent of instructor. Clinical experience in diagnosis and treatment of urologic disease. Student will work closely with house staff, participate in conferences and surgery, and perform initial patient evaluation on new patients. May be repeated for credit. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Low

461. Externship in Urology (5-18)

Clinical activity—full time. Prerequisite: fourth-year medical students with consent of instructor. Under supervision, student acting as intern will assume full inpatient responsibility including admission history, physical examination, management of hospitalization, and participate in surgical procedures, outpatient clinic and learning diagnostic and therapeutic procedures. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Low

499. Research in Urology (1-12)

Research - 3-36 hours. Prerequisite: medical or veterinary medical students with consent of instructor. Research in oncology, male infertility, urodynamics, neurogenic bladder. Unique opportunity to apply recent technologies (nuclear medicine resonance, flow cytometry, recombinant DNA) in investigation, diagnosis and treatment of GU cancer, infectious disease, male infertility and development of genitourinary bioprosthetics. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Low

Medicine and **Epidemiology**

See Medicine and Epidemiology (VME), on page 523.

Medieval and Early Modern Studies

(College of Letters and Science) Emily Albu, Ph.D., Program Director Program Office. 176 Voorhies Hall

(530) 752-2257; http://mems.ucdavis.edu Committee in Charge

Don Abbott, Ph.D. (English) Emily Albu, Ph.D. (Classics) Seeta Chaganti, Ph.D. (English) Catherine Chin, Ph.D. (Religious Studies) A. Katie Harris, Ph.D. (History) Rex Stem, Ph.D. (Classics)

The Major Program

The major in Medieval and Early Modern Studies examines the intellectual, political, and cultural forces that shaped modern European civilization during the period from the end of Ancient Rome (fifth century) to the beginning of the Enlightenment (mideighteenth century). An interdisciplinary and interdepartmental program, the major includes studies in history, art history, philosophy, literature, drama, music, national languages, religion, rhetoric, and political theory.

The Program. The major requires interdisciplinary work, while allowing the student to focus on the early Middle Ages, the High Middle Ages, the Renaissance, or the Baroque. The series of medieval and early modern courses in the program provides the foundation for the major and prepares students for advanced work within the individual disciplines. On the upper-division level, students may choose course work in specific areas of History, Comparative Literature, English, French, German, Italian,

Spanish, and Latin, philosophy and religion, arts and language, and political thought. In addition, each student may elect to complete a senior thesis on a selected aspect of medieval and/or early modern

Career Alternatives. The major in Medieval and Early Modern Studies is a liberal arts degree providing excellent preparation for the rigors of professional schools as well as careers in law, museology, journalism, and teaching.

Medieval and Early Modern Studies A.B. Major Requirements:

UNITS

Preparatory Subject Matter 22

Medieval Studies 20A, 20B 10 Three additional courses chosen from: Art History 1B, 1C; Comparative Literature 2, 10A, 10B, 10C, 10D, 10E; English 10A, 46A; German 48; History 4A, 4B; Humanities 1*, 9; Philosophy 21, 22 12 Language proficiency is a desideratum. Courses in Latin and other European languages are strongly recommended, particularly for students planning to pursue graduate studies in the medieval or early modern field.

Depth Subject Matter 44

In consultation with the undergraduate adviser, students select a total of eleven courses from the following disciplines with at least three courses each from the medieval and early modern periods.

Art History 155, 156, 178A, 178B, 178C, 179B, 190B, 190C Classics 110

Comparative Literature 139, 164A, 164B,

Comparative Lielande 107, 1047, 1042, 164C, 166A, 180*
English 111, 113A, 113B, 115, 117, 122, 150A, 153*, 165*, 185A*, 188*, 189*
French 115, 116, 117A, 118B, 141*
German 101A, 112*, 120, 121, 122, 124*, 120, 121, 122,

German 101A, 112*, 120, 121, 122, 124*, 131, 134*, 160 History 102B, 102D, 121A, 121B, 121C, 122, 125, 130A, 130B, 131A, 131B, 131C, 132, 135A, 136, 139A, 144A, 148A, 151A, 151B, 190B, 190C Hidian 105, 112, 113, 114, 115A, 115B, 135C, 135D, 138, 130B, 140, 141 115C, 115D, 118, 139B, 140, 141 Latin 100, 101, 102, 103, 104, 105, 106, 108, 109, 110, 112, 114, 115, 116, 118, 119, 120, 121, 125, 130

Medieval Studies 130A, 130B, 131, 189,

Music 121*, 124A, 124B Philosophy 105, 145, 168, 170, 172 Political Science 115, 116, 118A Religious Studies 102, 115, 130* Spanish 130, 133N, 134A, 134B, 142*

Total Units for the Major......66

* Prior approval by Undergraduate Adviser necessary.

Major Adviser. See Program office.

Minor Program Requirements:

Medieval and Early Modern Studies..... 24

The minor in Medieval and Early Modern Studies is a coherent program of interdisciplinary study. Medieval Studies units may be taken in one or more of the traditional fields of concentration, including art, history, literature, music, national languages, philoso-phy, political theory, and religious studies. Courses must be upper-division with at least two courses each from the medieval and early modern periods. Students may also select a minor with a thematic emphasis.

Although there is no foreign language requirement for the minor, knowledge of Latin or a modern European language is recommended.

The minor must be designed in consultation with the Undergraduate Adviser.

Minor Adviser. See Program office.

Courses in Medieval Studies (MST) Lower Division Courses

20A. Early Medieval Culture (5)

Lecture - 3 hours; discussion - 1 hour; extensive writing. Readings (in translation) in medieval culture, such as Codes of Justinian, Confessions of Saint Augustine, Beowulf, the Nibelungenlied, The Song of Roland, the Summa Theologica of Thomas Aquinas, the Chronicles of Froissart, Chaucer's Canterbury Tales, and Dante's Divine Comedy. GE credit: ArtHum, Wrt | AH, WC, WE.—I. (I.)

20B. The Culture of the High Middle Ages

Lecture - 3 hours; discussion - 1 hour; extensive writing. Great transformations that created the modern world: Constitutional Government, the Hundred Years War, the Black Death, and the Peasants Revolts, the Renaissance, Reformation and Counter-Reformation, and the Baroque. GE credit: ArtHum, Wrt | AH, WC, WE.-II. (II.)

98. Directed Group Study (1-5)

(P/NP grading only.)

99. Special Study for Undergraduates (1-5) (P/NP grading only.)

Upper Division Courses 130A. Special Themes in Medieval Cultures

Lecture - 3 hours; discussion - 1 hour. Each offering concentrates on an interdisciplinary aspect of medieval culture in the Middle East and Europe: the idea of the hero, mysticism, urban development. Extensive readings focused on medieval source material. May be repeated for credit. GE credit: ArtHum, Wrt | AH, WC, WE.

130B. Special Themes in Renaissance Culture (4)

Lecture—3 hours; discussion—1 hour. Each theme illuminates an interdisciplinary aspect of Renaissance culture in the eastern and western hemispheres: exploration, medical pathology, daily life, baroque culture. Immersion in source material from 1500-1650. May be repeated for credit. GE credit: ArtHum, Wrt | AH, WC, WE.

131. Cross-Cultural Relations in the Medieval and/or Early Modern World (4)

Lecture/discussion - 3 hours; extensive writing. Prerequisite: course 20A or 20B or consent of instructor. Medieval and/or Renaissance aspects of cross culturalism. Relations between Christians, Jews, and Muslims: Europeans, Africans, and Asians; Old World and New World. Offered irregularly. GE credit: WC, WE.

189. Seminar in Medieval and Early Modern Culture (4)

Seminar—3 hours; term paper. Prerequisite: course 20A or 20B or consent of instructor. Focus on a particular problem or issue in the Medieval or Early Modern periods. Seminar topics might include (but not limited to) monasticism, origins of the university, chivalry, exploration, the role of women in the Medieval and Early Modern world. Offered in alternate years. GE credit: WE.

190. Senior Thesis (4)

Seminar-4 hours. Prerequisite: senior standing and major in Medieval Studies. Preparation of a research paper dealing with a selected aspect of medieval culture, under supervision of three members of the Committee in Charge. —I, II, III. (I, II, III.)

197T. Tutoring in Medieval Studies (1-4)

Seminar - 2 hours. Prerequisite: courses 20A and 20B; upper division standing; consent of instructor and chairperson of curriculum committee. Tutoring in Medieval Studies 20A and 20B, including leader-

UNITS

ship in small discussion groups affiliated with the course. May be repeated for credit for a total of 6 units. (P/NP grading only.)

198. Directed Group Study (1-5) (P/NP grading only.) 199. Special Study for Advanced

Undergraduates (1-5) (P/NP grading only.)

Meteorology

See Atmospheric Science, on page

Mexican-American (Chicano) Studies

See Chicana/Chicano Studies, on page 189.

Microbiology

See Microbiology, on page 417; Medical Microbiology (MMI), on page 404; Microbiology (A Graduate Group), on page 419; and Pathology, Microbiology, and Immunology (PMI), on page 524.

Microbiology

(College of Biological Sciences) Wolf-Dietrich Heyer, Ph.D., Chairperson of the Department

Department Office. 357 Briggs Hall (530) 752-2626; http://microbiology.ucdavis.edu

Primary Department Members

Scott C. Dawson, Ph.D., Associate Professor Wolf-Dietrich Heyer, Ph.D., Professor Neil Hunter, Ph.D., Professor Michele M. Igo, Ph.D., Associate Professor Stephen C. Kowalczykowski, Ph.D., Distinguished Professor

Su-Ju Lin, Ph.D., Associate Professor John C. Meeks, Ph.D., Research Professor Lorena Navarro, Ph.D., Assistant Professor Douglas C. Nelson, Ph.D., Professor Rebecca Parales, Ph.D., Professor Martin L. Privalsky, Ph.D., Professor John R. Roth, Ph.D., Distinguished Professor Kazuhiro Shiozaki, Ph.D., Professor Mitchell H. Singer, Ph.D., Professor Valley J. Stewart, Ph.D., Professor Lifeng Xu, Ph.D., Assistant Professor Secondary Department Members Sean Burgess, Ph.D., Associate Professor Jodi Nunnari, Ph.D., Professor Ted Powers, Ph.D., Professo

Secondary Department Members

Sean Burgess, Ph.D., Associate Professor Jodi Nunnari, Ph.D., Professor Ted Powers, Ph.D., Professor

Emeriti Faculty

Stanley W. Artz, Ph.D., Professor Emeritus

Paul Baumann, Ph.D., Professor Emeritus John L. Ingraham, Ph.D., Professor Emeritus JaRue S. Manning, Ph.D., Professor Emeritus David Pratt, Ph.D., Professor Emeritus Chester W. Price, Ph.D., Professor Emeritus Merna R. Villarejo, Ph.D., Professor Emerita Mark L. Wheelis, Ph.D., Senior Lecturer Emeritus

Affiliated Faculty

Eric D. Mann, Ph.D., Lecturer

The Major Program

Microbiology is the branch of biology that deals with bacteria, yeasts and other fungi, algae, protozoa, and viruses. These microorganisms are ubiquitous in nature and play a crucial role in areas such as agriculture, biotechnology, ecology, medicine, and veterinary science. The field of microbiology contributes to areas of fundamental inquiry such as biochemistry, cell biology, evolution, genetics, molecular biology, pathogenesis, and physiology. The ease and power of simultaneous genetic and biochemical analysis of microbes led to the emergence of the new disciplines of molecular biology and molecular genetics, and spawned the new industry of biotechnology.

The Program. The Microbiology Undergraduate Program offers Bachelor of Science and Bachelor of Arts degrees in the College of Biological Sciences. Both degrees are designed to provide students with quantitative skills and knowledge across the breadth of Biological Sciences, while maintaining a focus on the biology of microorganisms. The B.S. degree offers more training in mathematics, biochemistry and laboratory methodology; the A.B. degree incorporates more exposure to the liberal arts. The choice of a major program and its suitability for particular career options should be discussed with a major adviser.

Career Alternatives. A bachelor's degree in microbiology serves as the foundation for advanced study in microbiology, entry into the professional schools of all health sciences, or immediate employment in biotechnology, health care and food science

UNITS

A.B. Major Requirements:

011110
Preparatory Subject Matter44-56
Biological Sciences 2A-2B-2C14
Chemistry 2A-2B 10
Chemistry 2A-2B
118C6-12
Mathematics* 17A-17B or 21A-21B 8
Physics 1A-1B or 7A-7B-7C6-12
*Mathematics 16A-16B accepted to fulfill this
requirement only for transfer students
admitted prior to fall 2013.
·
Depth Subject Matter36
Biological Sciences 101, 105
(or 102+103)7-10
Microbiology 104, 104L, 105, 105L 13
Select at least one course from each of the
areas of study below.
Areas of Study:
1) Molecular Microbiology:
Microbiology 115, 150, 170 3
2) Medical Microbiology:
Microbiology 162; Medical Microbiology
and Immunology 188; Pathology,
Microbiology and Immunology 126,
1283-4
Restricted electives6-10
Select from:
Upper division Microbiology courses not used
in satisfaction of any other requirement; or
Biological Sciences 104, 181, 183; Food
Science and Technology 104; Molecular
Cellular Biology 120L, 121, 160L, 182; Plant
Pathology 120, 130, 148, 150; Plant
Sciences 174; Pathology Microbiology and
Immunology 126L, 127; Soil Science 111
Note: Although a course may be listed in

more than one category, that course may satisfy only one requirement in the entire major

Total Units for the Major80-92 **B.S. Major Requirements:**

Preparatory Subject Matter	55-65
Biological Sciences 2A-2B-2C	14
Chemistry 2A-2B-2C	15
Chemistry 8A-8B or 118A-118B-	
118C	. 6-12
Mathematics* 17A-17B-17C or	
21A-21B (21C recommended)	. 8-12
Physics 7A-7B-7C	
Microbiology 91 or 191	
*Mathematics 16A-16B-16C accepted	
fulfill this requirement only for transfer st	udents
admitted prior to fall 2013.	
Depth Subject Matter	45

Biological Sciences 101, 105 (or 102+103), *Transfer students admitted prior to Fall 2013 and current students admitted prior to Fall 2010 may also use STA 13, 13V, or 32 to satisfy this requirement. Microbiology 104, 104L, 105, 105L.....13 Select at least one course from each of the areas of study below. Areas of Study:

Microbiology and Immunology 126, Select from Upper division Microbiology courses not used in the satisfaction of any other requirement; or Biological Sciences 180L, 181, 183; Food Science and Technology 104; Molecular Cellular Biology 120L, 121, 160L, 182; Plant Pathology 120,

Note: Although a course may be listed in more than one category, that course may satisfy only one requirement in the entire

130, 148, 150; Plant Sciences 174;

126L, 127; Soil Science 111

Pathology Microbiology and Immunology

Total Units for the Major101-111

Master Adviser. Su-Ju Lin, Ph.D Honors and Honors Program. Su-Ju Lin, Ph.D

Teaching Credential Subject Representative. Su-Ju Lin, Ph.D; see the Teaching Credential/M.A. Program on page 115.

Graduate Study. The Graduate Group in Microbiology offers programs of study and research leading to the M.S. and Ph.D. degrees.

Strong preference is given to doctoral applicants. The group offers study in general microbiology, microbial physiology, microbial genetics, molecular mechanisms of microbial regulation, molecular mechanisms of microbial pathogenesis, immunology, virology, and recombinant DNA technology. For information on the graduate study and undergraduate preparation for the program contact a graduate adviser or the Chairperson of the Group

Related Courses. The offerings of the Department of Microbiology are augmented by courses in Food Science and Technology; Medical Microbiology; Molecular and Cellular Biology; Pathology, Microbiology, and Immunology; Plant Pathology; and Soil Science.

Faculty of the Department of Microbiology also teach or participate in the following courses: Biological Sciences 2A, 101 104 and 181.

Note: Although a course may be listed in

Courses in Microbiology (MIC) **Lower Division Courses**

10. Natural History of Infectious Diseases

Lecture - 3 hours. Topics in the natural history of infectious diseases principally affecting humans Introduction to infectious microbial agents, ecology, epidemiology, and induction of disease. Focus on diseases of a contemporary nature. For students not majoring in the biological sciences. Not open for credit to students who have completed course 101 or course 102. GE credit: SciEng.—III. (III.) Mann

91. Introduction to Research (1)

Seminar-1 hour. Prerequisite: Biological Sciences 1A or 2A or consent of instructor. Discussion of faculty research focusing on the biochemistry, genetics, and cell biology of microorganisms, along with ways undergraduates can participate in research projects of faculty members. May be repeated three times for credit. (P/NP grading only.) GE credit: SE.—III. (III.) Lin, Xu

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) (P/NP grading only.)

Upper Division Courses 101. Introductory Microbiology (5)

Lecture—4 hours; laboratory—3 hours. Prerequisite: Biological Sciences 1A, or 2A and Chemistry 2B (Chemistry 2B may be taken concurrently). Survey of microorganisms emphasizing their interactions with humans and diseases. Topics include microscopy survey of various microbes, the immune system, food microbiology, microbial pathogens, and mecha nisms of disease transmission. Designed for students requiring microbiology for professional schools. Not open for credit to students who have completed course 102 or 102L. GE credit: SE.-I, II, III. (I, II, III.) Mann, Navarro

102. General Microbiology (4)

Lecture—4 hours. Prerequisite: Biological Sciences 1A or 2A, and Chemistry 8B or 118B (may be taken concurrently). Survey of the biology of microorganisms. Topics include microbial structure, physiology, genetics, and evolution; virology; environmental microbiology; the immune system; and microbial pathogens and disease transmission. In combination with course 102L, fulfills the Microbiology requirement for professional schools. Not open for credit to students who have completed course 101. GE credit: QL, SE.—I, III. (I, III.)

104. General Microbiology (4)

–4 hours. Prerequisite: Biological Sciences 101; 103 or 105. Designed for students continuing in microbiology or using microorganisms as tools for the study of genetics and biochemistry. Biology of microorganisms, including viruses, archaea, bacteria and eukaryotic microbes. Topics include microbial structure, growth, antibiotics, pathogenesis, immunology, and epidemiology. Only two units of credit for students who have taken course 101. Not open for credit to students who have completed course 102. GE credit: QL, SE.-I. (I.) Stewart

104L. General Microbiology Laboratory (3)

Lecture - 1 hour; laboratory - 6 hours. Prerequisite: course 102 or 104 (may be taken concurrently); consent of instructor. Students must complete a petition for consideration of enrollment; petition available on department of Microbiology website. Introduction to principles and laboratory methods in microbiology. Designed for students continuing in microbiology or using microorganisms as tools for the study of genetics and biochemistry. In combination with course 104, fulfills the microbiology requirement for professional schools. Only two units of credit allowed to students who have completed course 101. Not open to students who have completed course 102L. GE credit: SE, WE.-I. (I.) Igo, Nelson

105. Microbial Diversity (3)

Lecture — 3 hours. Prerequisite: course 102 or 104; Biological Sciences 103 or 105. Survey of microbial diversity in the three domains of Life: Bacteria, Archaea, and microbial eukaryotes. Emphasizes microbial evolution and phylogeny, physiology and metabolism, global biogeochemical cycles, environmental adaptations, and genomic methods for analyzing culture-independent microbial diversity and microbial communities. GE credit: SE.—II. (II.) Dawson, Parales

105L. Microbial Diversity Laboratory (3)

Lecture - 1 hour; laboratory - 6 hours. Prerequisite: course 102 or 104; 102L or 104L; 105 (may be taken concurrently); Biological Sciences 103 or 105. Students must complete a petition for consideration of enrollment; petition available on department of Microbiology website. Classical enrichments for the isolation of metabolically diverse microbes; modern molecular methods for the identification of isolates; cultivation independent analysis of microbial communities from local environmental samples. GE credit: SE, WE.-II. (II.) Dawson, Parales

115. Recombinant DNA Cloning and Analysis (3)

Lecture—3 hours. Prerequisite: Biological Sciences 101 or equivalent. Cloning and analysis of recombinant DNA, with emphasis on Escherichia coli host-vector systems. DNA-modifying enzymes; vectors and their use; manipulation and expression of insert DNA; polymerase chain reaction; and sequence annotation. Graduate students see course 215. Not offered every year. GE credit: SE.—I. (I.) Xu

120. Microbial Ecology (3)

Lecture - 3 hours. Prerequisite: course 105, Biological Sciences 102 or 105. Interactions between nonpathogenic microorganisms and their environment, emphasizing physiological and metabolic character istics of various groups and their adaptation to and modification of specific habitats. Not offered every year. GE credit: SE.-III. (III.) Nelson

140. Bacterial Physiology (3)

Lecture - 3 hours. Prerequisite: Biological Sciences 101, 102, 103 (103 may be taken concurrently), or Biological Sciences 101, 105; Microbiology 102 recommended. Fundamentals of bacterial growth and bacterial responses to environmental stresses. Topics will include carbon and nitrogen regulation, growth rate control, post-exponential growth, and motility and chemotaxis. Not open for credit to students who have completed course 130A. Not offered every year. GE credit: SE.

150. Bacterial Genetics (3)

Lecture—3 hours. Prerequisite: Biological Sciences 101, 102, Biological Sciences 103 or course 140; course 102 recommended. Molecular genetics of enterobacteria and their viruses. Isolation of mutants; genetic exchange and mapping; complementation; suppression; transposons; gene expression and regulation; and genomics. Examples will illustrate applications to molecular cloning of recombinant DNA, and to the study of bacterial pathogenesis. Not offered every year. GE credit: SE.

155L. Bacterial Physiology Lab (4)

Lecture/discussion—1 hour; laboratory—8 hours.
Prerequisite: course 140 or 150, 102L, consent of instructor. Physiology and genetics of bacteria. Isolation and characterization of mutant strains. Mapping of mutations by conjugation and transduction studies of control of enzyme synthesis by induction, repression, and catabolite repression. Not offered every year.

162. General Virology (4)

Lecture — 4 hours. Prerequisite: Biological Sciences 102 or 105. Integrated presentation of the nature of animal, bacterial, and plant viruses, including their structure, replication and genetics. Only three units to students who have completed Pathology, Microbiology, and Immunology 128. GE credit: SE.—II. (II.) Falk, Manning

170. Yeast Molecular Genetics (3)

Lecture—3 hours. Prerequisite: Biological Sciences 101 and 102; course 102 or 140 (may be take concurrently) strongly recommended. Survey of the genetics, cell biology and technologies in yeasts and related lower eukaryotes. Topics include diversity of yeasts; cell structure; metabolism; cell cycle; genetic approaches and genomics; gene expression; yeasts as models to study higher eukaryotes; and contemporary techniques. GE credit: SE.—III. (III.) Lin

190C. Undergraduate Research Conference

Discussion - 1 hour. Prerequisite: upper division standing and consent of instructor, course 199 concurrently. Presentation and critical discussion of staff research activities: designed for advanced undergraduate students. May be repeated for credit. (P/ NP grading only.)—I, II, III. (I, II, III.)

191. Introduction to Research for Advanced Undergraduates (1)

Seminar - 1 hour. Prerequisite: Biological Sciences 1A or 2A or consent of instructor. Discussion of faculty research focusing on the biochemistry, genetics, and cell biology of microorganisms, along with ways undergraduates can participate in research projects of faculty members. May be repeated three times for credit. (P/NP grading only.) GE credit: SE.-III. (III.)

192. Internship (1-12)

Internship - 3-36 hours. Technical and/or professional experience on or off campus. Supervised by a member of the Microbiology Section faculty. (P/NP

194H. Microbiology Honors Research (2)

Independent study—6 hours. Prerequisite: senior standing; eligibility for college honors; completion of six units of 199 in microbiology; consent of section. Continuation of an individual microbiological research project culminating in writing of a senior thesis under a faculty director. (P/NP grading only.) — I, II, III. (I, II, ÎII.)

197T. Tutoring in Microbiology (1-12)

Prerequisite: upper division standing and consent of instructor. Assisting the instructor in one of the section's regular courses by tutoring individual or small groups of students in a laboratory, in voluntary discussion groups, or other voluntary course activities.

May be repeated for credit. (P/NP grading only.)— 1, 11, 111. (1, 11, 111.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) - I, II, III. (I, II, III.)

Graduate Courses

200B. Advanced Bacteriology (3)

Lecture - 3 hours. Prerequisite: course 200A. Intended for first year graduate students in microbiology and closely related fields. Advanced topics in phylogeny, physiology, and diversity of bacteria. Not offered every year.—II. (II.) Dawson, Parales

215. Recombinant DNA (3)

Lecture — 3 hours. Prerequisite: Biological Sciences 101, 102, 103 or the equivalent. Application of recombinant DNA technology to modern problems in biology, biochemistry, and genetics, emphasizing molecular cloning strategies, choice of vectors, preparation of insert DNA, and selection procedures.—I. (I.) Privalsky

262. Advanced General and Molecular Virology (3)

Lecture—3 hours. Prerequisite: graduate standing. Advanced integrated presentation of animal, bacterial, and plant viruses, including their structure, modes of regulation, expression and replication and effects on host cells and organisms. Offered in alternate years.—II. Luciw

263. Principles of Protein-Nucleic Acid Interactions (3)

Lecture - 3 hours. Prerequisite: advanced graduate standing and completion of one year of basic graduate course work in biochemistry, biophysics, chemistry, genetics, microbiology, or molecular biology. Physical basis of protein-nucleic acid interaction. Topics include nucleic acid recognition by proteins, thermodynamics of protein-nucleic acid stability, and kinetics of binding process for both non-specific and sequence-specific nucleic acid binding proteins. Emphasis on systems that represent paradigms in protein-nucleic acid interactions. Not offered every year. Not offered every year.—Kowalczykowski

274. Seminar in Genetic Recombination (1)

Seminar-1 hour. Prerequisite: graduate standing; consent of instructor. Biochemical and genetic aspects of genetic recombination in prokaryotes and eukaryotes. Mechanisms of recombination and biochemical and genetic characteristics of recombination proteins. Proteins include DNA strand exchange, DNA helicases, and Holliday junction resolving proteins. May be repeated for credit. Not offered every year. (S/U grading only.)—Kowalczykowski

275. Seminar in DNA Repair and Recombination (1)

Seminar—1 hour. Prerequisite: consent of instructor; graduate standing in Microbiology or closely related field. Review and discussion of current research and literature in DNA repair and recombination with presentations by individual students and invited speakers. May be repeated for credit. (S/U grading only.) - (I, II, III.) Heyer

276. Advanced Concepts in DNA Metabolism (3)

Lecture - 3 hours. Prerequisite: Molecular and Cellular Biology 221C or Genetics 201C or equivalent course recommended. DNA damage checkpoints, homologous recombination, and meiotic recombination. An advanced treatment of the clinical and current literature to discuss emerging principles and current models in these research areas. Offered in alternate years. - III. Hunter

290C. Advanced Research Conference (1)

Discussion/conference-1 hour. Prerequisite: graduate standing and/or consent of instructor. Presentation and critical discussion of staff research activities. Designed for advanced graduate students. May be repeated for credit. (S/U grading only.)—I, II, III. (I, 11. 111.)

291. Selected Topics in Microbiology (1)

Seminar - 1 hour. Prerequisite: graduate standing and consent of instructor. Current progress in microbiology and cellular and molecular biology. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

292. Seminar in Bacterial Physiology and Genetics (1)

Seminar - 1 hour. Prerequisite: consent of instructor, graduate standing in microbiology or closely related field. Review and discussion of current research and literature in bacterial physiology and genetics, with presentations by individual students. (S/U grading only.)—I, II, III. (I, II, III.)

298. Group Study (1-5)

Prerequisite: consent of instructor. (S/U grading only.)—I, II, III. (I, II, III.)

299. Research (1-12)

(S/U grading only.)—I, II, III. (I, II, III.)

Professional Course

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Microbiology (A Graduate Group)

Glenn Young Ph.D., Chairperson of the Group

Group Office. 3143 Tupper Hall (Medical: Microbiology and Immunology) (530) 752-0262

Faculty

David Asmuth, Ph.D., Assistant Professor (UCDHS: Infectious Diseases, Div. of) Enoch P. Baldwin, Ph.D., Associate Professor (Molecular and Cellular Biology) Peter A. Barry, Ph.D., Professor

(Comparative Medicine)

Stephen W. Barthold, Ph.D., Professor (Pathology, Microbiology, and Immunology) Nicole Baumgarth, Ph.D., Associate Professor

(Center for Comparative Medicine) Andreas Baumler, Ph.D., Professor

(Medical Microbiology and Immunology) Charles L. Bevins, Ph.D., Professor

(Medical Microbiology and Immunology) Linda F. Bisson, Ph.D., Professor (Viticulture and Enology)

Barbara A. Byrne, Ph.D., Assistant Professor (Pathology, Microbiology, and Immunology)

R. Holland Cheng, Ph.D., Professor (Molecular and Cellular Biology)

Kiho Cho, Ph.D., Associate Professor (Surgery and Pediatric Regenerative Medicine) Bruno B. Chomel, Ph.D., Professor

(Population Health and Reproduction) Patricia A. Conrad, Ph.D., Professor

(Pathology, Microbiology, and Immunology) Satya Dandekar, Ph.D., Professor

(Medical Microbiology and Immunology)
Scott Dawson, Ph.D., Assistant Professor (Microbiology)

Katherine DeRiemer, Ph.D., Associate Professor (Medical Microbiology & Immunology)
Jonathan Eisen, Ph.D., Professor

(Evolution & Ecology and Medical Microbiology

(Evolution & Ecology and Medical Miss & Immunology) Marc Facciotti, Ph.D., Assistant Professor (Biomedical Engineering)

Julia Fan, Ph.D., Assistant Professor
(Biological & Agricultural Engineering)
Angela Gelli, Ph.D., Assistant Professor

(Pharmacology and Toxicology)

Wolf-Dietrich Heyer, Ph.D., Professor (Microbiology) Neil Hunter, Ph.D., Associate Professor

(Microbiology) Michele M. Igo, Ph.D., Associate Professor (Microbiology)

Stephen C. Kowalczykowski, Ph.D., Professor

(Microbiology)
Hsing-Jien Kung, Ph.D., Professor
(Biological Chemistry)
Rance B. LeFebvre, Ph.D., Professor

(Pathology, Microbiology, and Immunology) Johan Leveau, Ph.D., Assistant Professor (Plant Pathology)

Su-Ju Lin, Ph.D., Assistant Professor (Microbiology) Bo Liu, Ph.D., Professor (Plant Biology)

Frank Loge, Ph.D., Associate Professor (Civil and Environmental Engineering)

Paul Luciw, Ph.D., Professor (Medical Pathology) Shirley Luckhart, Ph.D., Professor (Medical Microbiology and Immunology) Maria Marco, Ph.D. Assistant Professor

(Food Science & Technology)

John C. Meeks, Ph.D., Professor (Microbiology) Christopher J. Miller, Ph.D., Professor

(Pathology, Microbiology, and Immunology)
David A. Mills, Ph.D., Professor
(Viticulture and Enology)

Lorena Navarro, Ph.D., Assistant Professor (Microbiology)

Douglas C. Nelson, Ph.D., Professor (Microbiology) Jodi Nunnari, Ph.D., Professor (Molecular and Cellular Biology)

Bennie I. Osburn, Ph.D., Professor (VM: Pathology, Microbiology, and Immunology)
Rebecca E. Parales, Ph.D., Professor (Microbiology)
Niels C. Pedersen, Ph.D., Professor

(Medicine and Epidemiology)

Edmund R. Powers, Ph.D., Professor (Molecular and Cellular Biology)

Martin L. Privalsky, Ph.D., Professor (Microbiology)
Pamela Ronald, Ph.D., Professor (Plant Pathology) John R. Roth, Ph.D., Professor (Microbiology) Michael A. Savageau, Ph.D., Professor

(Biomedical Engineering) Kate M. Scow, Ph.D., Professor

(Land, Air and Water Resources) Barbara L. Shacklett, Ph.D., Associate Professor (Medical Microbiology and Immunology)
Kazuhiro Shiozaki, Ph.D., Professor (Microbiology)

Mitchell H. Singer, Ph.D., Professor (Microbiology)
Jay V. Solnick, M.D., Ph.D., Professor

(Internal Medicine) Jeffrey L. Stott, Ph.D., Professor

(Pathology, Microbiology, and Immunology) Michael Syvanen, Ph.D., Professor

(Medical Microbiology and Immunology) Jose V. Torres, Ph.D., Professor

(Medical Microbiology and Immunology) Renee Tsolis, Ph.D., Associate Professor

(Medical Microbiology and Immunology) Bart Weimer, Ph.D., Professor

(Population Health & Reproduction) Stefan Wuertz, Ph.D., Professor

(Civil and Environmental Engineering) Lifeng Xu, Ph.D., Assistant Professor (Microbiology)

Tilahun D. Yilma, Ph.D., Professor (Pathology, Microbiology, and Immunology)

Glenn M. Young, Ph.D., Associate Professor (Food Science and Technology)

Affiliated Faculty

Patrick S. C. Leung, Ph.D., Adjunct Professor (Internal Medicine)

Woutring Miller, Ph.D., Assistant Adjunct Professor (VM: Pathology, Microbiology, and Immunology)
Earl T. Sawai, Ph.D., Assistant Adjunct Professor

(Medical Pathology)
Ellen E. Sparger, Ph.D., Associate Adjunct Professor (VM: Medicine and Epidemiology)

Graduate Study. The Graduate Group in Microbiology offers study and research leading to the M.S. and Ph.D. degrees. Strong preference is given to doctoral applicants. The group offers study in modern molecular approaches to microbiological problems. Areas of research span fundamental, applied, and pathogenic microbiology, including bacterial and viral pathogenesis, eukaryotic microbiology, microbial genomics and genetics, microbial physiology and development, microbial ecology and environmental microbiology, cancer biology, and bioengineering and bioremediation. For information on the graduate study and undergraduate preparation for the program contact a graduate adviser or the Chairperson of the Group.

Graduate Advisers. S. Dawson (Microbiology), L.F. Bisson (Viticulture and Enology), R.E. Parales (Microbiology), E.E. Sparger (Vet Med: Medicine), R. Tsolis (Med:Microbiology & Immunology), B. Weimer (VM:Pop Health & Repro)

Courses in Microbiology (MIB) **Graduate Courses**

200A. Microbial Biology (3)

Lecture — 3 hours. Prerequisite: course Microbiology 102 or equivalent; prior coursework in Microbiol ogy. Designed to provide an overview of various aspects of microbiology and microbial processes.

Topics will include microbial genetics and genomics, microbial metabolism, signaling, and adaptations. -

201L. Advanced Microbiology Laboratory Rotations (5)

Laboratory—15 hours. Two five-week assignments in microbiology research laboratories. Individual research problems with emphasis on methodological/procedural experience and experimental design. May be repeated two times for credit. - I, II, III. (I, II, III.)

210. Microbial Interactions (2)

Lecture - 2 hours. Prerequisite: course 200A or consent of instructor. Analysis at the molecular level of the interactions of microbes with the environment, microbes with other microbes, and microbes in symbiotic and/or pathogenic associations with eukaryotic hosts. Topics discussed will vary. May be repeated two times for credit.—I, II, III. (I, II, III.)

290C. Advanced Research Conference (1)

Discussion/conference—1 hour. Prerequisite: graduate standing and/or consent of instructor. Presentation and critical discussion of staff research activities. Designed for advanced graduate students. May be repeated for credit. (S/U grading only.)—I, II, III. (I,

299. Research (1-12)

Research under the guidance of dissertation committee. (S/U grading only.)

Middle East/South Asia Studies

(College of Letters and Science)

Flagg Miller, Ph. D., Program Director

Program Office. 1272 Social Science & Humanities (530) 754-4926; http://mesa.ucdavis.edu

Committee in Charge

Ali Anooshahr, Ph.D. (History) Omnia El Shakry, Ph.D. (History)

Omnia El Silakiy, Fil.D. (Filsoly)
Suad Joseph, Ph.D.
(Anthropology, Women and Gender Studies)
W. Flagg Miller, Ph.D. (Religious Studies)
Noha Radwan, Ph.D. (Comparative Literature) Susan Miller, Ph.D. (History) Sudipta Sen, Ph.D. (History)

The Major Program

The major in Middle East/South Asia Studies offers a comparative understanding of the Middle East and South Asia, regions that have been integrally linked for centuries by trade, migration, exchange of scientific, mathematical, political and philosophical ideas, religion, literature, and art. These regions are connected in the modern period through similar and shared experiences of colonial rule, decolonization and nationalist struggle. Many of the major languages of the region, such as Arabic, Hindi-Urdu, Bengali, Persian, Punjabi, and Turkish, have heavily influenced each other. Religion is a significant force in the region binding people to sacred geographies, scripts, and genealogies. As opposed to presentist approaches which reproduce traditional area studies defined for strategic geopolitical interests, the Middle East/South Asia Studies major rethinks area studies through critical, comparative, historical, and sociological analyses of global interconnections of people, products, ideas, and processes. The major in Middle East/South Asia Studies offers students a unique opportunity to study exchanges, complementarities, and correspondences between these regions in religion, family structures, gender relations, media, literature and film, history, anthropology, law, political economy, international relations, development, urbanism, science and technology, diaspora studies, and other themes.

Programs, Internships, and Career Alterna**tives.** Many internship opportunities are available for the Middle East/South Asia Studies major and minor, consult with your advisor.

Middle East/South Asia Studies Abroad Program. University of California Education Abroad Program. More information can be found at http://eap.ucop.edu/ and http:// summer-abroad.ucdavis.edu/.

A.B. Major Program Requirements:

Preparatory Subject Matter 8-38 Two years (or the equivalent) of Arabic, Hebrew, or Hindi/Urdu (other Middle East/ South Asia Studies regional languages accepted with petition). Arabic 1, 2, 3, 21, 22, 23; Hebrew 1, 2, 3, 21, 22, 23; Hindi/ Urdu 1, 2, 3, 21, 22, 23......30

Depth Subject Matter 40-42

Middle East/South Asia Studies 100 4 Middle East/South Asia Studies 180 4 Two courses from Anthropology 142; Comparative Literature 166; History 113, 190A, 190B, 190C, 193A, 193B; Political Science 135, 136; Religious Studies 160, 102Q, 196A, 196B; Religious Studies 170; Women's Studies 178B..... 8 Additional Electives from Core Course list (below) 16-18

Total Units for Major......48-80 Core Course List:

Anthropology 142, 145; Arabic 1, 2, 3, 21, 22, 23; Art History 1E, 155; Asian American Studies 150F, 189E; Classics 1; Comparative Literature 53B, 53C, 166; Hebrew 1, 2, 3, 21, 22, 23; Hindi/Urdu 1, 2, 3, 21, 22, 23; History 102Q, 102R, 113, 190A, 190B, 190C, 193A, 193B, 196A, 196B; Middle East/South Asia Studies 92, 98, 99, 180, 192, 198, 190; Music 129B, 148; Political 192, 198, 199; Music 129B, 148; Political Science 135, 136; Religious Studies 21, 23, 60, 65C, 68, 160, 161, 162, 170; Women's Studies 178A, 178B, 184.

Note: With prior consultation with an

advisor, students can petition in the Program Committee in advance to accept other elective courses toward the major program, including language course's. Note: While some courses are identified as fulfilling more than one requirement, a given course can only fulfill one such requirement.

Restriction: No more than six units of MSA 92, 98, 99, 192, 198, 199 may be offered in satisfaction of the major requirements. However, students must have completed at least 40 units of upper division course work in satisfaction of the major requirements.

Major advisor. Consult the Middle East/South Asia Studies Program in 1272 Social Science & Humanities (530) 754-4926 or the Middle East/ South Asia Studies website at http://mesa.ucda-

Minor Program Requirements:

UNITS

Middle East/South Asia Studies...... 20-24

Middle East/South Asia Studies 100 Choose one course from: Anthropology 142; Asian American Studies 189E; Comparative Literature 166; History 113, 190A, 190B, 190C, 193A, 193B; Music 129B; Religious Studies 160, 161, 162; Women's Studies Asian American Studies 150F, 189E; History 102Q, 196A, 196B; Music 129B, 148; Religious Studies 168, 170; Women's Studies 178B......4 Additional Electives from Core Course list for

Note: With prior consultation with an adviser, students can petition the Program Committee in advance to accept other elective courses toward the minor program. Under no circumstances may more than one lower division course be offered in satisfaction of requirements for the minor. Note: With prior consultation with an adviser, students can petition the Program Committee to accept more than four units of Middle East/South Asia Studies 192, 198, and/or 199 towards the minor program. Note: While some courses are identified as fulfilling more than one requirement, a given course can only fulfill one such requirement.

Minor Adviser. Consult the Middle East/South Asia Studies Program in 156 Everson Hall (530) 754-4926 or the Middle East/South Asia Studies website at http://mesa.ucdavis.edu.

Courses in Middle East/South Asia Studies (MSA)

Lower Division Courses

92. Internship in Middle East/South Asia Studies (3-15)

Internship. Prerequisite: consent of instructor. Work experience on and off campus in all subject areas offered as part of the ME/SA Studies program. Internship supervised by a member of the ME/SA faculty. May be repeated for credit up to 15 units. (P/NP grading only.) - I, II, III, IV. (I, II, III, IV.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor (P/NP grading

99. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor (P/NP grading

Upper Division Courses 100. Middle East and South Asia: Comparative Perspectives (4)

Lecture — 3 hours; extensive writing. Ethnographic and historical points of intersection and divergence in various aspects of the Middle East and South Asia in precolonial, colonial, and postcolonial societies. Anthropological, historical, and theoretical debates surrounding the region. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.

112. History of South Asian Islam (4)

Lecture—3 hours; discussion—1 hour. Comparative study of Muslim communities of South Asia. Commonalities in cultural identity and historical experience. Rise and spread of Islam, comparative history of Islamic Empires, colonial rule, and post-colonial nationalism. Not offered every year. - II. Ser

150. Women and Islamic Discourses (4)

Lecture/discussion-4 hours. Prerequisite: Women's Studies 50 or comparable course. Introduction to the debates/discourses about women and Islam. Transformations in debates/discourses in colonial and postcolonial periods in the Middle East & South Asia. Comparative study of debates/discourses on family, work, law, sexuality, religion, comportment, human rights, feminist and religious movements. Not offered every year. (Same course as Women's Studies 185.) - Joseph

180. Topics in Middle East and South Asian Studies (4)

Lecture -3 hours; extensive writing. Comparative perspective on the Middle East and South Asia. Topics may include modernity, religious traditions, colonialism, subalternity and social movements, gender and sexuality, history and memory, science and development, ritual and performance, public culture, diasporas. May be repeated one time for credit. GE credit: ArtHum, Div, Wrt | AH or SS, WC, WE.-I, II, III. (I, II, III.)

181A. Topics in Regional ME/SA Studies (4)

Lecture-3 hours; term paper. Iranian/Persianate topics for students specializing in region-specific Middle East and South Asia Studies. May be repeated three times for credit. GE credit: ArtHum or SocSci | AH or SS, WC, WE.

182A. Undergraduate Proseminar in Middle East/South Asia (4)

Seminar—3 hours; term paper. Prerequisite: course 100 recommended. Class size limited to 15 students. Seminar in Iranian/Persianate topics specializing in region-specific Middle East and South Asia studies. May be repeated three times for credit.—II.

192. Internship (1-12)

Internship—3-36 hours. Prerequisite: course 100. Supervised internship on and off campus in the area of Middle East and South Asia Studies. May be repeated for up to 12 units of credit. (P/NP grading only.)

194H. Special Study for Honors Students (1-5)

Prerequisite: open only to majors of senior standing who qualify for honors program; consent of instructor. Independent study of a problem in Middle East/ South Asian studies involving the writing of an honors thesis. — I, II, III. (I, II, III.)

198. Directed Group Study (1-5)

Prerequisite: course 100. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: course 100. (P/NP grading only.)

Military Science

(College of Letters and Science)

Reserve Officers' Training Corps (ROTC), Army

Patrick Rose, Lt. Col., Chairperson of the Department **Department Office.** 125 Hickey Gymnasium (530) 752-5211

Faculty

Major Matthew N. Paige, Assistant Professor Major Steven B. Poteat, Assistant Professor Lt. Col. Patrick Rose, Professor

Program of Study

The Military Science Department offers hands-on training in management and leadership. The program stresses the following Army Values: loyalty, duty, respect, selfless-service, honor, integrity, and personal courage. The program also stresses leadership dimensions as taught in the classes. Also stressed are current events, national and international politics, military affairs, ethics training, and human relations with emphasis on eliminating racial and gender discrimination. Management and leadership are taught using the U.S. Army as a model. Military skills (such as drill and ceremony, map reading, and squad tactics) are taught to the extent necessary to create an environment where students can enter leadership positions and apply theories taught in the classroom. Students learn by doing. The program assists students in all academic fields to prepare for positions of leadership in military or civilian

The department offers two program tracks: (1) a purely academic track; (2) a pre-commissioning track for those desiring a commission in the U.S Army. The academic track entails no obligation to the military and is open to all students. Students pursuing the academic track do not wear a uniform or otherwise participate in extra-curricular activities designed as part of the pre-commissioning process. Activities for all students include the Ranger Club (a club designed for adventure activities such as rappelling, white-water rafting, orienteering, and patrolling) and intramural sports teams.

Students who desire a commission in the U.S. Army participate in both the academic portion of the program and in the leadership laboratories and extracurricular activities designed to enhance their leadership and technical skills. They wear uniforms to leadership laboratories and selected classes and become ROTC cadets. Students may be cadets in the lower division courses without incurring a military obligation. Students participating in the upper division pre-commissioning program incur a military obligation. See below for details. Extra-curricular activities for cadets include an intercollegiate sports team (Ranger Challenge), the university color guard, a military honor society, and opportunities to participate in field training exercises.

Department Programs

Students are enrolled in Military Science under one of two programs.

Four-Year Program

There is no military obligation associated with attendance in lower division courses. Students are enrolled in the basic course (lower division) for the first two years on a voluntary basis. Admission to the advanced course (upper division) is by application from second-year lower division students who meet the academic, physical, and military aptitude requirements. Qualified veterans can enter the advanced course immediately because of their military service experience, upon approval by the Department Chairperson.

Juniors receive \$450 subsistence per month, and Seniors \$500 per month, after executing a contract agreeing to complete the courses and accept a com-mission in the U.S. Army upon graduation. During the course, all Military Science text books, uniforms and equipment are provided without cost. Students are given leadership development experience at the Leader Development and Assessment Course (LDAC) between their third and fourth years of the course. Emphasis is on individual participation, leadership development and the capability to function effectively in positions of significant responsibility.

Two-Year Program

The two-year program is for students, including graduate students, who have not attended lower division Military Science classes. In lieu of lower division courses an applicant attends a six-week summer program, Leaders Training Course (LTC) which is voluntary and carries no military obligation. Applicants are paid and transportation costs covered. Applications are accepted at anytime prior to the student's junior year; graduate students are also accepted. All other provisions explained above for the upper division course apply to the two-year program.

Scholarship Program

The U.S. Army offers four-, three-, and two-year Active Duty scholarships, two-year Reserve Forces Duty, and two-year Dedicated National Guard scholarships to students planning to attend or attending UC Davis. The U.S. Army ROTC scholarship package pays tuition. Also included in all scholarships is a flat rate of \$1200 per year for textbooks.

The Army Reserve Officers' Training Corps four-year Active Duty merit scholarships are awarded to qualified high school seniors in a national competition each year. A deadline of 10 January is set for submission of the four-year scholarship application. As high school seniors, students compete for the scholarship by submitting their complete application at www.goarmy.com/rotc/ or contact UC Davis, Department of Military Science at (530) 754-6707.

The three-year Active Duty and two-year Reserve Forces Duty scholarships are awarded to college students who are already attending UC Davis or transferring from a junior college to UC Davis. Students apply for and are awarded these Army scholarships through the Military Science Department.

Leadership Laboratory

During the course of the school year, two hours per week are spent conducting practical exercises. Classes emphasize adventure activities including offense, defense and patrolling techniques, weapons familiarization, rappelling, rope bridging, obstacle courses, leadership reaction course, and land navigation. All cadets are required to attend leadership laboratories for practical leadership experience and to prepare for attendance at LDAC, held at Fort Lewis, Washington.

Academic Credit

College of Agricultural and Environmental Sciences. The Bachelor of Science degree in agriculture requires the completion of 180 units. Military Science courses are counted in the unit allowance for electives

College of Biological Sciences. The Bachelor of Science degree requires the completion of 180 units. Military Science courses are counted in the allow-

College of Engineering. Military Science units are acceptable toward the requirements for the Bachelor of Science degree to the extent of the unrestricted elective units available in the curriculum being followed.

College of Letters and Science. The Bachelor of Arts degree requires the completion of 180 units. Military Science courses are counted in the allowance for electives

School of Veterinary Medicine. The number of Military Science units acceptable toward the Bachelor of Science degree in Veterinary Medicine is on an individual program basis approved by the Dean of the School. Graduates with the D.V.M. degree may apply for direct commission in the United States Army Veterinary Corps

Aerospace Studies (Air Force)

The Air Force Reserve Officer's Training Corps (AFROTC) is an educational program providing training in leadership, management, communications and military proficiency on college and univer-sity campuses. It also provides an opportunity to obtain a commission as a second lieutenant in the Air Force and enter the active duty forces after you complete a bachelor's or a graduate degree. The skills you acquire will become valuable assets for any subsequent career you choose.

The program is normally four years long, but a flexible design allows students to complete the curriculum in as little as two years. Undergraduate scholarships are available, but are not necessary for participation. Until you accept a scholarship or enter your junior year of the program, you have no obligation to join the Air Force. There are no costs for AFROTC uniforms, books, or classes.

UC Davis students have the option of taking the Air Force program on the UC Berkeley or CSU Sacramento campus.

Qualifications

Freshmen/Sophomore applicants must:

- Be full-time college students in good academic standing
- Have good moral character
- Be in strong physical condition
- Be at least 14 years old

Additionally, Juniors/Seniors/Scholarship recipients

- Be United States citizens or in the process of applying for citizenship
- Be 18 years old (or 17 years old with consent of parent or guardian)
- Pass the Air Force Officer Qualifying Test
- Pass a medical examination
- Be under the age of 31 at time of graduation (may be waived)

Scholarships

Opportunities for four-year and three-year undergraduate scholarships are better than ever. Scholarships cover the full cost of tuition, books and required fees at the University of California and are available for eligible high school seniors. It also includes \$300-\$500 monthly stipend during the

school year. If you are a junior or senior in high school and plan on attending a college or university in Northern California, you can write, call or visit the local AFROTC detachments for a scholarship application. Applications are also available from local Air Force recruiters or your high school guidance

All scholarships are merit-based and consider a variety of factors: cumulative GPA, class standing, SAT/ ACT scores, academic awards/achievements, leadership ability, athletic involvement, extracurricular activities, community service and letters of recommendation. A personal interview with an Air Force officer is also part of the application process. Prior to activating a scholarship, students must meet AFROTC medical and physical fitness standards. All scholarships must be used at an accredited college or university that offers AFROTC on campus or through cross-registration. The program is available at more than 1,000 universities and colleges nation-

If you are already in college, contact our office directly and apply for enrollment into AFROTC as a cadet. Three- and two-year full tuition scholarships are available for all academic majors, especially scientific and technical majors such as engineering, atmospheric science, math, computer science, and physics. GPA Scholarship requirements for nontechnical majors are slightly higher. Applicants are primarily evaluated on their leadership ability and academic performance.

Challenging Careers

All commissioned officers enter the Air Force as second lieutenants for a 4-year active duty service commitment. Pilots and navigators serve longer commitments, based on training requirements. Once on active duty, you'll be given instant responsibility in one of 32 primary career fields. Opportunities to fly are better than ever. Whether you are piloting the F-22 fighter, supervising 150 aircraft maintainers on the flightline, or caring for sick personnel in the emergency room, you will be rewarded knowing that you are making a difference

Air Force ROTC is offered through the Aerospace Studies departments at California State University Sacramento and U.C. Berkeley. Scholarships (including tuition, book allowance, and stipend) are available for qualified students. Students may enroll and attend one course per semester at the U.C. Berkeley or CSU Sacramento campus at no cost. Topics covered in AFROTC courses include Basic Military knowledge (1-credit), Military History (1-credit), Leadership Training (3-credits), and U.S. National Security Affairs and Preparation for Active Duty (3credits). Additional components of the AFROTC program include 2 hours per week of fitness activities, 2 hours per week of Leadership Lab, and a 4-week Summer Field Training between the Sophomore and Junior years. Upon completion of the program and granting of 4-year degree, students will commission as Second Lieutenants in the United States Air Force. To be eligible for AFROTC, applicants should be a full time student and meet additional fitness, GPA, testing, and other requirements. Interested students, please contact their department of choice:

For CSU Sacramento: http://www.csus.edu/afrotc (916) 278-7315; det088@maxwell.af.mil

For U.C. Berkeley: http://airforcerotc.berkeley.edu (510) 642-3572; airforce@berkeley.edu

Naval ROTC

Department of Naval Science 152 Hearst Gymnasium, UC Berkeley Berkeley, CA 94270-3640 (510) 642-3551; http://navyrotc.berkeley.edu

UC Davis students may participate in the Navy and Marine Corps ROTC program at UC Berkeley. The program is 4 years long and includes courses and weekly professional development laboratories (drill) at UC Berkeley. Students normally compete for national scholarships as high school seniors, although interested students may enroll as freshmen or sophomores and compete for scholarships based on successful participation in the program. A student who satisfactorily completes an ROTC program and is awarded a degree from UC Davis receives an active duty commission as a Second Lieutenant in the U.S. Marine Corps or an Ensign in the U.S. Navy.

Navy option students take the following courses:

Freshman year:

NS 1 Introduction to Naval Science

NS 2 Sea Power and Maritime Affairs

Sophomore year:

NS 3 Leadership and Management

NS 10 Naval Ship Systems I

Junior year:

NS 12A Navigation and Naval Operations I NS 12B Navigation and Naval Operations II

Senior year: NS 401 Naval Ship Systems II

NS 412 Leadership and Ethics

In lieu of NS401, NS10, NS12A and NS12B. Marine Corps students participate in Marine Seminars and complete MA154, History of Littoral Warfare and MA20, Evolution of Warfare (or a designated equivalent).

Scholarship students are required to complete a number of other courses at Davis, including one year each of calculus, physics, and English, and one quarter each of computer science, and military history or national security policy.

Interested students should contact the Department of Naval Science at UC Berkeley at the address above to obtain information and apply.

Courses in Military Science (MSC)

Lower Division Courses

11. Roles and Organization of the U.S. Army (1)

Lecture/discussion-2 hour. Constitutional and legal basis of the Army, organization and strategic roles in time of war and peace. Surveys the duties and responsibilities of junior Army Officers studied in the context of current problem. -IV. (IV.)

12. Introduction to Tactical Military Leadership (1)

Lecture - 1 hours. Prerequisite: lower division standing. Military leadership fundamentals to include setting direction, problem-solving, presenting briefs, and using effective writing skills. Basic military tactics, orienteering and land navigation. Dimensions of leadership values, attributes, skills, and actions.— II. (II.)

13. Introduction to Basic Military Operations (1)

Lecture - 1 hour. Prerequisite: lower division standing. Basic military tactical theories and their application at the individual and squad level. Military tactical operations and basic military first aid. — III.

14A. Introduction to Military Leadership Skills (0.5)

Laboratory-2 hours. Prerequisite: lower division standing and consent of instructor. Personal and organizational leadership skills introduced in leadership laboratory. Extensive supervised leadership experiences conducted in a military environment. Basic military skills necessary to function in a leader-ship role. (P/NP grading only.)—I. (I.)

14B. Introduction to Military Leadership **Skills (0.5)**

Laboratory - 2 hours. Prerequisite: lower division standing; consent of instructor. Continuation of development of leadership and military skills introduced in course 14A. Emphasis on the role of the individual, the basic organizational element of the Army, the squad. Supervisory controls reduced as students gain capabilities. (P/NP grading only.)—II.

14C. Introduction to Military Leadership **Skills (0.5)**

Laboratory - 2 hours. Prerequisite: lower division standing; consent of instructor. Development of skills required for promotion to junior non-commissioned officer level. Chain of command from company through individual levels. Interrelationship of squad and platoon organization. (P/NP grading only.)—III. (III.)

21. Military History, Study of Battles (2)

Lecture - 2 hours. Prerequisite: course 22B or consent of instructor. Application of the nine Principles of War to key battles in American and World history. Tactics on a strategic and operational level. Evaluation of leadership and decision-making processes of key leaders. — III. (III.)

22A. Innovative Team Leadership (2)

Lecture - 2 hours. Prerequisite: lower division standing or consent of instructor. Leadership values, attributes and theories. Use of basic military skills such as land navigation and squad operations to enhance understanding of the Army. Types of military briefings. Practice in interpersonal skills. Presentation of a briefing.—I. (I.)

22B. Foundations of Tactical Leadership (2)

Lecture - 2 hours. Prerequisite: course 22A or consent of instructor. Leadership of tactical teams in complex operating environment. Self-assessment of leadership style. Basic military skills: terrain analysis, patrolling and operations orders. Dynamics of adaptive leadership in the context of military operations. - II. (II.)

24A. Individual Military Leadership Skills (0.5)

Laboratory-2 hours. Prerequisite: courses 14A, B and C, enrolled in course 22A or consent of instructor. Develop and practice personal military leadership skills in extensive supervised leadership labs. Cadets perform basic military skills, improve on troop leading procedures and lead subordinates in tactical situations. Begin with drill and ceremony, land navigation and individual movement techniques. (P/NP grading only.)—I. (I.)

24B. Individual Military Leadership Skills (0.5)

Laboratory-2 hours. Prerequisite: courses 14A, B and C, enrolled in course 22B or consent of instructor. Development and practice of personal military leadership skills in extensive supervised leadership labs. Performance of basic military skills, improve ment on troop-leading procedures, leadership of subordinates in tactical situations. (P/NP grading only.) — II. (II.)

24C. Individual Military Leadership Skills (0.5)

Laboratory-2 hours. Prerequisite: courses 14A, B and C, enrolled in course 21 or consent of instructor. Develop and practice personal military leadership skills in extensive supervised leadership labs. Begin with drill and ceremony, land navigation and individual movement techniques. Cadets perform basic military skills, improve on troop leading procedures and lead subordinates in tactical situations. (P/NP grading only.) - III. (III.)

Upper Division Courses

131. Military Leadership and Management

Lecture - 2 hours. Prerequisite: upper division standing and consent of instructor. Leadership and management in organizational context. Team dynamics, leadership styles, professional ethics, development of a leadership framework. Management skills for planning, decision making, and organizing developed through definition of problems, development of courses of action, implementation of solutions. - I. (I.)

132A. Advanced Military Operations (2)

Lecture - 2 hours. Prerequisite: upper division standing, course 131 or consent of instructor. Military small unit tactical theory as the basis for leadership development. Principles of war, contemporary operating environment, Geneva Law of Land Warfare,

military offensive and defensive operations. Emphasis on development of critical thinking, problem solving, and communication skills.—II. (II.)

132B. Applied Leadership (2)

Lecture - 2 hours. Prerequisite: upper division standing, course 132A or consent of instructor. Military small unit tactical theory and application as basis for leadership development. Application of leadership styles and skills to complete problem-solving exercises and the development of an adaptable framework applicable to a variety of shifting environments and situations. — III. (III.)

134A. Adaptive Tactical Leadership (0.5)

Laboratory-2 hours. Prerequisite: upper division standing, course 131 or consent of instructor. Small unit tactical operations serve as the basis for enhancement of leadership performance through tactical application. Assessment of leadership attributes, skills, and actions through participation in a variety of leadership roles in problem-solving exercises. (P/NP grading only.)—I. (I.)

134B. Adaptive Tactical Leadership (0.5)

Laboratory-2 hours. Prerequisite: upper division standing, course 132A or consent of instructor. Small unit tactical operations as the basis for enhancement of leadership performance through tactical application. Assessment of leadership attributes, skills, and actions through participation in a variety of leadership roles in problem-solving exercises. (P/NP grading only.)—II. (II.)

134C. Adaptive Tactical Leadership (0.5)

Laboratory-2 hours. Prerequisite: upper division standing, course 132B or consent of instructor. Small unit tactical operations are taught, serve as basis for students exploration, development. Serve in variety of leadership roles in which leadership attributes, skills, actions are closely assessed and developed while they are faced with series of problem solving exercises. (P/NP grading only.)—III. (III.)

141. Ethical Leadership (2)

Lecture - 2 hours. Prerequisite: upper division standing; consent of instructor. Direct influence of leaders on individual motivation and group processes. The complexities of balancing moral, legal, and ethical obligations while applying fundamental business principles in determining the best possible outcome from competing solutions.—I. (I.)

142. Military Law (2)

Lecture — 2 hours. Prerequisite: division standing and course 141, or consent of instructor. The United States Constitution and the Military Justice System. Basic law of war, with an emphasis on issues that might arise on the battlefield or during a national emergency. - II. (II.) Connelly

143. U.S. Army Management Systems (2)

Lecture - 2 hours. Prerequisite: division standing and course 142 or consent of instructor. Leadership and management, focusing on four management sys tems: planning, organizing, leading and controlling. Practical methodologies for assessing management decisions while balancing competing ethical, economic, infrastructure and future growth trade-offs. -III. (III.)

144A. Military Training Leadership Skills (0.5)

Laboratory—2 hours. Prerequisite: upper division standing, course 141 or consent of instructor. Enhancement of student leadership performance through practical application. Small unit military tactical operations as the basis for the student exploration and development. (P/NP grading only.)—I. (I.)

144B. Military Training Leadership Skills

Laboratory-2 hours. Prerequisite: upper division standing, course 142 or consent of instructor. Enhancement of student leadership performance through practical application. Small unit military tactical operations serve as the basis for student exploration and development. (P/NP grading only.)—II.

144C. Military Training Leadership Skills

Laboratory-2 hours. Prerequisite: upper division standing, course 143 or consent of instructor. Enhancement of student leadership performance through practical application. Small unit military tactical operations as the basis for student exploration and development. (P/NP grading only.)—III. (III.)

191. Special Studies in Military Science (2)

Independent study-6 hours. Prerequisite: consent of department chair, and courses 131, 132A, 132B, 141, 142, 143. Intensive examination of one or more special problems in military science. Possible areas of study include leadership dimensions, principles of war, air-land battle imperatives, military strategy, the operational art and professional ethics, May be repeated two times for credit when topic differs. (P/NP grading only.)

Molecular Biosciences

See Veterinary Medicine, School of, on page 523.

Molecular and **Cellular Biology**

(College of Biological Sciences)

Jodi Nunnari, Ph.D., Professor and Chairperson of the Department

Department Office. 149 Briggs Hall (530) 752-3611; http://www.mcb.ucdavis.edu

Faculty

Primary Members

Jawdat Al-Bassam, Ph.D. Assistant Professor Enoch Baldwin, Ph.D., Associate Professor Nigel D. Browning, Ph.D., Adjunct Professor

(Chemical Engineering and Materials Science) Sean M. Burgess, Ph.D., Associate Professor Kenneth C. Burtis, Ph.D., Professor Judy Callis, Ph.D., Professor and Vice Chair Frederic L. Chedin, Ph.D., Associate Professor R. Holland Cheng, Ph.D., Professor Bruce W. Draper, Ph.D., Assistant Professor JoAnne Engebrecht, Ph.D., Professor and Vice Chair Carol A. Erickson, Ph.D., Professor

Academic Senate Distinguished Teaching Award Marilynn E. Etzler, Ph.D., Professor Oliver Fiehn, Ph.D., Professor Andrew Fisher, Ph.D., Professor (Chemistry) Christopher S. Fraser, Ph.D., Assistant Professor Charles S. Gasser, Ph.D., Professor James Hildreth Ph.D., Professor and Dean Kenneth B. Kaplan, Ph.D., Professor lan Korf, Ph.D., Associate Professor J. Clark Lagarias, Ph.D., Professor Julie A. Leary, Ph.D., Professor Francis J. McNally, Ph.D., Professor Richard W. Michelmore, Ph.D., Professor (Vegetable Crops; Medical Microbiology and

Immunology) Diana G. Myles, Ph.D., Professor Jeanette E. Natzle, Ph.D., Associate Professor Jodi Nunnari, Ph.D., Professor and Chairperson of

the Department Edmund R. Powers, Ph.D., Professor Raymond L. Rodriguez, Ph.D., Professor Lesilee S. Rose, Ph.D., Professor Jonathan M. Scholey, Ph.D., Professor Daniel A. Starr, Ph.D., Associate Professor David K. Wilson, Ph.D., Professor

Secondary Section Members

John J. Harada, Ph.D., Professor Academic Senate Distinguished Teaching Award Wolf-Dietrich Heyer, Ph.D., Professor Stephen C. Kowalczykowski, Ph.D., Distinguished Professor

William J. Lucas, Ph.D., Professor Brian Mulloney, Ph.D., Professor Sharman O'Neill, Ph.D., Professor Pamela A. Pappone, Ph.D., Professor Emeritus Martin L. Privalsky, Ph.D., Professor Steven M. Theg, Ph.D., Professor Larry N. Vanderhoef, Ph.D., Professor Martin Wilson, Ph.D., Professor

Emeriti Faculty

Peter B. Armstrong, Ph.D., Professor Emeritus Sterling Chaykin, Ph.D., Professor Emeritus James S. Clegg, Ph. D., Professor Emeritus Eric E. Conn, Ph.D., Professor Emeritus Academic Senate Distinguished Teaching Award, UC Davis Prize for Teaching and Scholarly Achievement

Richard S. Criddle, Ph.D., Professor Emeritus John H. Crowe, Ph.D., Professor Emeritus Michael E. Dahmus, Ph.D., Distinguished Professor Emeritus

David W. Deamer, Ph.D., Professor Emeritus Roy H. Doi, Ph.D., Distinguished Professor Emeritus Academic Senate Distinguished Teaching Award Gordon J. Edlin, Ph.D., Professor Emeritus Richard H. Falk, Ph.D., Professor Emeritus Leslie D. Gottlieb, Ph.D., Professor Emeritus Melvin M. Green, Ph.D., Professor Emeritus Robert D. Grey, Ph.D., Professor Emeritus Academic Senate Distinguished Teaching Award

Jerry L. Hedrick, Ph.D., Professor Emeritus . Distinguished Graduate Mentoring Award John A. Kiger, Ph.D., Professor Emeritus Mark G. McNamee, Ph.D., Professor Emeritus Carl W. Schmid, Ph.D., Professor Emeritus Irwin H. Segel, Ph.D., Distinguished Professor

Che-Kun J. Shen, Ph.D., Professor Emeritus Larry R. Sprechman, Ph.D., Senior Lecturer Emeritus

Lecturers

Benjamin F. Edwards, Ph.D., Lecturer Kenneth L. Hilt, Ph.D., Lecturer Judith A. Kjelstrom, Ph.D., Academic Coordinator/ Lecturer Larry Z. Morand, Ph.D., Academic Coordinator/

Lecturer Mark F. Sanders, Ph.D., Lecturer

Molecular and Cellular Biology offers three major programs: Biochemistry and Molecular Biology, Cell Biology, and Genetics.

The Biochemistry and Molecular Biology Major Program

The Biochemistry and Molecular Biology major introduces students to the chemistry of living organisms and the experimental techniques that are used to probe the structures and functions of biologically important molecules. Students who enjoy both chemistry and biology and who are comfortable with quantitative approaches to problem solving will find this major a rewarding field of study.

The Program. The biochemistry and molecular biology program begins with the four-course, upper division common curriculum that provides an introduction to the principles of biochemistry, genetics, and cell biology. Majors then take a comprehensive and rigorous laboratory course to familiarize them with the most important aspects of biochemical research. Additional upper division courses in biochemistry and molecular biology examine detailed aspects of these subjects. Students are also required to take courses in other biological sciences and a full year of physical chemistry.

Career Alternatives. The biochemistry and molecular biology program provides a sólid scientific background for students seeking a research, teaching, or service career in the life sciences. Positions are open to biochemists in bio-medical, biotechnological, pharmaceutical, agricultural research and chemical industries. Also, university-affiliated research laboratories, hospital laboratories, and

UNITS

government-sponsored research facilities provide employment opportunities. The major provides excellent preparation for advanced study in graduate or professional schools.

B.S. Major Requirements:

	OINII
Preparatory Subject Matter	. 49-53
Biological Sciences 2A-2B-2C	. 15
recommended)	. 12
Depth Subject Matter	. 57-62
Biological Sciences 101, 102, 103, 104	.13 6 4-8 11,6 6 mt to tion qed nce; 193

Total Units for the Major...... 106-115

Master Adviser. C.S. Gasser

Advising Center for the major is located in 156 Briggs (530) 752-9032.

Graduate Study. See Biochemistry, Molecular, Cellular and Developmental Biology, on page 175.

The Cell Biology Major Program

The Cell Biology major program provides students with a comprehensive understanding of the cell, the basic structural and functional unit of all living organ-

The Program. To understand living organisms, the biologist must understand the cell. Hence, cell biology lies at the core of the biological sciences. Students taking this major gain a solid foundation in biological principles. The major emphasizes how cellular organization and function contribute to the development, maintenance and reproduction of adult organisms. The major illustrates the ways in which principles derived from the physical sciences, genetics, biochemistry, molecular biology and physiology are integrated in the study of living cells and emphasizes the experimental nature of the study of cell biology.

Career Alternatives. The major provides an excellent background for students wishing to enter postgraduate and professional programs in biological, health sciences or veterinary sciences; for students pursuing careers involving teaching or research in the biological sciences; for students interested in careers in the biotechnological or pharmaceutical industries; or for students interested in careers related to the administrative, legal or commercial aspects of biomedical science.

B.S. Major Requirements:

	OINIIO
Preparatory Subject Matter	55-65
Biological Sciences 2A-2B-2C	
Chemistry 2A-2B-2C	15
Mathematics* 17A-17B-17C or 21A-21B	
(21C recommended) 8-	
Physics 7A-7B-7C	12
Chemistry 8A-8B or 118A-118B-	
118C 6-	12

LINITO

* Mathematics 16A-16B-16C accepted to fulfill this requirement only for transfer students admitted prior to fall 2013.

Depth Subject Matter45-51
Biological Sciences 101, 102, 103,
104
Statistics 100 or 130A-130B 4-8
Molecular and Cellular Biology 140L 5
Two courses from Molecular and Cellular
Biology 143, 144, or 145
Molecular and Cellular Biology 1213 Molecular and Cellular Biology 150;
or 163 and 164 4-6
Select at least 10 additional units from the
following: Chemistry 107A, 107B; Evolution
and Ecology 100, 150; Microbiology 101,
102, 150, 170; Molecular and Cellular
Biology 120L, 123, 124, 126, 138, 143,
144, 145, 148, 150, 158, 160L, 162, 163,
164, 178, 182, 191; Neurobiology,
Physiology, and Behavior 100, 101, 103,
112, 160, 161; Pathology, Microbiology, and Immunology 126, 126L, 128; Plant
Biology 111, 111D, 113, 113D, 152;
Medical Microbiology 188 No more than 4
units of research (193, 194H, 199) may be
used for credit in this category10

Total Units for the Major..... 101-116 Master Adviser. D.A.Starr

Advising Center for the major is located in 156 Briggs (530) 752-0202.

The Genetics Major Program

The Genetics major provides a broad background in the biological, mathematical, and physical sciences basic to the study of heredity, gene expression and evolution. The major is sufficiently flexible to accommodate students interested in the subject either as a basic discipline in the biological sciences or in terms of its applied aspects such as biotechnology, medicine, and agriculture.

The Program. The genetics program begins with the four-course, upper division core curriculum that provides an introduction to the principles of genetics, biochemistry, and cell biology. Students then take additional upper division courses in specialized areas of modern genetics including gene expression, evolution, development, human genetics and genomics, as well as a laboratory course in the principles of genetics. Additional upper division courses in biological sciences, as well as internship/research coursework can be chosen to fulfill required elective

Career Alternatives. The genetics degree provides suitable preparation for a wide variety of careers, including teaching, research, work with biotechnology companies, medicine, and all the health sciences. It is also an excellent background for students wishing to continue their education in a graduate program, a teacher-training program, medical school, veterinary school, or other professional

UNITS

B.S. Major Requirements:

Preparatory Subject Matter 40-48
Biological Sciences 2A-2B-2C14
Chemistry 2A-2B-2C or 2AH-2BH-
2CH15
Chemistry 8A-8B or 118A-118B-
118C 6-12
Mathematics* 17A-17B-17C or 21A-21B
(21C recommended) 8-12
Physics 7A-7B-7C 12
* Mathematics 16A-16B-16C accepted to
fulfill this requirement only for transfer students
admitted prior to fall 2013.
Depth Subject Matter 48-53
Biological Sciences 101, 102+103 (or 105),
104 10-13
Molecular and Cellular Biology 121,
1826

Evolution and Ecology 100 or Biological Sciences 181
Biological Sciences 134, 181, 183 Biotechnology 150 Engineering: Computer Science 124 Evolution and Ecology 100, 102, 103. 131, 150, 175 Microbiology 105, 150, 170 Molecular and Cellular Biology 150, 162, 163, 164 Plant Biology 112, 113 Plant Sciences 154
Or upper division courses in genetics, genomics or other fields relevant to the student's interest chosen in consultation with the adviser. No more than 4 units of 192, 193, 198, or 199 may be

Total Units for the Major95-117 Master Adviser. J.E. Natzle

Advising Center for the major is located in 156 Briggs Hall (530) 752-0202.

Graduate Study. See Genetics (A Graduate Group), on page 318.

used for credit in this category.

Courses in Molecular and Cellular Biology (MCB)

Lower Division Courses

10. Introduction to Human Heredity (4)

Lecture - 3 hours; discussion - 1 hour. Topics in human heredity and human gene structure and function, including the genetic basis of human development, causes of birth defects, mental retardation, genetic diseases, sexual determination, development, and behavior. GE credit: SciEng | QL, SE, SL.—II, III. (III.) Rannala, Sanders

99. Special Study (1-5)

Independent study—3-15 hours. Prerequisite: consent of instructor. (P/NP grading only.) GE credit:

Upper Division Courses

120L. Molecular Biology and Biochemistry Laboratory (6)

Laboratory-10 hours; lecture-2 hours; laboratory/discussion-1 hour. Prerequisite: Biological Sciences 103 (may be taken concurrently). Restricted enrollment. Introduction to laboratory methods and procedures employed in studying molecular biology and biochemical processes. Designed for students who need experience in the use of molecular biology and biochemical techniques as research and analytical tools. GE credit: QL, SE, SL, VL, WE.-I, II, III. (I, II, III.)

121. Advanced Molecular Biology (3)

Lecture — 3 hours. Prerequisite: Biological Sciences 101 and 102 or 105 or Animal Biology 102 (may be taken concurrently, prior completion recommended). Structure, expression, and regulation of eukaryotic genes. Chromosome structure and replication; gene structure, transcription, and RNA processing; protein synthesis and translation control; development, immune system, and oncogenes. Not open for credit to students who have completed Molecular and Cellular Biology 161. GE credit: SciEng | QL, SE, SL.—I, II, III. (I, II, III.) Burgess, Gasser, Harmer, Powers

123. Behavior and Analysis of Enzyme and Receptor Systems (3)

Lecture — 3 hours. Prerequisite: Biological Sciences 103. Introduction to the principles of enzyme kinetics and receptor-ligand interactions with emphasis on metabolic regulation and data analysis. Topics include simultaneous equilibria, chemical and

steady-state kinetics, allosteric enzymes, mulitreactant systems, enzyme assays, membrane transport and computer-assisted simulations and analyses. GE credit: QL, SE.-I, III. (I, III.) Fraser, Wilson

124. Macromolecular Structure and Function (4)

Lecture - 4 hours. Prerequisite: Biological Sciences 103, Chemistry 118C. An in-depth investigation into protein and nucleic acid structure and thermodynamics and how these properties influence their biological functions. Key examples of important functional classes of these molecules will be examined. Not open for credit to students who have completed course 122 or Chemistry 108. GE credit: SE.—I, II. (I, II.) Baldwin, Browning

126. Plant Biochemistry (3)

Lecture—3 hours. Prerequisite: Biological Sciences 103 or 105. The biochemistry of important plant processes and metabolic pathways. Discussion of methods used to understand plant processes, including use of transgenic plants. (Same course as Plant Biology 126.) GE credit: SE, SL.—II. (II.) Callis, Tian

138. Undergraduate Seminar in Biochemistry (1)

Seminar — 1 hour. Prerequisite: Biological Sciences 103. Discussion of the historical developments of modern biochemistry or current major research problems. May be repeated two times for credit when topic differs. (P/NP grading only.) GE credit: OL, SE.—I, II, III. (I, II, III.) Callis, Gasser

140L. Cell Biology Laboratory (5)

Lecture - 2 hours; laboratory - 6 hours; discussion -1 hour. Prerequisite: Biological Sciences 104 (may be taken concurrently). Exercises illustrating the principles of cell biology with emphasis on light microscopy. GE credit: OL, QL, SE, SL, VL.—II. (II.) Kaplan

142. Advanced Cell Biology: Contractile and Motile Systems (4)

Lecture—3 hours, term paper. Prerequisite: Biological Sciences 102, 104 (may be taken concurrently); Mathematics 16B. Advanced cell biology with emphasis on molecular, biophysical and cellular properties of contractile and motile systems. GE credit: SE

143. Cell and Molecular Biophysics (3)

Lecture—3 hours. Prerequisite: Biological Sciences 101, 102, 103, 104. Physical chemical principles by which molecules form living, moving, reproducing cells. Physical nature of cytoplasm; molecular structure/bonding in macromolecules, macromolecular assemblies and protein machines. Physical techniques and modeling of cytoskeletal polymer-motor dynamics and function during intracellular transport, mitosis and motility. GE credit: QL, SE.—(I.) Scholey

144. Mechanisms of Cell Division (3)

Lecture—3 hours. Prerequisite: Biological Sciences 101, 102, 104. The molecules and mechanisms that allow eukaryotic cells to coordinate cell growth, DNA replication, segregation of chromosomes and cell division. GE credit: SE, WE.-II. (II.) McNally

145. Assembly and Function of Cell Signaling Machinery (3)

Lecture — 3 hours. Prerequisite: Biological Sciences 101, 102, 104. Molecular basis of cell signaling, including positioning of cellular machinery, components of various signaling pathways, and downstream effects of signaling on cell adhesion, cell differentiation, and programmed cell death. GE credit: SE.—III. (III.) Erickson

148. Undergraduate Seminar in Cell Biology (2)

Seminar-2 hours. Prerequisite: upper division standing in the biological sciences or a related discipline. Student reports on current topics in cell biology with emphasis on integration of concepts, synthesis, and state-of-the-art research approaches. Reviews of literature and reports of undergraduate research may be included. May be repeated for credit. (P/NP grading only.) GE credit: OL, SE.

150. Developmental Biology (4)

Lecture — 4 hours. Prerequisite: Biological Sciences 101. Analysis of the mechanistic basis for animal development with a focus on experimental evidence and the relevant fundamental experimental strategies. Fertilization and early development, morphogenesis and patterning, cell differentiation, regulation of cell proliferation and tissue growth. GE credit: SE, SL.—I. (I.) Armstrong, Edwards

158. Undergraduate Seminar in **Developmental Biology (2)**

Seminar-2 hours. Prerequisite: upper division standing in the biological sciences or a related discipline. Student reports on current topics in cell biology with emphasis on integration of concepts, synthesis, and state-of-the-art research approaches. Reviews of literature and reports of undergraduate research may be included. May be repeated for credit. (P/NP grading only.) GÉ credit: OL, SE.-I, II, III. (I, II, III.)

160L. Principles of Genetics Laboratory (5)

Laboratory-6 hours; lecture-2 hours, discussion/ laboratory-1 hour. Prerequisite: Biological Sciences 101. Laboratory work in basic and molecular genetics including gene mapping, isolation and characterization of mutants in eukaryotic model systems, reverse genetics, gel electrophoresis, recombinant DNA techniques, and PCR. Not open for credit to students who have completed Genetics 100L. GE credit: QL, SE, VL, WE.-I, II, III. (I, II, III.) Engebrecht, Kiger, Natzle, Rose, Sanders, Sundaresan

162. Human Genetics and Genomics (3)

Lecture - 3 hours. Prerequisite: course 121 or equivalent. Human molecular genetic variation, molecular basis of metabolic disorders, chromosome aberrations and consequences, analysis of the human genome, and computational techniques of genetic & genomic analyses. GE credit: SciEng | QL, SE, SL.—I. (I.) Chedin

163. Developmental Genetics (3)

Lecture - 3 hours. Prerequisite: course 121; course 164. Current aspects of developmental genetics. Historical background and current genetic approaches to the study of development of higher animals. GE credit: SciÉng | SE, SL.—II. (II.) Natzle, Rose

164. Advanced Eukaryotic Genetics (3)

Lecture - 3 hours. Prerequisite: course 121. Five basic operations of genetic analysis: mutation, segregation, recombination, complementation, and regulation. Emphasis on the theory and practice of isolating and analyzing mutations, as well as understanding mechanisms underlying both Mendelian and epigenetic inheritance. GE credit: SciEng | SE, SL.—IİI. (III.) Burgess, Engebrecht

178. Undergraduate Seminar in Molecular Genetics (1)

Seminar-1 hour. Prerequisite: upper division standing, completion of Biological Sciences 101, and completion or concurrent enrollment in course 121. Discussion of current topics in molecular genetics to show advanced applications of basic principles and to highlight professional career opportunities. May be repeated one time for credit when topic differs. (P/NP grading only.) GE credit: SciEng | OL, SE. I, II, III. (I, II, III.) Chedin, Engebrecht, Rodriguez

182. Principles of Genomics (3)

Lecture—3 hours. Prerequisite: Biological Sciences 101. Fundamentals of genomics, including structural genomics, functional genomics, proteomics, and bioinformatics, focusing on the impact of these disci plines on research in the biological sciences. Social impacts of genomic research. GE credit: SciEng | SE.—II. (II.) Burtis, Korf

190C. Undergraduate Research Conference

Discussion — 1 hour. Prerequisite: upper division standing and consent of instructor; concurrent enrollment in course 193 or 199. Presentation and discussion of current research by faculty and students. May be repeated for credit. (P/NP grading only.) GE credit: SE.—I, II, III. (I, II, III.)

191. Introduction to Research (1)

Seminar — 1 hour. Prerequisite: Biological Sciences 102 (may be taken concurrently) or consent of instructor. Various topics in molecular and cellular biology including biochemistry, genetics, and cell biology will be discussed, along with ways undergraduates can participate in research projects of faculty members. May be repeated for credit. (P/NP grading only.) GE credit: SE.-I, II, III. (I, II, III.)

192. Internship (1-12)

Internship - 3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Technical and/or practical experience on and off campus, supervised by a member of the Section of Molecular and Cellular Biology faculty. (P/NP grading only.) GE credit:

193. Advanced Research (3)

Laboratory-6 hours; discussion-1 hour. Prerequisite: upper division standing, completion of an upper division Molecular and Cellular Biology laboratory course and consent of instructor. Research project carried out under the supervision of a faculty sponsor. Discussion and analysis of results and proposed experiments on a weekly basis with faculty sponsor. May include presentation of a seminar to a research group. May be repeated for credit. (P/NP grading only.) GE credit: SE.—I, II, III. (I, II, III.)

194H. Research Honors (3)

Independent study—9 hours. Prerequisite: 6 units of course 193 and/or 199 with faculty director; senior standing; GPA of at least 3.250; consent of Section. Honors project. Continuation of an intensive, individual laboratory research project in biochemistry, genetics, or cell biology culminating with the presentation of the work in a written thesis and in a seminar. (P/NP grading only.) GE credit: OL, SE, WE.

197T. Tutoring in Molecular and Cellular Biology (1-5)

Tutorial – 2-6 hours. Prerequisite: upper division standing, completion of course to be tutored, and consent of instructor. Assisting the instructor in one of the section's regular courses by tutoring individual or small groups of students in a laboratory, in voluntary discussion groups, or other voluntary course activities. May be repeated for credit. (P/NP grading only.) GE credit: SE.—I, II, III. (I, II, III.)

198. Directed Group Study (1-5)

Variable – 1-5 hours. Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.

199. Special Study for Advanced Undergraduates (1-5)

Independent study—3-15 hours. Prerequisite: consent of instructor. (P/NP grading only.) GE credit:

Graduate Courses

210. Molecular Genetics and Genomics (3)

Lecture/discussion - 3 hours. Prerequisite: Biological Sciences 101 and Molecular & Cellular Biology 121, or equivalent. Pass one restricted to graduate students. Emphasizes molecular genetic and genomic approaches to address fundamental biological questions. Introduces and emphasizes the strengths of prokaryotic and eukaryotic model sys tems and serves as building block for the BMCDB core courses, which use model systems to develop their themes. May be repeated one time for credit.— I. (I.) Engebrecht

211. Macromolecular Structure and Interactions (3)

Lecture — 3 hours. Prerequisite: Biological Sciences 102, or the equivalent, or consent of instructor. Pass one restricted to graduate students. Conceptual and quantitative basis for macromolecular structurefunction relationships. Investigation of the paradigm form follows function. Review of key elements of protein, nucleic acid, and membrane structure. Exploration of specific macromolecular associations by analyzing chemical structure and physical-chemical behavior. No credit for students that have taken course 221A.-I. (I.) Baldwin, Segal, Wilson

212. Cell Biology (3)

Lecture - 3 hours. Prerequisite: Biological Sciences 104, or equivalent, or consent of instructor. Pass one restricted to graduate students. Analysis of basic processes governing cell organization, division, and transport. Study of the integration and regulation of cell behavior in response to changes in cellular environment. No credit for students that have taken course 221D.-II. (II.) McNally

213. Developmental Biology (3)

Lecture - 3 hours. Prerequisite: undergraduate biology course or consent of instructor. Pass one restricted to graduate students. Fundamental principles in embryonic development that guide application of modern cellular and genetic approaches to understand developmental mechanisms. Emphasis on experimental approaches used to critically address scientific questions. —II. (II.) Erickson

214. Molecular Biology (3)

Lecture - 3 hours. Prerequisite: course 211, or equivalent, or consent of instructor. Pass one restricted to graduate students. Investigation of the basic cellular processes in prokaryotes and eukaryotes that govern the central dogma of molecular biology (DNA-RNAprotein). No credit for students that have taken course 221C.-III. (III.) Heyer

215. Graduate Reading Course (2)

Discussion - 10 hours. Prerequisite: graduate standing or consent of instructor. Pass one restricted to graduate students. Development of critical reading skills through study of major paradigm advances in specialized fields of biochemistry, molecular, cell, and developmental biology. Emphasis on active learning and student participation. Guided analysis of literature and major advances in field of study May be repeated two times for credit if topic differs. — III. (İII.) Kaplan

220L. Advanced Biochemistry Laboratory Rotations (5)

Laboratory-15 hours. Prerequisite: course 221A (may be taken concurrently) and 120L or the equivalent. Two five-week assignments in biochemistry research laboratories. Individual research problems with emphasis on methodological/procedural experience and experimental design. May be repeated two times for credit.—I, II, III. (I, II, III.)

221B. Mechanistic Enzymology (3)

Lecture—3 hours. Prerequisite: undergraduate level organic and biological chemistry, one course in physical chemistry recommended. Analysis of organic enzyme reaction mechanisms and the exploration of enzyme catalyzed reactions. - I. (I.) Bald-

241. Membrane Biology (3)

Lecture—3 hours. Prerequisite: Biological Sciences 102, 103, 104 or consent of instructor. Advanced topics on membrane biochemistry and biophysics. Relationship of the unique properties of biomem branes to their roles in cell biology and physiology. (Same course as Biophysics 241.)—III. (III.) Longo,

248. Seminar in Cell Biology (2)

Seminar - 2 hours. Prerequisite: consent of instructor. Discussion of recent literature on the physical and chemical aspects of organization and function of living systems, topics of current interest in ultrastructure and function of cells. Organizational and functional properties of the molecular and cellular levels of biological systems. May be repeated for credit.—I.

251. Molecular Mechanisms in Early Development (3)

Lecture-3 hours. Prerequisite: graduate standing or consent of instructor; introductory background in developmental biology and/or cell biology recommended. Analysis of the early events of development including: germ cells and other stem cells, gameto genesis, meiosis, imprinting, fertilization, genetically engineered organisms, egg activation and establishment of embryonic polarity with focus on cellular events including gene regulation and cell signaling. Offered in alternate years. — (I.) Draper

252. Cellular Basis of Morphogenesis (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 150. Development of form and structure; morphogenetic movement, mechanisms of cellular motility, cell adhesion, intercellular invasion, interaction of cells and tissues in development. Offered in alternate years. — (II.) Tucker

255. Molecular Mechanisms in Pattern Formation and Development (3)

Lecture - 3 hours. Prerequisite: graduate standing or consent of instructor; introductory background in developmental biology and/or genetics recommended. Genetic and molecular analysis of mechanisms that control animal development after fertilization. Establishment of embryonic axes, cell fate and embryonic pattern; induction, apoptosis, tissue patterning. Critical reading of current literature in C.elegans, Drosophila, and mouse genetic model systems. Offered in alternate years. - III. Natzle,

256. Cell and Molecular Biology of Cancer

Lecture—1 hour; term paper. Prerequisite: course in cell or developmental biology (e.g., course 150, 141, 163, or Biological Sciences 104). Analysis at the cellular and molecular levels of the regulation of normal and neoplastic tissue growth; tumor dissemination; identification and characterization of oncoaenic agents: characterization of oncogenes and tumor-suppressor genes.—I. (I.)

257. Cell Proliferation and Cancer Genes (3)

Lecture - 1.5 hours; seminar - 1.5 hours. Prerequisite: course 221C and 221D or the equivalent. Genetic and molecular alterations underlying the conversion of normal cells to cancers, emphasizing regulatory mechanisms and pathways. Critical reading of the current literature and development of experimental approaches.—I. (I.) Carraway

258. Seminar in Development (2)

Seminar - 2 hours. Prerequisite: consent of instructor. Reports and discussion on embryology, morphogenesis, and developmental mechanisms. May be repeated for credit. - II. (II.) Erickson

259. Literature in Developmental Biology (1)

Seminar – 1 hour. Prerequisite: consent of instructor. Critical presentation and analysis of recent journal articles in developmental biology. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.) Erickson

263. Biotechnology Fundamentals and Application (2)

Lecture — 2 hours. Prerequisite: Biological Sciences 101, 102 and Microbiology 102 or consent of instructor. Must be a graduate student in good standing. Fundamentals of molecular biology and chemical engineering involved in recombinant DNA technology. Topics: principles of rate processes of biological systems, optimization of bioreactors, and issues related to overexpression and production of recombinant molecules. Participation in studentdirected team projects. - II. (II.) McDonald, Privalsky, Rodriguez, VanderGheynst

282. Biotechnology Internship (7-12)

Internship - 21-36 hours. Prerequisite: graduate standing and consent of instructor. Research at a biotechnology company or interdisciplinary cross-college lab for a minimum of 3 months as part of the Designated Emphasis in Biotechnology Program. (S/ U grading only.)—I, II, III. (I, II, III.) Dandekar

290C. Research Conference (1)

Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Presentations and critical discussions of faculty and graduate student research in molecular and cellular biology including biochemistry, genetics, and cell biology. May be repeated for credit. (S/U grading only.)—I, II, III. (I, III.)

291. Current Progress in Molecular and Cellular Biology (1)

Seminar - 1 hour. Prerequisite: graduate standing or consent of instructor. Seminars presented by guest lecturers on subject of their own research activities. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

294. Current Progress in Biotechnology (1)

Seminar - 1 hour. Prerequisite: graduate standing or consent of instructor. Seminars presented by guest lecturers on subjects of their own research activities. May be repeated for credit. (Same course as Chemical Engineering 294.) (S/U grading only.)—I, II, III. (I, II, III.) Kjelstrom, McDonald, Rodriguez

295. Literature in Molecular and Cellular Biology (1)

Seminar—1 hour. Prerequisite: graduate standing and consent of instructor. Critical reading and evaluation of current literature in molecular and cellular biology disciplines. Papers will be presented and discussed in detail. May be repeated for credit. (S/ U grading only.)—I, II, III. (I, II, III.) Baldwin, Fisher, Privalsky, Wilson

298. Group Study (1-5)

Variable - 1-5 hours. Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12)

Independent study—3-36 hours. (S/U grading only.)

Professional Course

390. Methods of Teaching (1)

Discussion - 1 hour. Prerequisite: graduate standing and consent of instructor. Practical experience in the methods and problems of teaching biochemistry/ genetics/cell biology. Includes analysis of texts and supporting material, discussion of teaching techniques, preparing for and conducting discussion and laboratory sections, formulating examinations under supervision of instructor. Participating in the teaching program required for Ph.D. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Molecular, Cellular, and Integrative **Physiology** (A Graduate Group)

Catherine VandeVoort, Ph.D., Chairperson of the Group

Group Office. 311 Life Sciences

(530) 752-9092; http://biosci3.ucdavis.edu/GradGroups/MCIP/

Faculty

Thomas Sean H. Adams, Ph.D., Research Physiologist (USDA WHNRC) Thomas E. Adams, Ph.D., Professor (Animal Science) Steven E. Anderson, Ph.D., Research Physiologist

(Physiology and Membrane Biology) Keith Baar, Ph.D., Assistant Professor (Neurobiology, Physiology, and Behavior)

Linda Barter, Ph.D., Assistant Professor (VM: Surgical and Radiological Sciences) Trish J. Berger, Ph.D., Professor (Animal Science)

Bers, Donald M., Ph.D., Professor (Medical Pharmacology)

Sue Bodine, Ph.D., Professor

(Neurobiology, Physiology, and Behavior) Laura Borodinsky, Ph.D., Assistant Professor (Physiology & Membrane Biology)

Julie Bossuyt, Ph.D., Assistant Professor (Medical Pharmacology)

Robert Brosnan, Ph.D., Associate Professor (VM: Surgical & Radiological Sciences) Peter M. Cala, Ph.D., Professor

(Physiology and Membrane Biology) Christopher C. Calvert, Ph.D., Professor (Animal Science)

Earl E. Carstens, Ph.D., Professor (Neurobiology, Physiology, and Behavior) Gretchen Casazza, Ph.D., Assistant Adjunct Professor (Exercise Biology) Ernest S. Chang, Ph.D., Professor (Bodega Marine Laboratory) Chao-Yin Chen, Ph.D., Associate Professor (Medical Pharmacology)
Tsung-Yu Chen, Ph.D., Associate Professor (Med: Neurology) Gary N. Cherr, Ph.D., Professor (Bodega Marine Laboratory) Anthony T. W. Cheung, Ph.D. Professor (Med: Pathology) Nipavan Chiamvimonvat, M.D., Professor (Cardiovascular Medicine) Alan J. Conley, D.V.M, Ph.D., Professor (Population Health and Reproduction) Carroll E. Cross, M.D., Professor (Internal Medicine, Human Physiology) Fitz-Roy E. Curry, Ph.D., Professor (Physiology and Membrane Biology) Wenbin Deng, Ph.D., Assistant Professor (Cell Biology and Human Anatomy) Sanda Despa, Ph.D., Assistant Professor in Residence (Medical Pharmacology) Florin Despa, Ph.D., Assistant Professor in Residence (Medical Pharmacology) Jason P. Eiserich, Ph.D., Associate Professor (Neurology) Michael J. Ferns, Ph.D., Professor (Anesthesiology and Pain Medicine) Katherine Ferrara, Ph.D., Professor (Biomedical Engineering) Alla F. Fomina, Ph.D., Assistant Professor (Physiology and Membrane Biology) Charles A. Fuller, Ph.D., Professor (Neurobiology, Physiology, and Behavior)
J. David Furlow, Ph.D., Associate Professor (Neurobiology, Physiology, and Behavior)
Jack M. Goldberg, Ph.D., Senior Lecturer
(Neurobiology, Physiology, and Behavior)
Aldrin Gomes, Ph.D., Assistant Professor (Neurobiology, Physiology, and Behavior) Leigh Griffiths, Ph.D., Assistant Professor (VM: Medicine and Epidemiology) Fawaz Haj, Ph.D., Associate Professor (Nutrition) Samantha Harris, Ph.D., Assistant Professor (Neurobiology, Physiology, and Behavior) Peter J. Havel, D.V.M., Ph.D., Professor (Molecular Biosciences) Kei Hayashi, Ph.D. Assistant Professor (VM: Surgical & Radiological Sciences) Barbara A. Horwitz, Ph.D., Professor (Neurobiology, Physiology, and Behavior) Andrew T. Ishida, Ph.D., Professor (Neurobiology, Physiology, and Behavior) Steven Jinks, Ph.D., Assistant Adjunct Professor (Anesthesiology & Pain Medicine)
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(Physiology and Membrane Biology)

Isaac N. Pessah, Ph.D., Professor

(Molecular Biosciences)

Helen E. Raybould, Ph.D., Professor (Anatomy, Physiology and Cell Biology) Janet F. Roser, Ph.D., Professor (Animal Science) John C. Rutledge, M.D., Professor (Internal Medicine) Jon Sack, Ph.D., Assistant Professor (Physiology and Membrane Biology) Saul Schaefer, M.D., Professor (Internal Medicine) Edward S. Schelegle, Ph.D., Associate Professor (VM: Anatomy, Physiology and Cell Biology)
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Catherine VandeVoort, Ph.D., Adjunct Professor (Obstetrics and Gynecology) Amparo Villablanca, M.D., Professor (Internal Medicine)
Peter C. Wainwright, Ph.D., Professor (Evolution and Ecology)
W. Jeffrey Weidner, Ph.D. Professor
(Neurobiology, Physiology, and Behavior) Robert H. Weiss, M.D., Professor (Internal Medicine) Jonathan Widdicombe, Ph.D., Professor (Physiology and Membrane Biology) Barry W. Wilson, Ph.D., Professor (Animal Science) Dennis W. Wilson, Ph.D., Professor (VM: Pathology, Microbiology, and Immunology) John Wingfield, Ph.D., Professor (Neurobiology, Physiology, and Behavior) Heike Wulff, Ph.D., Assistant Professor (Pharmacology) Vladimir Yarov-Yarovoy, Ph.D., Assistant Professor (Physiology and Membrane Biology) Clare E. Yellowley, Ph.D., Professor (VM: Anatomy, Physiology and Cell Biology)
Jie Zheng, Ph.D., Associate Professor

Emeriti Faculty

Irwin Feinberg, M.D., Professor Emeritus John M. Horowitz, Ph.D., Professor Emeritus

(Physiology and Membrane Biology)

Graduate Study. The Graduate Group in Molecular, Cellular, and Integrative Physiology offers programs of study and research leading to the M.S. and Ph.D. degrees and participates in joint Ph.D./M.D. and Ph.D./D.V.M. programs. The programs emphasize broad training in the fundamental principles of cellular, molecular, and integrative physiology. For information regarding these programs, address the Program staff person at the Group office.

Graduate Advisers. Gretchen Casazza, Master

Courses in Molecular, Cellular, and **Integrative Physiology (MCP)**

(Formerly courses in Physiology)

Graduate Courses

200L. Animal Cell Culture Laboratory (4)

Discussion - 2 hours; laboratory - 6 hours. Prerequisite: courses in undergraduate biochemistry, cell biology, or general physiology, or consent of instructor. Techniques of cell culture, with emphases on cell physiology and the actions of drugs and toxicants on cultured somatic cells. Design, performance and interpretation of experiments with animal cells in vitro. – II. (II.) B. Wilson, R. Wu

210A. Advanced Physiology (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Physiology Ph.D. program, or consent of instructor. Advanced course in general principles of physiology, surveying homeostasis, cellular and selected topics, and neurophysiology. (Same course as Human Physiology 210A.)—I. (I.) Ferns

210B. Advanced Physiology (6)

Lecture - 5 hours; discussion - 1 hour. Prerequisite: Physiology 210A; Physiology Ph.D. program, or consent of instructor. Advanced course on general principles of physiology, surveying homeostasis, cellular and selected topics, and neurophysiology.—II. (II.) Stebbins

210C. Advanced Physiology (5)

Lecture - 5 hours. Prerequisite: doctoral student in the Molecular, Integrative and Comparative Physiology Graduate Group, or consent of instructor. Graduate level instruction in the general principles of physiology and the neural and humoral control of the cardiovascular, renal, respiratory, gastrointestinal, sensory, musculoskeletal, and reproductive systems.—III. (III.) Adams

210L. Physiology Laboratory Rotations (5)

Laboratory — 15 hours. One mandatory 10-week rotation and up to two more voluntary rotations. Students will learn techniques and perform experiments related to a particular research problem. At the end of the 10-week period in the laboratory, students will give a short talk and hand in a research paper.—I, II. (I, II.) Widdicombe, Zheng

216. Neurophysiology Literature (3)

Lecture-1 hour; discussion-2 hours. Lectures covering experimental and theoretical methods in studying cell membrane ion channels and the resulting characterization of the physiological functions and structure/function relationships of some of the most important channel types. Discussion of classical and current original papers.—I. (I.)

219. Muscle Growth and Development (3)

Lecture—2 hours; seminar—1 hour. Prerequisite: Biological Sciences 103, Biological Sciences 104 or Molecular and Cellular Biology 150, or consent of instructor. Integration of growth and development of skeletal muscle; morphology, biochemistry, neural control mechanisms, circulatory and nutritional fac-tors. Prenatal and neonatal differentiation of fiber types. Experimental and hereditary myopathies. Offered in alternate years.—III. Bodine, Carlsen

220. General and Comparative Physiology of Reproduction (3)

Lecture - 3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 110, 110L; Biological Sciences 101, 103. Basic phenomena of sexual and asexual reproduction and comparisons of processes in a wide variety of animals; gamete formation, structure, and metabolism; fertilization; neuroendocrine mechanisms in maturation and reproductive cycles; behavioral aspects.—III. (III.) Adams, Berger, Conley

222. Mammalian Gametogenesis and Fertilization (3)

Lecture/discussion-3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 121 or the equivalent. Course will emphasize our current understanding of events in mammalian gametogenesis and the fertilization process. Published results, conclusions drawn from these results, and their contribution to our understanding will be discussed.—III.

230. Advanced Endocrinology (2)

Lecture - 2 hours. Prerequisite: Neurobiology, Physiology, and Behavior 130 or the equivalent, and graduate standing. Focus on timely topic of endrocrine research. Critical review of current literature and discussion of future research strategies in the area. May be repeated for credit when topic differs.

231. Neuroendocrinology (3)

Lecture - 3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 110 or the equivalent course in systemic physiology; Neurobiology, Physiology, and Behavior 130 or the equivalent course in endocrinology. Neural-endocrine interactions; neural regulation of the endocrine system, especially in relation to reproduction; the role of hormones and growth factors in sexual differentiation of the brain.

234. Current Topics in Neurotoxicology (3)

Lecture—3 hours. Prerequisite: core courses in one of the following graduate programs: Pharmacology and Toxicology, Agricultural and Environmental Chemistry, Biochemistry and Molecular Biology, Cell and Developmental Biology, Immunology, Molecular Cellular and Integrative Physiology or Neuroscience. Restricted to upper level undergraduate students must obtain permission from the course coordinator. General principles of neurotoxicology, the cell and molecular mechanisms and health impacts of specific neurotoxicants and the contribution of neurotoxic compounds to complex neurodevelopmental disorders and neurodegenerative diseases. (Same course as Environmental Toxicology 234 and Molecular Biosciences 234.) Offered in alternate years.—II. P. Lein

242. Biological Rhythms (3)

Lecture - 2 hours; lecture/discussion - 1 hour. Prerequisite: Neurobiology, Physiology, and Behavior 110 or the equivalent. General aspects and basic mechanisms of biological rhythms; the importance of rhythm desynchronization in areas of pharmacology and space medicine; telemetry; mathematical meth ods; chronometry; daily, reproductive, and annual periods; shift-work, jet lag and sleep disorders. Offered in alternate years. —(I.) Fuller

255. Physiology of the Stress Response (2)

Lecture/discussion - 2 hours. Prerequisite: graduate student status. Definition of Stress; Physiological mechanisms of adaptation to stress; Hormonal control of the systemic stress response; Mechanisms of the cellular stress response; Discussion of current trends in stress physiology and current methods for studying the stress response. (Same course as Animal Biology 255.)—III. (III.) Kueltz

261A. Topics in Vision: Eyes and Retinal Mechanisms (2)

Lecture/discussion-2 hours. Prerequisite: graduate standing, Neurobiology, Physiology, and Behavior 100 or 112 or the equivalent. Structure and function of the visual system, with emphasis on the eye and retina, including optics, anatomy, transduction, retinal synapses, adaptation, and parallel processing. (Same course as Neuroscience 261A and Neurobiology, Physiology, and Behavior 261A.) (S/U grading only.)—II. (II.) Ishida

261B. Topics in Vision: Systems, Psychophysics, Computational Models (2)

Lecture/discussion-2 hours. Prerequisite: consent of instructor; course 261A recommended. Functions of the central visual pathways and their underlying mechanisms. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system. (Same course as Neuroscience 261B and Neurobiology, Physiology, and Behavior 261B.) (S/U grading only.) Offered in alternate years. - II. Britten

261C. Topics in Vision: Clinical Vision Science (2)

Lecture/discussion-2 hours. Prerequisite: courses 261A and 261B, or consent of instructor. Causes and mechanistic bases of major blinding diseases. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system related to disease. (Same course as Neuroscience 261C and Neurobiology, Physiology, and Behavior 261C.) (S/U grading only.) Not offered every year.—III. Werner

275. Neurohumoral Regulatory Mechanisms of Thermogenesis (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: Biological Sciences 104 or the equivalent; Biological Sciences 102 or the equivalent; consent of instructor. Designed for graduate and advanced undergraduate students, this course will examine thermogenic systems in homeotherms (primarily mammals) with respect to regulation (hormonal and central nervous control) and effector mechanisms (basis of heat generation at the target cell).

290. Seminar (1)

Seminar-1 hour. Discussion and critical evaluation of advanced topics and current trends in research. (S/U grading only.)—I, II, III. (I, II, III.)

290C. Research Conference in Physiology

Discussion — 1 hour. Prerequisite: graduate standing and consent of instructor. Presentation and discussion of faculty and graduate student research in physiology. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

291B. Seminar in Cellular Mechanisms of Adaptation (1)

Discussion - 0.5 hour; seminar - 0.5 hour. Prerequisite: Neurobiology, Physiology, and Behavior 100B; Biological Sciences 103; consent of instructor. Review and evaluation of current literature and research in cellular adaptations to the environment. May be repeated for credit when topic differs. (S/U grading only.)

291D. Research Approaches in Physiology (2)

Seminar-2 hours. Prerequisite: graduate standing in Graduate Group in Physiology or consent of instructor. Current research in physiology. Overall design of experiments and particular research areas. (S/U grading only.)—I. (I.) Eiserich, Raybould

293. Current Progress in Physiology (1)

Seminar - 1 hour. Prerequisite: graduate standing and consent of instructor. Seminars presented by guest lecturers describing their current research activities. May be repeated for credit. (S/U grading only.)

298. Group Study (1-5) 299. Research (1-12)

(S/U grading only.)

Professional Courses

300A-300B. Pedagogical Aspects of Physiology in Higher Education (3-3)

Lecture, discussion, or laboratory, or combination. Prerequisite: meet qualifications for teaching assistant in physiology. Participation as a teaching assistant for one quarter in a designated physiology course. Instruction in methods of leading discussion groups, leading laboratory sections, writing and grading quizzes, operation and use of laboratory equipment, and reading and grading laboratory reports. Course meets teaching requirements for Ph.D. program in Physiology. (S/U grading only.)-1, 11, 111. (1, 11, 111.)

390. The Teaching of Physiology (1)

Discussion — 1 hour. Prerequisite: Teaching Assistant assignment to a physiology lecture course and consent of instructor. Practical experience in methods and problems of teaching physiology lecture courses. May include analyses of texts and supporting material, discussion of teaching techniques, preparing for and conducting discussion sessions, and formulation of topics and questions for examinations under supervision of instructor. May be repeated for credit. (S/U grading only.)—I, II, IIÍ. (I, II, İII.)

Music

(College of Letters and Science)

Henry Spiller, Ph.D., Chairperson of the Department

Department Office. 112 Music Building (530) 752-5537; Fax (530) 752-0983; http://music.ucdavis.edu

Faculty

Christian Baldini, Ph.D., Assistant Professor Ross Bauer, Ph.D., Professor Anna Maria Busse Berger, Ph.D., Professor D. Kern Holoman, Ph.D., Professor Academic Senate Distinguished Teaching Award, UC Davis Prize for Teaching and Scholarly Achievement

Beth Levy, Ph.D., Associate Professor Jessie Ann Owens, Ph.D., Professor Pablo Ortiz, D.M.A., Professor Mika Pelo, Ph.D., Assistant Professor Christopher A. Reynolds, Ph.D., Professor

Academic Senate Distinguished Teaching Award Kurt Rohde, M.M., Associate Professor Laurie San Martin, Ph.D., Associate Professor Henry Spiller, Ph.D., Associate Professor Jeffrey Thomas, Professor

Emeriti Faculty

Robert S. Bloch, M.A., Professor Emeritus Sydney R. Charles, Ph.D., Professor Emerita Andrew D. Frank, M.A., Professor Emeritus Albert J. McNeil, M.S., Professor Emeritus David A. Nutter, Ph.D., Professor Emeritus Wayne Slawson, Ph.D., Professor Emeritus

Affiliated Faculty

Phebe Craig, M.M., Lecturer Sam Nichols, Ph.D., Lecturer Robert Sabino, Lecturer Thomas Slabaugh, M.M., Lecturer Amelia Triest, B.A., Lecturer

Faculty Affiliates in Applied Music

Keith Bohm, D.M.A., Lecturer (saxophone) Lois Brandwynne, M.A., Lecturer (piano) Tod Brody, B.A., Lecturer (flute)
Delbert Bump, M.A., Lecturer (jazz) Scott Choate, Lecturer (tuba) Bruce Chrisp, M.M., Lecturer (trombone) Susan Lamb Cook, M.A., Lecturer (cello) Phebe Craig, M.M., Lecturer (harpsichord) Scott Macomber, M.M., Lecturer (trumpet) Thomas Derthick, B.M., Lecturer (double bass) Daniel Flanagan, M.M., Lecturer (violin) Jolán Friedhoff, M.M., Lecturer (violin) Christopher Froh, M.M., Lecturer (percussion) Michael Goldberg, M.A., Lecturer (guitar) David Granger, M.M., Lecturer (bassoon) Ann Lavin, Ď.M.A., Lecturer (clarinet) Zoila Muñoz, M.M. Lecturer (voice) Jonathan Nadel, M.M., Lecturer (voice) Peter Nowlen, B.M., Lecturer (French horn) Michael Seth Orland, A.B., Lecturer (piano) Laura Reynolds, M.M., Lecturer (oboe) Ellen Ruth Rose, M.M., Lecturer (viola) Rita Sahai, M.A., Lecturer (Hindustani vocal music) Michael Sand, M.M., Lecturer (violin) Marilyn Swan, B.M., Lecturer (piano)

The Major Program

The Bachelor of Arts degree in music provides both a broad liberal arts education and the skills necessary to explore music through its history, composition, theory, and performance. Students majoring in music may choose from three tracks in the major (1) composition, (2) music history, theory, and ethnomusicology, or (3) performance. After a common core of courses in the lower division, students pursue their chosen track with specialized courses leading to an appropriate senior project.

All majors are expected to complete a substantial project (composition, research presentation, recital) in the senior year (Music 195). Music majors who intend to pursue graduate studies in music are encouraged to satisfy the requirements of one of the honors programs in music.

Study Abroad and the Music major. The

department encourages students to pursue a portion of their studies abroad. In close collaboration with their undergraduate advisers, students plan a course of study abroad that complements their coursework at Davis. UC Davis Music majors have completed upper division coursework at EAP partner institutions in Australia, England, France, Germany, and Italy; Music faculty members lead a summer program in Argentina.

The Program. A fundamental grounding in music theory, music history, and performance during the first two years of study leads to more specialized study of composition, history, or performance during the last two years of undergraduate work.

Career Alternatives. Students who graduate with a B.A. in music from UC Davis have gone on to careers as composers and performers, in academia, and in the concert, media, and computing industries. Others have continued in medicine, law and business.

A.B. Major Requirements:

J	
	UNITS
Preparatory Subject Matter	27-45
Music 6A, 6B, 6C	9
plus Music 2A, 2B, 2C	(0-6)*
and Music 16A, 16B, 16C	(0-6)*
Music 7A, 7B, 7C	9
plus Music 17A, 17B, 17C	
Music 24A, 24B, 24C	9
* May be excused by diagnostic	
examination at the beginning of eac	h
quarter.	
Depth Subject Matter	36-37
Choose upper division courses from or the following tracks:	ne of

Depth Subject Matter36
Choose upper division courses from one of
the following tracks:
Track 1: Music Composition 36
Music 124A, 124B6
Music 121 or 1224
Music 130 (one year)
Music 1952
At least 6 units selected from Music
131, 140-148
Music 101A, 101B
At least 4 units selected from Music 102.
107A, 107B, 108A, 108B, 113, 114,
121, 122, 198, 1994
Track 2: Music History, Theory, and
Ethnomusicology
Music 124A, 124B6
Music 121 and/or 122 8
(Need 8 units of seminar courses chosen
from above in any combination. Note:
Music 121 and 122 may be repeated for
credit.)
Music 130 (one year)
At least 6 units selected from Music
131, 140-1486
At least 12 further units selected from
Music 101A, 101B, 102, 108A, 108B,
113, 114, 121, 122, 198, 199 12
Track 3: Music Performance
Music 124A, 124B 6
Music 121 or 1224
Music 130 (one year)
Music 195
At least 16 units selected from Music
131, 140-148

Music 101A, 101B, 102, 108A, 108B, 113, 114, 121, 122, 198, 199............6 Total Units for the Major 63-82

At least 6 further units selected from

Note: A maximum of 19 units in performance courses (Music 130-131, 140-149) apply toward the degree; see Unit Credit Guidelines, College of Letters and Science degree requirements section.

Honors Programs. Students who wish to pursue particularly intensive studies in music should elect one of the following honors programs in place of one of the tracks above: Theory/Composition Honors 45-49 Music 124A, 124B6 At least 11 units selected from Music 130, 131, 140, 141, 142, 143, 144, 145, 146, 147.11 Music 101A, 101B 8 Two quarters of Music 194H for a total of at least 6 units resulting in a Senior composition or theory thesis 6 Select 14-18 units from Music 102, 107A, 107B, 107C, 108A, 108B, 113, 114, 122......14-18 At least 11 units selected from Music 130, 131, 140, 141, 142, 143, 144, 145, 146, 147.......11 Two quarters of Music 194H for a total of at least 6 units resulting in a Senior Select 10-14 units from Music 108A, 121, 122...... 10-14 Major Advisers. J. Thomas (A-F), A. Triest (G-M), M. Pelo (N-Z)

UNITS

22

Minor Program Requirements:

Music
A minimum of 16 units of upper division
Music courses
Courses chosen from: Music 105, 106,
107A, 107B, 110A-G, 115, 122, 126,
129A-D
A minimum of 6 units in upper division music
performance courses
Courses chosen from: Music 140, 141,
142, 143, 144, 145, 146, 147, 148,

Foreign Language. Students contemplating graduate study in music are advised to consider pursuing foreign language study beyond the elementary level.

149, 154, 198

Diagnostic Exams are given before admission into Music 6A-6B-6C. As an alternative Music 3A-3B may be recommended. Diagnostic exams are also given for Music 16A-16B-16C and 17A-17B-17C at the beginning of each year. Transfer students should take the Music 6 diagnostic exam given during the first class meetings.

Beginning and transfer students are required to take Music 2A-2B-2C (Keyboard Competence) unless they can pass out of one or more of the classes by demonstrating proficiency through a diagnostic exam given at the beginning of each quarter. Students learn (1) four-part keyboard harmony in all major and minor keys; (2) moderate fluency with figured bass at the keyboard; (3) major and minor scales with proper fingering; ability to sight read simple piano music and Bach chorales.

Student Performing Activities. The Department of Music presents over 100 concerts each year, offering performance opportunities for both majors and non-majors in the UC Davis Symphony Orchestra, University Chorus, Concert Band and Wind Ensemble, Early Music Ensemble, Baroque Chamber Orchestra, Jazz Band, world music ensembles (Gamelan, Samba School, Hindustani Vocal Ensemble) and numerous chamber ensembles. There is a close relationship with the Robert and Margrit Mondavi Center for the Performing Arts, where several of the ensembles are resident.

Chamber ensembles perform frequently in the popular weekly Thursday Noon Concerts. Performance groups have collaborated with the Department of Theatre and Dance in productions of musical theater and opera. Study of instruments and voice with professional performers and teachers is required of all majors. Similar opportunities exist for qualified nonmaiors.

Faculty and Facilities. The faculty is noted for its achievements in a variety of areas. The music scholars are active in research, writing, and performance; the music of the composers is performed and recorded nationally and internationally. The journal, 19th-Century Music, is housed in the department.

The regular faculty is joined throughout the year by visiting Artists-in-Residence, distinguished performers who give public concerts and lectures and who work with students informally.

The Empyrean Ensemble, a professional new music ensemble, is in residence at UC Davis, where it annually premieres the work of student composers. The American Bach Soloists, an ensemble of professional singers and instrumentalists specializing in music of the late 18th and early 19th centuries, is affiliated with the Department of Music.

The department's facilities include a large collection of Renaissance, Baroque, and modern instruments, along with non-western instruments including a Sundanese gamelan. The arts quadrangle houses the Computer and Electronic Music Studio, practice and rehearsal rooms, and an excellent music library with some 10,000 CDs, several hundred videos and a collection of music reference materials. Scores and music monographs are housed in the Peter J. Shields Library, adjacent to the Music Building. A partnership of campus libraries affords online access to more than 100,000 tracks of classical and world music by streaming audio.

Graduate Study. The Department of Music offers programs of study and research leading to the M.A. degree in composition/theory, musicology, ethnomusicology, and conducting, and the Ph.D. degree in composition/theory, musicology, and ethnomusicology. Detailed information regarding graduate study may be obtained from the Graduate Adviser.

Graduate Advisers. R. Bauer, B. Levy

Courses in Music (MUS)

Lower Division Courses

2A. Keyboard Competence, Part 1 (2)

Performance - 2 hours. Prerequisite: course 6A and 16A concurrently; consent of instructor. Training to meet the minimum piano requirements for the major in music. Scales and simple harmonic progressions in twelve keys, both major and minor. (P/NP grading only.) GÉ credit: AH.-I. (I.) Triest

2B. Keyboard Competence, Part 2 (2)

Performance—2 hours. Prerequisite: courses 6B and 16B concurrently; successful completion of course 2A or demonstration of required keyboard proficiency level on diagnostic exam; consent of instructor. Training to meet the minimum piano requirements for the major in music. Harmonic progressions, modulations and score reading at the piano. (P/NP grading only.) GE credit: AH.-II. (II.)

2C. Keyboard Competence, Part 3 (2)

Performance - 2 hours. Prerequisite: course 6C and 16C concurrently; successful completion of course 2B or demonstration of required keyboard proficiency level on diagnostic exam; consent of instructor. Training to meet the minimum piano requirements for the major in music. Harmonic progressions, figured bass realization, sight reading and keyboard repertory. (P/NP grading only.) GE credit: AH. – III. (III.) Triest

3A. Introduction to Music Theory, Part I (4)

Lecture—1 hour; recitation—3 hours. Fundamentals of music theory, ear-training, harmony, counterpoint, and analysis directed toward the development of listening and writing techniques. Intended for the general student. GE credit: AH.-I, II. (I, II.) Triest

3B. Introduction to Music Theory, Part II (4)

Lecture-1 hour; recitation-3 hours. Prerequisite: completion of course 3A or permission of the instructor. Continuation of course 3A. Development of melodic and harmonic writing skills. Basic analysis training. Intended for the general student. GE credit: AH. — II, III. (II, III.) Triest

6A. Elementary Theory, Part 1 (3)

Lecture-3 hours. Prerequisite: Admission by examination given during first class meeting; concurrent enrollment in course 16A and 2A or demonstration of required proficiency level on diagnostic exam Development of music writing and listening skills through the study of music fundamentals, species counterpoint, harmony, analysis of repertory. Intended primarily for music majors. GE credit: AH.—I. (Í.) Nichóls

6B. Elementary Theory, Part 2 (3)

Lecture — 3 hours. Prerequisite: course 6A; concurrent enrollment in course 16B and 2B or demonstration of required proficiency level on diagnostic exam. Continuation of course 6A. GE credit: AH. -II. (II.) Nichols

6C. Elementary Theory, Part 3 (3)

Lecture - 3 hours. Prerequisite: course 6B; concurrent enrollment in course 16C and 2C or demonstration of required proficiency level on diagnostic exam. Continuation of courses 6A-B. GE credit: AH.—III. (III.) Nichols

7A. Intermediate Theory, Part 1 (3)

Lecture-3 hours. Prerequisite: course 6C; course 17B concurrently. Homophonic music of the Classical era with a focus on analysis of music by Haydn, Mozart, and Beethoven. Composition of pieces in the homophonic forms such as minuet and trio, theme and variations, rondo and sonata. Intended for music majors. GE credit: AH.—I. (I.) San Martin

7B. Intermediate Theory, Part 2 (3)

Lecture - 3 hours. Prerequisite: course 7A; course 17B concurrently. Nineteenth-century harmony and voice leading through the music of the Romantic era.
Focus on analysis of music by Chopin, Schumann, Brahms, Wagner, and Wolf. Composition of character pieces and songs. Intended for Music majors. GE credit: AH.—II. (II.) San Martin

7C. Intermediate Theory, Part 3 (3)

Lecture—3 hours. Prerequisite: course 7B; course 17C concurrently. The music of the first thirty years of the twentieth century and various analytical tools pertaining to it. Works of Debussy, Stravinsky, Schoenberg, Berg, and others. Composition of small pieces for solo instruments, voice and piano. Intended for Music majors. GE credit: AH.—III. (III.)

10. Introduction to Musical Literature (4)

Lecture - 3 hours; listening - 1 hour. Introduction to composers and major styles of Western music. Lectures, listening sections, and selected readings. For non-majors. GE credit: ArtHum, Wrt | AH, VL, WC, WE.-I, II, III. (I, II, III.) Holoman, Levy, Pelo

11. Musics of the World (4)

Lecture - 3 hours; listening section - 1 hour. Survey of selected art, folk, and popular music cultures from different parts of the world. Emphasis on understanding relationship of musical style, aesthetic principles, and performance practice to wider cultural contexts. GE credit: ArtHum, Div | AH, VL, WC.-I, III. (I, III.) Spiller

16A. Elementary Musicianship, Part 1 (2)

Lecture/laboratory-2 hours. Prerequisite: concurrent enrollment in course 6A is required; students must pass a short diagnostic exam, at the beginning of the quarter, in order to be admitted into the course. The melodic, rhythmic, and harmonic materials of Western music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis. GE credit: AH.-I. (I.) Triest

16B. Elementary Musicianship, Part 2 (2)

Lecture/laboratory-2 hours. Prerequisite: concurrent enrollment in course 6B is required; course 16A or demonstration of required proficiency level on diagnostic exam. The melodic, rhythmic, and harmonic materials of Western music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis. GE credit: AH. - II. (II.) Triest

16C. Elementary Musicianship, Part 3 (2)

Lecture/laboratory-2 hours. Prerequisite: concurrent enrollment in course 6C is required; course 16B or demonstration of required proficiency level on diagnostic exam. The melodic, rhythmic, and harmonic materials of Western music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis. GE credit: AH. - III. (III.) Triest

17A. Intermediate Musicianship, Part 1 (2)

Lecture/laboratory-2 hours. Prerequisite: course 7A concurrently; successful completion of course 16C or demonstrate required proficiency level on diagnostic exam. The melodic, rhythmic, and harmonic materials of Western music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis. GE credit: AH-I. (I.) Craig

17B. Intermediate Musicianship, Part 2 (2)

Lecture/laboratory-2 hours. Prerequisite: course 7B concurrently; successful completion of course 17A or demonstrate required proficiency level on diagnostic exam. The melodic, rhythmic, and harmonic materials of Western music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis. GE credit: AH-II. (II.) Craig

17C. Intermediate Musicianship, Part 3 (2)

Lecture/laboratory-2 hours. Prerequisite: course 7C concurrently: successful completion of course 17B or demonstrate required proficiency level on diagnostic exam. The melodic, rhythmic, and harmonic materials of Western music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis. GE credit: AH—III. (III.) Craig

24A. Introduction to the History of Music I (3)

Lecture — 3 hours. Prerequisite: course 6A (may be taken concurrently). History of music from the late Baroque to Beethoven. Intended primarily for majors in music. GE credit: Wrt | AH, VL, WE. - II.

24B. Introduction to the History of Music II (3)

Lecture - 3 hours. Prerequisite: course 24A, course 6B (may be taken concurrently). The history of music from the Romantic Period to the nineteenth century. Intended primarily for majors in music. GE credit: Wrt | AH, VL, WE.—III.

24C. Introduction to the History of Music III

Lecture—3 hours. Prerequisite: course 24B, course 6C (may be taken concurrently). The history of music of the 20th century. Intended primarily for majors in music. GE credit: Wrt | AH, VL, WE.—I.

28. Introduction to African American Music

Lecture/discussion-3 hours; discussion-1 hour; listening; project. Survey of African American music, such as spirituals, blues, ragtime, jazz, theater, gospel, R&B, rap, and art music. Emphasis on historical and sociocultural contexts, as well as African roots. GE credit: Div, Wrt | ACGH, AH, DD, VL, WE.-III.

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) GE credit: AH

99. Special Study for Undergraduates (1-5) (P/NP grading only.) GE credit: AH.

Upper Division Courses

101A. Advanced Theory, Part 1 (4)

Lecture - 3 hours; lecture/laboratory - 1 hour. Prerequisite: course 7C. Twentieth-century music from 1930 through 1950 and the various analytical tools pertaining to it. Works of Copland, Sessions, Schoenberg, Bartók, and Stravinsky. Composition of small pieces for piano and voice. GE credit: AH.—I. (I.)

101B. Advanced Theory, Part 2 (4)

Lecture—3 hours; lecture/laboratory—1 hour. Prerequisite: course 101A. Music from 1950 to the present and the analytical tools pertaining to it. Works of Babbit, Carter, Dallapiccola, Ligeti, Messiaen, Reich and others. Composition of small pieces for ensemble. GE credit: AH.—II. (II.) San Martin

102. Tonal Counterpoint (4)

Lecture—3 hours; practice—1 hour. Prerequisite: course 7C. Imitative tonal counterpoint with an analytical focus on the Two-Part Inventions and fugues from the The Well-Tempered Klavier by J. S. Bach. Composition of exercises and short pieces using contrapuntal techniques. Intended for music majors. GE credit: AH.-I. (III.) Bauer

103. Workshop in Composition (3)

Workshop-3 hours. Prerequisite: course 7C. Workshop in musical composition for undergraduates who are interested in pursuing serious compositional studies and intending to follow the composition track of the major. Course will explore the techniques and materials of musical composition. May be repeated for credit. GE credit: AH.-I, II, III. (I, II, III.) Ortiz, Rohde, San Martin

105. History and Analysis of Jazz (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 10, 3A-3B, or 28. Jazz and the evolution of jazz styles in historical and cultural context. For nonmajors. GE credit: ArtHum, Div, Wrt | ACGH, AH, DD, WE.-I. Bauer

106. History of Rock Music (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 3A-3B, 10. Rock and the evolution of rock styles in historical and cultural context. For nonmajors. GE credit: ArtHum, Wrt | ACGH, AH, VL, WE.—Reynolds

107A. Computer and Electronic Music (3)

Lecture—3 hours; laboratory—1 hour. Prerequisite: consent of instructor. Studies in electronic and computer music composition. The principles and procedures of composition in various electronic media are explored through compositional exercises. Limited enrollment. GE credit: AH.-I. (I.) Nichols

107B. Computer and Electronic Music (3)

Lecture — 3 hours; laboratory — 1 hour. Prerequisite: course 107A and consent of instructor. Continuation of course 107A. Limited enrollment. GE credit: AH. - (II.) Nichols

108A-108B. Orchestration (2-2)

Lecture—2 hours. Prerequisite: 108A—course 7C; 108B—course 108A. Techniques of orchestration from study of basic instrumental techniques to analysis of orchestral scores and scoring for various instru-mental combinations. GE credit: AH, VL.—II-III. (II-III.)

110A. The Music of a Major Composer: Beethoven (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 10 or 3A-3B. The work of Beethoven will be studied in the context of his time and his contemporaries. Lectures, discussion/guided listening sections, and selected readings. For non-majors. GE credit: ArtHum, Wrt | AH, VL, WC, WE.—I. Reynolds

110B. The Music of a Major Composer: Stravinsky (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 10 or 3A-3B. The work of Stravinsky will be studied in the context of his time and his contemporaries. Lectures, discussion/guided listening sections, and selected readings. For non-majors. GE credit: ArtHum, Wrt | AH, VL, WC, WE.—(II.) Bauer

110C. The Music of a Major Composer: Bach (4)

Lecture -3 hours; discussion -1 hour. Prerequisite: course 10 or 3A-3B. The work of Bach will be studied in the context of his time and his contemporaries. Lectures, discussion/guided listening sections, and selected readings. For non-majors. GE credit: ArtHum, Wrt | AH, VL, WC, WE.—II. San Martin

110D. The Music of a Major Composer: Mozart (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 10 or 3A-3B. The work of Mozart will be studied in the context of his time and his contemporaries. Lectures, discussion/guided listening sections, and selected readings. For non-majors. GE credit: ArtHum, Wrt | AH, VL, WC, WE.—(I.) Busse Berger

110E. The Music of a Major Composer: Haydn (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 10 or 3A-3B. The work of Haydn in the context of his time and his contemporaries. Lectures, discussion/guided listening sections, and selected readings. For non-majors. GE credit: ArtHum, Wrt | AH, VL, WC, WE.

110F. American Masters (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 10 or 3A-3B. An overview of American concert music by master composers from Charles Ives to the present. Lectures, discussion/guided listening sections, and selected readings. For non-majors. Offered in alternate years. GE credit: ArtHum, Wrt | ACGH, AH, DD, VL, WE.—(III.)

110G. Music of a Major Composer—Handel

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 10 or 3A-3B. Work of Handel in the context of his time and his contemporaries. Lectures, discussion/guided listening sections, and selected readings. For non-majors. Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WC, WE. - III. Thomas

113. Introduction to Conducting (2)

Lecture - 1 hour; performance - 1 hour. Prerequisite: consent of instructor; course 7C. Principles and techniques of conducting as they apply to both choral and instrumental ensembles. Not offered every year. GE credit: AH.—I, II. Baldini, Thomas

114. Intermediate Conducting (2)

Lecture—1 hour; performance—1 hour. Prerequisite: course 113. Intermediate conducting with a continued focus on principles and techniques as they apply to both choral and instrumental ensembles. GE credit: AH.—II. Baldini, Thomas

115. History of Film Music (4)

Lecture—3 hours; film viewing—3 hours. Prerequisite: courses 3A and 3B, or course 10. Film music from silent films to movies of the past decade. How music supports and shapes film narrative and structure. Use of jazz, rock and classical music in film. Offered in alternate years. Offered irregularly. GE credit: ArtHum, Wrt | AH, VL, WE.—II. Ortiz

121. Topics in Music Scholarship (4)

Seminar—4 hours. Prerequisite: courses 7C and 24C, or consent of instructor. Sources and problems of a historical period or musical style selected by the instructor and announced in advance. May be repeated for credit. GE credit: AH, OL.-1, II, III. (I, II, III.)

122. Topics in Analysis and Theory (4)

Seminar-4 hours. Prerequisite: course 7C and course 24C, or consent of instructor. Analysis of works of a composer or musical style selected by the instructor and announced in advance. Consideration of theoretical issues. May be repeated for credit. GE credit: AH, OL.-I, II, III. (I, II, IİI.)

124A. History of Western Music: Middle Ages to 1600 (3)

Lecture—3 hours. Prerequisite: course 6C and 24C. Historical survey of composers and musical styles from the Middle Ages to the beginning of the 17th century. GE credit: Wrt.—II. Busse Berger

124B. History of Western Music: 1600-

Lecture - 3 hours. Prerequisite: course 124A. Historical survey of composers and musical styles from the late 1500s to the mid-18th century. GE credit: Wrt | AH, VL, WE.—III. Busse Berger

126. American Music (4)

Lecture—3 hours; listening—1 hour. Prerequisite: course 10 or 3A-3B or consent of instructor. Introductory survey of American musics, including Native American music, Hispanic polyphony, New England psalmody, and selected 20th-century composers and styles. Offered in alternate years. GE credit: Div, Wrt | ACGH, AH, DD, WÉ. - (II.) Levy

127. Music from Latin America (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: consent of instructor. Examination of music from Latin America. Characteristic music (i.e., tango, bossa nova, salsa, musica motena, musica andina) as well as its implications in other musical genres. Taught in Spanish. Not open to students who have taken Spanish 171 or 171S. (Same course as Spanish 171 Offered in alternate years. GE credit: AH.—II. Ortiz

129A. Musics of the Americas (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 11 or 3A-3B. Survey of music cultures from North, Central, and South America, including the Caribbean, with emphasis on the role of music in society and on the elements of music (instruments, theory, genres and form, etc.). Introduction to ethnomusicological theory, methods, approaches. Not offered every year. GE credit: ArtHum, Div, Wrt | AH, VL, WE.—II. Spiller

129B. Musics of Africa, Middle East, Indian Subcontinent (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 11 or 3A-3B. Survey of music cultures with special emphasis on the role of music in society and on the elements of music (instruments, theory, genres and form, etc.). Introduction to ethnomusicological theory, methods, approaches. Offered irregularly. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.

129C. Musics of East and Southeast Asia (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 11 or 3A-3B. Survey of music cultures from Japan, China, Korea, Vietnam, and Indonesia, with special emphasis on the role of music in society and on the elements of music (instruments, theory, genres and form, etc.). Introduction to ethnomusicological theory, methods, approaches. Offered irregularly. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.—

129D. Folk Musics of Europe (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 11 or 3A-3B. Survey of folk musics from all of Europe, with emphasis on the role of music in society and on the elements of music (instruments, genres, form, etc.). Introduction to ethnomusicological theory, methods, approaches. Offered irregularly. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.-Gra-

130A-R, U. Applied Study of Music: Advanced (1)

Performance instruction - 1 hour. Prerequisite: open to Music majors with ability to perform scales and short compositions from standard repertoire; admission by audition and consent of instructor. Class instruction, arranged by section: (A) Voice (prerequisite of course 1 or the equivalent); (B) Piano; (C) Harpsichord; (D) Organ; (E) Violin; (F) Viola; (G) Cello; (H) Double Bass; (I) Flute; (J) Oboe; (K) Clarinet; (L) Bassoon; (M) French Horn; (N) Trumpet; (O) Trombone; (P) Tuba; (Q) Percussion; (R) Classical Guitar; (U) Recorder. May be repeated for credit. Offered as demand indicates.—I, II, III. (I, II, III.)

131A-R, U. Applied Study of Music: Advanced (Individual) (2)

Performance instruction - 0.5 hour; independent practice-5 hours. Prerequisite: open to Music majors only. Admission by audition and consent of instructor. Individual instruction in (A) Voice (prerequisite of course 1 or the equivalent); (B) Piano; (C) Harpsichord; (D) Organ; (E) Violin; (F) Viola; (G) Cello; (H) Double Bass; (I) Flute; (J) Oboe; (K) Clarinet; (L) Bassoon; (M) French Horn; (N) Trumpet; (O) Trombone; (P) Tuba; (Q) Percussion; (R) Classical Guitar; (U) Saxophone. May be repeated for credit.—I, II, III. (I, II, III.)

132. Singing for Actors (1)

Performance - 1 hour. Prerequisite: consent of instructor. The elements of basic singing techniques, through selected exercises, vocalises, and songs May be repeated for credit. (P/NP grading only.) GE credit: AH.

140. University Jazz Band (2)

Rehearsal - 4 hours. Prerequisite: consent of instructor. Open to students in any major. Rehearsal, study, and performance of jazz band music and full variety of jazz band styles, including swing, be-bop, and contemporary jazz styles. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.) Bump

141. University Symphony (2)

Rehearsal-4 hours. Prerequisite: admission subject to audition before first class meeting. Open to any student in the University whose proficiency meets the requirements of concert performance. Sight-reading, rehearsal and performance of music from the orchestral literature. May be repeated for credit. (P/NP grading only.) GE credit: AH. —I, II, III. (I, II, III.) Baldini

142. University Chamber Singers (2)

Rehearsal—3 hours. Prerequisite: admission subject to audition before first class meeting. Rehearsal and performance of works for small choral group. May be repeated for credit. (P/NP grading only.) GE credit: AH. — (I, II, III.) Thomas

143. University Concert Band (2)

Rehearsal—4 hours. Prerequisite: admission subject to audition before first class meeting. Open to any student in the University whose proficiency meets the requirements of concert performance. Rehearsal and performance of music for band. May be repeated for credit. (P/NP grading only.) GE credit: AH.—I, II, III. (I, II, III.)

144. University Chorus (2)

Rehearsal-4 hours. Prerequisite: admission subject to audition before first class meeting. Open to any student in the University. Rehearsal and performance of choral music. May be repeated for credit. (P/NP grading only.) GE credit: AH.—I, II, III. (I, II, III.) Thomas

145. Early Music Ensemble (2)

Rehearsal-4 hours. Prerequisite: admission subject to audition before first class meeting. Rehearsal and performance of Medieval, Renaissance, and Baroque music for vocal ensemble and historical instruments. May be repeated for credit. (P/NP grading only.) GE credit: AH.-I, II, III. (I, II, III.) Nut-

146. Chamber Music Ensemble (1)

Rehearsal-2 hours; student practice-1 hour. Prerequisite: admission subject to audition before first class meeting. Open to any student in the University whose proficiency meets the requirements of concert performance. Study, rehearsal, and performance of ensemble music for strings, winds, voice, piano, harpsichord, and organ. May be repeated for credit. (P/NP grading only.) GE credit: AH.—I, II, III. (I, II, III.) Baldini

147. University Wind Ensemble (2)

Rehearsal-4 hours. Prerequisite: consent of instructor. Rehearsal, study, and performance of a full variety of wind ensemble music; and to have students share their work in public performances. May be repeated for credit. (P/NP grading only.) GE credit: AH. — (I.) Nowlen

148. Hindustani Vocal Ensemble (2)

Rehearsal—2 hours. Basics of Hindustani music through theory and practice. Fundamentals of raga (mode) and tala (rhythms) with special emphasis on improvisation, a central feature of khyal (singing style). Five ragas each quarter. May be repeated up to six times for credit. (P/NP grading only.) GE credit: AH. — I, II, III. (I, II, III.) Sahai

149. Indonesian Gamelan Ensemble (2)

Rehearsal-2 hours. Prerequisite: consent of instructor. Indonesian music practice. Basic instrumental technique and repertory. Focus on two styles of Sundanese gamelan (tuned percussion orchestras): salendro and degung. May be repeated for credit. (P/NP grading only.) GE credit: AH.—I, II, III. (I, II, III.) Spiller

192. Internship in Music (1-4)

Internship - 3-12 hours. Prerequisite: consent of instructor and academic advisor or department chairperson. For Music majors. Internship outside the university related to music. Student must submit a written proposal to an appropriate Music Department instructor. May be repeated up to eight units of credit. (P/NP grading only.) GE credit: AH.-I, II, III, IV. (I, II, III, IV.)

194HA-194HB. Special Study for Honors Students (2-4)

Independent study - 6-12 hours. Prerequisite: course 7C, 124B. Open only to students who qualify for the honors program and admission to Music Senior Honors Program. Preparation and presentation of a culminating project, under the supervision of an instructor, in one of the creative or scholarly areas of music. (Deferred grading only, pending completion of sequence.) GE credit: AH.—I, II, III. (I, II, III.)

195. Senior Project (2)

Project - 6 hours. Prerequisite: Consent of instructor and undergraduate advisor. Preparation of a senior project in music composition (public presentation of a new work), in music performance (a public recital), or in music history and theory (public presentation of research results). Restricted to music majors with senior standing. GE credit: AH.-I, II, III. (1, 11, 111.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) GE credit: AH

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.) GE credit: AH.

Graduate Courses

202. Notation (4)

Seminar—3 hours; term paper. Study of musical notation; investigation of techniques for editing Medieval and Renaissance music. - I. Busse Berger

203. Music Composition (4)

Seminar—3 hours; term paper. Technical projects that explore compositional problems, the skill and techniques with which to solve them, and free composition. May be repeated for credit.—I, II, III. (I, II, III.) Bauer, Ortiz, Rohde, San Martin

204. Advanced Conducting (3)

Tutorial - 2 hours; practice. Prerequisite: courses 113 and 114 or equivalent; keyboard skills appropriate to graduate standing. Open to graduate students in conducting. This course covers the technical aspects of conducting and the broader issues in music history and analysis that conductors must face before leading a rehearsal or performance. May be repeated for credit.—I, II, III. (I, II, III.) Baldini,

207. Advanced Electronic and Computer Music (4)

Seminar-2 hours. Prerequisite: courses 107A-107B-107C. Advanced composition of computer and electronic music.—I. (I.) Nelson, Pelo

210A. Proseminar in Music (Theory and Analysis) (4)

Seminar—3 hours; term paper. Voice-leading analysis of tonal music derived from Schenker and pitchclass set theory. Recent work on compositional design, generalizations of the concept of interval, psychologically oriented music theory, and theories of durational structure and timbre.—I. Bauer

210B. Proseminar in Music (Musicology and Criticism) (4)

Seminar-3 hours; term paper. Issues and concepts of music history, including performance practice questions for specific repertoires and periods; principles, aims, and methods of archival study; historical theory; evolution of musical styles; philosophical debates about goals and aims of the discipline in general. — III. Levy

210C. Proseminar in Music (Ethnomusicology) (4)

Seminar—3 hours; term paper. Intensive examina-tion of major trends in ethnomusicology as exempli-fied by scholars working in several non-Western cultures. Ethnomusicological theory, ranging from ethnographic description to metamusicological study (Seegar) to analysis of individual genres to sociological study. — I. Spiller

212. Ethics of Musical Ethnography (4)

Seminar - 3 hours; fieldwork. Prerequisite: course 210C. The role, methodology, perception, and assumptions of the ethnomusicologist in ethnographic scholarship. Examination of complex ethical and political questions in relation to practical fieldwork techniques. Offered in alternate years.

213. Transcription and Notation (4)

Seminar-3 hours; project. Prerequisite: course 210C. Practical instruction in the transcription and analysis of primarily non-Western musics. Analytical and theoretical issues, the politics of representation, and the cultural values and ideologies implicit in notation. Offered in alternate years.

214. Recent Issues in Ethnomusicology (4)

Seminar - 3 hours; term paper. Prerequisite: course 210C. Issues, schools of thought, and basic literature in ethnomusicology from the 1980s to present. Emphasis on theory and methodology. Offered irregularly. - Spiller

221. Topics in Music History (4)

Seminar—3 hours. Studies in selected areas of music history and theory. May be repeated for credit. - I, II, III. Levy, Musicology faculty

222. Techniques of Analysis (4)

Seminar-3 hours. Analysis and analytical techniques as applied to music of all historical style periods. May be repeated for credit. - III. Composition

223. Topics in Ethnomusicology (4)

Seminar - 4 hours. Intended for graduate students in Music; Anthropology students may enroll with consent of instructor.In-depth ethnomusicological studies of selected cultures and their musics; study of historical, theoretical, contextual, and cultural features. Offered irregularly. — Ethnomusicology faculty

299. Individual Study (1-12)

(S/U grading only.)

Native American Studies

(College of Letters and Science)

Inés Hernandez-Avila, Ph.D., Chairperson of the

Department Office. 2401 Hart Hall (530) 752-3237; http://nas.ucdavis.edu

Faculty

Steven J. Crum, Ph.D., Professor Inés Hernandez-Avila, Ph.D., Professor Academic Senate Distinguished Teaching Award Martha J. Macri, Ph.D., Professor Zoila Mendoza, Ph.D., Professor Elisabeth Rose Middleton, Ph.D., Assistant Professor Hulleah Tsinhnahjinne, M.F.A., Associate Professor

Emeriti Faculty

George C. Longfish, M.F.A, Professor Emeritus Victor D. Montejo, Ph.D., Professor Emeritus Stefano Varese, Ph.D., Professor Emeritus

The Major Program

Native American Studies provides a multi-disciplinary introduction to the indigenous cultures of North, Central, and South America. It challenges students to consider issues of cultural diversity, sovereignty, and indigenous knowledge systems in preparation for living in a world of constantly increasing social and cultural complexity.

The Program. Students electing a major in Native American Studies may complete Plan I, Plan II, or Plan III. Plan I enables students to concentrate chiefly upon the Native experience in North America (north of Mexico). Plan II encourages interested students to focus upon Meso-America with some course work integrating Meso-America with North America and South America. Plan III focuses upon South America with some course work integrating that region with areas to the north.

Career Alternatives. Native American Studies is excellent preparation for a scholarly career or professional career such as teaching, law, human services, health, tribal administration, social work, and inter-ethnic relations. Graduate schools and agencies in these and related areas are looking for students with broad interdisciplinary preparation and who possess knowledge and sensitivity relating to ethnic issues and cultural diversity.

A.B. Major Requirements:

Preparatory Subject Matter20 Native American Studies 1, 10................................ 8 One or two courses from Native American Studies 32, 33, 46, 55...... 4-8 One or two courses from African American and African Studies 12, 52, Anthropology 2, 3, Asian American Studies 1, Chicana/o Studies 10, History 17A 4-8 Depth Subject Matter 16

LINITS

Native American Studies 130A, 157, 180......12 One course from Native American Studies

107, 115, 130B, 130C, 133, 156 4 Note: If a course is counted for either Plans I, II, or III (below), it cannot also be counted as part of the 16 units of Depth Subject

Areas of Specialization (complete one plan) Plan I-North American Emphasis....... 28

Two courses from Native American Studies 107, 115, 116, 117, 118, 122, 130C, 101, 181A, 181B, 181C..... Two courses from Anthropology 113, 136, 161A, 161B, 165, 166, 172, 173, 174, 175, 176, African American and African Studies 100, 101, 107, 120, 123, 133, 150, 160, 175, 176, Arrican Studies 100, 101, 107, 120, 120, 120, 1 153, 160, American Studies 120, Asian American Studies 100, 101, 110, 111, 112, Chicana/o Studies 100, 110, 111, 154, 156, Sociology 128, Women's Studies One other upper division Native American Studies course, selected in consultation with adviser 4

Plan II - Mexico-Central America Emphasis 28

Native American Studies 107, 133 8 Three courses from History 161A, 166A, 166B, Anthropology 134, 145, 146, 174, 175, Chicana/o Studies 130, Native American Studies 122..... Two courses from Spanish 155, 172, Art History 151, Native American Studies 101, 156, 181A, 181B, 181C, or, if student's work is specifically focused upon a Meso-American language or topic, from Native American Studies 188, 191......8

Plan III—South American Emphasis 28

Native American Studies 107, 120 8 Two courses from History 161A, 161B, 162, student's work is specifically focused upon a South American language or topic, from Native American Studies 188, 191 12

Total Units for the Major64 Major Adviser. Z. Mendoza

Minor Program Requirements:

The Native American Studies minor provides an introduction to the Native experience in the Americas by means of exposure to course work dealing with some of the major aspects of Indian life, including history, values, politics, literature, and art.

Native American Studies......24

Native American Studies 1 or 10...... 4 Five upper division courses, at least one of which is chosen from each of the following Ethno-History: Native American Studies 130A, 130B, 130C, or 133 Philosophy and values: Native American Studies 156, 157, or 180 Politics and current affairs: Native American Studies 115, 116, 117, 118, 120, 122 Art and literature: Native American Studies 101, 181A, 181B, or 181C One other upper division course selected in

consultation with adviser.

Study Off Campus. Majors have the option of spending one to three quarters elsewhere in the Americas or on or near a reservation as part of the fulfillment of the Area of Specialization. Each student's plan must be approved by the student's adviser and by the chairperson and may fulfill from 12 to 20 of the 28 units required for the emphasis. The courses or field internship taken elsewhere must be focused upon indigenous peoples or indigenous languages and the institution of study shall be located in an area with substantial indigenous population. Students must have upper division standing

and, for Plan I, course 107 or the equivalent should have been completed; for Plan II, courses 107 and 133 should have been completed; and for Plan III, courses 107 and 120 should have been completed prior to departure. Several options may be used for receiving academic credit, including course 195. The department strongly encourages students to participate in the UC Education Abroad Program, Short-Term Programs Abroad.

Graduate Study. The Department offers a program of study leading to the M.A. and Ph.D. degrees in Native American Studies, as well as a designated emphasis in Native American Studies for graduate students in approved programs. Further information regarding graduate study may be obtained at the Department office and at Graduate Studies.

Graduate Advisers. Martha J. Macri

Courses in Native American Studies (NAS)

Lower Division Courses

1. Introduction to Native American Studies (4)

Lecture - 3 hours; discussion - 1 hour. Introduction to Native American Studies with emphasis upon basic concepts relating to Native American historical and political development. GE credit: SocSci, Div | ACGH, DD, SS, WC, WE.-I, II, III. (I, II, III.) Crum. Middleton

5. Introduction to Native American Literature (4)

Lecture/discussion-4 hours. Prerequisite: completion of Subject A requirement. Intensive focus on analysis of Native American literary texts, with frequent writing assignments to develop critical thinking and composition skills. GE credit: ArtHum, Div, Wrt | AH, DD, OL, WE. - I, II, III, IV. (I, II, III, IV.)

10. Native American Experience (4)

Lecture - 3 hours; discussion - 1 hour. Introduction to the diverse cultures of Native American peoples from North, Central, and South America. Emphasis on Native American voices in the expression of cultural views and in the experience of conflicting values. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, DD, WC, WE.—I, II, III, IV. (I, II, III, IV.) Hernandez-Avila, Macrci, Mendoza

12. Native American/Indigenous Film (4)

Lecture—3 hours; film viewing; discussion—1 hour. Survey and analysis of the visual colonization of Native American peoples and the contemporary responses by Native American/Indigenous filmmakers claiming visual sovereignty. Examines a range of filmic genres including documentary, features, shorts, festivals, tv and internet screening. GE credit: ACGH, AH or SS, DD, VL, WC, WE.—Tsinhnahjin-

32. Native American Music and Dance (4)

Lecture/discussion-4 hours. Introduction to the music and dance of the native peoples of the Americas. Students will study secular native music and dance from a cross-section of regions and tribes. GE credit: Div. — (I.) Mendoza

33. Native American Art in the U.S. (4)

Lecture - 4 hours. Comprehensive survey of Indian art forms with emphasis upon design, media, and function. Intent is to familiarize the student with a wide range of styles and techniques. GE credit: ArtHum, Div.—Tsinhnahjinnie

34. Native American Art Studio (4)

Lecture - 2 hours; studio - 6 hours. Prerequisite: consent of instructor; course 33 recommended. Limited enrollment. Studio projects to be influenced by contemporary and traditional Native American arts. Examples of designs and media presented in lectures will be of indigenous origin. Introduction and familiarized with various materials and techniques. GE credit: ACGH, AH, DD, OL, VL, WC.-Tsinhnahjinnie

46. Orientation to Research in Native American Studies (4)

Lecture/discussion—3 hours; term paper. Prerequisite: Native American Studies major or minor, or consent of instructor. Introduces students to basic research resources pertinent to Native American subjects available in the region, including libraries, archives, museums, etc. Emphasis is upon learning to use documentary resources or other collections of data. Students will carry out individual projects. Limited enrollment. GE credit: SocSci, Div, Wrt.

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading

Upper Division Courses 101. Contemporary Indian Art (4)

Lecture—4 hours. Prerequisite: course 33. Historical review of contemporary Indian art from 1900 to the present by looking at the two art centers of Oklahoma and Santa Fe. Social pressures that have influenced the imagery that exists today will be examined. GE credit: ArtHum, Div. - III. Tsinhnahjin-

107. Special Topics in Native American Languages (4)

Lecture/discussion-4 hours. Prerequisite: consent of instructor. Investigation of various subjects in contemporary and historical Native American language studies. May be repeated for credit when a different topic is studied. GE credit: Div.-II. (I.) Macri, Mendoza

108. Indigenous Languages of California

Lecture/discussion-3 hours; term paper. Prerequisite: a course in Native American Studies, or Linguistics 1, or Anthropology 4. Survey of the indigenous languages of the California region: linguistic prehistory, languages at first European contact, subsequent language loss, current efforts at language and cultural revitalization, indigenous languages of recent immigrants to California. GE credit: ACGH, AH or SS, DD, WE.-II. (II.) Macri

110A. Quechua Language and Society, Beginning Level 1 (4)

Lecture/discussion-4 hours. Introduction to Quechua language and society emphasizing the practical use of the language. Provides the student with some basic Quechua communication skills and with an initial knowledge about contemporary Andean society and the status of Quechua language today. Not available for students who took NAS 107 in the Fall quarter of 2007. GE credit: SS.-Men-

110B. Quechua Language and Society, Beginning Level 2 (4)

Lecture/discussion-4 hours. Prerequisite: course 110A. Second Level of the teaching of Quechua language and society. Emphasis on development of conversational and reading skills. Continuation of the study of aspects of contemporary Andean society and the status of Quechua language today. Offered in alternate years. GE credit: SS.—II. Mendoza

110C. Quechua Language and Society, Intermediate Level 1 (4)

Lecture/discussion-4 hours. Prerequisite: courses 110A and B. Third level of the teaching of Quechua language and society. Emphasis on development of conversational and reading skills. Introduction to more complex grammatical structures. Continuing the study of contemporary Andean society and the status of Quechua language today. Offered in alternate years. GE credit: SS.—II. Mendoza

110D. Quechua Language and Society, Intermediate Level 2 (4)

Lecture/discussion-4 hours. Prerequisite: course 110A, B and C. Fourth level of the teaching of Quechua language and society. Emphasis on complex structural patterns while emphasizing conversational skills and improving reading competence. Study of different sociopolitical processes that have affected Andean identity and the status of Quechua language. Offered in alternate years. GE credit: SS.—III. Mendoza

115. Native Americans in the Contemporary World (4)

Lecture/discussion-4 hours. Prerequisite: course 1, 10, or 55. The sociocultural development of American Indian populations in modern times with emphasis upon North America. Attention will be given to contemporary Indian affairs and problems as well as to the background for present day conditions. Not open for credit to students who have completed Anthropology 141B. (Former course Anthropology 141B.) GE credit: SocSci, Div, Wrt.—I. (II.) Crum

116. Native American Traditional Governments (4)

Lecture-4 hours. Prerequisite: course 1; Anthropology 2. Study of selected Native American Tribal Governments, confederations, leagues, and alliance systems. Offered in alternate years. GE credit:

117. Native American Governmental Decision Making (4)

Lecture-4 hours. Prerequisite: course 116, Political Science 2; Anthropology 123 recommended. Native American governmental and community decision making with emphasis on federal and state programs, tribal sovereignty, current political trends and funding for tribal services. Offered in alternate years. GE credit: SocSci, Div.—II.

118. Native American Politics (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 117. Examination of the various interest groups and movements found among Native people and how they relate to the determination of Indian affairs. Study of political action available to Native groups, and local communities, along with relevant theory relating to underdevelopment. Offered in alternate years. GE credit: ACGH, DD, SS, OL, WE.-III. Crum

119. Introduction to Federal Indian Law (4)

Lecture-3 hours; term paper. Introduction to the foundational cases and statutes of federal Indian law, from European Contact through the 20th century. GE credit: ACGH, SS, WE.—III. (III.) Middleton

120. Ethnopolitics of South American Indians (4)

Lecture/discussion-4 hours. Prerequisite: course 1, 10 or 55. Social, political, cultural movements of indigenous South Americans in response to establishment, expansion of European colonialism, post-colonial nation-states. Ethnopolitical processes developed through interactions between Indians, Euroamericans. Šocioethnographic analysis of main indigenous areas and the development of national societies. GE credit: SocSci, Div, Wrt.-(I.)

122. Native American Community Development (4)

Lecture — 4 hours. Prerequisite: course 1 or 10. Application of community development theory and techniques to the development problems of Native American communities. Offered in alternate years (Former course 161.) GE credit: ACGH, DD, OL, SS, WE.—II.

125. Performance and Culture Among Native Americans (4)

Lecture - 3 hours; listening - 3 hours. Prerequisite: upper division standing in division of humanities or social sciences or consent of instructor. Interdisciplinary study of public expressive forms among Native Americans. Comparative analysis of music, dances, rituals, and dramas from throughout the Americas in their social and cultural contexts. Offered in alternate years. Not open for credit to students who have completed Music 125.—(III.) Mendoza

130A. Native American Ethno-Historical Development (4)

Lecture-4 hours. Prerequisite: course 1 or 10; History 17A recommended. Study of Native American ethno-history in North America before 1770s. GE credit: SocŚci, Div, Wrt | ACGH, DD, SS, WC, WE. - I. (I.) Crum

130B. Native American Ethno-Historical Development (4)

Lecture/discussion-4 hours. Prerequisite: course 1; History 17A-17B recommended. Study of Native American ethno-history in North America, 1770-1890. GE credit: SocŚci, Div, Wrt | ACGH, DD, SS, WE.-II. (II.) Crum

130C. Native American Ethno-Historical Development (4)

Lecture/discussion-4 hours. Prerequisite: course 1; History 17A-17B recommended. Study of Native American ethno-history in North America after 1890. GE credit: SocSci, Div, Wrt | ACGH, DD, SS, WE.-III. (III.) Crum

133. Ethnohistory of Native People of Mexico and Central America (4)

Lecture/discussion-4 hours. Prerequisite: course 1, 10 or 55. Ethnohistorical development of pre-colonial, colonial, post-colonial Mexican and Central American indigenous people; the impact of economic and political factors on the process of cultural adaptation. Attention is given to the questions of nation-building, forced assimilation, indigenous resistance, organized political responses. GE credit: SocSci, Div.-III. (III.) Varese

133A. Ethnoshistory of Native Peoples of Mexico and Central America to 1500 (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 1 or course 10 or consent of instructor. Ethnohistorical development of the indigenous peoples of Mexico and Central America up to and including the earliest period of European contact. Focus is on indigenous written historical records of the Maya, Mixtec, and Nahuatl peoples. May be repeated one time for credit. GE credit: SocSci, Div, Wrt.—I, II, III. (I, II, III.) Macri

133B. Ethnohistory of Native Peoples of Mexico and Central America 1500 to 2000

Lecture/discussion-4 hours; term paper. Prerequisite: course 1 or 10, or consent of instructor. Ethnohistory of indigenous peoples of Mexico and Central America from 1500 to contemporary times. Focus on social and cultural dynamics, particularly the role of indigenous people in the process of nation-state building in Mexico and Central America. Offered in alternate years. GE credit: SocSci, Div, Wrt | AH, OL, SS, WE.—(III.)

134. Race and Sex: Race Mixture and Mixed Peoples (4)

Lecture - 4 hours. Prerequisite: one course chosen from Anthropology 1 or 2, Native American Studies 10, Chicana/o Studies 110, African American and African Studies 100 or Asian American Studies 110. The phenomena of racial, ethnic and interreligious intermixture and marriage, and of multi-ethnic peoples. Emphases on the Americas and upon the sociocultural effects of intermixture and on the lives of bicultural and multi-ethnic persons. (Same course as Anthropology 134.) GE credit: SocSci, Div,

135. Gender Construction in Native Societies (4)

Lecture - 4 hours. Prerequisite: one course from course 1, 10, Anthropology 30, Chicana/Chicano Studies 111, African American and African Studies 17, Asian American Studies 112 or 113, or Women's Studies 50 or 70. Historical and traditional Native American constructions of feminine and masculine genders as well as third, fourth, and fifth genders. Examines gender roles and statuses. Addresses the problems with contemporary terminologies and impacts of colonization on contemporary constructions of gender identities. Offered in alternate years. GE credit: AH or SS, DD, OL, WE. - (III.)

146. Orientation to Research in Native American Studies (4)

Lecture/discussion-4 hours; term paper. Prerequisite: Native American Studies major or minor, of consent of instructor. Limited enrollment. Introduction to basic research resources pertinent to Native American subjects available in the region, including libraries, archives, museums, etc. Emphasis on learning to use documentary resources or other collections of data. Students will carry out individual projects. GE credit: ACGH, DD, SS, WE.-II. (II.) Crum

157. Native American Religion and Philosophy (4)

Lecture/discussion-4 hours. Prerequisite: upper division standing; course 1, 5, or 10. Religious and philosophical traditions of Native American/indigenous peoples of the Americas. Offered in alternate years. GÉ credit: Div | AH, OL, WE. - (II.) Hernández-Ávila

180. Native American Women (4)

Lecture/discussion-4 hours. Prerequisite: course 1, 10, or Women's Studies 50. Native American women's life experiences, cross-cultural comparisons of gender roles, and Native women's contemporary feminist thought. Utilizes texts from literature, social science, and autobiography/biography. GE credit: AH or SS, DD, OL, WE.—II. (II.)

181A. Native American Literature (4)

Lecture/discussion-4 hours. Prerequisite: one from course 5, English 3, Comparative Literature 1, 2, 3. Works of fiction (short story, novel) by contemporary Native American authors, with an emphasis on writers from the United States. Offered in alternate years. GE credit: ArtHum, Div, Wrt | ACGH, AH, DD, OL, WE.-I. (I.) Hernández-Avila

181B. Native American Literature (4)

Lecture/discussion-4 hours. Prerequisite: one from course 5, english 3, Comparative Literature 1, 2, 3. Works by or about Native Americans including nonfiction novels, biographies and autobiographies. Explore ways Native Americans create and recreate their culture through the creative process in literature. Examine from a critical perspective autobiographies and testimonial literature. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, DD, OL, WE.-II. (II.) Hernandez-Avila

181C. Native American Literature (4)

Lecture —4 hours. Prerequisite: English 3, Comparative Literature 1, 2, 3, or any course from the Gen eral Education Literature Preparation List. Analysis of works by or about Native Americans including novels and autobiographies, analysis of Native American poetry, oral literature, songs, and tales. Ttraditional literature and poetry. Offered in alternate years. GE credit: ArtHum, Div, Wrt.-I, II, III. (I, II, III.) Hernández-Avila

184. Contemporary Indigenous Literature of Mexico (4)

Lecture/discussion-4 hours. Prerequisite: course 1 or 10; course 181A or 181C recommended; reading knowledge of Spanish required. Contemporary indigenous literature of Mexico, with a focus on the genres (poetry, fiction, drama, essay); analysis of cultural, historical, and spiritual themes, imager styles and performances; biographies of and influences on the Native writers themselves. Offered irregularly. GE credit: AH or SS, OL, WC.-IV. (IV.) Hernández-Avila

185. Native American Literature in Performance (4)

Performance instruction—4 hours. Prerequisite: consent of instructor. Performance of contemporary Native American literature onstage, through adaptations of selected literature as well as the creation of original pieces. Offered in alternate years. May be repeated up to four units for credit. GE credit: AH, DD, OL, WC. — (III.) Hernández-Avila

188. Special Topics in Native American Literary Studies (4)

Lecture/discussion-4 hours; term paper. Prerequisite: upper division standing and one of the following recommended: course 5, 10, 181A, 181C.

Special topics drawn from Native American literature. May be repeated for credit when topic differs. Offered irregularly. GE credit: Div, Wrt | AH, DD, OL, WE. — IIĬ, IV. (III, IV.) Hernández-Ávila

190. Seminar in Native American Studies

Discussion—2 hours. Prerequisite: senior standing. Seminar of critical issues faced by Native American people. (P/NP grading only.)

191. Topics in Native American Studies (4)

Lecture/discussion—3 hours; term paper. Prerequisite: upper division standing and consent of instructor. Selected topics in Native American ethno-history, development, culture, and thought. May be repeated for credit when a different topic is studied. GE credit: ArtHum, Div.-III. (I.)

192. Internship (1-12)

Internship - 1 hour. Supervised internship in the CN Gorman Museum, community, and institutional settings related to Native American concerns. May be repeated up to 12 units for credit including 192 and other internships taken in other departments and institutions. (P/NP grading only.) GE credit: AH.—I, II, III, IV. (I, II, III, IV.) Tsinhnahjinnie

194HA-194HB. Special Studies for Honors Students (4-4)

Independent study-12 hours. Prerequisite: senior qualifying for honors. Directed reading, research and writing culminating in the completion of a senior honors thesis or project under direction of faculty adviser. (Deferred grading only, pending completion of sequence.)

195. Field Experience in Native American Studies (12)

Field work—36 hours. Prerequisite: senior standing and major in Native American Studies, completion of lower division major requirements, and course 161. Field work with governmental and community groups, under supervision of faculty adviser and sponsor. Knowledge acquired in other courses to be applied in field work. (P/NP grading only.)—I, II, III.

196. Senior Project in Native American Studies (4)

Discussion-1 hour; independent study-3 hours. Prerequisite: senior standing and major in Native American Studies, course 195 (may be taken concurrently), and consent of instructor. Guided research project that enables student to apply the theory and research principles from major course work. Final product is to be a major senior project or thesis. (P/NP grading only.)—I, II, III. (I, II, III.)

197TC. Community Tutoring in Native American Studies (1-5)

Tutorial—3-15 hours. Prerequisite: consent of major committee; upper division standing with major in Native American Studies. Supervise tutoring in community. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: upper division standing; consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading

Graduate Courses

200. Basic Concepts in Native American Studies (4)

Seminar-4 hours. Prerequisite: graduate standing and consent of instructor. Analysis of the characteristics of the discipline of Native American Studies. Concentration is on both traditional and contemporary native scholarship and thought as well as the theoretical and methodological consequences derived from application of these ideas. Offered in alternate years. — (I.)

202. Advanced Topics in Native American Studies (4)

Seminar-4 hours. Prerequisite: graduate standing. Advanced study of selected topics or themes relevant to the field of Native American studies. Topics will

be announced at the time of offering. May be repeated for credit when topic differs. - II, III. (I, II,

207. Leadership Skills and Strategies in California Language Documentation & Revitalization (4)

Seminar—3 hours; term paper. Introduction to the indigenous languages of the Americas, with a focus on California; an examination of how contemporary Native communities document and revitalize their heritage languages. Learn to assist and administer language programs.—III. (III.) Macri

212. Community Development for Sovereignty and Autonomy (4)

Seminar—4 hours. Prerequisite: graduate standing and consent of instructor. Examines a sample of contemporary indigenous communities from south, central and north America with the goal of understanding and evaluating the strategies adopted by Native American communities to develop and implement forms of sovereignty or autonomous selfmanagement. Offered in alternate years.-III.

213. Native Criminality and Deviance (4)

Seminar-4 hours. Prerequisite: graduate standing. Examination of "deviance" in Native communities with focus on Native criminality in North America. Analysis of the concept of deviance from several different world views. Readings from a range of theories to incorporate varying theoretical perspective on criminality and deviance.—I. (I.)

217. Public Law 83-280: Colonial Termination (4)

Seminar-4 hours. Prerequisite: graduate standing, including school of law students. Examination of the signature law of the Termination Era, Public Law 83-280. Discussions to include termination, societal conformity, political consent, jurisdiction, self-determination & decolonization, and colonial relationship between Native Peoples and the United States. - I, II, III. (I, II, III.)

220. Colonialism/Racism and Self-Determination (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing. Study of imperial/colonial systems and their psychosocial impacts upon oppressors and oppressed, of racism as the outgrowth of colonialism, and of nationalism, ethnic conflict and self-determination. Focus on indigenous peoples, but other groups will also be considered. Offered in alternate years. — (II.)

224. Performance in the Americas (4)

Seminar—3 hours; term paper. Prerequisite: graduate standing. Ethnomusicological and anthropological approaches to study of public performance in the Americas. New ways of looking at music, dance, rituals and other forms of public expressive forms normally called "folklore" or "popular culture." Offered in alternate years. Not open for credit to students who have completed Music 224. (Former course Music 224.) – (II.) Mendoza

233. Visual Sovereignty (4)

Seminar—3 hours; film viewing—2 hours; term paper. Extensively examine the field of contemporary Native American and Indigenous photography, film and performance through research of artworks, writings by artists, theorists, and material in museum collections. May be repeated two times for credit when topic differs. Offered in alternate years. -

237. Native American Art Collections and Museums (4)

Seminar-3 hours; term paper. Research and examination of regional Native American art held in museums and other public institutions, as well as privatelyheld collections. Includes onsite viewing and research of museum collections and archives. Offered in alternate years.—Tsinhnahjinnie

240. Native American Public Health: Topics and Issues (4)

Seminar—3 hours; term paper. Introduction to Native American public health issues and contributing causal factors (including environmental justice

and historical trauma); the dimensions of cultural competency in diagnosis and service provision; the structure of Native health care institutions; and debates in Native treatment modalities. -II. (II.) Mid-

250. Indigenous Critique of Classic Maya Ethnographies (4)

Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. Construction of the Maya world through ethnographic writing during the present century. Deconstruction of ethnographies about the Mayans considering the modern theories and social/anthropological critiques of modern ethnographies. Offered in alternate years. — (II.) Montejo

280. Ethnohistorical Theory and Method (4)

Seminar — 3 hours; term paper. Discussion of the ethnohistorical method; the utilization of diverse types of data, especially documentary sources, to reconstruct socio-cultural history. Particular attention to the applied area of ethnohistory in the solution of contemporary social problems. Offered in alternate years.—I. Crum

298. Group Study for Graduate Students (1-5)

Prerequisite: graduate standing, consent of instructor. (S/U grading only.)

299. Special Study for Graduate Students

Prerequisite: graduate standing, consent of instructor. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)-I, II, III. (I, II, III.)

Natural Sciences

(College of Letters and Science)

Advising Center. 104 Everson Hall http://naturalsciences.ucdavis.edu/

Committee in Charge

Tessa Hill, Ph.D. (Geology) Susan Keen, Ph.D. (Evolution and Ecology) J. Richard Pomeroy, Ph.D. (Education) Neil Schore, Ph.D. (Chemistry) David Webb, Ph.D. (Physics)

The Major Program

Natural Sciences is an interdisciplinary major that provides significant breadth in biology, chemistry, earth sciences, physics and mathematics while offering additional depth in two of the natural sciences. It is especially designed to meet the needs of prospective science teachers, but will also serve students who wish to acquire training in more than one science. The major is sponsored by the Department of Geology.

The Program. The Natural Sciences curriculum offers an unusually broad training in science and mathematics. All students must complete a one year sequence in calculus, a course in statistics and one year sequences in chemistry, earth science, life science and physics. Each student will complete depth courses in two of these sciences. Prospective teachers may use these depth courses as preparation for primary and supplementary teaching credentials in science. Students who might wish to prepare for a teaching credential program should consult an advisor at their first opportunity in order to combine the prerequisites with General Education requirements.

Career Alternatives. Students whose goals include business, journalism, law, or medicine may acquire a broad background in science through this curriculum. The study of natural sciences also prepares a student to meet the subject matter requirements for primary and supplementary science

teaching credentials in California. Students who might wish to become a teacher should consult an advisor in the Mathematics and Science Teaching Program (MAST, http://mast.ucdavis.edu) at their first opportunity. MAST advisors can help students combine the prerequisites for a credential program with General Education requirements. The program also offers seminars that give participants experience in elementary, middle school, and high school classrooms.

B.S. Major Requirements:

	UNITS
Preparatory Subject Matter	68
Chemistry 2A, 2B, 2C1 Biological Sciences 2A, 2B, 2C1	5
Biological Sciences 2A, 2B, 2C1	4
Geology 2, 3, 3L, 50L, 60	3
Geology 2, 3, 31, 501, 60	7 2
Statistics 100 or 102	4
Depth Subject Matter	
Concentration (chosen from among the four	
fields of concentration listed below) 27-2	
Supplementary Field; chosen from among the	he
four fields listed below. May not include the	•
same field as the concentration. The same course may not be used to fulfill the	
requirements for both a Concentration and	a
Supplementary Field1	5
Total Units for the Major109	
Fields of Concentration:	
	7
Chemistry	
118B, 118C, 124A2	5
Chemistry 197 or 199	
Earth Science	8)
109L, 116N2	ó
Soil Science 100	5
Geology 199	3
Life Science	4
118C6-1	2
Biological Sciences 101	4
Biological Sciences 101 Evolution and Ecology 100, 101 Neurobiology, Physiology, and Behavior	8
Neurobiology, Physiology, and Behavior	
101	5
Neurobiology, Physiology, and Behavior 101L or Molecular and Cellular Biology	
160L3-	4
160L	s,
Evolution and Ecology, Molecular and	
Cellular Biology, or Neurobiology, Physiology, and Behavior	1
Physics	7
Chemistry 107A 110A	7
Geology 161, 162 Physics 108, 122	6
Physics 108, 122	7
Physics 137 or 160 Physics 199	3
Supplementary Fields:	4
	5
Chemistry 105, 107A, 118A, 124A1	J ⊿
Approved elective	i
Approved electiveOther Chemistry or related science cours	es
may be substituted with the prior approve	al
of the major adviser. Earth Science1	5
Geology 108, 109, 109L, 116N,	9
1381	4
Approved elective	
Other Geology or related science course may be substituted with the prior approve	
of the major adviser.	וג
Life Science1	5
Life Science	4
Evolution and Ecology 100	4
Neurobiology, Physiology, and Behavior	5
Approved electives	2
Other Biological Sciences or related	
science courses may be substituted with t	ne
prior approval of the major adviser.	

436 Nature and Culture

Physics 15
Physics 1223
Chemistry 107A, 110A
Geology 1613
Approved electives
Other Physics or related science courses
may be substituted with the prior approval
of the major adviser.
*Note: Students pursuing a concentration in

earth science or physics may not have had the necessary prerequisites in organic chemistry.

Major Advisers. H. W. Day (Geology), T. Hill (Geology)

Nature and Culture

(College of Letters and Science) This major was discontinued effective June 30,

Courses in Nature and Culture (NAC)

Upper Division Course 192. Internship in Nature and Culture (1-12)

Internship - 3-36 hours. Prerequisite: course 1. Internship in natural sciences, social sciences, or humanities on or off campus in which students use and improve their interdisciplinary skills and perspectives gained through the Nature and Culture curriculum. Supervised by a faculty member. May be repeated for credit. (P/NP grading only.)

Nematology

(College of Agricultural and Environmental Sciences) Michael Parrella, Ph.D., Chairperson of the Department

Chair Office. 367C Briggs Hall (530) 752-0492; http://nematology.ucdavis.edu

Department Office. 354 Hutchison Hall

Faculty

Edward P. Caswell-Chen, Ph.D., Professor Howard Ferris, Ph.D., Professor Edwin E. Lewis, Professor (Entomology) Steven A. Nadler, Ph.D., Professor Becky B. Westerdahl, Ph.D., Professor Valerie M. Williamson, Ph.D., Professor

Emeriti Faculty

Bruce A. Jaffee, Ph.D., Professor Emeritus Harry K. Kaya, Ph.D., Professor (Entomology) Armand R. Maggenti, Ph.D., Professor Emeritus Dewey J. Raski, Ph.D., Professor Emeritus

Minor Program Requirements:

willor i rogram Kequitements.
UNITS
Nematology18-20
Nematology 100, 110, and Soil Science
10010
Two or three courses from one of the
following areas: 8-10
(a) Plant Science: Microbiology 102;
Entomology 100, 135, 153, 156, 156L;
Evolution and Ecology 112; Plant Pathology
120, 148; Plant Biology 121; Soil Science
111, 112
(b) Entomology: One upper division
Entomology course; Evolution and Ecology
112; Microbiology 102; Plant Biology
121; Plant Pathology 120, 148; Soil
Science 102, 111, 112

Minor Adviser. S. A. Nadler

Graduate Study. Graduate degrees specializing in Nematology are offered through the Departments of Entomology and Plant Pathology, and through various Graduate Groups (Biochemistry, Ecology, Genetics, Plant Protection and Pest Management). Refer also to the Graduate Studies chapter of this

Courses in Nematology (NEM) **Lower Division Course**

10V. General Biology (4)

Web virtual lecture - 3 hours; web electronic discussion-1 hour. Concepts and issues in biology. Emphasis on composition and structure of organisms; regulation and signaling; heredity, evolution and the interaction and interdependence among life forms and their environments. Significant writing is required. Designed for students not specializing in biology. Not open for credit to students who have completed course Biological Sciences 1A, 1B, 1C, 2A, 2B, 2C or 10. (Same course as Biological Sciences 10V.) GE credit: SciEng, Wrt | SE, SL, WE.-III. (III.) Westerdahl

Upper Division Courses 100. General Plant Nematology (4)

Lecture - 2 hours; laboratory - 6 hours. Prerequisite: Biological Sciences 1B or 10. An introduction to the classification, morphology, biology, and control of the nematodes attacking cultivated crops. GE credit:

110. Introduction to Nematology (2)

Lecture - 2 hours. Prerequisite: Biological Sciences 1B or the equivalent or consent of instructor. The relationship of nematodes to human environment. Classification, morphology, ecology, distribution, and importance of nematodes occurring in water and soil as parasites of plants and animals. GE credit: SE. - II. (II.) Caswell-Chen, Nadler

150. Revising Scientific Prose (4)

Lecture/discussion-3 hours; term paper. Prerequisite: one course in English composition, understanding of English grammar and parts of speech, upper division standing in a science major, or consent of instructor. Principles of detailed revision; close analysis of writing styles in research papers, popular scientific articles, and other scientific reports; use of verb-based and noun-based writing styles. GE credit: Wrt.-II. (II.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading

Graduate Courses

201. Molecular and Physiological Plant Nematology (2)

Lecture—1 hour; discussion—1 hour. Prerequisite: Biological Sciences 101; Plant Pathology 120, course 100 or 110. Molecular biology and physiology of nematodes using Caenorhabditis elegans as a model, but with emphasis on plant-parasitic species. Plant responses to nematodes. Discussion of current literature emphasized. Offered in alternate years.-II. Williamson

203. Ecology of Parasitic Nematodes (2)

Lecture-1 hour; discussion-1 hour. Prerequisite: course 100 or 110 or Entomology 156; Evolution and Ecology 101 or Plant Biology 117. Major concepts in population and community ecology of animal- and plant-parasitic nematodes. Current advances in techniques, theory, and basic information about nematode-host dynamics, and application to management of nematode diseases. Offered in alternate years. - (III.) Caswell-Chen

204. Management of Plant-Parasitic Nematodes (2)

Lecture—1 hour; laboratory—3 hours. Prerequisite: course 100 or 110. Theory, foundation, principles and practices of nematode management. Techniques and equipment used to manage nematodes and methods used to analyze their effectiveness. Offered in alternate years.—III. Westerdahl

205. Insect Nematology and Biological Control (2)

Lecture – 1 hour; discussion – 1 hour. Prerequisite: courses 100 and 110, Entomology 100 or 110. The biology of insect-parasitic nematodes, their effect on the host, and their potential as biological control agents of insect and other invertebrate pests. Application of ecological theory in classical and augmentative biological control. Offered in alternate years. — (I.) Kaya, Lewis

206. Nematode Systematics and Evolution

Lecture-1 hour; laboratory-3 hours. Prerequisite: course 100 or 110 or Entomology 156; Evolution and Ecology 100 recommended. Nematode diversity as revealed by morphological and molecular evidence. Laboratory experience focuses on structural features used in taxonomy. Phylogenetic relationships based on morphological and molecular data used to consider patterns of character change among taxa. Offered in alternate years. — (I.) Nadler

210. Molecular Phylogenetic Analysis (3)

Lecture - 2 hours; laboratory - 3 hours. Theory and practice of inferring phylogenetic trees using molecular sequence data. Practical techniques for obtaining sequence data, advantages and disadvantages of common approaches for inferring trees, statistical methods for comparing alternative hypotheses. (Same course as Evolution and Ecology 210.) Offered in alternate years.—(II.) Nadler

245. Field Nematology (1)

Fieldwork-6 days. Prerequisite: course 100. Sixday demonstration and field study in applied nematology including diagnosis and prediction of nematode field problem strategies for control field plot design, and establishment in association with diverse California crops. (S/U grading only.)—I. (I.)

290. Seminar (1)

Seminar-1 hour. (S/U grading only.)-II, III. (II, III.)

290C. Advanced Research Conference (1)

Discussion - 1 hour. Prerequisite: graduate standing and consent of instructor. Planning and results of research programs, proposals, and experiments. Discussion and critical evaluation of original research being conducted by the group. Discussion led by individual research instructors for research group. (S/U grading only.)

298. Group Study (1-5)

(S/U grading only.)

299. Research (1-12)

(S/U grading only.)

Neurobiology, Physiology, and Behavior

(College of Biological Sciences)

Gregg H. Recanzone, Ph.D., Chairperson of the

Department Office. 196 Briggs Hall (530) 752-0203); http://www.npb.ucdavis.edu

Primary Department Members

Keith Baar, Ph.D. Assistant Professor Sue C. Bodine, Ph.D., Professor (Physiology & Membrane Biology) Kenneth H. Britten, Ph.D., Professor Earl E. Carstens, Ph.D., Professor Ernest S. Chang, Ph.D., Professor (Animal Science) Barbara X. Chapman, Ph.D., Professor Hwai-Jong Cheng, Ph.D., Professor (Pathology) Thomas P. Coombs-Hahn, Ph.D., Professor William DeBello, Ph.D., Associate Professor Jochen Ditterich, Ph.D., Associate Professor Charles A. Fuller, Ph.D., Professor John D. Furlow, Ph.D., Professor

Mark S. Goldman, Ph.D. Associate Professor (Ophthalmology)
Aldrin V. Gomes, Ph.D., Assistant Professor (Physiology & Membrane Biology) Samantha P. Harris, Ph.D., Associate Professor (Physiology & Membrane Biology) David A. Hawkins, Ph.D., Professor Barbara A. Horwitz, Ph.D., Distinguished Professor (Physiology & Membrane Biology) Academic Senate Distinguished Teaching Award, UC Davis Prize for Teaching and Scholarly Achievement Andrew T. Ishida, Ph.D., Professor (Ophthalmology) Kim McAllister, Ph.D., Associate Professor (Neurology) Lee Miller, Ph.D., Associate Professor Alexander I. Mogilner, Ph.D., Professor (Mathematics) Brian C. Mulloney, Ph.D., Distinguished Professor Gabrielle A. Nevitt, Ph.D., Professor Gregg H. Recanzone, Ph.D., Professor Mitchell L. Sutter, Ph.D., Professor James S. Trimmer, Ph.D., Professor (Physiology & Membrane Biology) Martin W. Usrey, Ph.D., Professor (Neurology) Craig H. Warden, Ph.D., Professor (Pediatrics) W. Jeff Weidner, Ph.D., Professor John S. Werner, Ph.D., Distinguished Professor (Ophthalmology)
Keith R. Williams, Ph.D., Senior Lecturer

Emeriti Faculty

Martin C. Wilson, Ph.D., Professor

John C. Wingfield, Ph.D., Endowed Chair Physiology, Distinguished Professor

Karen M. Zito, Ph.D., Assistant Professor

William C. Adams, Ph.D., Professor Emeritus Marylynn S. Barkley, Ph.D., M.D., Associate Professor Emerita James M. Boda, Ph.D., Professor Emeritus Edmund M. Bernauer, Ph.D., Professor Emeritus Leo M. Chalupa, Ph.D., Distinguished Professor Emeritus (Ophthalmology) Jack M. Goldberg, Ph.D., Senior Lecturer Emeritus Robert G. Holly, Ph.D., Senior Lecturer Emeritus John M. Horowitz, Ph.D., Professor Emeritus Academic Senate Distinguished Teaching Award Williard S. Lotter, Ph.D., Senior Lecturer Emeritus Peter R. Marler, Ph.D., Professor Emeritus Verne E. Mendel, Ph.D., Professor Emeritus Pamela A. Pappone, Ph.D., Professor, Emerita E. Dean Ryan, Ed.D., Professor Emeritus Arnold J. Sillman, Ph.D., Professor Emeritus Academic Senate Distinguished Teaching Award Dorothy E. Woolley, Ph.D., Professor Emerita

Affiliated Faculty

Erwin A. Bautista, Ph.D., Lecturer Gretchen Casazza, Ph.D., Assistant Adjunct Professor (Sports Medicine Program) Ann V. Hedrick, Ph.D., Associate Adjunct Professor Lauren C. Liets, Ph.D., Lecturer Paul B. Salitsky, Ph.D., Lecturer James D. Shaffrath, M.D., Lecturer Marilyn Ramenofsky, Ph.D., Adjunct Professor Grace L. Rosenquist, Ph.D., Assistant Adjunct

The Exercise Biology Major Program

The Program. The focus is on both the acute and adaptive effects of physical activity (and inactivity). Exercise biology deals with the mechanisms and consequences of activity from the molecular to the organismal (human ecological) level. We examine these mechanisms and consequences during growth, development, aging, disease and in altered environ-mental conditions. The exercise biology major encompasses the critical aspects of an integrative program in applied human biology. The Bachelor of Arts program provides a greater breadth of knowledge in the humanities and social sciences and is more appropriate for those who wish to apply their knowledge within the human community. The Bachelor of Science program is appropriate for students who desire a strong preparation in human biology.

Advising and Career Alternatives. Meet with an Exercise Biology staff advisor or review the information available in the advising office to learn more about the best course sequences to take to prepare you for careers in basic exercise physiology, applied exercise physiology, or biomechanics; for graduate study in exercise physiology or biomechanics; or for professional programs in medicine, or physical therapy, athletic training or occupational therapy. Students with further academic or professional interests in medicine and other health sciences, community service, business, sales, communications, education or coaching might find the Bachelor of Arts program attractive. The Bachelor of Science could lead to further graduate study in any field related to human biology as well as careers in medicine and other health sciences (e.g., physical therapy), biomechanics and biomedical engineering and medical equipment and all arms of the sciences and all arms of the sciences and all arms of the sciences and all arms of the sciences and all arms of the sciences and all arms of the sciences and all arms of the sciences are sciences and all arms of the sciences are sciences and all arms of the sciences are sciences and all arms of the sciences are sciences and all arms of the sciences are sciences and all arms of the sciences are sciences are sciences and all arms of the sciences are sciences are sciences and all arms of the sciences ar ment and pharmaceutical development and sales.

Preparatory Subject Matter.....37-40

A.B. Major Requirements:

Biological Sciences 2A-2B-2C. 14 Chemistry 2A, 2B. 10 Physics 1A-1B or 7A-7B. 6-8 Psychology 1 4 Statistics 13, 32, 100, or 102 3-4	
Psychology 41 recommended	
Depth Subject Matter40-	45
Biological Sciences 101	
Exercise Biology 106 and 106L	
Exercise Biology	
Community and Regional Development 176; Exercise Biology 120; History 178B; Science and Society 105, 120; Science and Technology Studies 150; Sociology 122, 154, 159, 172	
History and Philosophy option: Dramatic Art 141; History 135A, 135B, 136, 139A, 139B, 185A; Philosophy 108; Science and Technology Studies 130A, 130B, 131 Psychology and Communication option: Agricultural and Resource Economics 112, Communication 134, 136; Exercise Biology 121, 122; Human Development	
100C; Psychology 101, 121, 126, 140 No variable unit courses or Exercise Biology 148, 148L may be used to fulfill these requirements. Consult your adviser regularly.	

Total Units for the Major77-85 **B.S. Major Requirements:**

UNITS P

Preparatory Subject Matter	55-73
Biological Sciences 2A-2B-2C	14
Chemistry 2A-2B-2C	15
Chemistry 8A-8B or 118A-118B-	
118C6-	12
Mathematics* 17A-17B-17C or	
21A-21B (21C recommended)8-	
Physics 7A-7B-7C or 9A-9B-9C-9D 12-	20
*Mathematics 16A-16B-16C accepted to	
fulfill this requirement only for transfer stude	ents
admitted prior to fall 2013.	
Psychology 1 is highly recommended for	r all

students. Mathematics 21A-21B-21C-21D, 22A-22B, Physics 9A-9B-9C-9D and Engineering 6, 35 are recommended for students interested in graduate study in Biomechanics.

Depth Subject Matter	.50-55
Biological Sciences 101, 104, 105,	
(102 + 103 may be substituted for	
105) 10	.13
Neurobiology, Physiology, and Behavior	
101	5
Exercise Biology 106 and 106L	/
Exercise Biology 101, 102, 103, 104L	1.5
Statistics 100 or 102	13
Completion of 3 courses (9-11 units)	
selected from the following: (see advisor	r for
help in selecting appropriate course	
sequences)	
1 course from Group A	3-4
1 additional course from Group A	
or Group B	3-4
1 additional course from Groups A,	۰.
B or C	
Group A: Exercise Biology 111, 112, 1	15,
or 126 (laboratory courses) Group B: Exercise Biology 110, 113, 1	17
124, 125, 179	17,
Group C: Exercise Biology 122; Applie	ed
Science Engineering 115; Engineering	
102; Neurobiology, Physiology, and	
Behavior 112, 113, 140; Nutrition 111	I AV
No variable unit courses or Passed/Not	
Passed graded courses may be used to fu	lfill
these requirements. Consult your adviser	
regularly	
Total Units for the Major1()5-128

Total Units for the Major105-128 **Minor Program Requirements:**

UNITS

Exercise Biology18

At least 15 upper division units in exercise Exercise Biology or other approved course: An additional 3 upper division units from either the previous list of Exercise Biology courses OR the following courses: Exercise Biology 106; Neurobiology, Physiology, and Behavior 101; Biological Sciences, 101, 104, 1053

Master Adviser. Keith R. Williams for the Exercise Biology Major and Exercise Biology Minor

The Neurobiology, Physiology, and **Behavior Major Program**

Neurobiology, Physiology, and Behavior is a major that emphasizes the understanding of vital functions common to all animals. All animals perform certain basic functions—they grow, reproduce, move, respond to stimuli, and maintain homeostasis. The physiological mechanisms upon which these functions depend are precisely regulated and highly inte-grated. Actions of the nervous and endocrine systems determine behavior and the interaction between organisms and their physical and social environments. Students in this major study functional mechanisms; the control, regulation, and integration of these mechanisms; and the behavior that relates to those mechanisms. They do so at the level of the cell, the organ system, and the organism.

The Program. In the freshman and sophomore years, students majoring in Neurobiology, Physiology, and Behavior build a broad scientific background, taking courses in chemistry, biology, physics, and mathematics. As juniors or seniors, students can enroll in a variety of Neurobiology, Physiology, and Behavior courses and related upper division courses. Students can participate in a number of advanced laboratory courses or may design an individual, independent project guided by a member of the faculty.

Career Alternatives. Completion of the Neurobiology, Physiology, and Behavior major provides the foundation for advanced study leading to careers in high school teaching, college level teaching or research. It also serves as the basis for further training in the health professions, including but not limited to human and veterinary medicine, medical technology, physical therapy, pharmacy, dentistry and optometry. The major is also appropriate for those intending to seek careers in biotechnology or other biologically related industries.

B.S. Major Requirements:

b.5. Major Requirements.	UNITS
Preparatory Subject Matter	
Biological Sciences 2A-2B-2C	14
Chemistry 2A-2B-2C	15
Chemistry 8A-8B or 118A-118B-	12
118C	
21A-21B (21C recommended)8	12
Physics 7A-7B-7C*Mathematics 16A-16B-16C accepted to	12
fulfill this requirement only for transfer stude	ents
admitted prior to fall 2013.	
Depth Subject Matter	44-50
Biological Sciences 101, 105 (or 102 + 103), 10410-	13
Neurobiology, Physiology, and Behavior	
100, 101, 102	12
Select three or more units of laboratory cou work from the following list:	
Neurobiology, Physiology, and Behavio	r
101L, 104L, 106, 111L, 124, 141P, 15	50,
194H; other courses with the approval of the master adviser.	or
Statistics 100	4
Additional Neurobiology, Physiology, and Behavior depth unit requirement	12
All other Neurobiology, Physiology, and	12
Behavior courses not used in satisfaction	n of
any other requirement; or Anthropology	
154A, 154BN; or Entomology 104; or Exercise Biology 101, 102, 111. Cours	es
192, 197T, 199 may not be used to sat	isfy
the depth unit requirement. One course from Anthropology 151,	
Evolution and Ecology 100, Geology	
107	
Total Units for Major9	9-115
Minor Program Requirements:	
Human Physiology	20
Exercise Biology 101 Neurobiology, Physiology, &	4
Neurobiology, Physiology, & Behavior 101	5
One course from Exercise Biology 102, 1	10,
111, 113, 116, 11 <i>7</i> , 125	
One course from Neurobiology, Physiolog & Behavior 112, 113, 114, 122, 130, 1	Ι γ ,
168	JZ,
One course from two of the following area	as:
Functional Anatomy: Cell Biology and Human Anatomy 101; Anthropology 15	56
Genetics And Development: Anthropolo	
153; Human Development 100C, 101,	• /
117; Molecular and Cellular Biology 16 Immunology: Medical Microbiology 18	02 R
Nutrition: Nutrition 111B	5
Neuroscience	18
Neurobiology, Physiology, & Behavior	
100 Five courses from:	4
Choose at least four from following:	
Neurobiology, Physiology, & Behavior 1	03,
112, 124, 126, 160, 161, 162, 163, 164, 165, 168, 169	
One of the following may be completed	l to
fulfill course requirement:	
Psychology 113, 121, 129, Linguistics 175, Philosophy 103, Human Developm	ont
173, Philosophy 103, Human Developm 163	ieiii

The following courses are cross-listed and either offering can be used to fulfill the

course requirement: NPB 124/PSC 124,

NPB 160/NSC 160

Master Adviser. Dr. Will DeBello

Advising Center. 188 Briggs Hall (530) 752-

Graduate Study. Information on graduate study in neuroscience, physiology or behavior may be obtained by writing the Graduate Adviser, Graduate Group Complex. See also the graduate course offerings listed under Animal Behavior (A Graduate Group), on page 147, Molecular, Cel-lular, and Integrative Physiology (A Graduate Group), on page 426, Neuroscience, on page 442 and Physiology, on page 462. See also Graduate Studies, on page 111.

Courses in Exercise Biology (EXB) **Lower Division Courses**

10. Exercise and Fitness: Principles and

Lecture - 3 hours. Human movement from physiological, psychological, sociological, and historical perspectives. Biology and psychology of exercise across the human lifespan. Not open for credit to stu-dents who have completed an upper division Exercise Biology course. GE credit: SciEng, Div | SE, SL.—I, II. (I, II.) Barr, Shaffrath

90C. Research Conference (1)

Discussion - 1 hour. Prerequisite: lower division standing in Exercise Biology or related biological science and consent of instructor; concurrent enrollment in course 99. Research findings and methods in exercise biology. Presentation and discussion of research by faculty and students. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, İI, III.)

90X. Lower Division Seminar (1-2)

Lecture - 1-2 hours. Prerequisite: lower division standing and consent of instructor. Gives freshman or sophomore level students the opportunity to study a special topic in the general area of Exercise Biology in a small class setting. GE credit: SE.

92. Exercise Biology Internship (1-5)

Internship - 3-15 hours. Prerequisite: consent of instructor, dependent on availability of intern positions. Work experience in the application of physical activity programs to teaching, recreational, clinical or research situations under department faculty supervision. May be repeated one time for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

97T. Tutoring in Exercise Biology (1-5)

Tutorial - 3-15 hours. Prerequisite: lower division standing and consent of instructor. Assisting the professor by tutoring students in exercise biology course-related projects. May be repeated for credit for 10 units including courses 97TC, 197T and 197TC. No tutorial units will be counted towards the Exercise Biology major. (P/NP grading only.)—I, II,

97TC. Tutoring Exercise Biology in the Community (1-5)

Tutorial - 3-15 hours. Prerequisite: consent of instructor and chairperson. Tutoring in the community in exercise biology related projects under the guidance of the faculty. May be repeated one time for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

98. Directed Group Study

Prerequisite: consent of instructor and chairperson. (P/NP grading only.)—I, II, III. (I, II, III.)

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading only.) — I, II, III. (I, II, III.)

Upper Division Courses 101. Exercise Physiology (4)

Lecture — 4 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101. Physiologic responses to acute exercise, and physiologic adaptations to both chronic exercise (training) and selected environmen-tal stresses. Emphasis on the muscular, metabolic, cardiovascular, respiratory and renal responses and adaptations to exercise. Only 1 unit of credit allowed to students who have completed Exercise Science 101. Only 3 units of credit allowed to students who have completed Exercise Science 102. Not open for credit to students who have completed Exercise Science 101 and 102 (Former Exercise Science 101 and 102). GE credit: SE, SL.-I. (I.)

102. Introduction to Motor Learning and the Psychology of Sport and Exercise (4)

Lecture-4 hours. Prerequisite: Psychology 1 recommended. Theoretical and practical issues in motor learning, sport psychology, and exercise psychology. Emphasis on how motor skills are acquired and retained, and on the application of social psychology and human motivation studies to human performance. Only 2 units of credit allowed to students who have completed Exercise Science 104. Only 2 units of credit allowed to students who have completed Exercise Science 105. Not open for credit to students who have completed Exercise Science 104 and 105. (Former Exercise Science 104 and 105.) GE credit: SocSci | SS.—I, II. (I, II.) Salitsky

103. Analysis and Control of Human Movement (4)

Lecture-4 hours. Prerequisite: Cell Biology and Human Anatomy 101 and 101L, Physics 7A and 7B. Neurobiology, Physiology, and Behavior 101 recommended. Introduction to functional anatomy, neurophysiological basis of motor control, and biomechanics of human movement. Human movement understood in the context of body structures, basic principles of physics, and functional characteristics of nerve and muscle. Only 1 unit of credit allowed to students who have completed Exercise Science 103. Only 3 units of credit allowed to students who have completed Exercise Science 104. Not open for credit to students who have completed Exercise Science 103 and 104. (Former Exercise Science 103 and 104.) GE credit: QL, SE.—III. (III.) Williams

104L. Exercise Biology Laboratory (3)

Laboratory-3 hours; lecture-1 hour; discussion-1 hour. Prerequisite: course 101, 102, 103 (the last course may be taken concurrently). Principles and analytical procedures for assessing fundamental physiological, biomechanical, motor learning and motor control factors which underlie human movement and performance. Only 1 unit of credit allowed to students who have completed Exercise Science 101L. Only 1 unit of credit allowed to students who have completed Exercise Science 103. Not open for credit to students who have completed Exercise Science 101L and 103. GE credit: Wrt | SE, WE.-I, III. (I, III.) Shaffrath

106. Human Gross Anatomy (4)

Lecture — 4 hours. Prerequisite: Biological Sciences 2A; concurrent enrollment in course 106L or Cell Biology and Human Anatomy 101L strongly recom-mended. Upper division students only; Pass 1 open to upper division Exercise Biology or Anthropology majors only; Pass 2 open to Seniors in any major; Open enrollment at the start of the quarter for upper division students in any major. Detailed study of the gross anatomical structure of the human body, with emphasis on function and clinical relevance to students entering health care professions. (Same course as Cell Biology and Human Anatomy 101.) GE credit: SciEng | SE.—II. (II.) Gross

106L. Human Gross Anatomy Laboratory (3)

Laboratory—9 hours. Prerequisite: Biological Sciences 2A; must take course 106 or Cell Biology and Human Anatomy 101 concurrently (or have already completed). Upper division students only; Pass 1 open to upper division Exercise Biology or Anthropology majors only; Pass 2 open to Seniors in any major; Open enrollment at the start of the quarter for upper division students in any major; mandatory attendance on first day of lab. Detailed study of prosected human cadavers in small group format with extensive hands-on experience. (Same course as Cell Biology and Human Anatomy 101L.) GE credit: SciEng | SE.—II. (II.) Gross

110. Exercise Metabolism (3)

Lecture - 3 hours. Prerequisite: course 101 or Neurobiology, Physiology and Behavior 101. Exercise metabolism, with emphasis on skeletal muscle and cardiac muscle metabolism during activity and inactivity. Basics of bioenergetics, substrate utilization,

and cell signaling; mechanisms that regulate these properties, and differences between skeletal muscle and cardiac muscle metabolism. GE credit: SE.—III. (III.) Gomes

111. Environmental Effects on Physical Performance (3)

Lecture - 2 hours; discussion/laboratory - 3 hours. Prerequisite: courses 101 or consent of instructor. The effects of thermal, barometric and gravitational conditions on physiological function and physical performance of humans. Acute and chronic effects, emphasizing physiological adaptations and limitations, will be studied. GE credit: QL, SE.—II. (II.) Shaffrath

112. Clinical Exercise Physiology (4)

Lecture—3 hours; laboratory/discussion—3 hours. Prerequisite: courses 101 or consent of instructor. Physical activity as a therapeutic modality in normal and diseased populations (cardiovascular, pulmonary, diabetic). Effects of exercise and inactivity in terms of normal physiology, pathophysiology, and therapeutic benefit. Exercise fitness and disease assessment methods. GE credit: SE, SL.-II. (II.) Har-

113. Growth and Development in Human Performance (3)

Lecture - 3 hours. Prerequisite: Cell Biology and Human Anatomy 101, and Neurobiology, Physiology, and Behavior 101. Development of human performance potential from conception to old age, including influence of exercise, athletic participation, and preventive medicine. Alterations in motor skill patterns, morphology, and body composition, and physiological capacities with aging. GE credit: SciEng | SE.

115. Biomechanical Bases of Movement (3)

Lecture-2 hours; laboratory-3 hours to alternate weekly with discussion—1 hour. Prerequisite: course 103 or consent of instructor. Biomechanical bases of human movement investigated; topics include musculo-skeletal mechanics, tissue mechanics, electromyography, and measurement and analysis techniques. Application made to sport, clinical, and work environments, including extensive analysis of locomotion. GE credit: SciEng | QL, SE, VL, WE.-I. (I.) Williams

116. Nutrition for Physically Active Persons (3)

Lecture-3 hours. Prerequisite: course 101, Neurobiology, Physiology, and Behavior 101. The role of nutrition and exercise in modifying metabolism, body composition, performance and health of humans. GE credit: SE.

117. Exercise and Aging in Health and Disease (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: course 101 or 113 (concurrently). Etiology of and standard therapy for various diseases associated with aging (e.g., cardiovascular, pulmonary, and renal diseases, diabetes, obesity, lipemias, etc.). Exercise will then be considered as a protective and/or therapeutic modality. GE credit: SciEng | SE.—III. (III.) Shaffrath

120. Sport in American Society (3)

Lecture - 3 hours. Sociological approaches to the study of sport and contemporary American culture, including sport interaction with politics, economics, religion, gender, race, media and ethics. Socialization factors involving youth, scholastic, collegiate, and Olympic sport. (Same course as Physical Education 120.) GE credit: SocSci, Div | SS.—I, III. (I, III.)

121. Advanced Sport Psychology (3)

Lecture - 3 hours. Prerequisite: course 102; Psychology 1 recommended. Advanced study and consideration of major theoretical and practical issues in sport psychology. Emphasis on practical application to sport and human performance.

122. Psychological Effects of Physical Activity (3)

Lecture — 3 hours. Prerequisite: Psychology 1; upper division standing. Physical activity is evaluated in terms of its ability to enhance the quality of life. Top-

ics studied include: individual factors (self concept, type A); special populations (elderly, cardiovascular); and mental health changes (dépression, anxiety)

124. Physiology of Maximal Human Performance (4)

Lecture—3 hours; practice—4 hours. Prerequisite: course 101 or permission of instructor; Biological Sciences 101, 102, and 103 recommended. Molecular mechanisms underlying adaptation to training. Learn how to exercise to maximize their own performance as well as learning how the frequency, intensity and timing of exercise and nutrition affect the molecular signals that underlie performance. GE credit: SE.—II. (II.) Baar

125. Neuromuscular and Behavioral Aspects of Motor Control (3)

Lecture - 2 hours; lecture/discussion - 2 hours. Prerequisite: course 101. Factors which affect control of movement from neuropsychological, physiological, behavioral, and mechanical viewpoints. Topics include central vs. peripheral control mechanisms, open and closed loop theories, motor programming, cognitive learning strategies, and the effects of biochemical and biomechanical influences. GE credit:

126. Tissue Mechanics (3)

Lecture - 2 hours; laboratory/discussion - 3 hours. Prerequisite: course 103 or Engineering 45 or consent of instructor. Structural and mechanical properties of biological tissues including bone, cartilage, ligaments, tendons, nerves, and skeletal muscle (Same course as Biomedical Engineering 126.) GE credit: SciEng | QL, SE, WE.—II. (II.) Hawkins

148. Theory and Practice of Exercise Testing (1)

Lecture/discussion-1 hour. Prerequisite: course 112 (may be taken concurrently). Theory and practice of exercise testing applied to older adult populations. Physiological responses to and limitations of exercise testing. Application of exercise testing and training to healthy and diseased populations. (P/NP grading only.) GÉ credit: SE.—Casazza

148L. Adult Fitness Testing Laboratory (1)

Laboratory-3 hours. Prerequisite: courses 148 (concurrently). Testing symptomatic and asymptomatic older adults for functional aerobic capacity, body composition, blood lipids, pulmonary function, and cardiovascular disease risk. Counseling adults in appropriate exercise programs and lifestyle modifications. Two quarters minimum; third quarter permitted. May be repeated two times for credit. (Former course Physical Education 148L) (P/NP grading only.) GE credit: QL, SE.—Casazza

179. Frontiers in Exercise Biology (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: courses 101, 102 and 103 (may be taken concurrently); 104L recommended. Lectures by leading authorities and discussion of the latest research in newly emerging areas in exercise biology. Offered every fourth year. GE credit: SE.-III.

189. International Perspectives in Exercise Biology (4)

Lecture - 4 hours. Prerequisite: course 10 or upper division standing in Exercise Biology; consent of instructor: students will be accepted based upon academic merit, personal experience, and academic discipline in order to provide multidisciplinary perspectives. Compare and contrast exercise science issues between the US and an international location. Identify political, economic, cultural, technological and environmental issues that impact human exercise, physical activity, wellness, and sport from a global perspective. Limited enrollment. Offered irregularly.

190C. Research Conference (1)

Discussion - 1 hour. Prerequisite: upper division standing in Exercise Biology or related biological science and consent of instructor; concurrent enrollment in course 199. Research findings and methods in exercise biology. Presentation and discussion of research by faculty and students. May be repeated for credit. (P/NP grading only.)—I. II, III. (I. İI, III.)

192. Exercise Biology Internship (1-12)

Internship-3-36 hours. Prerequisite: consent of instructor, dependent on availability of intern positions. Work experience in the application of physical activity programs to teaching, recreational, clinical or research situations under program faculty supervision. Written report required. May be repeated up to 15 units of credit, including course 92. (P/NP grading only.)—I, II, III. (I, II, III.)

194H. Research Honors (2)

Independent study-6 hours. Prerequisite: senior standing, minimum of 6 units of course 199, 3.500 GPA or greater in major courses, consent of honors thesis adviser. Completion of individual honors research project in Exercise Biology, under the guidance of an Exercise Biology faculty adviser, culminating in written honors thesis. (P/NP grading only.) GE credit: SE. - I, II, III. (I, II, III.)

197T. Tutoring in Exercise Biology (1-5)

Tutorial—3-15 hours. Prerequisite: upper division standing and consent of instructor. Assisting the instructor by tutoring students in exercise biology course-related projects. May be repeated up to 10 units of credit including courses 97T, 97TC and 197TC. No tutorial units will be counted towards the Exercise Biology major. (P/NP grading only.)—I, II, III. (I, II, III.)

197TC. Tutoring Exercise Biology in the Community (1-5)

Tutorial - 3-15 hours. Prerequisite: consent of instructor and chairperson. Tutoring in the community in exercise biology related projects under the guidance of the faculty. May be repeated up to 10 units of credit including courses 97T, 97TC, 197T. (P/NP grading only. -I, II, III. (I, II, III.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor and chairperson. (P/NP grading only.) GE credit: SE.-I, II, IİI. (I, II,

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of chairperson. (P/NP grading only.) - I, II, III. (I, II, III.)

Courses in Neurobiology, Physiology, and Behavior (NPB)

Lower Division Courses

10. Elementary Human Physiology (3)

Lecture - 3 hours. Introduction to physiology for nonscience majors. Includes basic cell physiology and survey of major organ systems and how they function in homeostasis and human health. Not open for credit to students who have completed course 101. GE credit: SciEng.-II. (II.) Bautista, Mogilner

12. The Human Brain and Disease (3)

Lecture-3 hours. Normal function and diseases of the human brain and nervous system. Diseases discussed include Parkinson's, Alzheimer's, leprosy, amnesia and schizophrenia. Intended for non-science majors. Not open for credit to students who have completed courses 100, 101, 112, or Psychology 121. GE credit: SciEng.—I. (I.) Cheng, Recanzone

14. Illusions: Fooling the Brain (3)

Lecture — 3 hours. Introduction to perceptual processing in the human nervous system; illusions. GE credit: SciEng | QL, SE, SL.—II. (II.) Ditterich

15. The Physiology of Human Aging (4)

Lecture — 3 hours; discussion — 1 hour. A broad examination of age-associated changes in body functions. Includes basic cell physiology, a survey of major organ systems and the age-induced alterations in system function. Some age associated diseases will also be examined. Intended for non-science majors. Not open for credit to students who have completed Biological Sciences 15. GE credit: Sci-Eng. — (I.) Bautista

68. Biology of Drug Addiction and Abuse

Lecture - 3 hours Broad examination of addictive substances and their use/abuse. Topics include historical perspective, physiological effects, etiology, neurobiology of addiction and the impact of drugs on contemporary society. Intended for non-science majors. Not open for credit to students having completed course 168. GE credit: SciEng. — (III.) Bautista

90A. Lower Division Seminar: Issues in **Body Weight Regulation (2)**

Seminar - 2 hours. Prerequisite: lower division standing, consent of instructor. Critical examination of issues in body weight regulation through shared readings, discussions, written assignments, debates and oral presentations. Limited enrollment. —II. (II.)

90B. Human Color Perception (2)

Seminar-2 hours; term paper. Prerequisite: lower division standing. The neural determinants of color appearance, and why we see the world in the way we do. Discussions center around demonstrations of color phenomena and what they tell us about the human brain. Limited enrollment. - II. Werner

90C. Current Issues in Animal Behavior (2)

Seminar - 2 hours. Prerequisite: lower division standing. The mechanisms and outcomes of sexual selection (mate choice and mate competition). Theory current models and evidence that supports or refutes the models. Limited enrollment. — III. (III.) Hedrick

90D. Lower Division Seminar: Current Issues in Reproductive Endocrinology (2)

Seminar - 2 hours. Prerequisite: lower division standing. The integrative roles of reproductive hormones in mammalian reproduction and health. Current theory and models regarding hormone function and use in reproductive health and contraception, and evidence that supports or refutes the models.

90E. Biology of Aging (2)

Seminar-2 hours. Prerequisite: freshman standing. Current theories on the biology of aging covering genetic, biochemical, and physiological aspects. Emphasis on critical evaluation of controversial and contemporary issues

90F. Visual Impairment and Blindness: A World Wide Problem (2)

Seminar-2 hours. Prerequisite: lower division standing. Examination of various abnormalities of the eye and the important geographic and cultural factors that influence the epidemiology of those abnormali-

91C. Research Conference (1)

Discussion - 1 hour. Prerequisite: Lower division standing in Neurobiology, Physiology, and Behavior or related biological science and consent of instructor; concurrent enrollment in course 99. Research findings and methods in neurobiology, physiology, and/or behavior. Presentation and discussion o research by faculty and students. (P/NP grading only.)—I, II, III. (I, II, III.)

92. Internship (1-12)

Internship - 3-36 hours. Prerequisite: lower division standing and consent of instructor. Work experience off and on campus in all subject areas offered in the Department of Neurobiology, Physiology, and Behavior. Internships supervised by a member of the faculty. May be repeated once for credit. (P/NP grading only.) - I, II, III. (I, II, III.)

98. Directed Group Study (1-5)

Prerequisite: lower division standing and consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)

Prerequisite: lower division standing and consent of instructor. (P/NP grading only.)—I, II, III. (I, II, III.)

Upper Division Courses 100. Neurobiology (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Biological Sciences 1AB or 2ABC; Physics 9 ABC or 7ABC. Brains and nervous systems, neurons and neural circuits. Coordination of movement. Development of nervous systems. Vision, hearing, and feature extraction by the central nervous system. The cell biology of learning and memory. Not open for credit to students who have completed course 112, 160, 161 or 162, or Neuroscience 221 or 222. GE credit: QL.-I, II, III. (I, II III.) Carstens, Chapman, Cheng, Sutter

100Q. Quantitative Foundations of Neurobiology (1)

Autotutorial - 1.5 hours; extensive problem solving-1.5 hours. Prerequisite: course 100 (may be taken concurrently). Computational methods and mathematical models used to study phenomena in neurobiology. GE credit: QL, VL. - Mogilner, Sutter

101. Systemic Physiology (5)

Lecture — 5 hours. Prerequisite: Biological Sciences 1A, or 2A and Chemistry 2B; Physics 1B or 7C strongly recommended. Systemic physiology with emphasis on aspects of human physiology. Functions of major organ systems, with the structure of those systems described as a basis for understanding the functions. GE credit: SE.-I, II, III. (I, II, III.) Debello, Fuller, Furlow, Ishida, Usrey, Weidner, Wingfield,

101L. Systemic Physiology Laboratory (3)

Laboratory-3 hours; discussion-2 hours; term paper. Prerequisite: course 101. Selected experiments to illustrate functional characteristics of organ systems discussed in course 101.—I, II, III. (I, II, III.) Bautista, Liets

102. Animal Behavior (3)

Lecture — 3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C. Basic principles of behavioral organization in vertebrate and invertebrate animals. Underlying physiological and ethological mechanisms. The evolution of behavior, with special emphasis on behavior under natural conditions. Not open for credit to students who have completed course 155. (Former course 155.) GE credit: SL.—II, III. (II, III.) Britten, Hahn, Nevitt

102Q. Quantitative Topics in Animal Behavior (1)

Autotutorial-1.5 hours; extensive problem solving-1.5 hours. Prerequisite: Mathematics 16B; course 102 (may be taken concurrently). Study of the quantitative concepts and exemplar models used in animal behavior. Offered irregularly. GE credit: SciEng. — Hahn

103. Cellular Physiology/Neurobiology (3)

Lecture-3 hours. Prerequisite: Biological Sciences 103 or 105, and 104; Physics 7C recommended. Cellular physiology with emphasis on membrane transport processes and neuronal physiology. Fundamental physical-chemical and biological mechanisms of membrane transport will be considered in relation to cytoplasmic homeostasis, communication between cells, and the cellular mechanisms of sensory and motor transduction. Not open for credit to students who have completed course 100B (Former course 100B.)

104L. Cellular Physiology/Neurobiology Laboratory (4)

Lecture — 1 hour; laboratory — 3 hours; discussion — 1 hour; term paper or discussion. Prerequisite: courses 101 and 101L; Biological Sciences 103 or 105. Experiments in the physical and chemical processes of cells and tissues. GE credit: Wrt.—II. (II.) Horwitz

105. Introduction to Computer Models (4)

Lecture - 3 hours; lecture/laboratory - 1 hour. Prerequisite: Mathematics 16C or the equivalent, Physics 7C, Chemistry 2C, and course 100 or 101. Introduction to the ideas, mathematical techniques and computer tools required for developing models of cellular processes in physiology and neurobiology. Applications include membrane transport, ionic channels, action potentials, Ca²⁺ oscillations, respi ration, and muscle contraction.

106. Experiments in Neurobiology, Physiology, and Behavior: Design and Execution (3)

Laboratory - 7.5 hours; discussion - 0.5 hours. Prerequisite: course 100 or 101 or 102, and 199 and consent of instructor. Design and execution of exper-

iments in neurobiology, physiology, and/or behavior. Students choose and design a project in consultation with the sponsoring faculty member. May be repeated one time for credit to complete the project, with consent of instructor. An additional repeat is permitted for a different project under the guidance of another faculty member. (P/NP grading only.) GE credit: OL, QL, VL, WE.—I, II, III. (I, II, III.) Rosenquist

107. Cell Signaling in Health and Disease (3)

Lecture — 3 hours. Prerequisite: Biological Sciences 102 or 105. Basics of cell signaling pathways, their disruption in disease, and their current utility and future potential as therapeutic targets. Focus is on signaling pathways specific to nervous, endocrine and immune systems, and those fundamental to all cells. GE credit: SL.-II. (II.) Trimmer

111C. Advanced Systemic Physiology Laboratory (3)

Lecture-1 hour; laboratory-6 hours. Prerequisite: courses 101, 101L, Statistics 13; course 112, 113, or 114 recommended. Interfacing physiological recording equipment with microcomputers; data acquisition and analysis using the microcomputer; data interpretation within the framework of physiological concepts. GE credit: QL, VL, WE.

111L. Advanced Systemic Physiology Laboratory (4)

Lecture - 1 hour; discussion - 2 hours; laboratory - 6 hours; term paper. Prerequisite: courses 101 and 101L. Selected comprehensive experiments in the autonomic nervous system and the cardiovascular, respiratory, and neuromuscular systems. Emphasis on conceptual and methodological approaches in demonstrating the physiology of organ systems. GE credit: Wrt.-II. (II.) Liets

112. Neuroscience (3)

Lecture—3 hours. Prerequisite: course 100 or 101. Presentation of concepts in neuroscience including sensory systems, motor systems, and higher neural integration. Emphasis on mammalian nervous system. GE credit: SL.—II. (II.) Carstens

113. Cardiovascular, Respiratory, and Renal Physiology (4)

Lecture - 4 hours. Prerequisite: course 101; Chemistry 8B, Physics 7B and 7C recommended. An intense and advanced presentation of concepts in cardiovascular, respiratory, and renal physiology including discussion of acid-base balance

114. Gastrointestinal Physiology (3)

Lecture — 3 hours. Prerequisite: course 101; Biological Sciences 105 or 103 recommended, 105 preferred. Gastrointestinal anatomy and physiology. Digestion, secretion, absorption, motility, comparative physiology and pathology. Strong emphasis on neural and hormonal regulation and on cellular mechanisms of secretion and absorption.—I. (I.) Bautista, Horwitz

117. Avian Physiology (3)

Lecture — 3 hours. Prerequisite: Biological Sciences 1B, or 2A and 2B and Chemistry 2B; course 101 strongly recommended. Physiology of the various systems of birds with emphasis on digestion, respiration, excretion, and endocrine systems. - III. (III.)

121. Physiology of Reproduction (4)

Lecture - 4 hours. Prerequisite: course 101. Physiological mechanisms related to reproduction, breeding efficiency and fertility, with special reference to domestic animals. GE credit: QL, SL.—II. (II.) Berger

121L. Physiology of Reproduction Laboratory (1)

Laboratory - 3 hours. Prerequisite: course 121 recommended (may be taken concurrently). Experiments on the reproductive systems of domestic animals including male and female gametes. (P/NP grading only.)—II. (II.) Berger

122. Developmental Endocrinology (3)

Lecture - 3 hours. Prerequisite: course 101. Hormonal control of development, maturation and senescence from the cellular to organismal level,

with emphasis on the human. Prenatal and neonatal life, childhood and adolescence, adulthood and pregnancy, as well as the endocrinology of aging.

123. Comparative Vertebrate Organology

Lecture—3 hours; laboratory—3 hours. Prerequisite: Biological Science 1A and 1B or 2A and 2B. Functional anatomy of major organ systems in vertebrates. Each system examined from cellular to gross level in fish, birds, and mammals. Emphasis on how differentiated cell types are integrated into tissues and organs to perform diverse physiological functions. (Same course as Anatomy, Physiology and Cell Biology 100.)—II. (II.)

124. Comparative Neuroanatomy (4)

Lecture—3 hours; laboratory—2 hours. Prerequisite: Psychology 101, or course 100 or 101. Overview of the neuroanatomy of the nervous system in a variety of mammalian and non-mammalian vertebrates. Examine changes or modifications to neural structures as a result of morphological or behavioral specializations. (Same course as Psychology 124.) GE credit: SL.—II. (II.) Krubitzer, Recanzone

125. Comparative Physiology: Neurointegrative Mechanisms (3)

Lecture - 3 hours. Prerequisite: course 101. Comparisons of physiological functions in the animal kingdom: neurointegrative mechanisms of integration including aspects of phylogenetic development at both neuronal and systemic levels.

126. Comparative Physiology: Sensory Systems (3)

Lecture - 3 hours. Prerequisite: course 100 or 101. Basic physiological mechanisms involved in sensory systems. Comparative approach to considerations of mechanosensitive systems (audition, lateral lines, touch, echolocation, equilibrium), chemosensitive systems (olfaction, taste, pheromones), photosensitive systems (vision, infrared detection, UV detection), electroreception, and pain. Emphasis on

127. Comparative Physiology: Circulation (3)

Lecture-3 hours. Prerequisite: course 101. Comparisons of physiological functions in the animal kingdom: circulation. Comparative approach to cardiovascular function in vertebrates and invertebrates. GE credit: SL, VL.-Weidner

128. Comparative Physiology: Endocrinology (3)

Lecture—3 hours. Prerequisite: course 101. Comparison of physiological functions in the animal king dom: animal hormones and their functions.—II. (II.) Furlow, Chang

129. Comparative Physiology: Respiration (3)

Lecture—3 hours. Prerequisite: course 101. Comparisons of physiological functions in the animal kingdom: respiration.

130. Physiology of the Endocrine Glands (4)

Lecture - 4 hours. Prerequisite: course 101. Advanced presentation of concepts in endocrinology with emphasis on the role of hormones in reproduction, metabolism, and disease. GE credit: VL.-I. (I.)

132. Nature vs. Nurture: Physiological Interactions Among Genes, Nutrients and

Lecture—3 hours. Prerequisite: Biological Sciences 1A or 2A or consent of the instructor. Biochemical. physiological, genetic, and nutritional causes of important medical problems such as obesity, anorexia, heart disease and diabetes. One unit of credit allowed to students who have completed course 131. GE credit: SciEng.—I. (I.) Phinney, Warden

139. Frontiers in Physiology (3)

Lecture — 2 hours; discussion — 1 hour. Prerequisite: courses 100 and 101; 102 (may be taken concurrently). Lectures by leading authorities and discussion of the latest research in newly emerging areas in physiology. Offered every fourth year. Offered irregularly. GE credit: SciEng | QL, SE.

140. Principles of Environmental Physiology (3)

Lecture-3 hours. Prerequisite: course 101; Biological Sciences 102 recommended. Physiological aspects of interactions of organisms and environmental, cellular, system, and organismal levels. Emphasis on regulatory responses/mechanisms to thermal, pressure, gravity and light environmental variables. Not open for credit to students who have completed course 148. (Former course 148.) GE credit: WE.-II. Fuller

141. Physiological Adaptation of Marine Organisms (3)

Lecture — 2 hours; laboratory — 3 hours. Prerequisite: upper division standing; consent of the instructor; residence at Bodega Marine Laboratory required. Students must submit application available at http:// www.bml.ucdavis.edu. Physiological adaptation to the environment among organisms in marine and estuarine habitats. GE credit: QL, VL, WE.-III. (III.) Chang, Cheng, Cherr

141P. Physiological Adaptation of Marine Organisms/Advanced Laboratory Topics (5)

Laboratory-12 hours; discussion-1 hour. Prerequisite: course 141 concurrently; residence at Bodega Marine Laboratory required. Students must submit application available at http:// www.bml.ucdavis.edu. Training in scientific research from hypothesis to publication, including methods of library research. Research related to a topic covered in course 141. GE credit: VL, WE.-III. (III.) Chang,

150. Advanced Animal Behavior (4)

Lecture — 3 hours, laboratory — 3 hours. Prerequisite: course 102 or Psychology 101. Advanced integrative survey of biological principles of behavioral organization, emphasizing historical roots, current research directions, conceptual issues and controversies. Laboratory exercises on the description and analysis of the behavior of captive and free-living animals. (Same course as Psychology 122.)—II. (II.)

152. Hormones and Behavior (3)

Lecture - 3 hours. Prerequisite: course 101, and either course 102 or Psychology 101. Endocrine physiology with an emphasis on the principles of behavior. Fundamental relationships between hormones and various behaviors engaged in by the organism during its lifetime. Role of hormones in behavioral homeostasis, social behavior, reproduc-tive behavior, parental behavior, adaptation to stress. (Same course as Psychology 123.)—III. (III.) Furlow, Hahn

159. Frontiers in Behavior (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: courses 100, 101, 102. Lectures by leading authorities and discussion of the latest research in newly emerging areas in behavioral biology. Offered every fourth year. Offered irregularly. GE credit: QL, SF

160. Molecular and Cellular Neurobiology (3)

Lecture - 1.5 hours; discussion - 1.5 hours. Prerequisite: course 100, Biological Sciences 101 and consent of instructor. Selected topics in neurobiology. Topics include channel biophysics, action potential propagation, intracellular signal transduction path ways, synaptic physiology and quantal analysis, cellular mechanisms of synaptic plasticity, and neuromodulation of synaptic circuitry. (Same course as Neuroscience 160.) GE credit: VL. - (III.) Burns, Mulloney

160L. Advanced Cellular Neurobiology Laboratory (4)

Laboratory—12 hours. Prerequisite: course 160, Physics 7C recommended. Students will learn to record neural activity, to interpret their recordings, and to label neurons with antibodies against neurotransmitters. Mulloney

161. Developmental Neurobiology (3)

Lecture - 3 hours. Prerequisite: course 100 or 101. lssues, theoretical concepts, and methodologies in developmental neurobiology. Topics include prenatal and postnatal differentiation of neurons, and plasticity in the mature and aging brain. Integration of neurochemical, structural, physiological and behavioral perspectives. GE credit: ŚE.-III. (III.) McAllister

162. Neural Mechanisms of Behavior (3)

Lecture—3 hours. Prerequisite: course 100 or 101. The relationship between brain and behavior. Identification and analysis of the relevant neural circuits involved. Examples of systems to be considered are birdsong, locomotion, echolocation. - III. (III.) Britten

164. Mammalian Vision (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 100, 112, or Psychology 101. Structure and function of the mammalian visual system, from the formation of images on the retina through visually guided behavior and perception. Emphasis on biological mechanisms underlying vision.—II. Britten, Werner

165. Neurobiology of Speech Perception (3)

Lecture-3 hours. Prerequisite: course 100 or 101 or consent of instructor. Interdisciplinary approach to speech perception with emphasis on functional neuroanatomy and behavior. Topics include auditory processing in time and space, intelligibility in noisy environments, visual speech, evolution of vocal communication, models of speech perception, development, and hearing impairment. GE credit: SL.-I. (I.)

166. Math Tools for Neuroscience (4)

Lecture-4 hours. Prerequisite: course 100 or per mission of instructor; Math 16A, B, C or equivalent; Physics 7C strongly recommended. Introduction to mathematics techniques used in neuroscience. Applications to neuroscience of differential equations, linear algebra, Fourier transforms, correlation and convolution, and probability theory. Offered in alternate years. GE credit: QL. - Goldman

167. Computational Neuroscience (5)

Lecture-4 hours; lecture/laboratory-3 hours. Prerequisite: course 100 or permission of instructor; Math 16A, B, C or equivalent; Physics 7A, B, C or equivalent strongly recommended. Mathematical models and data analysis techniques used to describe computations performed by nervous systems. Lecture topics include single neuron biophysics, neural coding, network dynamics, memory, plasticity, and learning. Lab topics include programming mathematical models and data analysis techniques in MATLAB. Offered in alternate years. GE credit: QL. — (I.) Goldman

168. Neurobiology of Addictive Drugs (4)

Lecture/discussion-4 hours. Prerequisite: course 100 or 101 or the equivalent. Neurobiological basis for the effects and mechanisms of action of drugs with addictive potential, including opiates (morphine, heroin, methadone), amphetamines, cocaine, nicotine, marijuana (cannabinoids), alcohol, caf feine, and mind-altering drugs such as LSD and antidepressants. GE credit: SL, VL.-III. (III.) Liets

169. Frontiers in Neurobiology (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: courses 100 and 101, course 102 (may be taken concurrently). Lectures by leading authorities and discussion of the latest research in newly emerging areas in neurobiology. Offered every fourth year.
Offered irregularly. GE credit: QL.

190C. Research Conference (1)

Discussion - 1 hour. Prerequisite: upper division standing in Neurobiology, Physiology, and Behavior or related biological science and consent of instructor; concurrent enrollment in course 199. Research findings and methods in neurobiology, physiology, and/or behavior. Presentation and discussion of research by faculty and students. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, İI, III.)

192. Internship (1-12)

Internship - 3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience off and on campus in all subject areas offered in neurobiology, physiology, & behavior. May be repeated for credit. (P/NP grading only.)—I, II, III. (I,

194HA-194HB-194HC. Neurobiology Physiology, and Behavior-Honors (1-4-2)

Laboratory-3-12 hours. Prerequisite: senior standing; minimum 3.500 GPA in courses counted toward major; approval by the Master Adviser. Honors project in Neurobiology, Physiology, and Behavior. Lab oratory research on a specific question. The project is developed with the sponsoring faculty member and approved by the student's Honors Thesis Committee. Honors thesis to be submitted upon completion of the project. (P/NP grading only.)-I, II, III. (I,

197T. Tutoring in Neurobiology, Physiology, and Behavior (1-5)

Discussion - 2-6 hours. Prerequisite: upper division standing and consent of instructor. Assisting the instructor by tutoring students in one of the Department's regular courses. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, Iİ, III.)

198. Directed Group Study (1-5)

(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)—I, \overline{II} , \overline{III} . (I, \overline{II} , \overline{III} .)

Graduate Courses

211. Advanced Topics in Neuroimaging (2)

Seminar - 2 hours. Prerequisite: Psychology 210 or consent of instructor. Restricted to 16 students. Critical presentation and discussion of the most influential advanced issues in neuroimaging, emphasizing fMRI design/analysis and the integration of fMRI with EEG/MEG. (Same course as Neuroscience 211 and Psychology 211.) (S/U grading only.)—II. (II.)

212. Light and Fluorescence Microscopy (2)

Lecture—2 hours. Prerequisite: consent of instructor. Restricted to maximum 16 students. Theory and practical application of light and fluorescence microscopy in the biological sciences. (S/U grading only.) - II. (II.) Zito

217. Advanced Avian Physiology (1)

Project - 1 hour. Prerequisite: graduate standing and concurrent enrollment in course 117; consent of instructor. Study in depth of a topic in avian physiology through development of a lecture with associated instructional materials such as lesson plan, readings, presentation, and evaluation aids.—III. (III.) Millam

222. Systems Neuroscience (5)

Lecture - 4 hours; discussion - 1 hour. Prerequisite: graduate standing or consent of instructor. Integrative and information-processing aspects of nervous system organization. Topics include sensory systems, motor function, sensorimotor integration, the limbic system, and the neurobiology of learning and memory. (Same course as Neuroscience 222.)—II. (II.) DeBello, Ditterich, Usrey

245. Computational Models of Cellular Signaling (3)

Lecture - 3 hours. Prerequisite: consent of instructor. Computational and mathematical techniques in modeling of regulatory and signaling phenomena in neu-robiology and cell physiology, focusing on linear and nonlinear ordinary differential equation models. Applications include ion channel kinetics, electrical activity, signal transduction, calcium oscillations, and simple neural circuits.—II. (II.)

247. Topics in Functional Neurogenomics

Lecture — 1 hour; discussion — 1 hour. Prerequisite: graduate standing or consent of instructor. The theory, methods and principles of functional neurog-enomics with emphasis on the relationship to

molecular mechanisms involved in development and disease of the nervous system. (Same course as Neu-

261A. Topics in Vision: Eyes and Retinal Mechanisms (2)

Lecture/discussion - 2 hours. Prerequisite: graduate standing, course 100 or 112 or the equivalent. Structure and function of the visual system, with emphasis on the eye and retina, including optics, anatomy, transduction, retinal synapses, adaptation, and parallel processing. (Same course as Neuroscience 261A and Molecular, Cellular, and Integrative Physiology 261A.) (S/U grading only.)—(I.) Ishida

261B. Topics in Vision: Systems, Psychophysics, Computational Models (2)

Lecture/discussion - 2 hours. Prerequisite: consent of instructor, course 261A recommended. Functions of the central visual pathways and their underlying mechanisms. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system. (Same course as Neurobiology, Physiology, and Behavior 261B and Molecular, Cellular, and Integrative Physiology 261B.) (S/U grading only.) Offered in alternate years. - (II.) Britten

261C. Topics in Vision: Clinical Vision Science (2)

Lecture/discussion-2 hours. Prerequisite: courses 261A and 261B or consent of instructor. Causes and mechanistic bases of major blinding diseases. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system related to disease. (Same course as Neuroscience 261C and Molecular, Cellular, and Integrative Physiology 261C.) Not offered every year. (S/U grading only.)—(III.) Wer-

263. Modeling in Systems Neuroscience (4)

Lecture - 3 hours; lecture/laboratory - 1 hour. Prerequisite: consent of instructor. Modeling as a tool in systems neuroscience. Mathematical techniques will be introduced and used to explore advanced topics in echolocation, sound localization, electroreception, communications, and motor systems. Other topics include transforms, modeling assumptions, scales and linearity. Offered in alternate years.

267. Computational Neuroscience (5)

Lecture-4 hours; lecture/laboratory-3 hours. Prerequisite: one course in general neuroscience at the level of course 100; one year college-level Calculus at level of Math 16A, B, C; one year Physics at the level of Physics 7A, B, C, strongly recommended; students from other departments should contact the instructor. Mathematical models and data analysis techniques used to describe computations performed by nervous systems. Lecture topics include single-neuron biophysics, neural coding, network dynamics memory, plasticity, and learning. Lab topics include programming mathematical models and data analysis techniques in MATLAB. Offered in alternate years. (Same course as Neuroscience 267.)—(I.) , Goldman

270. How to Write a Fundable Grant Proposal (3)

Lecture/discussion-3 hours. Prerequisite: graduate standing in a life science and consent of instructor. Familiarization with the skills required to craft a successful grant proposal submitted to extramural agencies such as NIH and NSF.

285. Literature in Visual Neuroscience (2)

Seminar—2 hours. Literature in Visual Neuroscience. (Same course as Neuroscience 285.) May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.) Britten, Ditterich, Goldman, Usrey

287A. Topics in Theoretical Neuroscience (2)

Seminar — 2 hours. Prerequisite: consent of instructor. In-depth exploration of topics in theoretical neuroscience. Topic varies each year. Fall quarter (287A): foundational material from books and review articles. Spring quarter (287B): continuation of year's topic through readings of seminal articles from the primary literature. Offered in alternate years. May

be repeated for credit. (Same course as Neuroscience 287A.) (S/U grading only.)—I. Ditterich, Gold-

287B. Topics in Theoretical Neuroscience (2)

Seminar - 2 hours. Prerequisite: consent of instructor. In-depth exploration of topics in theoretical neuroscience. Topic varies each year. Fall quarter (287A): foundational material from books and review articles. Spring quarter (287B): continuation of year's topic through readings of seminal articles from the primary literature. May be repeated for credit. (Same Course as Neuroscience 287B.) (S/U grading only.)—III. Ditterich, Goldman

291. Auditory Neuroscience (1)

Seminar - 0.5 hours; discussion - 0.5 hours. Prerequisite: course 100 or 112 or Neuroscience 222 or the equivalent. Exploration of various important aspects of auditory physiology, behavior and psychophysics through review of original literature. New topic each quarter. May be repeated for credit with consent of instructor. (S/U grading only.)—I, II, III. (I, II, III.) Recanzone, Sutter

Neuroscience

See Neurobiology, Physiology, and Behavior, on page 436; and Neuroscience (A Graduate Group), below.

Neuroscience (A Graduate Group)

Barbara Chapman, Ph.D., Chairperson of the Group Group Office. 148 Center for Neuroscience (530) 757-8845;

http://neuroscience.ucdavis.edu/grad

Faculty

David Amaral, Ph.D., Professor (Psychiatry) Julie Barkmeier-Kraemer, Ph.D., Professor (Otolaryngology) Robert Berman, Ph.D., Professor

(Neurological Surgery)
Laura Borodinsky, Ph.D., Assistant Professor (Physiology and Membrane Biology)

Kenneth H. Britten, Ph.D., Professor (Neurobiology, Physiology, and Behavior) Marie Burns, Ph.D., Professor

(Ophthalmology and Vision Science) Earl E. Carstens, Ph.D., Professor

(Neurobiology, Physiology, and Behavior) Cameron Carter, M.D., Professor (Psychiatry and Behavioral Science)

Barbara Chapman, Ph.D., Professor (Neurobiology, Physiology, and Behavior) Tsung-Yu Chen, M.D., Ph.D., Professor (Neurology)

Hwai-Jong Cheng, M.D., Ph.D., Professor (Neurobiology, Physiology, and Behavior) Gino Cortopassi, Ph.D., Professor

(Molecular Biosciences)
William DeBello, Ph.D., Associate Professor (Neurobiology, Physiology, and Behavior) Charlie DeCarli, M.D., Professor (Neurology)

Wenbin Deng, Ph.D., Associate Professor (Cell Biology and Human Anatomy) Elva Diaz, Ph.D., Associate Professor

(Pharmacology)

Elizabeth Disbrow, Ph.D., Associate Professor Adjunct (Neurology)
Jochen Ditterich, Ph.D., Assistant Professor

(Neurobiology, Physiology, and Behavior) Arne Ekstrom, Ph.D., Assistant Professor (Psychology)

Michael Ferns, Ph.D., Professor (Anesthesiology and Pain Medicine)
Joy Geng, Ph.D., Assistant Professor (Psychology)

Mark Goldman, Associate Professor (Neurobiology, Physiology and Behavior) Qizhi Gong, Ph.D., Associate Professor (Cell Biology and Human Anatomy) Fredric Gorin, M.D., Ph.D., Professor (Neurology) Paul Hagerman, M.D., Ph.D., Professor (Biochemistry and Molecular Medicine) Randi Hagerman, M.D., Professor (Pediatrics) Johannes Hell, Ph.D., Professor Andrew T. Ishida, Ph.D., Professor (Neurobiology, Physiology, and Behavior)
Petr Janata, Ph.D., Associate Professor (Psychology) Lee-Way Jin, Ph.D., Professor (Pathology)
Paul S. Knoepfler, Ph.D., Associate Professor

(Cell Biology and Human Anatomy)
Leah Krubitzer, Ph.D., Professor (Psychology)
Janine LaSalle, Ph.D., Professor
(Medical Microbiology and Immunology)

Pamela Lein, Ph.D., Associate Professor (Molecular Biosciences)

Steven Luck, Ph.D., Professor (Psychology) Bruce Lyeth, Ph.D., Professor

(Neurological Surgery) G. R. Mangun, Ph.D., Professor

(Psychology) Martinez-Cerdeno, Veronica, Ph.D., Assistant Professor (Pathology)

A. Kimberley McAllister, Ph.D., Professor (Neurology, and Neurobiology, Physiology and . Behavior)

Lee Miller, Ph.D., Associate Professor (Neurobiology, Physiology, and Behavior) Brian Mulloney, Ph.D., Professor

(Neurobiology, Physiology, and Behavior) Liping Nie, Ph.D., Assistant Professor

(Otolaryngology)
Stephen Noctor, Ph.D., Assistant Professor (Psychiatry and Behavioral Sciences)

John Olichney, M.D., Professor (Neurology)

Isaac N. Pessah, Ph.D., Professor (Molecular Biosciences) David Pleasure, M.D., Professor

(Neurology and Pediatrics)
J. Daniel Ragland, Ph.D., Professor

(Psychiatry and Behavioral Sciences) Charan Ranganath, Ph.D., Professor (Psychology)

Gregg H. Recanzone, Ph.D., Professor (Neurobiology, Physiology, and Behavior) David Richman, M.D. Professor (Neurology) Susan Rivera, Ph.D., Professor (Psychology)

Philip A. Schwartzkroin, Ph.D., Professor

(Neurological Surgery)
Frank Sharp, M.D., Professor (Neurology)
Tony Simon, Ph.D., Professor

(Psychiatry and Behavioral Sciences) Mitchell L. Sutter, Ph.D., Professor

(Neurobiology, Physiology, and Behavior) Diane Swick, Ph.D., Associate Adjunct Professor (Neurology) Lin Tian, Ph.D., Assistant Professor

(Biochemistry and Molecular Medicine) Brian Trainor, Ph.D., Associate Professor (Psychology)

James Trimmer, Ph.D., Professor (Neurobiology, Physiology, and Behavior)

W. Martin Usrey, Ph.D., Professor (Neurobiology, Physiology, and Behavior and Neurology)

Ana Elena Vazquez, Ph.D., Associate Adjunct Professor (Otolaryngology)

John Werner, Ph.D., Professor

(Ophthalmalogy and Vision Science)
David Woods, Ph.D., Adjunct Professor (Neurology)
Xiang, Yang K., Ph.D., Associate Professor
(Pharmacology)
Ebenezer Yamoah, Ph.D., Professor

(Otolaryngology)
Andrew Yonelinas, Ph.D., Professor (Psychology)
Chengji Zhou, Ph.D., Assistant Professor
(Cell Biology and Human Anatomy)
Min Zhao, M.D., Ph.D., Professor

(Dermatology)

Zhou, Chengji, Ph.D., Associate Professor (Cell Biology and Human Anatomy) Karen Zito, Ph.D., Assistant Professor (Neurobiology, Physiology, and Behavior)

Emeriti Faculty

Leo M. Chalupa, Ph.D., Professor (Neurobiology, Physiology, and Behavior) Edward G. Jones, M.D., Ph.D., Professor (Psychiatry) Karen Sigvardt, Ph.D., Adjunct Professor (Neurology)

Graduate Study. The Graduate Group in Neuroscience offers programs of study leading to the Ph.D. degree. Neuroscience is a broad, interdepartmental program with faculty interests ranging from molecular biophysics of channels to cortical organization and cognition. A major goal of the program is to prepare students for careers as research scientists. Details of the program may be obtained from the Group office.

Graduate Advisers. R. Berman (Neurological Surgery), H. Cheng (Neurobiology, Physiology, and Behavior), B. Chapman (Neurobiology, Physiology, and Behavior), A. Ekstrom (Psychology), W. M. Usrey (Neurobiology, Physiology, and Behavior)

Courses in Neuroscience (NSC) **Upper Division Course**

160. Molecular and Cellular Neurobiology

Lecture — 1.5 hours; discussion — 1.5 hours. Prerequisite: Neurobiology, Physiology, and Behavior 100, Biological Sciences 101 and consent of instructor. Selected topics in neurobiology. Topics include channel biophysics, action potential propagation, intracellular signal transduction pathways, synaptic physiology and quantal analysis, cellular mechanisms of synaptic plasticity, and neuromodulation of synaptic circuitry. (Same course as Neurobiology, Physiology, and Behavior 160.)—III. (III.) Burns, Mulloney

Graduate Courses 200LA. Laboratory Methods in Neurobiology (6)

Laboratory-18 hours. Prerequisite: graduate standing in the Neuroscience Graduate Group. Individual research in the laboratory of a faculty member. Research problems emphasize the use of contemporary methods and good experimental design. May be repeated three times for credit. (S/U grading only.) — I, II, III. (I, II, III.)

200LB. Laboratory Methods in Neurobiology (3)

Laboratory-9 hours. Prerequisite: graduate standing in the Neuroscience Graduate Group. Individual research in the laboratory of a faculty member. Research problems emphasize the use of contemporary methods and good experimental design. May be repeated for credit. (S/U grading only.)—I, II, III. (I. II. İII.)

201. Neuroanatomy (3)

Lecture -2 hours; laboratory/discussion -1 hour. Prerequisite: consent of instructor. Mix of lectures, demonstrations, and dissections, emphasizing functional significance of neuroanatomy from a biological perspective, with comparisons between human and non-human brains. Emphasis placed on functional anatomy of the nervous system, integrated with cellular, molecular, cognitive, and developmental concepts. Limited enrollment. — I. (I.) Amaral, Chapman, Usrey

211. Advanced Topics in Neuroimaging (2)

Seminar-2 hours. Prerequisite: Psychology 210 or consent of instructor. Restricted to 16 students. Critical presentation and discussion of the most influential advanced issues in neuroimaging, emphasizing fMRI design/analysis and the integration of fMRI with EEG/MEG. (Same course as Neurobiology, Physiology, and Behavior 211 and Psychology 211.) (S/U grading only.)—II. (II.) Miller

220. How to Give a Scientific Seminar (3)

Lecture/discussion - 3 hours. Prerequisite: consent of instructor. Presentation of effective seminars. Student presentations of selected neuroscience topics in seminar format. Must be taken in two consecutive quarters. - II-III. (II-III.) DeBello, McAllister

221. Cellular Neurophysiology (4)

Lecture—4.5 hours. Prerequisite: graduate standing or consent of instructor. Physiological aspects of cellular and subcellular organization of the nervous system. Neuronal cell biology, the structure and function of ion channels, electrical excitability, signaling cascades, sensory transduction and, mechanisms of synaptic transmission, and the cellular basis of learning and memory.—I. (I.) Trimmer, Zito

222. Systems Neuroscience (5)

Lecture - 4 hours; discussion - 1 hour. Prerequisite: graduate standing or consent of instructor. Integrative and information-processing aspects of nervous system organization. Topics include sensory systems, motor function, sensorimotor integration, the limbic system, and the neurobiology of learning and memory. (Same course as Neurobiology, Physiology, and Behavior 222.)—II. (II.) DeBello, Ditterich, Usrey

223. Cognitive Neuroscience (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: graduate student standing in Psychology or Neuro-science or consent of instructor. Graduate core course for neuroscience. Neurobiological bases of higher mental function including attention, memory, language. One of three in three-quarter sequence. (Same course as Psychology 261.)—III. (III.) Swaab

224A. Molecular and Developmental Neurobiology (2)

Lecture/discussion - 2 hours. Prerequisite: consent of instructor. Key issues in developmental and molecular neurobiology. Discussion emphasis on critical evaluation of the experiments and methods described in research papers. Readings of seminal, primary research papers, reviews, and book chapters. Réading materials will be distributed one week in advance. - II. (II.) Martinez-Cerdeno

224B. Molecular and Developmental Neurobiology (2)

Lecture/discussion - 2 hours. Prerequisite: course 224A or consent of instructor. Continuation of course 224A. Key issues in developmental and molecular neurobiology, focusing on developmental topics. Discussion emphasis on critical evaluation of experiments and methods described in associated literature.—III. Chapman, Cheng

225. Translational Research in the Neurobiology of Disease (2)

Lecture - 1 hour; discussion - 1 hour. Prerequisite: Past or concurrent enrollment in Neuroscience courses 221, 222, 223, or permission of instructor; restricted to current graduate student enrollment or permission of instructor. This course will provide an overview of major neuropsychiatric and neurological disorders from both the clinical and fundamental science perspectives. Offered in alternate years. - II. Carter, Jones, Schwartzkroin

226. Molecular and Developmental Neurobiology (4)

Lecture/discussion-4 hours. Prerequisite: consent of instructor. Introduction to molecular and developmental neurobiology. Topics range from neurulation to development of sensory systems and include modern molecular methods and their application in develop-mental neuroscience.—II. (II.) McAllister

243. Topics in Cellular and Behavioral Neurobiology (2)

Discussion — 1 hour; seminar — 1 hour. Prerequisite: consent of instructor. An advanced examination of several current problems in neurobiology. Topics will vary in different years; may be repeated for credit. (S/Ú grading only.)—III. (III.) Ishida

247. Topics in Functional Neurogenomics (2)

Lecture - 1 hour; discussion - 1 hour. Prerequisite: graduate standing or consent of instructor. The theory, methods and principles of functional neurog-

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enomics with emphasis on the relationship to molecular mechanisms involved in development and disease of the nervous system. (Same course as Neurobiology, Physiology, and Behavior 247.)—II. Choudary

250. Biology of Neuroglia (2)

Lecture/discussion—1.5 hours. Prerequisite: consent of instructor. The properties and functions of non-neuronal or neuroglial cells in the mammalian central nervous system with relevance to neuronal development, physiology and injury response. Offered in alternate years. (Same course as Cell Biology and Human Anatomy 250.) (S/U grading only.)—III.

261A. Topics in Vision: Eyes and Retinal Mechanisms (2)

Lecture/discussion—2 hours. Prerequisite: graduate standing, Neurobiology, Physiology, and Behavior 100 or 112 or the equivalent. Structure and function of the visual system, with emphasis on the eye and retina, including optics, anatomy, transduction, retinal synapses, adaptation, and parallel processing. (Same course as Neurobiology, Physiology, and Behavior 261A and Molecular, Cellular, and Integrative Physiology 261A.) (S/U grading only.)—II. (II.) Ishida

261B. Topics in Vision: Systems, Psychophysics, Computational Models (2)

Lecture/discussion—2 hours. Prerequisite: consent of instructor, course 261A recommended. Functions of the central visual pathways and their underlying mechanisms. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system. (Same course as Neurobiology, Physiology, and Behavior 261B and Molecular, Cellular, and Integrative Physiology 261B.) (S/U grading only.) Offered in alternate years.—II. Britten

261C. Topics in Vision: Clinical Vision Science (2)

Lecture/discussion—2 hours. Prerequisite: courses 261A and 261B, or consent of instructor. Causes and mechanistic bases of major blinding diseases. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system related to disease. (Same course as Neurobiology, Physiology, and Behavior 261C and Molecular, Cellular, and Integrative Physiology 261C.) (S/U grading only.) Not offered every year.—III. Werner

267. Computational Neuroscience (5)

Lecture—4 hours; lecture/laboratory—3 hours. Prerequisite: one course in general neuroscience at the level of course 100; one year college-level Calculus at level of Math 16A, B, C; one year Physics at the level of Physics 7A, B, C, strongly recommended; students from other departments should contact the instructor. Mathematical models and data analysis techniques used to describe computations performed by nervous systems. Lecture topics include single-neuron biophysics, neural coding, network dynamics, memory, plasticity, and learning. Lab topics include programming mathematical models and data analysis techniques in MATLAB. Offered in alternate years. (Same course as Neurobiology, Physiology & Behavior 267.)—(I.) Goldman

283. Neurobiological Literature (1)

Seminar—1 hour. Prerequisite: consent of instructor. Critical presentation and analysis of recent journal articles in neurobiology. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.) Mulloney

284. Development of Sensory Systems (1)

Seminar—1 hour. Prerequisite: consent of instructor. Presentation and discussion of recent literature on the development of sensory systems. May be repeated for credit. (S/U grading only.)—II, III. (II, III.) Chapman

285. Literature in Visual Neuroscience (2)

Seminar—2 hours. Critical presentation and discussion of current literature in visual neuroscience. (Same course as Neurobiology, Physiology, and

Behavior 285.) May be repeated for credit if topic differs. (S/U grading only.)—I, II, III. (I, II, III.) Usrey, Britten

287A. Topics in Theoretical Neuroscience (2)

Seminar—2 hours. Prerequisite: consent of instructor. In-depth exploration of topics in theoretical neuroscience. Topic varies each year. Fall quarter (287A): foundational material from books and review articles. Spring quarter (287B): continuation of year's topic through readings of seminal articles from the primary literature. May be repeated for credit. (Same course as Neurobiology, Physiology & Behavior 287A.) (S/U grading only.)—(I.) Ditterich, Goldman

287B. Topics in Theoretical Neuroscience (2)

Seminar—2 hours. Prerequisite: consent of instructor. In-depth exploration of topics in theoretical neuroscience. Topic varies each year. Fall quarter (287A): foundational material from books and review articles. Spring quarter (287B): continuation of year's topic through readings of seminal articles from the primary literature. May be repeated for credit. (Same Course as Neurobiology, Physiology & Behavior 287B.) (S/U grading only.)—III. (III.) Ditterich, Goldman

289. Topics in Molecular and Developmental Neurobiology (2)

Seminar—2 hours. Analysis and discussion of seminal and current research papers in molecular and developmental neurobiology. Different topics will be covered each quarter. In the past topics have included, "Synaptic vesicle dynamics," "Neuronal polarity," and "Glutamate receptors." May be repeated ten times for credit when topic differs. (\$/U grading only.)—II, III. (II, III.) Diaz, McAllister, Zito

290C. Research Conference in Neurobiology (1)

Discussion—I hour. Prerequisite: graduate standing in Neuroscience or consent of instructor; course 299 (concurrently). Presentation and discussion of faculty and graduate student research in neurobiology. May be repeated for credit. (S/U grading only.)—I, II, III. (II. III. III.)

292. Cortical Plasticity and Perception (2)

Lecture/discussion—2 hours. Prerequisite: Neurobiology, Physiology, and Behavior 100 or 112 or equivalent or consent of instructor. Examination of research articles on cortical plasticity and changes in perception. Examples drawn from studies of the somatosensory, visual, auditory, and motor cortex. (Same course as Neurobiology, Physiology, and Behavior 292.) Offered in alternate years. (S/U grading only.)—(II.)

298. Group Study (1-5) (S/U grading only.) **299.** Research (1-12) (S/U grading only.)

Neurology

See Medicine, School of, on page 390.

Neurosurgery

See Medicine, School of, on page 390.

Nursing, School of, Betty Irene Moore

Heather M. Young, Ph.D., R.N., F.A.A.N.; Associate Vice Chancellor for Nursing, UC Davis, and Dean, Betty Irene Moore School of Nursing Deborah Ward, Ph.D., R.N., F.A.A.N., Associate Dean and Health Sciences Clinical Associate Profes-

4610 X St., Suite 4202 Sacramento, CA 95817 (916) 734-2145 http://nursing.ucdavis.edu

Mission Statement

The Betty Irene Moore School of Nursing at UC Davis cultivates academic excellence through immersive, interprofessional and interdisciplinary education and research in partnership with the communities serves. Faculty, staff and students discover and disseminate knowledge to advance health, improve quality of care and shape policy.

Nursing Science and Health-Care Leadership Graduate Degree Program

Hosted by the Betty Irene Moore School of Nursing at UC Davis, the Nursing Science and Health-Care Leadership Graduate Degree Program welcomed its first classes for the Master of Science and the Doctor of Philosophy degree programs in fall 2010. The UC Davis Nursing Science and Health-Care Leadership Graduate Degree Program prepares nurse leaders, researchers and faculty in a unique interdisciplinary and interprofessional environment. The full-time, academic, doctoral program prepares graduates as leaders in health care, health policy and nurse faculty/researchers at the university level. Graduates of the professional master's-degree program are well prepared for health-care leadership roles in a variety of organizations and as nurse faculty at the community college and prelicensure edu-

Faculty

The UC Davis Nursing Science and Health-Care Leadership Graduate Group includes a wide cross-section of academic disciplines with faculty from the Betty Irene Moore School of Nursing as well as UC Davis Health System and other UC Davis schools, colleges and departments. Within the graduate group faculty are experts in nursing, medicine, health informatics, nutrition, biostatistics, public health and other fields. For a complete list of faculty, see https://nursing.ucdavis.edu.

Courses in Nursing (NRS)

Graduate Courses

201. Health Status and Care Systems (4)

Lecture/discussion—3 hours; laboratory/discussion; project. Prerequisite: current enrollment in the Nursing Science and Health-Care Leadership graduate program or consent of instructor. Comparative health status data, major current health issues globally, nationally, regionally. Theoretical perspectives on social, political, economic determinants of health. Health-care systems examined, linked to data, and evaluated in regards to outcomes. Aging, rural, ethnic minority populations highlighted.—I. (I.)

202. Implementation Science (4)

Lecture/discussion—4 hours. Prerequisite: current enrollment in the Nursing Science and Health-Care Leadership graduate program or consent of instructor. Change processes in health care from political, historic, economic and sociologic frameworks. Historic and current examples of transformative change in the health-care system. Skills for system transformation through health policy, practice, research and education are emphasized.—II. (II.)

203. Leadership in Health Care (4)

Lecture/discussion - 3 hours; fieldwork. Prerequisite: current enrollment in the Nursing Science and Health-Care Leadership graduate program or con-sent of instructor. Critical examination of leadership from a variety of theoretical and philosophical perspectives and focuses on specific challenges in health care and leadership at various levels, e.g patient, organizational, and policy levels.—III. (III.)

204. Quantitative Skills for Change (4)

Lecture/discussion-3 hours; laboratory/discussion - 1 hour. Prerequisite: current enrollment in the Nursing Science and Health-Care Leadership graduate program or consent of instructor. Foundation for analyzing research, health, and systems data to answer clinical, systems, or policy questions. Use and examine multiple sources of data and information as a basis for planned change and transformation in health care.—III. (III.)

205. Research Design in Nursing and Health Care (4)

Lecture/discussion-4 hours. Prerequisite: current enrollment in the Nursing Science and Health-Care Leadership graduate program or consent of instruc-tor. Major types of quantitative and qualitative research design and their application to nursing and health-care research. Implications of choosing alter native research designs and critical analysis of philosophical underpinnings. Evaluation of control and validity, sampling, instruments to measure health concepts.—III. (III.)

206. Community Connections (2-5)

Prerequisite: current enrollment in the Nursing Science and Health-Care Leadership graduate program or consent of instructor. Open to NSHL MS students only. Community-based learning and experiences including community participation, assessment, data collection and analysis using multiple approaches, community health improvement projects, collaborative leadership practice, all with the guidance of community members and nursing faculty. May be repeated for credit. - I, II, III. (I, II, III.)

290. Master's Seminar (2)

Discussion - 2 hours. Prerequisite: current enrollment in the Nursing Science and Health-Care Leadership graduate program or consent of instructor. Open to NSHL MS students only or by consent of course instructor of record. Subject varies from quarter to quarter. Current knowledge and issues relevant to one of two fields of emphasis: population health or health systems. May be repeated 10 times for credit. –I, II, III. (I, II, III.)

291. Doctoral Seminar (2)

 ${\sf Discussion-2\ hours.\ Prerequisite:\ current\ enrollment}$ in the Nursing Science and Health-Care Leadership graduate program or consent of instructor. Focus on the theory, research and knowledge relevant to one of two fields of emphasis: population health or health systems. Emphasis placed on reading, critique and synthesis of classic and cutting-edge research in nursing and health care. May be repeated 10 times for credit. - I, II, III. (I, II, III.)

298. Special Topics in Nursing Science and Health-Care Leadership (2-4)

Lecture/discussion-2 hours. Prerequisite: current enrollment in the Nursing Science and Health-Care Leadership graduate program or consent of instructor. In-depth study of topics in Nursing Science and Health-Care Leadership, selected from: policy and politics in health care, health-care disparities, current issues in health care, approaches to the conduct of science, or other related areas, with year to year variation. May be repeated eight times for credit when topic differs.—I, II, III. (I, $\check{I}I$, III.)

299. Research and Writing (1-12)

Extensive writing or discussion - 3-36 hours. Prerequisite: consent of instructor. Students in the Nursing Science and Health-Care Leadership graduate programs conduct research and writing under the supervision of a faculty member. May be repeated for credit. (S/U grading only.)—I, ÍI, III. (I, II, III.)

299D. Dissertation Research and Writing

Extensive writing or discussion—3-36 hours. Prerequisite: consent of instructor. Students in the Nursing Science and Health-Care Leadership graduate programs conduct dissertation research and writing under the supervision of a faculty member. May be repeated for credit. (S/U grading only.)-I, II, III. (I, II, III.)

Professional Courses

301. Methods for Teaching Nursing and Health Sciences: Use of Simulation (4)

Lecture/discussion-4 hours. Prerequisite: current enrollment in the Nursing Science and Health-Care Leadership graduate program or consent of instructor. Simulation education reviewed as a teaching tool in nursing and health sciences; explores how to integrate simulation into individual courses. Emphasis placed on simulations that include clinical judgment, teamwork, and interdisciplinary communication. Offered in alternate years.—I.

302. Methods for Teaching Nursing and **Health Sciences: Curriculum and Instruction**

Lecture/discussion-4 hours. Prerequisite: current enrollment in the Nursing Science and Health-Care Leadership graduate program or consent of instruc-tor. Best practices in adult learning, performancebased curriculum models and instructional design. Experience in planning student-centered learning activities that are engaging and effective in achieving desired student performance. Use of distance technologies, case-based teaching, clinical teaching, role of clinical teacher. Offered in alternate years.

303. Methods for Teaching Nursing and Health Sciences: Assessment/Evaluation of Learning (4)

Lecture/discussion-4 hours. Prerequisite: current enrollment in the Nursing Science and Health-Care Leadership graduate program or consent of instructor. Application of approaches, processes, and tools for assessing adult learning, especially those that assess the student's ability to use knowledge/skills in practical situations. Other topics include: design of performance evaluation tasks, instructional rubrics, use of portfolios, grading, and reporting. Offered in alternate years. — (III.)

Nutrition

See Clinical Nutrition, on page 199; Food Service Management, on page 313; Nutrition; Nutritional Biology (A Graduate Group), on page 448; Nutrition Science, on page 449.

Nutrition

(College of Agricultural and Environmental Sciences) Francene M. Steinberg, Ph.D., RD., Chair of the Department

Department Office. 3135 Meyer Hall (530) 752-4630; http://nutrition.ucdavis.edu

Faculty

Elizabeth Applegate, Ph.D., Senior Lecturer (SOE) Academic Senate Distinguished Teaching Award Kenneth H. Brown, M.D., Distinguished Professor Gary Cherr, Ph.D., Professor

(Nutrition, Environmental Toxicology) Andrew J. Clifford, Ph.D., Distinguished Professor Kathryn G. Dewey, Ph.D., Distinguished Professor Nilesh W. Gaikwad, Ph.D., Assistant Professor

(Nutrition, Environmental Toxicology) Fawaz G. Haj, Ph.D., Associate Professor Carl L. Keen, Ph.D., Distinguished Professor (Nutrition, Internal Medicine) Bo L. Lönnerdal, Ph.D., Distinguished Professor (Nutrition, Internal Medicine) Roger McDonald, Ph.D., Professor Patricia Oteiza, Ph.D., Professor (Nutrition and Environmental Toxicology)
Carolyn M. Slupsky, Ph.D., Assistant Professor
(Nutrition, Food Science & Technology) Francene M. Steinberg, Ph.D., R.D., Professor and Chair Christine Stewart, Ph.D., Assistant Professor

Emeriti Faculty

(Nutrition)

Lindsay H. Allen, Ph.D., Professor Emeritus Louis E. Grivetti, Ph.D., Professor Emeritus Janet King, Ph.D., Professor Emeritus Robert B. Rucker, Ph.D., Professor Emeritus Barbara O. Schneeman, Ph.D., Professor Emeritus Judith S. Stern, Sc.D., R.D., Professor Emeritus (Nutrition, Internal Medicine) Frances J. Zeman, Ph.D., Professor Emeritus

Affiliated Faculty

Sean Adams, Ph.D., Assistant Adjunct Professor Ellen Bonnel, Ph.D., Academic Administrator Betty Burri, Ph.D., Adjunct Professor Britt Burton-Freeman, Ph.D., Associate Research Nutritionist

Paul A. Davis, Ph.D., Research Nutritionist Joan Frank, Academic Coordinator/Lecturer Ellen Fung, Ph.D., RD Associate Adjunct Professor Heidrun Gross, Ph.D., Assistant Project Scientist Robert M. Hackman, Ph.D., Research Nutritionist Marjorie Haskell, Ph.D., Associate Researcher Peter Havel, Ph.D., D.V.M., Professor Wayne Hawkes, Ph.D., Assistant Adjunct Professor M. Jane Heinig, Ph.D., Academic Administrator Sonja Hess, Ph.D., Associate Project Scientist Liping Huang, Ph.D., Associate Adjunct Professor Daniel Hwang, Ph.D., Adjunct Professor Lucia Kaiser, Ph.D., R.D., Specialist in Cooperative Extension

Nancy Keim, Ph.D., Adjunct Professor Darshan Kelley, Ph.D., Adjunct Professor Kevin Laugero, Ph.D., Assistant Adjunct Professor Louise Lanoue, Ph.D., Associate Project Scientist Siming Liu, Ph.D., Assistant Project Scientist John Newman, Ph.D., Assistant Adjunct Professor Gertrud Schuster, Ph.D., Assistant Project Scientist Charles Stephensen, Ph.D., Adjunct Professor Marilyn S. Townsend, Ph.D., R.D., Specialist in Cooperative Extension

Janet Uriu-Adams, Ph.D., Associate Researcher Marta Van Loan, Ph.D., Adjunct Professor Sheri Zidenberg-Cherr, Ph.D., Specialist in Cooperative Extension

Susan Żunino, Ph.D., Associate Adjunct Professor

Major Programs. See the majors in Clinical Nutrition, on page 199 and Nutrition Science, on page

Minor Program Requirements:

The Department of Nutrition offers four minor programs open to students majoring in other disciplines who wish to complement their study programs with a concentration in the area of food and nutrition.

Note: If the student's major program requires the same course in biochemistry and physiology, only one of the courses may duplicate credit toward the minor. Each program below lists replacement courses to fulfill the minimum unit requirement.

Community Nutrition20 Preparation. Plan in advance to include the required course prerequisites. Nutrition 111AV and 111B.....5 Nutrition 118, 192 (2 units)......6 Nutrition 120AN or 120BN4 Neurobiology, Physiology, and Behavior 1015 Replacement courses; see note above: Nutrition 114, 116A-116B, 116AL-116BL.

Food Service Management 25
Preparation. Plan in advance to include the
required course prerequisites.
Food Science and Technology 100A-100B,
101A-101B12
Food Service Management 120, 120L,
1229
Agricultural and Resource Economics
1124
Replacement courses; see note above:
Nutrition 10, 111AV, 111B, 114, 116A-
116B, 120AN, or 120BN, Economics 1A-
1B.

Nutrition and Food......22

Preparation. Plan in advance to include the
required course prerequisites.
Nutrition 111AV and 111B5
Nutrition 120AN or 120BN4
Food Science and Technology 100A,
100B8
Neurobiology, Physiology, and Behavior
1015
Replacement courses; see note above:
Nutrition 114, 116A-116B, 116AL-116BL.

Nutrition Science 20

Preparation. Plan in advance to include the required course prerequisites. Animal Biology 102 and 103, Biological Sciences 102 and 103 and Nutrition 111AV and 111B..... Neurobiology, Physiology, and Behavior Replacement courses; see note above: Nutrition 114, 115, 116A-116B, 117 120AN or 120BN, 122, 123, 124, 201,

Minor Adviser. 3202 Meyer Hall (530) 752-

Graduate Study. Programs of study leading to the M.S. and Ph.D. degrees are available in Nutrition. For information on graduate study contact the Nutrition Graduate Group.

Courses in Nutrition (NUT)

Lower Division Courses

10. Discoveries and Concepts in Nutrition

Lecture-3 hours. Nutrition as a science; historical development of nutrition concepts; properties of nutrients and foods. Not open for credit to students who have taken an upper division course in nutrition. GE credit: SciEng | SE, SL. - I, II, III. (I, II, III.) **Applegate**

11. Current Topics and Controversies in Nutrition (2)

Discussion – 1.5 hours; term paper. Exploration of current applications and controversies in nutrition. Students read scientific journal articles and write summaries, as well as give brief oral presentations. Topics change to reflect current interests and issues. GE credit: SciEng, Wrt | OL, SE, WE.-I, II, III. (I, II, III.) Applegate

99. Individual Study for Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.

Upper Division Courses

104. Environmental & Nutritional Factors in **Cellular Regulation and Nutritional** Toxicants (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 101; Biological Sciences 103 or Animal Biology 103. Cellular regulation from nutritional/toxicological perspective. Emphasis: role of biofactors on modulation of signal transduction pathways, role of specific organelles in organization/ regulation of metabolic transformations, major cofactor functions, principles of pharmacology/toxicology important to understanding nutrient/toxicant metabolism. (Same course as Environmental Toxicology 104.) GE credit: SE.—I. (I.) Haj, Oteiza

105. Nutrition and Aging (3)

Lecture-3 hours. Prerequisite: course 111AV and Animal Biology 103 or the equivalent. Role of nutrition in the aging process from both an organismal/ cell perspective, including demographics, theories of aging, nutrition and evolution, nutritional manipulation and life-span extension, and nutrition's impact on the diseases of aging. GE credit: SE.—III. (III.) McDonald

111AV. Introduction to Nutrition and Metabolism (3)

Web virtual lecture-3 hours. Prerequisite: Chemistry 8B, Neurobiology, Physiology, and Behavior 101 or the equivalent. Introduction to metabolism of protein, fat and carbohydrate; the biological role of vitamins and minerals; nutrient requirements during the life cycle; assessment of dietary intake and nutritional status. Not open for credit to students who have completed course 101. E credit: SE.-III. (III.) McDonald

111B. Recommendations and Standards for **Human Nutrition (2)**

Lecture - 2 hours. Prerequisite: Chemistry 8B, Neurobiology, Physiology, and Behavior 101 or the equivalent. Critical analysis of the development of nutritional recommendations for humans. Topics include history of modern recommendations, development of the Recommended Dietary Allowance (RDA) and other food guides; the Dietary Reference Intakes (DRI); administrative structure of regulatory agencies pertinent to nutrition recommendations; introduction to scientific methods used to determine the recommendations; food labeling laws; nutrition recommendations in other countries and cultures. Not open for credit to students who have completed course 111.—III. (III.) Zidenberg-Cherr

112. Nutritional Assessment: Dietary, Anthropometric, and Clinical Measures (3)

Lecture - 2 hours; laboratory - 3 hours. Prerequisite: Animal Biology 102 and 103 or course 101, course 111 (may be taken concurrently), Statistics 13. Methods of human nutritional assessment, including dietary, anthropometric, biochemical and hematological techniques, and physical examination. Principles of precision, accuracy, and interpretation of results for individuals and populations. GE credit: QL, SE.—III. (III.) Stewart

114. Developmental Nutrition (4)

Lecture — 4 hours. Prerequisite: Animal Biology 102 and 103 or course 101; course 111. Role of nutritional factors in embryonic and postnatal development. GE credit: SciEng, Wrt | SE.—II. (II.) Keen

115. Animal Nutrition (4)

Lecture — 3 hours; laboratory — 3 hours. Prerequisite: Chemistry 8B. Comparative differences among animals in digestion and metabolism of nutrients. Nutrient composition of feeds, digestive systems digestion, absorption, feeding strategies. GE credit: SciEng, Wrt | OL, QL, SL, VL, WE.-II. (II.) DePeters

116A-116B. Clinical Nutrition (3-3)

Lecture - 3 hours. Prerequisite: courses 111, 112 and Neurobiology, Physiology, and Behavior 101 or the equivalent. Biochemical and physiological bases for therapeutic diets. Problems in planning diets for normal and pathological conditions. GE credit: SE. –I-II. (I-II.) Clifford, Steinberg

116AL. Clinical Nutrition Practicum (3)

Lecture - 1 hour; laboratory - 3 hours; discussion - 1 hour. Prerequisite: course 116A (may be taken concurrently). Fundamental principles of planning and evaluating therapeutic diets and patient education for pathological conditions covered in 116A. GE credit: SE. — I. (I.) Frank

116B. Clinical Nutrition (3)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: courses 111, 112 and Neurobiology, Physiology, and Behavior 101 or the equivalent. Biochemical and physiological bases for therapeutic diets. Problems in planning diets for normal and pathological conditions. GE credit: SE.-I, II. (I, II.) Clifford, Stein-

116BL. Clinical Nutrition Practicum (3)

Lecture—1 hour; laboratory—3 hours; discussion—1 hour. Prerequisite: courses 116AL, and 116B (may be taken concurrently). Fundamental principles of planning and evaluating therapeutic diets and patient education for pathological conditions covered in 116B. Continuation of course 116AL. GE credit: SE.-II. (II.) Steinberg

117. Experimental Nutrition (6)

Lecture—3 hours; laboratory—6 hours; extensive writing. Prerequisite: courses 111, Biological Sciences 102 and 103, and a laboratory course in nutrition or biochemistry. Methods of assessing nutritional status. Application of chemical, microbiological, chromatographic and enzymatic techniques to current problems in nutrition. GE credit: Wrt | SE, WE.—I. (I.) Clifford, Gaikwad

118. Community Nutrition (4)

Lecture—4 hours. Prerequisite: course 101 or 111, and 116A. Nutrition problems in contemporary communities and of selected target groups in the United States and in developing countries. Nutrition programs and policy, principles of nutrition education. GE credit: SE, SL.—II. (II.) Heinig

119A. International Community-Based **Nutritional Assessment (1)**

Lecture/discussion-1 hour. Prerequisite: course 112 (may be taken concurrently) and consent of instructor. Issues and problems related to communitybased nutritional assessment in a low-income country, major nutritional problems in low-income countries; ethical issues in human investigation; survey design, data collection techniques, and data analysis; preparation for international travel; cross-cultural communication, health, and safety while living abroad.

119B. International Community-Based **Nutritional Assessment (6)**

Lecture - 2 hours; fieldwork - 12 hours. Prerequisite: course 119A and consent of instructor. A sixweek summer course in Peru. Implementation of a community-based nutritional assessment survey, including development of the survey instrument, selection of the study sample, collection and verification of data, and analysis and interpretation of the results; the project will be carried out by paired participation of students and faculty members of UC Davis and the collaborating foreign institution.

120AN. Nutritional Anthropology (4)

Lecture - 3 hours, discussion - 1 hour. Prerequisite: course 2 or Geography 2 recommended. Nutritional anthropology from historical and contemporary perspectives; the anthropological approach to food and diet; field work methods; case histories that explore food patterns and their nutritional implications. GE credit: SciEng or SocSci, Div | SE, SS.-IV. (IV.)

120BN. Nutritional Geography (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Geography 2 recommended. Nutritional geography from historical and contemporary perspectives; the geographical approach to food and diet; cultural and environmental factors that influence dietary practices; food-related landscapes and patterns. GE credit: SciEng or SocSci, Div | SE, SS

122. Ruminant Nutrition and Digestive Physiology (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: upper division standing; Animal Biology 103 or consent of instructor; Neurobiology, Physiology, and Behavior 101, Biological Sciences 1C, and Mathematics 16B recommended. Study of nutrient utilization as influenced by the unique aspects of digestion and fermentation in ruminants, both domestic and wild. Laboratories include comparative anatomy, feed evaluation, digestion kinetics using fistulated cows, computer modeling, and microbial exercises. GE credit: QL, SE.—III. (III.) Fadel

123. Comparative Animal Nutrition (3)

Lecture—3 hours. Prerequisite: Animal Biology 103. Restricted to upper division or graduate students. Comparative nutrition of animals; including laboratory, companion, zoo, and wild animals. Digestion and metabolic adaptations required for animal species to consume diverse diets ranging from grasses and leaves to nectar to insects and meat. Relation of nutrition to metabolic adaptations and physiological states, including growth, reproduction, and diseases. GE credit: SE. - III. (III.) Klasing

123L. Comparative Animal Nutrition Laboratory (1)

Laboratory—3 hours. Prerequisite: Animal Biology 103, course 123 (may be taken concurrently). Laboratory exercises leading to written reports on establishment of nutritional requirements and formulation of complete diets for laboratory, companion, zoo and wild animals. — III. (III.) Klasing

124. Nutrition and Feeding of Finfishes (3) Lecture — 3 hours. Prerequisite: Biological Sciences 103 and Wildlife, Fish, and Conservation Biology 121. Principles of nutrition and feeding of fishes under commercial situations; implication of fish nutrition to the environment and conservation of endangered species. GE credit: QL, SE, SL.-I. (I.) Hung

127. Environmental Stress and **Development in Marine Organisms (10)**

Lecture-4 hours; laboratory-12 hours; discussion - 2 hours. Prerequisite: Environmental Toxicology 101 or Biological Sciences 102 or 104 or the equivalent; Environmental Toxicology 114A or course 114 recommended. Course taught at Bodega Marine Laboratory. Effects of environmental and nutritional stress, including pollutants, on development and function in embryos and larvae of marine organisms. Emphasis on advanced experimental methods. (Same course as Environmental Toxicology 127.) GE credit: SciEng | OL, QL, SE, SL, VL, WE.-IV. (IV.) Cherr

129. Journalistic Practicum in Nutrition (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: course 111; a course in written or oral expression or consent of instructor. Critical analysis and discussion of current, controversial issues in nutrition; the use of journalistic techniques to interpret scientific findings for the lay public. Students will be required to write several articles for campus media. Course may be repeated one time for credit. GE credit: OL, SE, SL, WF

130. Experiments in Nutrition: Design and Execution (2)

Laboratory—6 hours. Prerequisite: consent of instructor; course 101, 110, 111, or 114 recommended. Experiments in current nutritional problems. Experimental design: students choose project and, independently or in groups of two-three, design a protocol, complete the project, and report findings. May be repeated for credit up to six times (three times per instructor) with consent of instructor. GE credit: SE.-I, II, III, IV. (I, II, III, IV.)

190. Proseminar in Nutrition (1)

Seminar - 1 hour. Prerequisite: senior standing; course 111. Discussion of human nutrition problems. Each term will involve a different emphasis among experimental, clinical, and dietetic problems of community, national and international scope. May be repeated two times for credit with consent of instructor. GE credit: OL, SE, VL.-I, II, III. (I, II, III.) Ziden-

190C. Nutrition Research Conference (1)

Discussion - 1 hour. Prerequisite: upper division standing in Nutrition or related biological science; consent of instructor. Introduction to research findings and methods in nutrition. Presentation and discussion of research by faculty and students. May be repeated for credit. (P/NP grading only.) GE credit: SÉ.—I, II, III. (I, II, III.)

192. Internship (1-12)

Internship - 3-36 hours. Prerequisite: one upper division course in nutrition and consent of instructor. Work experience on or off campus in practical application of nutrition, supervised by a faculty member. (P/NP grading only.)

197T. Tutoring in Nutrition (1-2)

Discussion/laboratory—3 or 6 hours. Prerequisite: Nutrition Science, Clinical Nutrition or related major. Completion of course 101. Tutoring of students in nutrition courses, assistance with discussion groups or laboratory sections, weekly conference with instructor in charge of course: written evaluations. May be repeated if tutoring a different course. (P/NP grading only.)

198. Directed Group Study (1-5) (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.) GE credit: SE.

Graduate Courses

201. Vitamin and Cofactor Metabolism (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: one upper division nutritional biochemistry and physiology course. Review of studies and relationships involving the metabolic functions of vitamins. Comparative nutritional aspects and the metabolism and chemistry of vitamins and vitamin-like compounds.

202. Advanced Nutritional Energetics (2)

Lecture—2 hours. Prerequisite: Animal Biology 102, 103, Neurobiology, Physiology, and Behavior 101 or the equivalent. History of nutritional energetics. Evaluation of energy transformations associated with food utilization. Energy expenditures at cellular, tissue, and animal levels as affected by diet and physiological state. Current and future feeding systems.

203. Advanced Protein and Amino Acid Nutrition (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: one upper division nutritional biochemistry and physiology course. Nutritional significance of protein and amino acids, including studies of the influence of dietary protein on digestion, absorption, metabolism, resistance to disease, and food intake. Study of dietary requirements and interrelationships among amino acids. — III. (III.)

204. Mineral Metabolism (2)

Lecture - 2 hours. Prerequisite: upper division nutrition or biochemistry course. Studies of metabolic functions and nutritional interrelationships involving minerals.

219A. International Nutrition (3)

Lecture—3 hours. Prerequisite: graduate standing; undergraduates only admitted with consent of instructor after completion of course 111AV. Epidemiology, etiology, and consequences of undernutrition, with particular focus on the nutritional problems of children and women in low income populations. Offered in alternate years.—II. Dewey

219B. International Nutrition (3)

Lecture - 3 hours. Prerequisite: course 219A. Intervention programs to prevent or ameliorate nutritional problems in low-income populations. Planning, implementing, and evaluating nutrition intervention programs. Offered in alternate years.—III. Dewey

230. Experiments in Nutrition: Design and Execution (2)

Laboratory—6 hours. Prerequisite: consent of instructor; courses 201, 202, 203, 204, or the equivalent recommended. Student selected projects to enhance laboratory skills. Independently, or in groups of two-three students, design a protocol, carry out the project, analyze the results and report the findings. May be repeated for credit up to six times (limit of three times per instructor) with consent of instructor.—I, II, III. (I, II, III.)

250. Metabolic Homeostasis (3)

Lecture - 2 hours; discussion - 1.5 hours. Prerequisite: passing the Nutrition Graduate Group Preliminary Examination or consent of instructor. Preference given to students with advanced standing in the Nutrition Graduate Group. Regulatory mechanisms of carbohydrate, lipid, and protein homeostasis; mechanisms of metabolic enzyme regulation and of the metabolic hormones; homeostatic mechanisms and interactions; fuel-fuel interactions; nutrition energy balance.

251. Nutrition and Immunity (2)

Lecture/discussion-2 hours. Prerequisite: Pathology, Microbiology, and Immunology 126, Medical Microbiology 107 or the equivalent, Animal Biology 102. Cellular and molecular mechanisms underlying interactions of nutrition and immune function, including modulation of immunocompetence by diet and effects of immune responses on nutritional needs. Lectures and discussion explore implications for resistance to infection, autoimmunity and cancer. Offered in alternate years. — (II.) Klasing, Erickson, Stephensen

252. Nutrition and Development (3)

Lecture - 3 hours. Prerequisite: courses 201, 202, 203, 204. Relationship of nutrition to prenatal and early postnatal development.—II. (II.) Keen, Oteiza

253. Control of Food Intake (3)

Lecture-2 hours; discussion-1 hour; 2 or 3 laboratory demonstrations per quarter. Prerequisite: course 201 or 202 or consent of instructor. Comprehensive study of the biochemical, nutritional, behavioral, and physiological mechanisms controlling food intake. Subject matter will be approached through lectures, laboratory demonstration and discussions where students and staff will critically evaluate the literature. Offered in alternate years.

254. Applications of Systems Analysis in Nutrition (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: course 202, Physiological Sciences 205A-205B or the equivalent. Quantitative aspects of digestion and metabolism; principles of systems analysis. Evolution of models of energy metabolism as applied in current feeding systems. Critical evaluations of mechanistic models used analytically in support of nutritional research. Offered in alternate years.—II. Fade

257. Selected Topics in Nutritional and **Hormonal Control of Nitrogen Metabolism** (2)

Lecture — 2 hours. Prerequisite: courses 201 through 204; Physiological Sciences 205A-205B or the equivalent. Quantitative and qualitative aspects of nitrogen metabolism; critical evaluation of dietary intake, hormones and diet-hormone interactions which affect nitrogen metabolism, including protein synthesis-degradation, amino acid synthesis-catabolism, nitrogen transport-excretion, depending on current literature. Offered in alternate years. — (I.) Klasing, Calvert

258. Field Research Methods in International Nutrition (3)

Lecture/discussion—3 hours. Prerequisite: graduate standing or consent of instructor. Issues and problems related to implementation of nutrition field research in less-developed countries, including ethics; relationships with local governments, communities, and scientists; data collection techniques and quality assurance; field logistics; research budgets; and other administrative and personal issues.

Offered in alternate years.—(II.) Brown, Dewey,

259. Nutrition and Aging (2)

Lecture — 2 hours. Prerequisite: three of courses 201, 202, 203 and 204. Interaction between nutrition and aging. Topics include physiological/biochemical basis of aging, age-related changes affecting nutritional requirements, nutrition and mortality rate, assessment of nutritional status in the elderly, and relationship between developmental nutrition and the rate of aging. Offered in alternate years.

260. Nutrition During Pregnancy (6)

Lecture - 5 hours; term paper. Prerequisite: acceptance into the Master's Degree program of Advanced Studies in Maternal and Child Nutrition. Overview of the anatomical, physiological and biochemical changes that occur during pregnancy and early development. Discussion and evaluation of nutritional/lifestyle factors associated with pregnancy outcomes and nutrition programs/interventions for pregnant women. — (I.) Heinia

261. Lactation and Infant Nutrition (6)

Lecture - 5 hours; discussion - 1 hour. Prerequisite: course 260. Overview of the physiological and biochemical processes underlying human lactation and nutritional needs of both mother and infant. Development of skills in assessment, nutrition counseling, education and support of new mothers and their families. - II. (II.) Heinig

262. Child and Adolescent Nutrition (6)

Lecture - 5 hours; discussion - 1 hour. Prerequisite: course 261. Relationships among nutrition, growth, and development during childhood and adolescence. Nutritional assessment for normal and high risk groups; psychological, social, and economic factors contributing to nutritional status. Nutritional needs and interventions for special groups, including obese children/adolescents, athletes, and eating disordered. — (III.) Heinig

263. Applied Research Methods in Maternal and Child Nutrition (4)

Lecture — 3 hours; term paper. Prerequisite: graduate standing; restricted to students enrolled in the MAS program and graduate students by consent of instructor. Application of epidemiological principles to the study of maternal and child nutrition. Topics include quantitative and qualitative study procedures, including study design, data collection, and related analytical techniques. — (I.) Heinig

264A. Current Topics in Maternal and Child Nutrition: Principles of Adult Education (2)

Seminar-2 hours. Prerequisite: graduate standing; restricted to students enrolled in the MAS program and graduate students by consent of instructor. Current scientific literature related to Maternal and Child Nutrition in adult education settings. Topics include methods and theories of adult education and critical thinking skills related to research evaluation. - II.

264B. Current Topics in Maternal and Child Nutrition: Epidemiology and Evidence-Based Practice (2)

Seminar—2 hours. Prerequisite: graduate standing; restricted to students enrolled in the MAS program and graduate students by consent of instructor. Current scientific literature related to Maternal and Child Nutrition. Topics include epidemiology, evidence based practice, breast feeding promotion, and nutritional assessment of populations. - II. Heinig

264C. Current Topics in Maternal and Child Nutrition: Public Policy Development and Implementation (2)

Seminar-2 hours. Prerequisite: graduate standing; restricted to students enrolled in the MAS program and graduate students by consent of instructor. Current scientific literature related to Maternal and Child Nutrition. Topics include nutrition surveillance and monitoring, as well as public policy development and implementation.—III. Heinig

270. Scientific Ethics in Biomedical Studies: **Emphasis on Nutrition (3)**

Lecture - 1 hour; discussion - 1 hour; term paper. Scientific ethics in biomedical studies, especially nutrition. Discussion and case study presentations on scientific integrity, fraud, misconduct, conflict of interest, human and animal research protections. Not open for credit to students who have completed course 492B.—Steinberg

290. Beginning Nutrition Seminar (2)

Lecture/discussion-1 hour; seminar-1 hour. Prerequisite: first year graduate standing. Discussion and critical evaluation of topics in nutrition with emphasis on literature review and evaluation in this field. Students give oral presentations on relevant

290C. Research Conference (1)

Discussion - 1 hour. Prerequisite: graduate standing and consent of instructor. Major professors lead research discussions with their graduate students. Research papers are reviewed and project proposals presented and evaluated. Format will combine seminar and discussion style. (S/U grading only.)-I, II, III. (I, II, III.)

291. Advanced Nutrition Seminar (1)

Seminar - 1 hour. Prerequisite: second-year graduate standing. Advanced topics in nutrition research. Multiple sections may be taken concurrently for credit. May be repeated for credit. (S/U grading only.)—I, IÍ, III. (I, İI, III.)

293A. Current Topics in Obesity, Food Intake and Energy Balance (3)

Lecture-1 hour; seminar-1 hour; discussion-1 hour. Prerequisite: graduate standing or course 129. Undergraduates with upper division standing with at least one writing course may enroll with consent of instructor. Current research and its evaluation. Principles of experimental design and scientific background for given article. Articles summarized for posting on Internet for use by healthcare professionals. May be repeated for credit with consent of

293B. Current Topics in Obesity, Food Intake, and Energy Balance with Special Topics (3)

Lecture - 1 hour; seminar - 1 hour; discussion - 1 hour. Prerequisite: graduate standing or course 129. Undergraduates with upper division standing with at least one writing course may enroll with consent of instructor. A continuation of course 293A, with additional special topics. May be repeated for credit up to 3 times with consent of instructor.

294A. Current Topics in Developmental Nutrition (2)

Seminar — 2 hours. Prerequisite: course 114 or 252 or consent of instructor. Effects of nutrition on embryology, morphogenesis, and developmental mechanisms. May be repeated for credit when topic

297T. Supervised Teaching in Nutrition (1-3)

Teaching under faculty supervision—3-9 hours. Pre requisite: graduate standing in nutrition or consent of instructor. Practical experience in teaching nutrition at the university level; curriculum design and evaluation; preparation and presentation of material. Assistance in laboratories, discussion sections, and evaluation of student work. (S/U grading only.)

298. Group Study (1-5) 299. Research (1-12)

(S/U grading only.)

Professional Courses

492A. Professionalism: An Academic Perspective (2)

Lecture/discussion-2 hours. Prerequisite: graduate standing. For graduate students in their initial quarter of residence. Professionalism topics are presented and examples drawn from both the biological and social sciences.

492C. Grant Writing (3)

Lecture - 1.5 hours; discussion - 1.5 hours. Prerequisite: graduate standing in Nutrition or consent of instructor. Preparation of grants for governmental agencies (particularly NIH and USDA) and private foundations. Students will write a research grant or fellowship application. May be repeated one time for credit with consent of instructor. Offered in alternate years.

Nutritional Biology (A Graduate Group)

Sheri Zidenberg-Cherr, Ph.D., Chairperson of the

Graduate Group Office. 1249 Meyer Hall

(530) 754-7684; http://nutritionalbiology.ucdavis.edu

Lars Berglund, Ph.D., Professor (Endocrinology) Kenneth H. Brown, M.D., Professor (Nutrition) C. Christopher Calvert, Ph.D., Professor (Animal Science)

Andrew J. Clifford, Ph.D., Professor (Nutrition) Douglas E. Conklin, Ph.D., Associate Professor (Ānimal Science)

Edward J. DePeters, Ph.D., Professor (Animal Science)

Kathryn G. Dewey, Ph.D., Professor (Nutrition) Kent L. Erickson, Ph.D., Professor

(Cell Biology and Human Anatomy)
James G. Fadel, Ph.D., Professor (Animal Science) Andrea J. Fascetti, D.V.M, Ph.D., Associate Professor (Molecular Biosciences)

J. Bruce German, Ph.D., Professor (Food Science and Technology)

M. Eric Gershwin, M.D., Professor (Internal Medicine)

Ralph Green, M.D., Professor (Pathology) Jean-Xavier Guinard, Ph.D., Professor (Food Science and Technology)

Fawaz G. Haj, Ph.D., Assistant Professor (Nutrition) Silas S. O. Hung, Ph.D., Professor (Animal Science) Thomas Jue, Ph.D., Professor (Biological Chemistry) Sidika E. Kasim-Karakas, M.D., Professor

(Internal Medicine) George A. Kaysen, M.D., Ph.D., Professor (Internal Medicine)

Carl L. Keen, Ph.D., Distinguished Professor (Nutrition, Internal Medicine)

Kirk C. Klasing, Ph.D., Professor (Animal Science) Jennifer A. Larsen, Ph.D., Assistant Professor of Clinical Nutrition (Molecular Biosciences)

Bo L. Lönnerdal, Ph.D., Professor (Nutrition, Internal Medicine)

Stanley L. Marks, B.V.Sc., Ph.D. Associate Professor (Medicine and Epidemiology)

Roger B. McDonald, Ph.D., Associate Professor (Nutrition)

Alyson Mitchell, Ph.D., Professor (Food Science and Technology) Patricia Oteiza, Ph.D., Associate Professor (Nutrition, Environmental Toxicology) Anthony F. Philipps, M.D., Professor (Pediatrics) Jon J. Ramsey, Ph.D., Associate Professor (Molecular Biosciences)

Helen E. Raybould, Ph.D., Professor (Anatomy, Physiology and Cell Biology) John C. Rutledge, Ph.D., Professor (Endocrinology) Roberto D. Sainz, Ph.D., Associate Professor

(Animal Science)
Jose Santos, Ph.D., Associate Professor (VMTRC)

Francene M. Steinberg, Ph.D., R.D., Professor (Nutrition)

Charles Stebbins, Ph.D., Professor (Cardiovascular Medicine)

Judith S. Stern, Sc.D., R.D., Distinguished Professor (Nutrition, Internal Medicine)

Christine P. Stewart, Ph.D., Assistant Professor (Nutrition) Natalie Torok, Ph.D., Associate Professor

(Gastroenterology & Hepatology) Craig H. Warden, Ph.D., Associate Professor (Neurobiology, Physiology, and Behavior) Vincent A. Ziboh, Ph.D., Professor (Dermatology, Biological Chemistry)

Emeriti Faculty

Harry W. Colvin, Jr., Ph.D., Professor Emeritus Robert E. Feeney, Ph.D., Professor Emeritus Richard A. Freedland, Ph.D., Professor Emeritus William N. Garrett, Ph.D., Professor Emeritus Dorothy W. Gietzen, Ph.D., Professor Emeritus C. Richard Grau, Ph.D., Professor Emeritus Louis Grivetti, Ph.D., Professor Emeritus Charles H. Halsted, M.D., Professor Emeritus Robert J. Hansen, Ph.D., Professor Emeritus Jiro J. Kaneko, D.V.M., Ph.D., D.V.Sc. (hc), Professor Emeritus

Janet King, Ph.D., Professor Emeritus Verne E. Mendel, Ph.D., Professor Emeritus James G. Morris, Ph.D., Professor Emeritus Ernesto Pollitt, Ph.D., Professor Emeritus Quinton R. Rogers, Ph.D., Professor Emeritus
Barbara O. Schneeman, Ph.D., Professor Emeritus Howard G. Schutz, Ph.D., Professor Emeritus Donal A. Walsh, Ph.D., Professor Bruce M. Wolfe, M.D., Professor Emeritus Frances J. Zeman, Ph.D., Professor Emeritus

Affiliated Faculty

Lindsay H. Allen, Ph.D., RD, Professor (Nutrition)

Betty Burri, Ph.D., Associate Adjunct Professor (Nutrition)

Britt Burton-Freeman, Ph.D., Assistant Research Nutritionist (Nutrition)

Paul A. Davis, Ph.D., Research Nutritionist (Nutrition) Cesar Fraga, Ph.D., Research Chemist (Nutrition) Wayne Chris Hawkes, Ph.D., Assistant Adjunct Professor (Nutrition)
Peter J. Havel, D.V.M., Ph.D., Professor

(Molecular BioSciences)

Liping Huang, Ph.D., Assistant Adjunct Professor (Nutrition)

Daniel Hwang, Ph.D., Adjunct Professor (Nutrition) Amy Block Joy, Ph.D., Specialist in Cooperative Extension

Lucia Kaiser, Ph.D., RD, Specialist in Cooperative Extension (Nutrition)

Nancy L. Keim, Ph.D., R.D., Adjunct Professor (Nutrition)

Darshan S. Kelley, Ph.D., Adjunct Professor (Nutrition)

Kevin Laugero, Ph.D., Assistant Adjunct Professor (Nutrition)

Joshua W. Miller, Ph.D., Associate Adjunct Professor (Pathology)

John Newman, Ph.D., Assistant Adjunct Professor (Nutrition) James W. Oltjen, Ph.D., Management Systems

Specialist (Animal Science)

Peter H. Robinson, Ph.D., Associate Extension Specialist (Animal Science)

Charles B. Stephensen, Ph.D., Adjunct Professor

Marta D. Van Loan, Ph.D., Adjunct Professor (Nutrition)

Sheri A. Zidenberg-Cherr, Ph.D., Specialist in Cooperative Extension (Nutrition)

Susan Zunino, Ph.D., Associate Adjunct Professor

Graduate Study. The Graduate Group in Nutritional Biology offers programs of study and research leading to the M.S. and Ph.D. degrees. The great diversity of research interests represented by the faculty members allows students to choose from a wide variety of themes: nutritional biochemistry, animal nutrition, nutrition and development, nutrient bioavailability, human/clinical nutrition, nutrition and behavior, nutritional energetics, community nutrition, community health, maternal and child nutrition, nutrition and endocrinology, international nutrition, obesity/body composition, physiology of digestion, nutrition and chronic disease, culture and nutrition, nutrition and gene expression, nutrition and aging, food preferences, nutrition and immunity, diet and exercise, dietary assessment, protein and lipid metabolism, food intake regulation, nutrition educa-

Graduate Advisers. Consult the Nutritional Biology Graduate Group office.

Nutrition Science

(College of Agricultural and Environmental Sciences) **Faculty**

See the Department of Nutrition, on page 445.

The Major Program

The study of nutrition encompasses all aspects of the consumption and utilization of food and its constituents. Key areas of study include: the biochemical reactions important to the utilization of nutrients and food constituents; the impact of diet on health and disease; and, nutrition-related policy and public health issues. The nutrition science major includes two options for studying these areas: nutritional biology and nutrition in public health.

The Program. Nutrition as it is taught on the Davis campus is a biological science and requires a complete background in chemistry and biology, along with calculus and physics (nutritional biology option) or economics (nutrition in public health option). These courses are generally completed during the first two years, and along with biochemistry, must be completed before most nutrition classes can be taken. During their junior and senior years, students in the nutritional biology option take additional course work in biochemistry, physiology, and toxicology. Students in the nutrition in publich health option take additional course work in social and health-related sciences.

Career Alternatives. Both options are excellent preparation for professional or graduate training in medicine, public health, or other health sciences. The nutritional biology option also provides preparation for technical work in nutrition in the animal, food, and pharmaceutical industries. The nutrition in public health option prepares students for jobs in administrative, teaching, or public health/public service positions. Students who complete the additional academic requirements for an internship in dietetics are also qualified for careers in dietetics following completion of an internship.

B.S. Major Requirements:

Preparatory Subject Matter.....62-65 Biological Sciences 2A, 2B & 2C...... 14 Chemistry 2A-2B-2C and 8A-8B, or 118A-118B, or 128A-128B and 129A21-23 Sociology 46A or Psychology 41......4 The remaining preparatory subject matter is based on which major option you choose.

Nutritional Biology option:

Nutrition in Public Health option:
Physics 1A-1B 6
Mathematics 16A-16B
1 or 34-5
Anthropology 2 or Psychology 1 or Sociology

Anthropology 2 or Sociology 1 or 3......4-5 Psychology 1......4

Depth Subject Matter76-85

Biological Sciences 101 4
Food Science and Technology 100A and
100B 8
Microbiology 1015
Neurobiology, Physiology, and Behavior
101, 101L 8
Nutrition 111AV, 111B, 112, 116A 11
The remaining depth subject matter is based
on which major option you chose when
completing your preparatory courses.

Nutritional Biology option:

Biological Sciences 102, 103 6
Molecular and Cellular Biology 120L 6
Neurobiology, Physiology, and
Behavior 114
Nutrition 104, 117 10
Nutrition Restricted Electives
Selection of courses must be made in
consultation with a faculty advisor prior to or
upon reaching the 120 unit level:
Exercise Biology 110; Nutrition 99, 105,
114, 115, 116B, 118, 120AN, 120BN,
122, 123, 124, 127, 130, 190, 192, 199

Nutrition in Public Health option:

Nonmon in Fobile Health opnon.		
	Animal Biology 102, 10310	
	Exercise Biology 110	
	Nutrition 118 4	
	Nutrition Restricted Electives	
	Selection of courses must be made in	
	consultation with a faculty advisor prior to or	
	upon reaching the 120 unit level:	
	Food Service Management 120, 122;	
	Nutrition 99, 104, 105, 114, 116B, 117,	
	120AN, 120BN, 129, 130, 190, 192, 199	

Restricted Electives 8-12 Choose one of the following areas to complete the restricted elective units in: Agricultural and Health Policy: Agricultural & Resource Economics 15, 120, Public Health Sciences 175W, or Political Science 109

Cultural Diversity & Community Change:

African American and African Studies 100, American Studies 55, Agricultural and Resource Economics 112, Communication 136, Community & Regional Development 2, 152, 176, International Agricultural Development 10, 103, Science and Society 130, or Sociology 181

Community Health and Education:

Communication 165, Education 110, 120, 153, Psychology 126, 130 or Sociology 154
Natural and Applied Sciences: Chicano Studies 140A, Community & Regional Development 20, Environmental Toxicology 101, 128, Exercise Biology 101, 102, 113, 117, Human Development 100A, 100B, 100C, Neurobiology, Physiology & Behavior 132, Philosophy 15, Plant Sciences

151, Science and Society 2, 15, 90C, or 90F Total Units for the Degree.....146

Major Adviser. B. L. Lönnerdal

Advising Center for the major is located in 3202 Meyer Hall (530) 752-2512.

Dietetics Internship. To fulfill the academic requirements for an internship in Dietetics, choose the following courses from the categories in which they appear above: English 3 or University Writing Program 1, Psychology 1, Communication 1, Sociology 3 or Anthropology 2, Economics 1A or 1B, Nutrition 116B. The following courses must also be added (some of which may meet restricted elective requirements): Agricultural and Resource Economics 112; Nutrition 116AL-BL; Food Service Management 120, 120L, 122. Students intending to apply for admission to a dietetic internship should contact the Advising office no later than the first quarter of the junior year for information on procedures.

Graduate Study. The Department of Nutrition offers programs of study and research leading to the M.S. and Ph.D. degrees in Nutrition. For information on graduate study contact the graduate adviser. See Graduate Studies, on page 111.

Obstetrics and Gynecology

See Medicine, School of, on page 390.

Oceanography

(College of Letters and Science)

Oceanography is the study of the earth's oceans, investigating connections between geological, biological, chemical and physical processes in the marine realm, and the interactions between the Earth's ocean/atmosphere system. The interdisciplinary minor in oceanography is for students with back-grounds in any of these fields, as well as those interested in marine policy and conservation. The curriculum reflects the integrative nature of oceanog raphy, with core courses covering the major disciplines in oceanography and elective courses that allow students to cater the minor to their interests. The oceanography minor includes courses taught at the Davis campus and courses offered at Bodega Marine Laboratory.

450 Ophthalmology

The minor is sponsored by the Department of Geology in 2119 Earth and Physical Sciences Building.

Minor Program Requirements:

UNITS

Oceanography22-
Geology 150A/Environmental Science and
Policy 150A4
Geology 150B/Environmental Science and
Policy 150B3
Geology 150C/Environmental Science and
Policy 150C4
Environmental Science and Policy 1523
An electives sequence, with one course from
group (a) and one to two additional electives
from either groups (a) or (b): 8-10
(a) Geology 116N/Environmental Science
and Policy 116N, Atmospheric Science
158, Wildlife, Fish, and Conservation
Biology 120, 157, Environmental
Toxicology 120, Evolution and Ecology
112, 115;
(b) Atmospheric Science 121A, 121B,
Geology 108, 109, 152, Evolution and
Ecology 106, 114, Environmental Science
and Policy 124, Environmental Toxicology

Note. Courses Geology 150C/ Environmental Science and Policy 150C, Environmental Science and Policy 124, 152, Environmental Toxicology 127, and Evolution and Ecology 106 and 114 are taught at Bodega Marine Laboratory.

Minor Adviser. T.M. Hill *(Geology)*, 3115 Earth and Physical Sciences Building (530) 752-0179

Ophthalmology

See Medicine, School of, on page 390.

Organizational Studies

See Sociology, on page 494.

Orthopaedic Surgery

See Medicine, School of, on page 390.

Otolaryngology

See Medicine, School of, on page 390.

Parks and Recreation

See Community and Regional Development, on page 203; Design, on page 215; Environmental Planning and Management (under Environmental Horticulture, on page 293); Landscape Architecture, on page 362; and Physical Education, on page 455.

Pathology

See Pathology (PMD), on page 408; Pathology, Microbiology, and Immunology, on page 450; and Plant Pathology, on page 465.

Pathology, Microbiology, and Immunology

See Veterinary Medicine, School of, on page 523.

Pediatrics

See Medicine, School of, on page 390.

Performance Studies (A Graduate Group)

Lynette Hunter, Chairperson of the Group Marian Bilheimer, Graduate Administrator

Arts Group Graduate Office. 216 Wright Hall (530) 754-6973; mlbilheimer@ucdavis.edu http://performancestudies.ucdavis.edu/

Faculty. Executive: Seeta Chaganti (English), Maxine Craig (Women and Gender Studies), Lynette Hunter (Theatre and Dance), Jon Rossini (Theatre and Dance), Halifu Osumare (African American and African Studies)

There are over 45 affiliated faculty in departments throughout HArCS and other faculty, all of whom offer courses relevant to the discipline.

Graduate Study. The Ph.D. in Performance Studies is a four-year program. In the first two years of study, students develop an understanding of performance by drawing from a range of regular course offerings in the field to identify, explore, and define a field or fields of research. Students are required to complete four core courses out of five in performance studies, and one colloquium course. Each individual program is then built from seminar and/or practice as research courses, as well as independent or group studies, developing one or more of the four strands of the program: Comparative Medias, Embodiments, Cultures/Ecologies, and History/Text. A wide range of affiliated faculty offer courses throughout the HArCS faculty, and Designated

Emphases are available in Studies in Performance and Practice, African American and African Studies, Critical Theory, Feminist Theory and Research, Native American Studies, and Writing, Rhetoric and Composition Studies. Students are required to complete a minimum of 60 units before taking the qualifying examination. No more than 12 units may be taken below the graduate level unless specifically approved by the Ph.D. graduate program adviser.

Main Program Adviser. Lynette Hunter (Theatre and Dance)

Graduate Advisers. Jon Rossini (Theatre and Dance), Seeta Chaganti (English), Maxine Craig (Women and Gender Studies), Halifu Osumare (African American and African Studies), Blake Stimson (Art History), Susan Avila (Design), Annabeth Rosen (Art Studio), Emily Albu (Classics), Archana Venkatesen (Comparative Literature, Religious Studies), Henry Spiller (Music), Beth Rose Middleton (Native American Studies), Kriss Ravetto (Cinema and Technocultural Studies)

Courses in Performance Studies (PFS)

Graduate Courses

270A. Individually Guided Research in Performance Studies (4)

Discussion—1 hour; independent study; extensive writing. Prerequisite: course 200; one from course 265A, B, C, or D; consent of instructor. Restricted to students in the Graduate Group PhD in Performance Studies. Individually guided research, under the supervision of a faculty member, on a Performance Studies topic related to the student's proposed dissertation project to produce a dissertation prospectus.

270B. Individually Guided Research in Performance Studies (4)

Discussion—1 hour; independent study; extensive writing. Prerequisite: course 200; one of courses 265A, B, C, or D; consent of instructor. Restricted to students in the Graduate Group PhD in Performance Studies. Individually guided research, under the supervision of a faculty member, on a Performance Studies topic related to the student's proposed dissertation project, to produce a dissertation prospectus.

270C. Individually Guided Research in Performance Studies (4)

Discussion/laboratory—2 hours; fieldwork; term paper. Prerequisite: course 200; one of courses 265A, B, C, or D; consent of instructor. Restricted to students in the Graduate Group PhD in Performance Studies. Individually guided research, under the supervision of a faculty member, on a Performance Studies topic related to the student's proposed dissertation project to produce a dissertation prospectus.

Professional Course

459. Approaches to Theatre and Dance (4)

Seminar—3 hours; term paper; project. Prerequisite: consent of instructor; advanced graduate students. Work on approaches to theatre, dance, film/video, design and performance, with a focus on methodology and professional development. May be repeated five times for credit. Offered irregularly.

Pharmacology and Toxicology

See Medical Pharmacology and Toxicology (PHA), on page 405; Molecular Biosciences (VMB), on page 524; and Pharmacology and Toxicology (A Graduate Group), on page 451.

Pharmacology and **Toxicology** (A Graduate Group)

Pamela J. Lein, Chairperson of the Group

Group Office. 4117 Meyer Hall (Department of Environmental Toxicology (530) 752-4516;

http://www.envtox.ucdavis.edu/ptx

Faculty. The more than 80 faculty in the graduate group are from more than 25 academic departments and organized research units within the College of Agricultural and Environmental Sciences, the College of Biological Sciences, the School of Medicine and the School of Veterinary Medicine

Graduate Study. The program, which offers both the M.S. and Ph.D. degree, emphasizes an interdisciplinary approach that combines coursework and experimental training in modern approaches to pharmacological and toxicological problems. Areas of research span fundamental and translational research in a broad spectrum of areas within pharmacology and toxicology, including cardiovascular pharmacology, cancer therapeutics, neuropharmacology, drug discovery and design, neurotoxicology, pulmonary toxicology and environmental toxicology. Students complete core courses in pharmacology and toxicology and carry out research rotations during their first year of study. All Ph.D. students receive financial support. For detailed information on the program, contact the Group office, graduate advisers, or the group chairperson.

Graduate Advisers. A.R. Buckpitt (Molecular Biosciences), K. Carraway (Biochemistry & Molecular Medicine), A. Gelli (Pharmacology), R. Harper (Pul-monary Medicine), Mary Horne (Pharmacology), J.A. Last (Pulmonary Medicine), P. Lein (Molecular Biosciences), K. Pinkerton (Institute of Toxicology and Environmental Health), B. Puschner (Molecular Biosciences), M. Wood (Environmental Toxicology)

Courses in Pharmacology and Toxicology (PTX)

Additional courses that satisfy the breadth and depth requirements of the program are taught under departments of faculty in the group.

Graduate Courses

201. Principles of Pharmacology and Toxicology I (5)

Lecture — 5 hours. Prerequisite: Biological Sciences 102 and Neurobiology, Physiology, and Behavior 101. First of three courses presenting fundamental principles of pharmacology and toxicology. Introductory overview of basic concepts in pharmacology/ toxicology, followed by in-depth blocks on fate processes of chemicals in the body, fate processes in tissue selective responses, selective toxicity employed therapeutically. - I. (I.)

202. Principles of Pharmacology and Toxicology II (4)

Lecture - 4 hours. Prerequisite: course 201. The second of three courses presenting fundamental principles of pharmacology and toxicology. Principles of pharmacodynamics and mechanisms of drug/toxicant actions. —II. (II.)

203. Principles of Pharmacology and Toxicology III (4)

Lecture—4 hours. Prerequisite: courses 201 and 202. Integrated physiological systems, cardiovascular and nervous systems and how drugs and toxicants act to perturb function. — III. (III.)

230. Advanced Topics in Pharmacology and Toxicology (1-3)

Lecture/discussion/seminar-1 hour each (course format can vary at option of instructor). Prerequisite: course 201 and consent of instructor. In-depth coverage of selected topics for graduate students in Pharmacology-Toxicology and related disciplines. Topics determined by instructor in charge for each quarter. - I, II, III. (I, II, III.)

277. Life and Death Decisions at the Cellular Level (2)

Lecture - 2 hours. Prerequisite: undergraduate or graduate introductory course in cell biology (such as Biological Sciences 104), and general biochemistry (Molecular and Cellular Biology 121 or 122) required; restricted to graduate standing or consent of instructor. Fundamental concepts in cell signaling; signaling pathways as related to cell death and a variety of human diseases including cancer, Alzheimer's, and Parkinson's.—III. (III.) Goldkorn

290. Seminar (1)

Current topics in pharmacology and toxicology. (S/ U grading only.) - I, II, III. (I, IĬ, III.)

290C. Advanced Research Conference (1)

Lecture/discussion. Provide credit for participation in and attendance at research conferences. May be repeated three times for credit. (S/U grading only.)-I, II, III. (I, II, III.) Puschner

299. Research (1-12)

(S/U grading only.)

Philosophy

(College of Letters and Science)

David Copp, Ph.D., Chairperson of the Department

Department Office. 1240 Social Sciences and Humanities Building (530) 752-0703; http://philosophy.ucdavis.edu

Faculty

Aldo Antonelli, Ph.D., Professor David Copp, Ph.D., Professor Cody Gilmore, Ph.D., Associate Professor James R. Griesemer, Ph.D., Professor Elaine M. Landry, Ph.D., Associate Professor George J. Mattey II, Ph.D., Senior Lecturer Robert May, Ph.D., Professor Roberta Millstein, Ph.D., Professor Bernard Molyneux, Ph.D., Associate Professor Marina A. L. Oshana, Ph.D., Professor Adam Sennet, Ph.D., Associate Professor Jan Szaif, Ph.D., Professor

Emeriti Faculty

William H. Bossart, Ph.D., Professor Emeritus Robert C. Cummins, Ph.D., Professor Emeritus Gerald Dworkin, Ph.D., Professor Emeritus Joel I. Friedman, Ph.D., Professor Emeritus Neal W. Gilbert, Ph.D., Professor Emeritus Michael Jubien, Ph.D., Professor Emeritus John F. Malcolm, Ph.D., Professor Emeritus Paul Teller, Ph.D., Professor Emeritus Michael V. Wedin, Ph.D., Professor Emeritus George Wilson, Ph.D., Professor Emeritus

The Major Program

Philosophy addresses problems and questions that arise in all areas of human thought and experience and in all disciplines. Recurring questions about the nature of value, the good life, right conduct, knowledge, truth, language, mind, and reality are central to philosophical study. Philosophy also investigates the methodologies and assumptions of the major disciplines in the university in order to deepen our understanding of the sciences, of mathematics, art, literature, and history, and of religion and morality. It leads us to address issues about the nature of these subjects, about the methods of reasoning characteristic of them, and about the contributions they make to our understanding of ourselves and our world.

Philosophy contributes to the liberal education of its students. The department emphasizes an analytic approach to philosophical questions, which trains students to understand and evaluate arguments and to think and write precisely and clearly. These skills are of immense value in a variety of careers.

The Program. The Department of Philosophy offers courses in such areas as the theory of knowledge, metaphysics, logic, ethics, and political philosophy. In addition, upper division courses are offered in moral and political philosophy, and aesthetics, and in the philosophy of religion, of mind, of language, of mathematics, of law, and of the physical, biological, and social sciences.

The problems of philosophy have important roots in past. The history of philosophy is important not only as part of the heritage of educated persons, but also because it is relevant to contemporary issues. For these reasons, the department places great emphasis on the history of philosophy, providing courses on the major figures and traditions of western philoso-

Career Alternatives. Students of philosophy learn to understand and evaluate arguments and to think and write precisely and clearly. These analytical skills are assets in any career. Many of our majors have pursued graduate study in philosophy and have become philosophers in their own right. Others have pursued academic careers in related disciplines in the humanities and social sciences. Philosophy majors are well prepared for law, business, or other professional schools and have found careers in computer programming, government service, teaching, the ministry, and social work.

A.B. Major Requirements:

Preparatory Subject Matter.....16

One course from any three of the following areas (a) General Philosophy: Philosophy 1 (b) Ancient Philosophy: Philosophy 21 (c) Early Modern Philosophy: Philosophy 22 (d) Philosophy of Mind: Philosophy 13 (e) Ethics: Philosophy 14, 15 or 24

(f) Philosophy of Science: Philosophy 30, 31, 32 or 38

(g) Philosophy of Language: Philosophy 17 (h) Metaphysics: Philosophy 101 (i) Theory of Knowledge: Philosophy 102

Philosophy 124 Depth Subject Matter36

Upper division units in Philosophy......36 Note: Philosophy 101 and 102 may not be counted toward both preparatory and depth subject matter units.

Total Units for the Major52 Major Adviser, G.I. Mattev

Advising Office. 1240 Social Science and Humanities

Minor Program Requirements:

Students wishing to minor in Philosophy may choose a general minor or a minor specializing in logic. There are no specific courses required for the general minor, so students may create a program to suit their own interests. The range of choice in the logic specialization is limited to the courses listed.

Philosophy—General20

Twenty upper division units in philosophy. Philosophy 12 may be substituted for four of the upper division units.

Philosophy-Logic20

135, 189K12

Minor Adviser. G.J. Mattey

Honors Program. The department offers an honors program, which gives qualifying majors the opportunity to work closely with faculty and graduate students.

Courses for Non-Majors. Students majoring in most disciplines in the university will find courses relevant to their educational or career goals. Philosophy 1 is the introductory course for non-majors.

Philosophy 5 teaches critical thinking. The following courses are recommended:

(1) Pre-law: 12, 14, 24, 30, 102, 112, 115, 116, 118 and, especially, 119; (2) Pre-medical: 14, 30, 108, 114, 115, (3) Business: 14, 102, 112, 114, 115, 116, (3) Business: 14, 102, 112, 114, 115, 116, 117, 118, 119; (4) Social Policy: 14, 24, 101, 102, 114, 115, 116, 117, 118, 119; (5) Social Sciences: 12, 30, 31, 32, 101, 102, 103, 109, 118, 131; (6) Physical Sciences: 12, 30, 31, 32, 101, 102, 106, 107, 112, 131; (7) Biological Sciences: 30, 31, 32, 101, 102, 108. 102, 108; (8) Humanities and the Arts: 14, 21 through 24, 101, 102, 103, 105, 114, 116, 118, 123, 160 through 175; (9) Agricultural and Environmental Science and Policy: 5, 14, 24, 30, 31, 114, 115, 116, 118.

Department Activities. The Philosophy department sponsors a lecture-seminar series of well-known philosophers who present papers in their fields of expertise. The department also operates ongoing faculty and graduate student colloquia. Undergraduate students are welcome to attend and join these discussions. Information can be obtained in the Department office.

Graduate Study. The Department of Philosophy offers programs of study leading to the M.A. and Ph.D. degrees. Detailed information may be obtained by writing to the Graduate Adviser.

Graduate Adviser. Elaine M. Landry

Courses in Philosophy (PHI)

Lower Division Courses

1. Introduction to Philosophy (4)

Lecture - 3 hours; discussion - 1 hour. Problems of philosophy through major writings from various periods. Problems are drawn from political, aesthetic, religious, metaphysical, and epistemological concerns of philosophy. GE credit: ArtHum, Wrt | AH, WE.—I, II, III. (I, II, III.)

5. Critical Reasoning (4)

Lecture—3 hours; discussion—1 hour. Criteria of good reasoning in everyday life and in science. Topics to be covered may include basic principles of deduction and induction; fallacies in reasoning; techniques and aids to reasoning; principles of scientific investigation; aids to clarity. Not open to students who have completed course 6. GE credit: Wrt | WE.

11. Philosophy East and West (4)

Lecture - 3 hours; discussion - 1 hour. Comparative treatment of select theories in Eastern and Western philosophy, e.g., of self, God, being, knowledge, enlightenment. Topics selected from the following philosophies: Eastern—Buddhist, Confucian, Hindu, Taoist; and Western—Platonist, Aristotelian, Medieval Christian, Modern Rationalist/Empiricist, Kantian, Hegelian, Existentialist. GE credit: ArtHum, Div, Wrt | AH, WÉ.

12. Introduction to Symbolic Logic (4)

Lecture - 3 hours; discussion - 1 hour. Syntax and semantics of the symbolic language sentence logic. Syntax and semantics of the symbolic language sentence logic. Symbols of sentence logic. Translation between sentence logic and English. Truth table interpretation of sentence logic. Proof techniques. Application of truth tables and proof techniques to arguments in English. Not open for credit to students who have taken course 112, 113, 134, or 135 and passed with a grade of C or better. GE credit: AH.—I, IV. (I, IV.) Antonelli, Gilmore, Landry, Mattey

13. Minds, Brains, and Computers (4)

Lecture - 3 hours; discussion - 1 hour. Contemporary theories of the nature of the mind. The mind as a brain process and as a computer process. Ways in which neuroscience, artificial intelligence and psychology seek to understand the mind. GE credit: Sci-Eng or SocSci, Wrt | SE, SL, SS, WE.-Molyneux

13G. Minds, Brains, and Computers Discussion (1)

Discussion - 1 hour. Restricted to concurrent enrollment in course 13. Small group discussion and preparation of short papers for course 13. GE credit: WE.-Molyneux

14. Ethical and Social Problems in Contemporary Society (4)

Lecture — 3 hours; discussion — 1 hour. Philosophical issues and positions involved in contemporary moral and social problems. Possible topics include civil disobedience and revolution, racial and sex discrimination, environment, population control, technology and human values, sexual morality, freedom in society. GE credit: ArtHum, Div, Wrt | AH, WE.

15. Bioethics (4)

Lecture - 3 hours; discussion-1 hour. Critical analysis of normative issues raised by contemporary medicine and biology. Possible topics include euthanasia, abortion, reproductive technologies, genetic engineering, practitioner/patient relation-ships, allocation of medical resources, experimentation on human subjects. GE credit: ArtHum, Wrt | AH, WE. - Dworkin

16. Philosophical Foundations of American Democracy (4)

Lecture - 3 hours; discussion-1 hour. The philosophical underpinnings of democratic government and the tension between the goals of providing security and of preserving democracy and civil liberties. Illustration of the tension through focus on issues related to war and terrorism. GE credit: ACGH, AH, WE.-I. Copp

17. Language, Thought, and World (4)

Lecture-3 hours; discussion-1 hour. Puzzles in the philosophy of language, such as what language is, how language conveys thoughts, whether we each speak our own private language, and what we can learn about the world by studying language. GE credit: SocSci, Wrt | SS, WE.-May

21. History of Philosophy: Ancient (4)

Lecture - 3 hours; discussion - 1 hour. Survey of Greek philosophy with special attention to the Pre-Socratics, Plato, and Aristotle. GE credit: ArtHum, Wrt | WE.-Szaif

22. History of Philosophy: Early Modern (4)

Lecture—3 hours; discussion—1 hour. Survey of major figures in philosophy of the seventeenth and eighteenth centuries, with emphasis on Descartes, Hume, and Kant. GE credit: ArtHum, Wrt | WC.– II. (II.) Mattey

24. Introduction to Ethics and Political Philosophy (4)

Lecture - 3 hours; discussion - 1 hour. Reading of historical and contemporary works highlighting central problems in ethical theory and political philosophy. Why should we be moral? What is moral behavior? What is justice, both for the individual and for society? Is there a right of rebellion? GE credit: ArtHum, Wrt | AH, WE.-Oshana

30. Introduction to Philosophy of Science

Lecture-3 hours; discussion-1 hour. Basic problems in the philosophy of science, common to the physical, biological, and social sciences. Analysis of explanation, confirmation theory, observational and theoretical terms, the nature of theories, operationalism and behaviorism, realism, reduction. Not open for credit to students who have taken course 104. GE credit: ArtHum or SciEng, Wrt | AH or SE, SL, WE.—Landry, Millstein

31. Appraising Scientific Reasoning (4)

Lecture — 3 hours; discussion — 1 hour. Introduction to scientific hypotheses and the kinds of reasoning used to justify such hypotheses. Emphasis on adequate justification, criteria, and strategies for distinguishing scientific from pseudoscientific theories. Concrete historical and contemporary cases. GE credit: ArtHum or SciEng | AH or SE, SL, WE.-Griesemer

32. Understanding Scientific Change (4)

Lecture - 3 hours; discussion - 1 hour. Concepts of scientific change in historical and philosophical perspective. Survey of models of growth of knowledge, 17th century to present. Relationship between logic of theories and theory choice. Kuhn's revolution model. Examples from various sciences. GE credit: ArtHum or SciEng, Wrt | AH or SE, WE.-Griese-

38. Introduction to Philosophy of Biology

Lecture - 3 hours; discussion - 1 hour. Non-technical introduction to philosophical, social, and scientific ideas, methods and technologies in contemporary biological fields such as evolution, genetics, molecular biology, ecology, behavior. Philosophical consideration of determinism, reductionism, explanation, theory, modeling, observation, experimentation. Evaluation of scientific explanations of human nature. GE credit: ArtHum, Wrt | AH or SE, SL, WE.-Griesemer, Millstein

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading

Upper Division Courses

(Certain upper division courses may not be offered every year.)

101. Metaphysics (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: one course in philosophy recommended. Theories of being. Such topics as reality, substance, universals, space, time, causality, becoming, body, experience, persons, freedom, and determinism. Views of the nature and method of metaphysics. Anti-metaphysical arguments. GE credit: ArtHum, Wrt | AH,

102. Theory of Knowledge (4)

Lecture - 3 hours; extensive writing or discussion. Prerequisite: one course in philosophy. Analysis of the concept of knowledge. The relation between knowledge, belief and truth. Development of foundationalist, coherentist and externalist theories of justified belief. Examination of skepticism. GE credit: ArtHum, Wrt | AH, WE.—Mattey

103. Philosophy of Mind (4)

Lecture/discussion-3 hours; term paper. The relation between mind and body, our knowledge of other minds, and the explanation of mental acts. Discussion of such concepts as action, intention, and causation. GE credit: ArtHum, Wrt | AH, WE.-

104. The Evolution of Mind (4)

Lecture/discussion-3 hours; term paper. Prerequisite: one previous Philosophy course or instructor permission. The interpretation of human thought and behavior through the lens of evolutionary theory. Topics include the nature/nurture debate concerning cognitive and other mental capacities and traits, and the interaction between evolution, learning and development. GE credit: SocSci | SS, WE

105. Philosophy of Religion (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: one course in philosophy recommended. Logical, metaphysical, epistemological, and existential aspects of selected religious concepts and problems. GÉ credit: ArtHum, Wrt | AH, WE.—Gilmore, Szaif

107. Philosophy of the Physical Sciences (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: one philosophy course or a science background recommended. Nature of testability and confirmation of scientific hypotheses; nature of scientific laws, theories, explanations, and models. Problems of causality, determininism, induction, and probability; the structure of scientific revolutions. GE credit: ArtHum or SciEng, Wrt | AH or SE, WE.

108. Philosophy of the Biological Sciences (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: one course in biology or one course in philosophy. Scientific method in biology. Nature of biological theories, explanations, and models. Problems of evolutionary theory, ecology, genetics, and sociobiology. Science and human values. GE credit: ArtHum or SciEng, Wrt | AH or SE, SL, WE.—Griesemer,

109. Philosophy of the Social Sciences (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: one course in philosophy or a social science recommended. The nature of the social sciences, their subject matter and methods. Similarities to and differences from natural and life sciences. Predicting and explaining human behavior. Behaviorism. Reduction, holism, and individualism. Related moral issues. The social sciences and philosophy. GE credit: ArtHum or SocSci, Wrt | AH or SŚ, WE.

111. Philosophy of Space and Time (4)

Lecture/discussion-3 hours; term paper. Prerequisite: one upper division philosophy course. Philosophical problems of space and time. The philosophical implications of space-time theories, such as those of Newton and Einstein. Topics may include the nature of geometry, conventionalism, absolutist versus relationist views of space and time, philosophical impact of relativity theory. GE credit: AH, WE.-Gilmore

112. Intermediate Symbolic Logic (4)

Lecture/discussion-4 hours. Prerequisite: course 12 or consent of instructor. Predicate logic syntax and semantics. Transcription between predicate logic and English. Proof techniques. Identity, functions, and definite descriptions. Introduction to concepts of metatheory. GE credit: AH.-II. (II.) Landry, Mattey

113. Metalogic (4)

Lecture/discussion-4 hours. Prerequisite: course 112, Mathematics 108, or the equivalent. The metalogic of classical propositional and first-order predicate logic. Consistency, soundness and completeness of both propositional and predicate logic. The Löwenheim-Skolem theorem for predicate logic. Undecidablity of predicate logic. GE credit: AH. — (III.) Antonelli

114. History of Ethics (4)

Lecture/discussion-4 hours. Prerequisite: one philosophy course. Study of some classic texts from the history of philosophical writing on central problems of ethics, taking the form either of a survey or concentrated examination of selected historical figures. Readings from such philosophers as Aristotle, Butler, Hume, Kant, Mill. GE credit: ArtHum, Wrt | WC.-

115. Problems in Normative Ethics (4)

Lecture/discussion-3 hours; term paper. Prerequisite: one course in philosophy. Moral philosophy studied through examination of moral problems and the moral principles and common sense intuitions that bear on them. Problems discussed may include: animal rights, fetal rights, euthanasia, justice and health care, war, nuclear deterrence, world hunger, environmental protection. GE credit: ArtHum, Wrt | AH, WE. - Millstein

116. Ethical Theories (4)

Lecture/discussion—3 hours; term paper. Prerequisite: one course in philosophy; one course in ethics recommended. Study of fundamental concepts and problems in ethical theory through an examination of classical and contemporary philosophical theories of ethics. Among the theories that may be discussed are utilitarianism, virtue theory, theories of natural rights, Kantian ethical theory, and contractarianism. GE credit: AH, WE.—Copp

117. Foundations of Ethics (4)

Lecture/discussion-3 hours; term paper. Prerequisite: one of courses 114, 115, 116, 101, or 137. Advanced investigation of questions about the nature and foundations of morality. Among the topics that may be discussed are moral realism and

anti-realism, cognitivism and non-cognitivism, types of relativism, moral skepticism, normative language and normative belief. GE credit: AH, WE.—Copp

118. Political Philosophy (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: one course in philosophy. Intensive examination of some central concepts of political thought such as the state, sovereignty, rights, obligation, freedom, law, authority, and responsibility. GE credit: SocSci, Div, Wrt | AH, WE.—Oshana

119. Philosophy of Law (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: one course in philosophy or consent of instructor Philosophical theories of the nature of law, legal obligation, the relation of law and morals. Problems for law involving liberty and justice: freedom of expression, privacy, rights, discrimination and fairness, responsibility, and punishment. GE credit: SocSci, Div, Wrt | AH, WE.—Dworkin, Oshana

120. Environmental Ethics (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: one course in philosophy. Conceptual and ethical issues concerning the environment. Extension of ethical theory to animals, all life, and ecosystem wholes. Topics may include contemporary environmental issues such as global warming, sustainability and biodiversity. Not open for credit for students who have completed course 115 prior to Fall 2011. GE credit: AH, WE.—Millstein

123. Aesthetics (4)

Lecture/discussion—3 hours; term paper. Prerequisite: one course in philosophy recommended. Nature of art, of artistic creation, of the work of art, and of aesthetic experience; nature and validity of criticism; relations of art to its environment. GE credit: ArtHum, Wrt | AH, WE.

125. Theory of Action (4)

Lecture — 3 hours; extensive writing or discussion — 1 hour. Prerequisite: one course in Philosophy. Survey of prominent contemporary approaches to leading problems in action theory. Problems include issues about the nature of intentional action and the conceptual character of explanations of actions in terms of the agent's reasons. GE credit: ArtHum, Wrt | AH, WE.

128. Rationality (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: at least one course in philosophy. Philosophical issues concerning rationality in its various forms. Focus is on theoretical and practical reasoning and conditions for rational belief, choice, and action. Possible additional topics include rationality and human limitations; paradoxes of rationality; varieties of irrationality; rationality and objectivity. GE credit: AH. - Antonellil

131. Philosophy of Logic and Mathematics (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 12 or one course for credit in mathematics. Nature of formal systems and mathematical theories. Selected topics include logical and semantical paradoxes; foundations of mathematics; set theory, type theory, and intuitionistic theory; philosophy of geometry; philosophical implications of Gödel's incompleteness results. GE credit: AH, WE.-Glanzberg, Landry

134. Modal Logic (4)

Lecture/discussion-4 hours. Prerequisite: course 112 or Mathematics 108 or the equivalent. Survey of the main systems of modal logic, including Lewis systems S4 and S5. "Possible worlds" semantics and formal proofs. Applications to epistemology, ethics, or temporality. GE credit: AH. - Antonelli

135. Alternative Logics (4)

Lecture/discussion-4 hours. Prerequisite: course 12, Mathematics 108, or the equivalent. Alternatives to standard truth-functional logic, including many-valued logics, intuitionist logics, relevance logics, and non-monotonic logics. GE credit: AH. — Antonelli

137A. Philosophy of Language: Theory of Reference (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: one course in philosophy or linguistics. Survey of issues and views concerning reference, or how words refer to things. Topics include names and descriptions, the distinction between sense and reference, the puzzle of non-referring terms, causal theories of reference, and possibility and necessity. Only two units of credit for students who have completed course 137. GE credit: AH, WE.-May

137B. Philosophy of Language: Truth and Meaning (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: one course in philosophy or linguistics. Comparative treatment of theories about the relationship between truth and meaning. Topics include: the identification of meaning with truth conditions, the nature of propositions, theories of linguistic understanding, the roles of mind and world in determining meaning. Only two units of credit for students who have completed course 137. GE credit: AH, WE.-Glanzberg

137C. Philosophy of Language: Semantics and Pragmatics (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: one course in philosophy or linguistics. Philosophical issues and positions concerning the meaning and use of language. Topics include the distinction between meaning and implication, the roles of context and convention in language use, speaker meaning versus linguistic meaning and speech act theory. Only two units of credit for students who have completed course 137. GE credit: AH, WE.-Sennet

141. Socrates and the Socratic Dialogue (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 21 recommended, or one course in philosophy, or consent of instructor. The philosophy of Socrates as found in the Socratic dialogues of Plato. Topics include the Socratic practice of refutation, its method, epistemological foundation, and moral purpose; Socratic eudaimonism and Socratic virtue theory; the paradoxes of Socratic intellectualism. GE credit: AH, WE.—Szaif

143. Hellenistic Philosophy (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 21 recommended, or other course in philosophy. Positions and arguments of the major philosophical schools of the Hellenistic period: Stoicism, Epicureanism, and Scepticism. Focus is on eth-ical, epistemological and metaphysical questions and their interconnectedness. GE credit: AH, WE.-

145. Medieval Philosophy (4)

Lecture/discussion — 4 hours. Prerequisite: course 21 or other course in ancient philosophy. Major philosophers in the medieval Christian, Islamic, and Jewish traditions. Offered in alternate years. GE credit: AH, WC.-Szaif

151. Nineteenth Century European Philosophy (4)

Lecture/discussion-4 hours. Prerequisite: course 22N. Survey of the main movements in nineteenth century philosophy on the European continent. Idealism in Schopenhauer and Hegel, dialectical materialism in Marx, irrationalism in Kierkegaard, Nietzsche and Dostoevsky. Not offered every year. GE credit: ArtHum | AH, WE.—Mattey

156. Contemporary Analytic Philosophy (4)

Lecture/discussion—3 hours; term paper. Prerequi site: one course in philosophy. Consideration of central issues such as meaning/reference, analytic/ synthetic, reductionism, formal and ordinary language, essential properties, ontological commitment, possible world semantics; influential works by philosophers such as Russell, Moore, Wittgenstein, Austin, Carnap, Quine, Putnam, Kripke, van Fraassen. GE credit: AH, WE.

157. Twentieth Century European Philosophy (4)

Lecture/discussion-4 hours. Prerequisite: one course in Philosophy. Survey of the main movements in twentieth century philosophy on the European continent, including phenomenology, existentialism, post-structuralism and post-modernism. Philosophers covered are Husserl, Heidegger, Sartre, Foucault, Derrida. GE credit: ArtHum | AH, WE.—Mattey

160. Pre-Socratics (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 21. Study of the metaphysical views of such pre-Socratic figures as the Milesians, the Pythagoreans, Heracleitus, Parmenides, Empedocles, Anaxagoras, and the atomists. GE credit: AH,

161. Plato (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 21. Examines Plato's most important contributions in metaphysics, epistemology, psychology, cosmology, ethics and political philosophy. Dialogues will be selected from Plato's middle and later writings. GE credit: AH, WE.

162. Aristotle (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 21. An overview of Aristotle's most central and influential writings. Topics selected from fields such as metaphysics, physics, ethics, logic, and psychology. GE credit: AH, WE.

168. Descartes (4)

Lecture/discussion-4 hours. Prerequisite: course 22N. The philosophical writings of Renè Descartes. Topics include the refutation of skepticism, the nature and existence of mind and body, the existence of God, and the foundations of science. Not offered every year. GE credit: AH, WE.-Mattey

170. Leibniz (4)

Lecture/discussion-4 hours. Prerequisite: course 22N. Survey of the philosophical writings of Gottfried Wilhelm Leibniz. Topics include Leibniz's logic, the existence of God, human freedom, substance, and the relation between science and metaphysics. Not offered every year. GE credit: AH, WE.-Mat-

172. Locke and Berkeley (4)

Lecture/discussion-4 hours. Prerequisite: course 22N. Principal metaphysical works of John Locke and George Berkeley. Topics include abstract ideas, existence of matter, primary and secondary qualities, essence, substance, the existence of God, and the nature of scientific knowledge. May be repeated for credit. Not offered every year. GE credit: AH, WE.-Mattey

174. Hume (4)

Lecture/discussion-4 hours. Prerequisite: course 22N. David Hume's Treatise of Human Nature and related writings. Topics include empiricism, space, causality, belief, skepticism, the passions, and morality. Not offered every year. GE credit: AH, WE.-

175. Kant (4)

Lecture/discussion-4 hours. Prerequisite: course 22N. Immanuel Kant's *Critique of Pure Reason* and related writings. Topics include the nature of human cognition, space and time, *a priori* concepts, sub-stance, causality, human freedom, and the existence of God. Not offered every year. GE credit: AH, WE.-Mattey

178. Frege (4)

Lecture/discussion - 3 hours; extensive writing. Prerequisite: one upper-division course in philosophy or permission of instructor. Development of Gottlob Frege's views about language and logic. Formulation of his grand mathematical idea known as logicism and how it led to the philosophy of language. GE credit: AH, WE.—II. May

189A. Special Topics in Philosophy (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: one course in the area of the special topic. Special topics in (A) History of Philosophy. May be repeated up to eight units of credit. Not offered every year. GE credit: AH, WE.

189B. Special Topics in Philosophy (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: one course in the area of the special topic. Special topics in (B) Metaphysics. May be repeated up to eight units of credit. Not offered every year. GE credit: AH, WE.

189C. Special Topics in Philosophy (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: one course in the area of the special topic. Special topics in (C) Theory of Knowledge May be repeated up to eight units of credit. Not offered every year. GE credit: WE.

189D. Special Topics in Philosophy (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: one course in the area of the special topic. Special topics in (D) Ethics. May be repeated up to eight units of credit. Not offered every year. GE credit: AH, WE

189E. Special Topics in Philosophy (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: one course in the area of the special topic. Special topics in (E) Political Philosophy. May be repeated up to eight units of credit. Not offered every year. GE credit: AH, WE.

189F. Special Topics in Philosophy (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: one course in the area of the special topic. Special topics in (F) Philosophy of Law. May be repeated up to eight units of credit. Not offered every year. GE credit: AH, WE.

189G. Special Topics in Philosophy (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: one course in the area of the special topic. (G) Aesthetics. May be repeated up to eight units of credit. Not offered every year. GE credit: AH, WE.

189H. Special Topics in Philosophy (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: one course in the area of the special topic. Special topics in (H) Philosophy of Mind. May be repeated up to eight units of credit. Not offered every year. GE credit: AH, WE

1891. Special Topics in Philosophy (4)

Lecture/discussion - 3 hours; extensive writing. Prerequisite: one course in the area of the special topic. Special topics in (I) Philosophy of Science. May be repeated up to eight units of credit. Not offered every year. GE credit: AH or SE, WE.

189J. Special Topics in Philosophy (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: one course in the area of the special topic. Special topics in (J) Philosophy of Language. May be repeated up to eight units of credit. Not offered every year. GE credit: AH.

189K. Special Topics in Philosophy (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: one course in the area of the special topic. Special topics in (K) Logic. May be repeated up to eight units of credit. Not offered every year. GE credit: AH.

194HA-194HB. Honors Research Project (4-4)

Tutoring—3 hours; term paper. Prerequisite: consent of instructor; open to students who are members of the honors program in Philosophy. Completion of honors research project under direction of an instructor. Consult departmental major adviser for list of instructors available in a given quarter

198. Directed Group Study (1-5)

(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

200A. Proseminar I (4)

Seminar - 3 hours; term paper. Prerequisite: consent of instructor; open only to students in their first quarter of the Philosophy Ph.D. program. Intensive study

of core works in a selected area of philosophy. Intensive experience in philosophical writing, discussion, and presentation of written work.—I. (I.)

200B. Proseminar II (4)

Seminar—3 hours; term paper. Prerequisite: consent of instructor; only for students in their first quarter of Philosophy Ph.D. program. Intensive study of core works in a selected area of philosophy. Intensive experience in philosophical writing, discussion, and presentation of written work. Limited enrollment.—I.

201. Metaphysics (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Topics vary from quarter to quarter and may include the following: What are things? Do names refer to things? If so, how? Do things have essential properties? What is the nature of necessity? May be repeated for credit when topic differs and with consent of instructor. - Gilmore

202. Theory of Knowledge (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing in philosophy or consent of instructor. Topics vary from quarter to quarter. Sample topics include belief, skepticism, justification, externalism, naturalized epistemology. May be repeated for credit with consent of instructor. - Mattey

203. Philosophy of Mind (4)

Seminar — 3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Topics in the philosophy of mind such as the mind-body problem, mental representation, consciousness, intentionality. May be repeated for credit with consent of instructor. - Molyneux

203P. Philosophy of Mind Practicum (4)

Practicum - 12 hours. Prerequisite: consent of instructor. Specific research conducted and prepared for publication by advanced students in a team setting. Topics include knowledge representation and learning in neural networks, the nature and formal properties of mental representation. May be repeated for credit when topic differs and with consent of instructor. (S/U grading only.)

207. Philosophy of Physics (4)

Seminar - 3 hours; term paper. Prerequisite: graduate standing in Philosophy or consent of instructor. Intensive treatment of one (or more) topic(s) in the philosophy of physics, such as foundations of spacetime theories, the interpretation of quantum mechanics, or foundations of statistical mechanics. May be repeated for credit when topic differs and with consent of instructor.

208. Philosophy of Biology (4)

Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Intensive treatment of one (or more) topic(s) in the philosophy of biology, such as foundations of evolutionary theories, reductionism in biology, sociobiology and cultural evolution. May be repeated for credit when topic differs and with consent of instructor. - Griesemer, Millstein

210. Philosophy of Science (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Treatment of one or more general topics of current interest in philosophy of science. Topics may include scientific explanation, theories of confirmation, scientific realism, reduction in physics and biology. May be repeated for credit when topic differs and with consent of instructor. -- Griesemer, Landry, Millstein

212. Philosophy of Logic and Mathematics

Seminar—3 hours; term paper. Prerequisite: course 112 or 113 or Mathematics 108 or 125 or the equivalent. Philosophical issues in logic and math. Topics may include nature of logical and mathematical truth or knowledge, correctness of logical sys tems, foundations of mathematics, metaphysical and epistemological presuppositions, applications to philosophical problems and formalization of philosophical theories. May be repeated for credit when topic differs and with consent of instructor. - Glanzberg-Antonelli, Glanzberg, Landry

213. Advanced Logic for Graduate Students

Lecture/discussion—3 hours; extensive problem solving. Prerequisite: graduate standing in Philosophy. Enrollment in the Philosophy Ph.D. program. Intensive study of advanced logic, including set theory, metatheory of predicate logic, and modal logic. May be repeated two times for credit when topic differs-I. (I.) Antonelli, Mattey

214. Ethics (4)

Seminar—3 hours; term paper Prerequisite: graduate standing in philosophy or consent of instructor. Topics may include morality and motivation, objectivity in ethics, the relationship between the factual and the moral. Topics vary from quarter to quarter. May be repeated for credit when topic differs and with consent of instructor. —Copp, Dworkin, Oshana

217. Political Philosophy (4)

Seminar - 3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Advanced studies in political philosophy. Topics vary but may include distributive justice, enforcement of morality by the state, equality, obligation to obey the law, social contract theory. May be repeated for credit when topic differs and with consent of instructor.— Glanzberg, May, Sennet

220. Environmental Ethics (4)

Lecture—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Intensive treatment of one or more topic(s) in environmental ethics, such as biodiversity, sustainability, composition of the moral community, invasive species, endangered species, applications of ethical theories to contemporary environmental issues. - Millstein

237. Philosophy of Language (4)

Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of philosophical issues raised by language, such as the nature of semantic content, proper semantics for verbs of propositional attitude, feasibility and limitations of formal semantics and pragmatics for natural languages. May be repeated for credit when topic differs and with consent of instructor. - Glanzberg, Jackson, May, Sennet

238. Philosophy of Language Workshop (4)

Seminar — 3 hours; extensive writing. Discussion of recently published, unpublished and in-progress research in philosophy of language, including work on the relation of language and mind, of language and logic, and linguistic theory. Open to graduate students only. May be repeated for credit when topic differs.—May

261. Plato (4)

Seminar—3 hours; term paper. Prerequisite; graduate standing or consent of instructor. Advanced seminar designed for analysis of arguments, doctrines, and texts from Plato's works. Methods of argumentation and interpretation are especially stressed. Topics vary according to instructor. May be repeated for credit with consent of instructor. - Szaif

262. Aristotle (4)

Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Advanced seminar designed for analysis of arguments, doctrines, and texts from Aristotle's works. Methods of argumentation and interpretation are especially stressed. Topics vary according to instructor. May be repeated for credit with consent of instructor. —Szaif

275. Kant (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing in philosophy or consent of instructor. Intensive study of a topic in the philosophy of Kant, in such areas as metaphysics, theory of knowledge, ethics. May be repeated for credit with consent of instructor. - Mattey

290. History of Philosophy (4)

Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Topics in the history of philosophy. Topics vary according to

instructor from quarter to quarter. May be repeated for credit when topic differs and with consent of

298. Group Study (1-5) 299. Research (1-12)

(S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Physical Education

(College of Letters and Science)

W.J. Weidner, Ph.D, Program Director

Program Office. 264 Hickey Gymnasium (530) 752-1111

Committee in Charge

Carissa Adams, Ph.D. (Physical Education) Keith Baar, Ph.D.

(Neurobiology, Physiology, and Behavior) G. Robert Biggs, B.A. (Physical Education) Stephen T. Bronzan, M.S. (Physical Education) Barbara A. Jahn, M.S. (Physical Education) Susan Kauzlarich, Ph.D. (Chemistry)

Academic Senate Distinguished Graduate Mentoring Award

Bill Maze, M.B.A. (Physical Education) W.J. Weidner, Ph.D.

(Neurobiology, Physiology, and Behavior)

G. Robert Biggs, B.A., Supervisor Barbara A. Jahn, M.S., Supervisor

Affiliated Faculty

Carissa Adams, Ph.D., Lecturer/Coach Alex Antipa, B.S., Lecturer Stephen T. Bronzan, M.S., Lecturer/Assistant

Director Greg Chapla, B.A., Lecturer/Director of Football Operations

Rozanne DeWeese, M.A., Lecturer/Coach Steven Doten, Ph.D., Lecturer/Coach Tim Fua, B.S., Lecturer Adam Getchell, M.S., Lecturer Yajun Graves, B.S., Lecturer Jennifer Gross, B.A., Lecturer/Coach Rick Henderson, B.S., Lecturer Jeff Hogan, B.A., Supervising Athletic Trainer/

Lecturer Mark Johnson, M.S., Lecturer/Coach Elaine Jones, M.S., Lecturer/Coach Andrea Khoo, B.S., Lecturer John Lavallee, M.Ed., Lecturer/Coach Daryl Lee, M.S., Lecturer/Coach James Les, B.S. Lecturer/Coach Ron Manara, B.A., Lecturer Bill Maze, M.B.A., Lecturer/Coach Eric Mild, M.S., Lecturer/Coach Mike Moroski, M.A., Lecturer/Coach Peter Motekaitis, M.A., Lecturer/Coach Kevin Nosek, M.S., Lecturer/Coach Gerald Nunes, B.S., Lecturer Jill Radzinski, M.A., Athletic Trainer/Lecturer Maryclaire Robinson, M.S., Lecturer/Coach Anthony Schifano, B.A. Lecturer/Coach Dwayne Shaffer, M.A., Lecturer/Coach Sandy Simpson, B.A., Lecturer/Coach Sandy Simpson, B.A., Lecturer/Coach Lisa Varnum, B.S., Athletic Trainer/Lecturer Matt Vaughn, M.A., Lecturer/Coach Addrew Watshawer, B.A., Lecturer/Coach Andrew Wartenburg, B.A. Lecturer/Coach Cy Williams, M.A.T., Lecturer/Coach Jamey Wright, J.D., Lecturer/Coach Karen Yoder, M.A., Lecturer/Coach

The Program of Study

The Program in Physical Education facilitates the development and offering of non-major courses related to physical activities and education, fitness and health, athletic training, teacher education, and organized sport. The Program is available as part of a student's general educational experience to enhance and broaden the understanding and experience of physical activity in the maintenance of lifetime health and fitness.

The basic activities series includes Physical Education 1, fitness, lifetime, and sports skills. The PE 1 activity courses are instructional in nature, designed to introduce new skills to beginners or to improve existing skills. Physical Education 6 is offered for students participating in intercollegiate athletics. Additional lower division courses include those in special skill areas, such as life-saving and water safety, scuba diving, health and fitness, and athletic training. Upper division courses include advanced classes in coaching, sociology of sports, advanced skills in scuba diving, and a series of courses that meet the mandated requirements for students pursuing teacher preparation and certification.

Teaching Credential Subject Representative. W.J. Weidner

Class and Recreational Use of Facilities. The incidental fee payable by all students at the time of registration entitles students to the use of the gymnasium, pool, showers, towels, lockers, tennis courts, and athletic fields. Equipment for games and sports are available for classes. Lockers must be turned in on the last day of class, i.e., before the final examination period. Fines are imposed for each formal transaction necessitated by failure of the student to comply with the regulations of the program.

Courses in Physical Education (PHE)

Lower Division Courses 1. Physical Activities (0.5)

Laboratory-2 hours. Sections in: (a) sports skills, rules and strategy; (b) physical fitness and personal health; (c) recreation; (d) aerobic dance. May be repeated along with course 6 for a combined total of 6 units. (P/NP grading only.)—I, II, III. (I, II, III.)

6. Preparation and Participation in ICA Competition (1)

Discussion/laboratory - 10-20 hours. Prerequisite: consent of instructor (coach). Preparation and participation in Intercollegiate Athletics. Development of fundamental and advanced individual and team skills. In-depth knowledge of rules and strategy. Advanced sports competition and Conference and NCAA levels. May be repeated along with course 1 for a combined total of 6 units. (P/NP grading only.)-I, II, III. (I, II, III.)

7. Professional Physical Education Activities: Men and Women (1)

Lecture-1 hour; or laboratory-2 hours. Fundamental skills for: (a) coaching competitive athletics; (b) classroom teaching and coaching, and (c) classroom teaching and officiating. May be repeated for a total of six units. - I, II. (I, II.)

8. Student-Athlete Life Skills (1)

lege level.

Lecture — 1 hour. Prerequisite: consent of instructor. Open to intercollegiate student-athletes only. For intercollegiate student-athletes. Balancing academic and athletic demands. Academic, psychological, and sociocultural issues which influence success as a college student-athlete. (P/NP grading only.)-I, II.

15. Administration of Intramural Sports (2) Lecture — 2 hours. Planning and administering intramural sports programs at the high school and col-

25. Theory of Lifesaving and Water Safety (2)

Lecture - 1 hour; laboratory - 2 hours. Prerequisite: sound physical condition, and no physical handicap that would render student unable to perform the

required skills and ability to pass preliminary swimming test. Provides the student with the knowledge, organizational procedures, and skill development necessary to provide for water safety and save his/ her own life or the life of another in an aquatic emergency. (American Red Cross Advanced Lifesaving Certificate awarded upon successful completion of necessary requirements.) - III. (III.) Jahn

27. Training Course for Water Safety Instructors (2)

Lecture-1 hour; laboratory-2 hours. Prerequisite: advanced swimming (course 1) or consent of instructor; course 5 and current Advanced Life-Saving Certificate. Theoretical knowledge and practical experience necessary for the organization and teaching of swimming and lifesaving classes. (American Red Cross Water Safety Instructor's Certificate awarded upon successful completion of necessary requirements.) - III. (III.) Jahn

29. Basic Scuba (2)

Lecture - 2 hours; laboratory - 2 hours. Prerequisite: good physical condition, ability to pass preliminary swimming test. Introduction to basic knowledge required for scuba diving, function and maintenance of equipment, physics and physiology of diving, diver first aid and CPR, oceanography and marine life, and underwater communication. Pool and open water sessions available for certification. (P/NP grading only.) - I, III. (I, III.)

40. Drugs and Society (2)

Lecture - 2 hours; fieldwork - 2 hours total; film-viewing — 5 hours total. Pharmacology, methods of use, and effects of use of psychoactive and performanceenhancing drugs. Historical overview of drug use. Identification of behavior of "at-risk" and "user" ulations. (P/NP grading only.)—II, IV. (II, IV.)

44. Principles of Healthful Living (2)

Lecture - 2 hours. Application of scientific and empirical knowledge to personal, family, and community health problems. (P/NP grading only.)—I, II, II, III, İV. (II, III, IV.)

92. Physical Education Internship (1-5)

Internship - 3-15 hours; written project proposal and evaluation. Prerequisite: consent of instructor; enrollment dependent on availability of intern positions, with priority given to Exercise Biology majors. Work experience in the application of physical activity programs to teaching, recreational, clinical or research situations under department faculty supervision. May be repeated for credit once but no internship units will be counted toward Exercise Biology major. (P/ NP grading only.)

97T. Tutoring in Physical Education (1-5)

Tutorial - 1-5 hours. Prerequisite: lower division standing and consent of Program Director. Tutoring of students in lower division physical activity courses. Weekly meetings with instructor in charge of courses. Written reports on methods and materials required. May be repeated one time for credit. (P/ NP grading only.)

97TC. Tutoring in the Community (1-5)

Tutorial - 2-15 hours; discussion - 1 hour. Prerequisite: lower division standing and consent of Program Director. Tutoring in the community in physical activity related projects under the guidance of the Physical Education faculty. Regular meetings with instructor in charge and written report required. May be repeated one time for credit. (P/NP grading only.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor and Program Director. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) (P/NP grading only.)

Upper Division Courses

100. Field Experience in Teaching Physical Education (2)

Discussion-1 hour; fieldwork-4 hours. Prerequisite: upper division standing and appropriate course 1 or 7. Tutoring or teacher's aide in physical educa-

tion activities, including athletic coaching, in public schools under the guidance of a regular teacher with supervision by a departmental faculty person. May be repeated one time for credit. (P/NP grading only.) — I, II, III. (I, II, III.)

120. Sport in American Society (3)

Lecture - 3 hours. Sociological approaches to the study of sport and contemporary American culture, including sport interaction with politics, economics, religion, gender, race, media and ethics. Socializa tion factors involving youth, scholastic, collegiate, and Olympic sport. (Same course as Exercise Biology 120.) GE credit: SocSci, Div.—II, IV. (II, IV.) Sal-

128A. Intermediate Scuba Diving (4)

Lecture—3 hours; laboratory—3 hours; fieldwork—2 hours. Prerequisite: course 29 and consent of instructor. Lectures and practice in diver safety, rescue, accident management and patient care. Pool and open water sessions required for certification. (P/NP grading only.) - I, IV. (I, IV.) Salitsky

128B. Research Diving Techniques (4)

Lecture - 3 hours; laboratory - 3 hours; fieldwork - 3 hours. Prerequisite: course 128A; consent of instructor. Lectures and application on search and light salvage, night diving, research techniques, cold-water, low visibility diving, blue water, deep and altitude diving. Pool and open water sessions required for certification. (P/NP grading only.)—III. (III.) Fastenau

131. Physical Activity and the Disabled (4)

Lecture - 3 hours; laboratory - 3 hours. The study of the diverse and complex nature of individuals with disabilities and how they adapt to their disabilities in daily living. Integration of individuals with disabilities into the community, schools, and physical activity and recreational programs. Not open for credit to students who have completed Exercise Biology 131.

133. Prevention and Care of Sports Injuries (3)

Lecture — 2 hours; laboratory — 3 hours. Prerequisite: Cell Biology and Human Anatomy 101 (may be taken concurrently). Prevention, care, and rehabilitation of injuries incurred by athletes. Laboratory on anatomy, emergency care, physical therapy methods, and taping techniques. Not open for credit to students who have completed Exercise Biology 133.-IV. (IV.)

135. Advanced Procedures in Evaluation and Management of Athletic Injuries (3)

Lecture - 3 hours. Prerequisite: course 133 or Exercise Biology 133, Cell Biology and Human Anatomy 101, consent of instructor. Advanced study of the evaluation and management of athletic injuries, including mechanism of injury, biomechanics and pathophysiology. Current topics in athletic training. Not open for credit to students who have completed Exercise Biology 135.

141. Coaching Principles and Methods (3)

Lecture/discussion - 3 hours. Prerequisite: upper division standing; course 143. Technical, tactical, and strategic aspects of coaching. Methods for organizing and delivering effective information in coach ing. Biomechanical basis of motor skills and motor learning principles applied to coaching. Classroom development of coaching skills and outside observations of coaching required.—III. (III.) Bronzan

142. Physical Education in the Public Schools (3)

Lecture - 3 hours. Analysis and study of the principles and methods basic to teaching physical education at the elementary and secondary levels.

143. Coaching Effectiveness (3)

Lecture — 3 hours. Prerequisite: upper division standing; 3 units of courses 1 and 6 combined. Synthesis and application of basic components of sport psychology, sport pedagogy, and sport physiology and basic management and administration of athletics in public high schools. (P/NP grading only.)—I, II, IV. (I, II, IV.) Bronzan

144. Principles of Health Education (2)

Lecture - 2 hours. Prerequisite: course 44 and upper division standing or consent of instructor. Principles of teaching health education in the public schools. (P/NP grading only.)

150. Recreation in the Community (3)

Lecture - 2 hours; discussion - 1 hour; two Saturday field trips - 8 hours. The nature and scope of community recreation programs in California emphasizing low income, highly populated areas, and poor rural

192. Physical Education Internship (1-12)

Internship—3-36 hours; written project proposal and evaluation. Prerequisite: upper division standing and consent of instructor; enrollment dependent on availability of intern positions, with priority given to Exercise Science majors. Work experience in the application of physical activity programs to teaching, recreational, clinical or research situations under department faculty supervision. May be repeated for a total of 12 units (including course 92) but no internship units will be counted toward Exercise Science major. (P/NP grading only.)—I, II, III. (I, II, III.)

197T. Tutoring in Physical Education (1-5)

Tutorial - 1-5 hours. Prerequisite: consent of chairperson. Tutoring of students in lower division physical activity courses. Written reports on methods and materials required. May be repeated one time for credit. (P/NP grading only.)

197TC. Tutoring in the Community (1-5)

Tutorial-2-15 hours; discussion-1 hour. Prerequisite: upper division standing and consent of Department Chairperson. Tutoring in the community in physical education related projects under the guidance of the Physical Education faculty. Regular meetings with instructor in charge and written report required. May be repeated one time for credit. (P/ NP grading only

198. Directed Group Study (1-5)

Prerequisite: consent of instructor and Department Chairperson. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Professional Courses

300. The Elementary Physical Education Program (2)

Lecture - 1 hour; laboratory - 2 hours; field trips to selected programs. Prerequisite: senior standing or credential student. Introduction to principles, theories, material, and practices of elementary school physical education program. - III. (III.)

380. Methods of Teaching Physical

Lecture-1 hour; laboratory-6 hours. Prerequisite: course 142 and six units of course 7; or consent of instructor. The methods of teaching group and individual activities for grades K-12; program planning, class management, organization, and evaluation. (P/NP grading only.)

Physical Medicine and Rehabilitation

See Medicine, School of, on page 390.

Physics

(College of Letters and Science)

Andreas Albrecht, Ph.D., Chairperson of the Depart-

Maxwell Chertok, Ph.D., Vice Chairperson of the Department (Administration and Undergraduate Matters

Rena Zieve, Ph.D., Vice Chairperson of the Department (Graduate Matters)

Department Office. 174 Physics Building (530) 752-1500; http://www.physics.ucdavis.edu

Faculty

Andreas J. Albrecht, Ph.D., Professor Robert H. Becker, Ph.D., Professor Patricia C. Boeshaar, Ph.D., Senior Lecturer Marusa Bradac, Ph.D., Assistant Professor Manuel Calderon de la Barca Sanchez, Ph.D., Associate Professor

Steven Carlip, Ph.D., Professor Daniel A. Cebra, Ph.D., Professor Hsin-Chia Cheng, Ph.D., Associate Professor Maxwell B. Chertok, Ph.D., Professor

Shirley Chiang, Ph.D., Professor

Academic Senate Distinguished Teaching Award John Conway, Ph.D., Professor Daniel L. Cox, Ph.D., Professor James Crutchfield, Ph.D., Professor Nicholas Curro, Ph.D., Associate Professor Robin Erbacher, Ph.D., Professor Charles S. Fadley, Ph.D., Professor Christopher D. Fassnacht, Ph.D., Associate Professor Daniel Ferenc, Ph.D., Professor Ching-Yao Fong, Ph.D., Professor Giulia Galli, Ph.D., Professor John F. Gunion, Ph.D., Professor Joint L. Gundin, Ph.D., Professor Nemanja Kaloper, Ph.D., Professor Joseph E. Kiskis, Ph.D., Professor Barry M. Klein, Ph.D., Professor Lloyd E. Knox, Ph.D., Professor Winston T. Ko, Ph.D., Professor Kai Liu, Ph.D., Professor Lori Lubin, Ph.D., Professor Markus Luty, Ph.D., Professor Warren E. Pickett, Ph.D., Professor David Pines, Ph.D., Professor John B. Rundle, Ph.D., Professor Sergey Savrasov, Ph.D., Professor Richard T. Scalettar, Ph.D., Professor Rajiv R.P. Singh, Ph.D., Professor Robert Svoboda, Ph.D., Professor John Terning, Ph.D., Professor S. Mani Tripathi, Ph.D., Professor J. Anthony Tyson, Ph.D., Professor

Emeriti Faculty

Franklin P. Brady, Ph.D., Professor Emeritus Thomas A. Cahill, Ph.D., Professor Emeritus Ling-Lie Chau, Ph.D., Professor Emerita Lawrence B. Coleman, Ph.D., Professor Emeritus
Academic Senate Distinguished Teaching Award Linton R. Corruccini, Ph.D., Professor Emeritus James E. Draper, Ph.D., Professor Emeritus Glen W. Erickson, Ph.D., Professor Emeritus Claude Garrod, Ph.D., Professor Emeritus James P. Hurley, Ph.D., Professor Emeritus John A. Jungerman, Ph.D., Professor Emeritus William J. Knox, Ph.D., Professor Emeritus Richard L. Lander, Ph.D., Professor Emeritus Douglas W. McColm, Ph.D., Senior Lecturer Emeritus, Academic Senate Distinguished Teaching Award Neal Peek, Ph.D., Senior Lecturer Emeritus David E. Pellett, Ph.D., Professor Emeritus

Academic Senate Distinguished Teaching Award

David J. Webb, Ph.D., Senior Lecturer David Wittman, Ph.D., Associate Professor Dong Yu, Ph.D., Assistant Professor

Xiangdong Zhu, Ph.D., Professor

Rena J. Zieve, Ph.D., Professor Gergely Zimanyi, Ph.D., Professor

Wendell H. Potter, Ph.D., Senior Lecturer Emeritus Academic Senate Distinguished Teaching Award Philip M. Yager, Ph.D., Professor Emeritus

Affiliated Faculty

Rodney W. Cole, Ph.D., Lecturer Academic Federation Excellence in Teaching Award

Albert De Roeck, Ph.D. Adjunct Professor Randy R. Harris, Ph.D., Lecturer Academic Federation Excellence in Teaching Award

Eckart Lorenz, Ph.D., Adjunct Professor Harry B. Radousky, Ph.D., Adjunct Professor Ramona Vogt, Ph.D., Adjunct Professor

The Major Program

From the smallest subatomic particles to atoms, molecules, stars, and galaxies, the study of physics is the study of what makes the universe work. Knowledge gained using atomic-scale microscopes and highenergy particle accelerators and nuclear reactors teaches us not only what holds the atomic nucleus together but also how proteins function and why

The Program. The Department of Physics offers a Bachelor of Arts in Physics and two Bachelor of Science degree programs: in Physics (which also offers an emphasis in Astrophysics), and in Applied Physics. The A.B. degree provides a broad coverage of classical and modern physics while permitting a broader liberal arts education than is possible with the other two programs. The B.S. degree in either Physics or Applied Physics should be followed by the student who plans to enter physics as a profession, and also provides excellent training for a wide vari-ety of technical career options. The B.S. in Applied Physics provides the student with a solid introduction to a particular applied physics specialty. For the student who plans to enter the job market upon com-pleting a B.S. degree, the applied physics orientation would be an asset. Either B.S. program provides a solid foundation in physics for the student interested in graduate work in either pure or applied physics.

Career Alternatives. Careers in physics and applied physics include research and development, either in universities, government laboratories, or industry; teaching in high schools, junior colleges, and universities; management and administration in industrial laboratories and in government agencies; and in production and sales in industry. A major in physics also provides a strong base for graduate-level work in such interdisciplinary areas as chemical physics, biophysics and medical physics, geophysics and environmental physics, astrophysics and astronomy, computer science, and materials science.

Physics

A.B. Major Requirements:

Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE..... Mathematics 21A, 21B, 21C, 21D, 22A, 22B......22 Depth Subject Matter35-37 Physics 104A, 105A, 110A, 110B, 112, 115A, 122..... At least one course from 129A, 130A, 1 At least one additional fixed-unit upper division Physics course excluding 160 3-4 Total Units for the Major76-84

Preparatory Subject Matter.....41-47

B.S. Major Requirements:

Preparatory Subject Matter.....50-56 Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE19-25

Mathematics 21A, 21B, 21C, 21D, 22A, 22B Computer Science Engineering 30 (or

Depth Subject Matter59-62 Physics 104A, 105A, 105B, 110A, 110B, 110C, 112, 115A, 115B...........36
Physics 102 (1 unit) or 104B...........14 Physics 122 or 116A, B and C4-12 Two courses from one specialty (General Relativity/Astrophysical Applications, Condensed Matter, or Nuclear/Particle Physics) and one course from a different specialty. Lists of courses in each specialty are available from the department......1 Additional upper division Physics courses excluding 160, for a total of 15 upper division Physics courses of 3 or more units each. With prior departmental approval, one course from mathematics, engineering, or natural science may be used to meet this requirement. May include only one course from 194H, 195, 198, 199......0-9

Total Units for the Major109-118 **Astrophysics Emphasis**

Preparatory Subject Matter.....50-56 Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE..... Mathematics 21A, 21B, 21C, 21D, equivalent programming course)...... Chemistry 2A or 2HA (ŽB-2C or 2HB-2HC highly recommended)......5

Depth Subject Matter59-65 with an astrophysics topic and prior departmental approval), 154, 155, Geology 163; may include only one course from Physics 194H, 195, or 199......6-9

Total Units for the Major109-121 Recommended

Computer Science Engineering 40; Astronomy 25

Applied Physics

UNITS

B.S. Major Requirements:

Preparatory Subject Matter.....49-56 equivalent programming course)......4 Depending on area of concentration: Chemistry 2A or 2HA (2B-2C or 2HB-2HC highly recommended) Computer Science Engineering 40 Mathematics 22AL......14-5

Depth Subject Matter57-64 Further courses from approved lists within one of the following concentrations chosen in consultation with a major adviser, to

Total Units for the Major...... 106-121 Recommended Electives

Astronomy: Astronomy 25 Computer and numerical analysis: Mothematics 128A or Applied Science Engineering 115 Statistics: Statistics 131A Advanced mathematics: Mathematics 108, 118AB, 119AB 127ABC 185AB

Program Variance. Courses from other departments may be submitted for courses in the depth subject matter requirements by obtaining written permission from the Undergraduate Curriculum Committee Chairperson, as approved by the Department.

Major Advisers. Contact Departmental Undergraduate Majors office in 174 Physics Building, for adviser assignment.

Minor Program Requirements:

All courses in the minor have prerequisites equivalent to Mathematics 21A-21B-21C-21D and 22A-22B and Physics 9A-9B-9C-9D. Students considering the possibility of a minor should consult with a Physics major advisor before beginning course work in the minor program.

UNITS

Physics...... 24

At least 6 upper division courses in Physics (excluding Physics 160, 197T and 199)2

Graduate Study. The Department of Physics offers programs of study and research leading to the M.S. and Ph.D. degrees. Further information regarding requirements for these three degrees, graduate research, teaching assistantships, and research assistantships may be obtained by writing to the Chairperson, Department of Physics, One Shields Avenue, University of California, Davis, CA 95616.

Astronomy. In addition to the introductory Astronomy courses listed, upper division and graduate courses in Astronomy, Astrophysics and Cosmology are listed under Physics.

Courses in Astronomy (AST)

Lower Division Courses

10G. Introduction to Stars, Galaxies, and the Universe (3)

Lecture—3 hours. Non-mathematical introduction to astrophysics of the Universe beyond our solar system using concepts of modern physics. Not open for credit to students who have taken Astronomy 2, the former Astronomy 10, any quarter of Physics 9 or 9H, or any upper-division physics course (other than 137 or 160). GE credit: SciEng | SE, SL, VL.—I, II, III. (I, II, III.)

10L. Observational Astronomy Laboratory (1)

Laboratory—2.5 hours. Prerequisite: course 10G or 10S (may be taken concurrently). Introduction to observations of the night sky using small telescopes in nighttime laboratory. Not open for credit to students who have completed course 2 or 10. GE credit: SciEng | SE, VL.—I, III. (I, III.)

105. Astronomy of the Solar System (3)

Lecture—3 hours. Introduction to naked eye and telescopic observations of events in the night sky: positions of sun, moon, planets throughout the year. Historical perspective on how our understanding of the solar system evolved to current non-mathematical astrophysical interpretation of planetary systems. Not open for credit to students who have taken

course 2, Physics 9 or 9H, or any upper-division physics course (other than 137 or 160). GE credit: SciEng | SE, SL, VL.—I, II, III. (I, II, III.)

25. Introduction to Modern Astronomy and Astrophysics (4)

Lecture—3 hours; lecture/discussion—2.5 hours. Prerequisite: good facility in high school physics and mathematics (algebra and trigonometry). Description and interpretation of astronomical phenomena using the laws of modern physics and observations by modern astronomical instruments. Gravity, relativity, electromagnetic radiation, atomic and nuclear processes in relation to the structure and evolution of stars, galaxies and the universe. Not open to students who have received credit for course 2, 10G, or 10L. GE credit: SE, SL, VL.—1. (I.) Fassnacht, Jubin

Courses in Physics (PHY)

Physics 10 is primarily a concept-oriented one-quarter lecture/discussion course requiring relatively little mathematical background.

Physics 1 is a two-quarter sequence requiring some mathematics (trigonometry). Either 1A alone or both quarters may be taken. The sequence is not intended to satisfy entrance requirements of a year of physics for professional schools, but will satisfy requirements of 3 or 6 units of physics.

Physics 7 is a one-year (three-quarter) introductory physics course with laboratory intended for students majoring in the biological sciences. It has a calculus prerequisite. If you don't need a full year of introductory physics, you should take one or two quarters of Physics 1 instead. Read the following information carefully if you are using Physics 7 to complete an introductory course you have already begun.

The sequence of material in Physics 7 is different from that in most traditionally taught introductory physics courses. Physics 7B is most like the first quarter or semester of traditionally taught courses which treat classical mechanics. Physics 7C is most like the last quarter or semester which, in traditionally taught courses, treats optics, electricity and magnetism, and modern physics. The content and sequence of Physics 7A is unlike that of most other traditionally taught courses.

If you have completed one introductory quarter or semester of a traditionally taught physics course and want to continue with Physics 7, you should first take (and will receive full credit for) Physics 7A. Then, either skip 7B, but self-study the last three weeks of material, or take 7B and receive reduced credit. Finally, take 7C for full credit.

If you have taken two quarters of a year-long introductory physics course and have not had extensive work in optics, electricity and magnetism, and modern physics, you should take Physics 7C. In no case should you take Physics 7B without first taking Physics 7A. All other situations should be discussed directly with a Physics 7 instructor.

Students not intending to take the entire sequence should instead take Physics 1.

Physics 9 is a four-quarter sequence using calculus throughout and including laboratory work as an integral component. The course is primarily for students in the physical sciences and engineering.

Physics 9H is a five-quarter honors physics sequence, which may be taken instead of Physics 9. It is intended primarily for first-year students with a strong interest in physics and with advanced placement in mathematics to MAT 21B. Students who plan to major in physics, and also motivated non-majors, should take Physics 9H instead of Physics 9 if they are ready to begin MAT21B in fall quarter. In course requirements and prerequisites, Physics 9HA-9HE can be substituted for Physics 9A-9D. Students may not switch between the 9H and 9 series beyond 9HA or 9A.

Lower Division Courses

1A. Principles of Physics (3)

Lecture—3 hours. Prerequisite: trigonometry or consent of instructor. Mechanics. Introduction to general principles and analytical methods used in physics with emphasis on applications in applied agricultural and biological sciences and in physical education. Not open to students who have received credit for course 7B, or 9A. GE credit: SE.—I. (I.)

1B. Principles of Physics (3)

Lecture—3 hours. Prerequisite: course 1A or 9A. Continuation of course 1A. Heat, optics, electricity, modern physics. Not open for credit to students who have received credit for course 7A, 7B, 7C, 9B, 9C, or 9D. GE credit: SE.—II. (II.)

7A. General Physics (4)

Lecture — 1.5 hours; discussion/laboratory — 5 hours. Prerequisite: completion or concurrent enrollment in Mathematics 16B, 17B, or 21B. Introduction to general principles and analytical methods used in physics for students majoring in a biological science. Only two units of credit allowed to students who have completed course 1B or 9B. GE credit: SE.—I, II, III. (I, II, III.)

7B. General Physics (4)

Lecture — 1.5 hours; discussion/laboratory — 5 hours. Prerequisite: course 7A. Continuation of course 7A. Only two units of credit allowed to students who have completed course 9A, or 1A. GE credit: SE.—I, II, III. (I, II, III.)

7C. General Physics (4)

Lecture — 1.5 hours; discussion/laboratory — 5 hours. Prerequisite: course 7B. Continuation of course 7B. Only two units of credit allowed to students who have completed course 9C or 5C. GE credit: SE.—I, II, III. (I, II, III.)

9A. Classical Physics (5)

Lecture—3 hours; laboratory—2.5 hours; discussion—1 hour. Prerequisite: Mathematics 21B. Introduction to general principles and analytical methods used in physics for physical science and engineering majors. Classical mechanics. Only 2 units of credit to students who have completed course 1A or 7B. Not open for credit to students who have completed course 9HA. GE credit: SE.—I, III. (I, III.)

9B. Classical Physics (5)

Lecture—3 hours; laboratory—2.5 hours; discussion—1 hour. Prerequisite: course 9A, Mathematics 21C, 21D (may be taken concurrently). Continuation of course 9A. Fluid mechanics, thermodynamics, wave phenomena, optics. Only 2 units of credit to students who have completed course 7A. Not open for credit to students who have completed course 9HB, 9HC, or Engineering 105. GE credit: SE.—I, II. (I, II.)

9C. Classical Physics (5)

Lecture—3 hours; laboratory—2.5 hours; discussion—1 hour. Prerequisite; course 9B, Mathematics 21D, 22A (may be taken concurrently). Electricity and magnetism including circuits and Maxwell's equations. Only 3 units of credit to students who have completed course 7C. Not open for credit to students who have completed course 9HD. GE credit: SE.—II, III. (II, III.)

9D. Modern Physics (4)

Lecture—3 hours; discussion—1.5 hours. Prerequisite: course 9C and Mathematics 22A; Mathematics 22B recommended (may be taken concurrently). Introduction to physics concepts developed since 1900. Special relativity, quantum mechanics, atoms, molecules, condensed matter, nuclear and particle physics. Not open for credit to students who have completed course 9HB, 9HC, or 9HE. GE credit: SE.—1, III. (I, III.)

9HA. Honors Physics (5)

Lecture — 3 hours; discussion/laboratory — 4 hours. Prerequisite: Mathematics 21B (may be taken concurrently) or consent of instructor. Classical mechanics. Same material as course 9A in greater depth. For students in physical sciences, mathematics, and engineering. Only 2 units of credit to students who

have completed course 7B. Not open for credit to students who have completed course 9A. GE credit:

9HB. Honors Physics (5)

Lecture — 3 hours; discussion/laboratory — 4 hours. Prerequisite: Physics 9HA or 9A, Mathématics 21C (may be taken concurrently). Special relativity, thermal physics. Continuation of course 9HA. Only 2 units of credit to students who have completed course 7A. Not open for credit to students who have completed course 9B or 9D. GE credit: SE.—II. (II.)

9HC. Honors Physics (5)

Lecture -3 hours; discussion/laboratory -4 hours. Prerequisite: course 9HB and Mathematics 21D (may be taken concurrently). Waves, sound, optics, quantum physics. Continuation of Physics 9HB. Only 2 units of credit to students who have completed course 7C. Not open for credit to students who have completed course 9B or 9D. GE credit: SE.—III. (III.)

9HD. Honors Physics (5)

Lecture—3 hours; discussion/laboratory—4 hours. Prerequisite: course 9HC and Mathematics 21D. Electricity and magnetism. Continuation of Physics 9HC. Not open for credit to students who have completed course 9C. GE credit: SE.-I. (I.)

9HE. Honors Physics (5)

Lecture — 3 hours; discussion/laboratory — 4 hours. Prerequisite: course 9HD and Mathematics 22B (may be taken concurrently). Application of quantum mechanics. Not open for credit to students who have completed course 9D. GE credit: SE.—II. (II.)

10. Topics in Physics for Nonscientists (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: high school algebra. Emphasis varies: survey of basic principles or a deeper exploration of some particular branch. Past topics included black holes, space time, and relativity; physics of music; history and philosophy; energy and the environment; and natural phenomena. Check with the Department office for the current emphasis. No units of credit allowed if taken after any other physics course. GE credit: SciEng, Wrt | SE

12. Visualization in Science (3)

Lecture - 3 hours. Class size limited to 20-50 students. Production, interpretation, and use of images in physics, astronomy, biology, and chemistry as scientific evidence and for communication of research results. GE credit: SE, VL.-I. (I.)

30. Fractals, Chaos and Complexity (3)

Lecture/discussion-3 hours. Prerequisite: Mathematics 16A or 21A. Modern ideas about the unifying ideas of fractal geometry, chaos and complexity. Basic theory and applications with examples from physics, earth sciences, mathematics, population dynamics, ecology, history, economics, biology, computer science, art and architecture. Offered in alternate years. (Same course as Geology 30.) GE credit: SciEng | QL, SE. - (II.) Rundle

49. Supplementary Work in Lower Division Physics (1-3)

Students with partial credit in lower division physics courses may, with consent of instructor, complete the credit under this heading. May be repeated for credit. GE credit: SE. -I, II, III. (I, II, III.)

90X. Lower Division Seminar (2)

Seminar - 2 hours. Prerequisite: lower division standing and consent of instructor. Examination of a special topic in Physics through shared readings, discussions, written assignments, or special activities such as laboratory work. May be repeated for credit. Limited enrollment. GÉ credit: SE.

98. Directed Group Study (1-5)

Prerequisite: consent of instructor; primarily for lower division students. (P/NP grading only.) GE credit:

99. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.

Upper Division Courses 102. Computational Laboratory in Physics (1)

Laboratory—4 hours. Prerequisite: Mathematics 21D, 22AB; Computer Science Engineering 30; course 9D or 9HD; course 104A concurrently. Introduction to computational physics and to the computational resources in the physics department. Preparation for brief programming assignments required in other upper division physics classes. Not open to students who have completed course 104B or 105AL. GE credit: SE.-I. (I.)

104A. Introductory Methods of Mathematical Physics (4)

Lecture—3 hours; extensive problem solving. Prerequisite: courses 9B, 9C, 9D and Mathematics 21D, 22A, and 22B with grade C- or better or consent of instructor. Introduction to the mathematics used in upper-division physics courses, including applications of vector spaces, Fourier analysis, partial differential equations. - I. (I.)

104B. Computational Methods of Mathematical Physics (4)

Lecture-3 hours; extensive problem solving. Prerequisite: course 104A with grade C- or better and course 105AL or consent of instructor. Introduction to the use of computational techniques to solve the mathematical problems that arise in advanced physics courses, complementing the analytical approaches emphasized in course 104A. GE credit: SE. - II. (II.)

104C. Intermediate Methods of **Mathematical Physics (4)**

Lecture — 3 hours; extensive problem solving. Prerequisite: course 104A with grade C- or better or consent of instructor. Applications of complex analysis, conditional probability, integral transformations and other advanced topics. Offered in alternate years. III. (III.)

105A-105B. Analytical Mechanics (4-4)

Lecture - 3 hours; extensive problem solving. Prerequisite: courses 9B, 9C, 9D and Mathematics 21D, 22A, and 22B passed with grade C- or better; or consent of department; course 104A and 105A passed with a grade C- or better or consent of department required for 105B. Principles and applications of Newtonian mechanics; introduction to Lagrange's and Hamilton's equations. GE credit: SE. — I-II. (I-II.)

105C. Continuum Mechanics (4)

Lecture-3 hours. Prerequisite: 104A and 105A passed with a grade of C- or better, or consent of department. The continuum hypothesis and limitations, tensors, isotropic constitutive equations, and wave propagation. Applications such as elastic solids, heat flow, aerodynamics, and ocean waves. Not offered every year. GE credit: SE.

105A-105B. Analytical Mechanics (4-4)

Lecture-3 hours; extensive problem solving. Prerequisite: courses 9B, 9C, 9D and Mathematics 21D, 22A, and 22B passed with grade C- or better; or consent of department; course 104A and 105A passed with a grade C- or better or consent of department required for 105B. Principles and applications of Newtonian mechanics; introduction to Lagrange's and Hamilton's equations. GE credit: SE.—I-II. (I-II.)

105C. Continuum Mechanics (4)

Lecture - 3 hours. Prerequisite: 104A and 105A passed with a grade of C- or better, or consent of department. The continuum hypothesis and limitations, tensors, isotropic constitutive equations, and wave propagation. Applications such as elastic solids, heat flow, aerodynamics, and ocean waves. Not offered every year. GE credit: SE.

1110A. Electricity and Magnetism (4)

Lecture - 3 hours. Prerequisite: courses 9B, 9C, 9D and Mathematics 21D, 22A, and 22B with grade Cor better, or consent of department. Theory of electrostatics, electromagnetism, Maxwell's equations, electromagnetic waves. - I, II, III. (I, II, III.)

110B. Electricity and Magnetism (4)

Lecture-3 hours. Prerequisite: courses 110A and 104A with a grade of C- or better or consent of department. Theory of electrostatics, electromagnetism, Maxwell's equations, electromagnetic waves.—I, II, III. (İ, II, III.)

110C. Electricity and Magnetism (4)

Lecture—3 hours. Prerequisite: course 110B with a grade of C- or better, or consent of department. Theory of electrostatics, electromagnetism, Maxwell's equations, electromagnetic waves. — I, II, III. (I, II, III.)

112. Thermodynamics and Statistical Mechanics (4)

Lecture-3 hours; extensive problem solving. Prerequisite: course 115A or the equivalent. Introduction to classical and quantum statistical mechanics and their connections with thermodynamics. The theory is developed for the ideal gas model and simple magnetic models and then extended to studies of solids, quantum fluids, and chemical equilibria. GE credit: SE.—I. (I.)

115A. Foundation of Quantum Mechanics

Lecture—3 hours; extensive problem solving. Prerequisite: courses 104A and 105A passed with a grade of C- or better, or consent of department. Introduction to the methods of quantum mechanics with applications to atomic, molecular, solid state, nuclear and elementary particle physics. Extensive problem solving. GE credit: SE. - III. (III.)

115B. Applications of Quantum Mechanics

Lecture - 3 hours; extensive problem solving. Prerequisite: course 115A passed with a grade of C- of better, or consent of department. Angular momentum and spin; hydrogen atom and atomic spectra; perturbation theory; scattering theory. GE credit: SE.-I.

116A. Electronic Instrumentation (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 9C and Math 22B or consent of instructor. Experimental and theoretical study of important analog electronic circuits. Linear circuits, transmission lines, input impedance, feedback, amplifiers, oscillators, noise. GE credit: SE, VL.—I. (I.)

116B. Electronic Instrumentation (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 9C or 9HD or consent of instructor. Continuation of course 116A. Introduction to the use of digital electronics and microcomputers in experimental physics. Nonlinear electronics, integrated circuits, analog-to-digital and digital-to-analog converters, transducers, actuators. GE credit: SE.-II. (II.)

116C. Introduction to Computer-Based Experiments in Physics (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 9D or 9HD, 116B, Mathematics 22B or consent of instructor. Introduction to techniques for making physical measurements using computer-based instrumentation. GE credit: SE, WE.—III. (III.)

122A. Advanced Laboratory in Condensed Matter Physics (4)

Laboratory-8 hours. Prerequisite: course 115A or consent of the department. Experimental techniques and measurements in solid-state physics. Student performs three to six experiments depending on diffi-culty. Individual work is stressed. Thorough write-ups of the experiments are required. GE credit: SE, WE. — II, III. (II, III.)

122B. Advanced Laboratory in Particle Physics (4)

Laboratory-8 hours. Prerequisite: course 115A or consent of the department. Experimental techniques and measurements in nuclear and particle physics. Students perform three to six experiments depending on difficulty. Individual work is stressed. Thorough write-ups of the experiments are required. GE credit: SE, WE.—II, III. (II, III.)

123. Signals and Noise in Physics (4)

Lecture—3 hours; project—1 hour. Prerequisite: courses 9A, B, C, D and 104A, or consent of instructor. Techniques of measurement and analysis

designed to avoid systematic error and maximize signal/noise ratio. Illustrative examples of optimal filters ranging from condensed matter to cosmology. Not open to students who have completed this course previously as course 198. Not offered every year. GE credit: SE.—III. (III.) Tyson

129B. Nuclear Physics, Extensions and Applications (4)

Lecture—3 hours; term paper. Prerequisite: course 129A. Continuation of course 129A. Nuclear reactions, neutrons, fission, fusion accelerators, introduction to meson and particle physics, nuclear astrophysics, and applications of nuclear physics and techniques to mass spectrometry, nuclear medicine, trace element analysis. Not offered every year. GE credit: SE

130A-130B. Elementary Particle Physics (4-4)

Lecture — 3 hours; extensive problem solving. Prerequisite: course 115A passed with a grade of C- or better or consent of instructor. Properties and classification of elementary particles and their interactions. Experimental techniques. Conservation laws and symmetries. Strong, electromagnetic, and weak interactions. Introduction to Feynman calculus. GE credit: SE. — II, III. (II, III.)

140A-140B. Introduction to Solid State Physics (4-4)

Lecture — 3 hours; extensive problem solving. Prerequisite: course 115A or the equivalent passed with a grade of C- or better or consent of instructor. Survey of fundamental ideas in the physics of solids, with selected device applications. Crystal structure, x-ray and neutron diffraction, phonons, simple metals, energy bands and Fermi surfaces, semiconductors, optical properties, magnetism, superconductivity. GE credit: SE. - II-III. (II-III.)

150. Special Topics in Physics (4)

Lecture—3 hours; project. Prerequisite: courses 9A, B, C, D or 9HA, HB, HC, HD, HE or consent of instructor. Topics vary, covering areas of contemporary research in physics. May be repeated for credit. Not offered every year. GE credit: SE.—I, II, III. (I, II, III.)

151. Stellar Structure and Evolution (4)

Lecture - 3 hours; project. Prerequisite: courses 9A, B, C, D or consent of instructor. The chemical composition, structure, energy sources and evolutionary history of stars, with equal emphasis on both the observational data and theoretical models, including black holes, neutron stars and white dwarfs and the formation of substellar masses. Offered in alternate years. GE credit: SE. - (I.) Becker, Boeshaar

152. Galactic Structure and the Interstellar Medium (4)

Lecture—3 hours; project. Prerequisite: courses 9A, B, C, D and 105A concurrently or consent of instructor.The structure, contents, and formation of our Milky Way galaxy, viz. its shape and size, the nature of the interstellar medium, stellar populations, rotation curves, mass determination and evidence of dark matter. Offered in alternate years. GE credit: SE.—I. Boeshaar, Knox

153. Extragalactic Astrophysics (4)

Lecture-3 hours; project. Prerequisite: courses 9A, B, C, D, 104A and 105A or consent of instructor. Structure and evolution of galaxies and clusters of galaxies, including distance and mass determination, galaxy types and environments, active galactic nuclei and quasars, gravitational lensing and dark matter, global cosmological properties. Not open to students who have completed course 127. Offered in alternate years. GE credit: SE. - (II.) Fassnacht

154. Astrophysical Applications of Physics (4)

Lecture—3 hours; project. Prerequisite: course 105AB, 110A; 110B and 115A concurrently; 112 or consent of instructor. Applications of classical and quantum mechanics, thermodynamics, statistical mechanics, and electricity and magnetism to astro-physical settings such as the Big Bang, degenerate white dwarf and neutron stars, and solar neutrinos.

Not open to students who have completed this course previously as course 198. Offered in alternate years. GE credit: SE. - (III.) Knox

155. General Relativity (4)

Lecture - 3 hours; project. Prerequisite: course 104A and 105A; 105B and 110A or consent of instructor. Definition of the mathematical frame work for the description of the gravitational field, introduction of the dynamical equations of Einstein governing its evolution and review of the key solutions, including black holes and expanding universes. Offered in alternate years. GE credit: SE.—III. Kaloper

156. Introduction to Cosmology (4)

Lecture — 3 hours; project. Prerequisite: courses 9A, B, C, D and 105A concurrently or consent of instructor. Contemporary knowledge regarding the origin of the universe, including the Big Bang and nucleosynthesis, microwave background radiation, formation of cosmic structure, cosmic inflation, cosmic acceleration and dark energy. Offered in alternate years. Not open to students who have completed course 126. GE credit: SE.-II. Albrecht

157. Astronomy Instrumentation and Data Analysis Laboratory (4)

Lecture — 2 hours; laboratory — 6 hours; project. Pre-requisite: courses 9A, B, C, D. Experimental techniques, data acquisition and analysis involving stellar, nebular and galaxy digital imaging, photometry and spectroscopy. Analyzing time resolved changes in the solar atmosphere in the light of hydrogen alpha. Offered in alternate years. GE credit: SE.—(III.) Boeshaar, Tyson

160. Environmental Physics and Society (3)

Lecture — 3 hours. Prerequisite: course 9D or 7C; or course 10 or 1B and Mathematics 16B or the equivalent. Impact of humankind on the environment will be discussed from the point of view of the physical sciences. Calculations based on physical principles will be made, and the resulting policy implications will be considered. (Same course as Engineering 160.) GE credit: SciEng or SocSci | SE, SL.-III. (III.)

190. Careers in Physics (1)

Seminar-2 hours. Overview of important research areas in physics, discussions of research opportunities and internships, strategies for graduate school and industrial careers, the fellowship and assistantship selection process, preparation of resumes, personal statements, and letters of recommendation. Physics and Applied Physics majors only. (P/NP grading only.) GE credit: SE. – I. (I.)

194HA-194HB. Special Study for Honors Students (4-4)

Independent study-12 hours. Prerequisite: consent of instructor required. Open only to Physics and Applied Physics majors who satisfy the College of Letters and Science requirements for entrance into the Honors Program. Independent research project at a level significantly beyond that defined by the normal physics curriculum. (Deferred grading only, pending completion of sequence). GE credit: SE.

195. Senior Thesis (5)

Independent study—15 hours. Prerequisite: consent of instructor required. Open only to Physics and Applied Physics majors with senior standing. Preparation of a senior thesis on a topic selected by the student with approval of the department. May be repeated for a total of 15 units. GE credit: SE.-I, II, III. (I, II, III.)

197T. Tutoring in Physics and Astronomy (1-5)

Tutoring of students in lower division courses. Leading of small voluntary discussion groups affiliated with one of the department's regular courses. Weekly meeting with instructor. (P/NP grading only.)
GE credit: SE.—I, II, III. (I, II, III.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.) GE credit: SE.

Graduate Courses

200A. Theory of Mechanics and Electromagnetics (4)

Lecture - 3 hours; independent study - 1 hour. Prerequisite: courses 104B, 105B, and 110C or the equivalent; course 204A concurrently. Theoretical approaches in classical mechanics including the use of generalized coordinates and virtual work; variational calculus; Lagrange equations; symmetries, conservation laws, and Noether theorem; Lagrangian density; Hamilton formalism; canonical transformations; Poisson brackets; and Hamilton-Jacobi equations. - I. (I.)

200B-200C. Theory of Mechanics and Electromagnetics (4-4)

Lecture - 3 hours; independent study - 1 hour. Prerequisite: course 200A, and course 204B concurrently. Theoretical approaches in electromagnetics including static electromagnetic fields; Maxwell's equations; plane waves in various media; magnetohydrodynamics; diffraction theory; radiating systems; and special relativity. — II-III. (II-III.)

204A-204B. Methods of Mathematical Physics (4-4)

Lecture—3 hours; independent study—1 hour. Prerequisite: courses 104A and 104B or the equivalent. Linear vector spaces, operators and their spectral analysis, complete sets of functions, complex variables, functional analysis, Green's functions, calculus of variations, introduction to numerical analysis.—I-II. (I-II.)

210. Computational Physics (3)

Lecture — 3 hours. Prerequisite: knowledge of Fortran or C. Analytic techniques to solve differential equations and eignevalue problems. Physics content of course will be self-contained, and adjusted according to background of students. - II. (II.)

215A-215B-215C. Quantum Mechanics (4-4-4)

Lecture - 3 hours; independent study - 1 hour. Prerequisite: course 115B or the equivalent. Formal development and interpretation of non-relativistic quantum mechanics; its application to atomic, nuclear, molecular, and solid-state problems; brief introduction to relativistic quantum mechanics and the Dirac equation. — I-II-III. (I-II-III.)

219A. Statistical Mechanics (4)

Lecture—3 hours; extensive problem solving. Prerequisite: course 215B or the equivalent. Foundations of thermodynamics and classical and quantum statistical mechanics with simple applications to properties of solids, real gases, nuclear matter, etc. and a brief introduction to phase transitions. —III. (III.)

219B. Statistical Mechanics (4)

Lecture—3 hours; extensive problem solving. Prerequisite: course 219A. Further applications of thermodynamics and classical and quantum statistical mechanics. The modern theory of fluctuations about the equilibrium state, phase transitions and critical

223A. Group Theoretical Methods of Physics – Condensed Matter (3)

Lecture - 3 hours. Prerequisite: courses 215A, 215B (215C is corequisite) or consent of instructor. Theory of groups and their representations with applications in condensed matter. Not offered every year.

223B. Group Theoretical Methods of Physics - Elementary Particles (3)

Lecture — 3 hours. Prerequisite: courses 215A, 215B (215C is corequisite) or consent of instructor. Theory of groups and their representations with applications in elementary particle physics. Not offered every

224A. Nuclear Physics (3)

Lecture — 3 hours. Prerequisite: course 215B. Comprehensive study of the nucleon-nucleon interaction including the deuteron, nucleon-nucleon scattering, polarization, determination of real parameters of Smatrix, and related topics. Not offered every year.

224B. Nuclear Physics (3)

Lecture - 3 hours. Prerequisite: course 224A. Study of nuclear models, including shell model, collective model, unified model. Energy level spectra, static momenta, and electromagnetic transition rates. Not offered every year.

224C. Nuclear Physics (3)

Lecture—3 hours. Prerequisite: course 224B. Study of nuclear scattering and reactions including the optical model and direct interactions. Beta decay and an introduction to weak interactions. Not offered every year.

229A. Advanced Nuclear Theory (3)

Lecture - 3 hours. Prerequisite: course 224C Advanced topics in nuclear theory; theory of quantum-mechanical scattering processes. Exact formal theory and models for two-body scattering. Not offeréd every year.

229B. Advanced Nuclear Theory (3)

Lecture - 3 hours. Prerequisite: course 229A Advanced topics in nuclear theory; theory of quantum-mechanical scattering processes. Exact formal theory and models for three-body scattering. Not offered every year.

230A. Quantum Theory of Fields (3)

Lecture—3 hours. Prerequisite: course 215C. Relativistic quantum mechanics of particles; techniques and applications of second quantization; Feynman diagrams; renormalization.—III. (III.)

230B. Quantum Theory of Fields (3)

Lecture - 3 hours. Prerequisite: course 230A. Continuation of 230A, with selected advanced topics, such as S-matrix theory, dispersion relations, axiomatic formulations. -1. (1.)

230C. Quantum Theory of Fields (3)

Lecture - 3 hours. Prerequisite: course 230A and B, or consent of instructor. Renormalization theory and applications, including dimensional regularization, Ward identities, renormalization group equations, coupling constant unification, and precision electroweak calculations. May be repeated for credit with consent of instructor.—II. (II.)

240A. Condensed Matter Physics A (3)

Lecture - 3 hours. Prerequisite: course 215C, 219A; course 140AB or equivalent recommended. Topics in condensed matter physics: Crystal structure; oneelectron theory; transport and optical properties of semiconductors; phonons, electron-phonon scatter-

240B. Condensed Matter Physics B (3)

Lecture — 3 hours. Prerequisite: course 240A. Topics in condensed matter physics: transport and optical properties of metals and quantum structures; experimental measurement the Fermi surface and of phonon spectra. - II. (II.)

240C. Condensed Matter Physics (3)

Lecture - 3 hours. Prerequisite: course 240AB Review of second quantization. Interacting electron gas, electron-phonon interaction and effects, including instabilities of electronic systems. Topics in the theory of superconductivity and magnetism. — III (III.)

241. Advanced Topics in Magnetism (3)

Lecture — 3 hours. Prerequisite: courses 240A-240B and 240C-240D, or consent of instructor. Topics chosen from areas of current research interest. Not offered every year.

242. Advanced Topics in Superconductivity (3)

Lecture—3 hours. Prerequisite: courses 240A-240B and 240C-240D, or consent of instructor. Topics chosen from areas of current research interest. Not offered every year.

243A-243B-243C. Surface Physics of Materials (3-3-3)

Lecture - 3 hours. Prerequisite: courses 140A-140B, 115A-115B or the equivalents; courses 215A, 240A, or the equivalents recommended. Experimental and theoretical fundamentals of surface and interface physics and chemistry, including electronic and magnetic structure, thermodynamics, adsorption kinetics, epitaxial growth, and a discussion of various spectroscopic and structural probes based on photons, electrons, ions, and scanning probes. Offered in alternate years—I, II, III.

245A. High-Energy Physics (3)

Lecture - 3 hours. Prerequisite: course 230A. Phenomenology and systematics of strong, electromagnetic, and weak interactions of hadrons and leptons; determination of quantum numbers; quarks and quarkonia; deep inelastic scattering; the quark parton model; experiments at hadron colliders and electron-positron colliders. — I. (I.)

245B. High-Energy Physics (3)

Lecture — 3 hours. Prerequisite: course 245A. Electroweak interactions; phenomenology of the Standard Model of SU(2)_LxU(1); weak interaction experiments; properties of and experiments with W and Z vector bosons; Glashow-Weinberg-Salam model and the Higgs boson; introduction to supersymmetry and other speculations.—II. (II.)

245C. Collider Physics (3)

Lecture - 3 hours. Prerequisite: course 245A; course 252B taken previously or concurrently; or consent of instructor. Collider physics. Topics include quark and gluon distribution functions and the computation of cross sections; Large Hadron Collider and International Linear Collider phenomenology; collider and detector characteristics; extracting models from data; software tools for analyzing experimental data. May be repeated for credit with consent of instructor.—III. (III.)

246A. Supersymmetry: Theory and Phenomenology (3)

Lecture - 3 hours. Prerequisite: courses 230A-230B, 245A-245B recommended, or consent of instructor. Construction of supersymmetric models of particle physics; superfields; supersymmetry breaking the minimal supersymmetric standard model; supergrav ity. Collider phenomenology of supersymmetry. Dark matter phenomenology. Not offered every year. —III.

246B. Advanced Supersymmetry (3)

Lecture - 3 hours. Prerequisite: course 246A Advanced topics in supersymmetry. Topics include holomorphy, the Affleck-Dine-Seiberg superpotential, Seiberg duality for SUSY QCD, dynamical SUSY breaking, Seiberg-Witten theory, superconformal field theories, supergravity, anomaly and gaugino mediation, and the AdS/CFT correspondence. Not offered every year-I. (I.)

250. Special Topics in Physics (3)

Lecture—3 hours. Prerequisite: consent of instructor. Topic varies. May be repeated for credit. Not offered every quarter. — I, II, III. (I, II, III.)

252A. Techniques of Experimental Physics (3)

Lecture—3 hours. Introduction to techniques and methods of designing and executing experiments. Problems and examples from condensed matter research will be utilized. Not offered every year.

252B. Techniques of Experimental Physics (3)

Lecture-3 hours. Introduction to techniques and methods of designing and executing experiments. Problems and examples from nuclear and particle research will be utilized. - I. (I.)

252C. Statistics and Data Analysis for Particle Physics (3)

Lecture—3 hours. Introduction to statistical data analysis methods in particle physics. Theoretical lectures combined with practical computer laboratory work. - II. (II.)

253. Signals and Noise in Physics (3)

Lecture — 3 hours. Techniques for extracting signals from noise, systematic error. Not offered every year.—II. (II.)

256. Natural Computation and Self-Organization: The Physics of Information **Processing in Complex Systems (3)**

Lecture - 3 hours. Prerequisite: course 200A or Mathematics 119A/B or Mathematics 219; course 204A or Mathematics 119A/B or Mathematics 219; course 219A or Mathematics 135A/B or

Mathematics 235A. Explores intrinsic unpredictability (deterministic chaos) and the emergence of structure in natural complex systems. Using statistical mechanics, information theory, and computation theory, the course develops a systematic framework for analyzing dynamical and stochastic processes in terms of their causal architecture. —II. (II.) Crutchfield

260. Introduction to General Relativity (3)

Lecture—3 hours. Prerequisite: courses 200A, 200B. An introduction to general relativity. Differential geometry and curved spacetime; the Einstein field equations; gravitational fields of stars and black holes; weak fields and gravitational radiation; experimental tests; Big Bang cosmology.—I. (I.)

262. Early Universe Cosmology (3)

Lecture — 3 hours. Prerequisite: second year standing in Physics graduate program or consent of instructor. Introduction to early universe cosmology: the Big Bang, inflation, primordial nucleosynthesis, dark matter, dark energy, and other topics of current interest. Not offered every year. - II. (II.)

263. Cosmic Structure Formation (3)

Lecture - 3 hours. Prerequisite: course 260. Growth of structure from small density inhomogeneities in the early universe to the diverse structures observable today. Use of observable properties (cosmic microwave background, gravitational lensing, peculiar velocities, number density, etc.) to constrain models of structure formation and fundamental physics. Not offered every year. — III. (III.)

265. High Energy Astrophysics and Radiative Processes (3)

Lecture — 3 hours. Prerequisite: graduate standing in physics or consent of instructor. Survey course covering galactic and extragalactic X-ray and gamma-ray astronomy, radiative processes, and techniques of high-energy astrophysics.—I.

266. Data Analysis for Astrophysics (3)

Lecture — 3 hours. Prerequisite: graduate standing in physics or consent of instructor. Survey course covering measurement and signal analysis techniques for astrophysics and cosmology throughout the electromagnetic spectrum. Offered in alternate years. - II.

267. Observational Extragalactic Astronomy & Cosmology (3)

Lecture-3 hours. Prerequisite: graduate standing in physics or consent of the instructor. Survey course covering current areas of research on extragalactic objects, their physical properties, origin, evolution, and distribution in space. Offered in alternate years. - III. (III.)

270. Current Topics in Physics Research (2)

Lecture/discussion - 2 hours. Prerequisite: graduate standing in physics or consent of instructor. Reading and discussion to help physics graduate students develop and maintain familiarity with the current and past literature in their immediate field of research and related areas. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

280. Seminar in Ethics for Scientists (2)

Seminar-2 hours. Prerequisite: graduate standing in any department of Science or Engineering. Studies of topical and historical issues in the ethics of science, possibly including issues such as proper authorship, peer review, fraud, plagiarism, responsible collaboration, and conflict of interest. Limited enrollment. (Same course as Chemical Engineering and Materials Science 280 and Chemisitry 280.) (S/U grading only.)-III. (III.)

285. Careers in Physics (1)

Seminar — 1.5 hours. Prerequisite: graduate standing in Physics. Designed to give Physics graduate students an in-depth appreciation of career opportunities with a graduate degree in physics. Professional physicists, mainly from outside academia, will give seminars describing both research and career insights. May be repeated for credit. Offered irregularly. (S/U grading only.)—I. (I.)

290. Seminar in Physics (1)

Seminar-1 hour. Prerequisite: graduate standing in Physics or consent of instructor. Presentation and discussion of topics of current research interest in physics. Topics will vary weekly and will cover a broad spectrum of the active fields of physics research at a level accessible to all physics graduate students May be repeated for credit. (S/U grading only.)-I, II, III. (I, II, III.)

291. Seminar in Nuclear Physics (1)

Seminar - 1 hour. Prerequisite: graduate standing in Physics or consent of instructor. Presentation and discussion of topics of current research interest in nuclear physics. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

292. Seminar in Elementary Particle Physics (1)

Seminar - 1 hour. Prerequisite: graduate standing in Physics or consent of instructor. Presentation and discussion of topics of current research interest in elementary particle physics. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

292A. Seminar in Elementary Particle Physics (1)

Seminar - 1 hour. Prerequisite: graduate standing in Physics or consent of instructor. Presentation and discussion of topics of current research interest in elementary particle physics. May be repeated for credit. (S/U grading only.)—Í, II, III. (I, II, III.)

292B. High Energy Frontier Initiative And Cosmology Theory Seminar (1)

Seminar – 1 hour. Prerequisite: Physics graduate students. May be repeated five times for credit. (S/U grading only.) — I, II, III. (I, II, III.)

293. Seminar in Condensed Matter Physics

Seminar—1 hour. Prerequisite: graduate standing in Physics or consent of instructor. Presentation and discussion of topics of current research interest in condensed matter physics. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

294. Seminar in Cosmology (1)

Seminar-1 hour. Prerequisite: graduate standing in Physics or consent of instructor. Presentation and discussion of topics of current research interest in Cosmology. May be repeated for credit. (S/U grading only.) — I, II, İII. (I, II, III.)

295. Introduction to Departmental Research (1)

Seminar - 1 hour. Seminar to introduce first- and second-year physics graduate students to the fields of specialty and research of the Physics staff. (S/U grading only.)—II. (II.)

297. Research on the Teaching and Learning of Physics (3)

Seminar-3 hours. Prerequisite: graduate standing in Physics or consent of instructor. Discussion and analysis of recent research in how students construct understanding of physics and other science concepts and the implications of this research for instruction. - III. (III.) 7

298. Group Study (1-5)

Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12)

(S/U grading only.)

Professional Courses

371. Teaching in an Active-Engagement Physics Discussion/Lab Setting (1)

Lecture/discussion-1 hour. Prerequisite: course 9D or equivalent; consent of instructor; open to graduate students only. Analysis of recent research on science/physics teaching and learning and its implications for teaching labs, discussions, and discussion/labs with an emphasis on differences between conventional and active-engagement instructional settings. The appropriate role of the instructor in specific instructional settings. May be repeated two times for credit. I, II, III. (Ĭ, II, III.)

390. Methods of Teaching Physics (1)

Lecture/discussion — 1 hour. Prerequisite: graduate standing in Physics; consent of instructor. Practical experience in methods and problems related to teaching physics laboratories at the university level, including discussion of teaching techniques, analysis of quizzes and laboratory reports and related topics. Required of all Physics Teaching Assistants. May be repeated for credit. (S/U grading only.)—I, II, III. (1, 11, 111.)

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Physiology

See Anatomy, Physiology and Cell Biology (APC), on page 523; Human Physiology (HPH), on page 400; Molecular, Cellular, and Integrative Physiology (A Graduate Group), on page 426; and Neurobiology, Physiology, and Behavior, on page

Plant Biology

See Agricultural Management and Rangeland Resources, on page 141; Crop Science and Management, on page 213; Environmental Horticulture, on page 293; Plant Biology, on page 462; Plant Biology (A Graduate Group), on page 464; and Vegetable Crops, on page 523.

Plant Biology

(College of Biological Sciences)

William J. Lucas, Ph.D., Chairperson of the Depart-

Anne B. Britt, Ph.D., Vice Chairperson of the Depart-

Graduate Program. See Plant Biology (A Graduate Group), on page 464.

Department Office. 1002 Life Sciences (530) 752-0617; http://www-plb.ucdavis.edu

Advising is in College of Biological Sciences, Dean's Office in 202 Life Sciences.

Committee in Charge of the Major

Bo Liu, Ph.D. Anne Britt, Ph.D. Steven Theg, Ph.D

Faculty

Faculty includes members of the Departments of Plant Biology, Molecular and Cellular Biology, and Evolution and Ecology in the College of Biological Sciences and the Department of Plant Sciences in the College of Agricultural and Environmental Sciences.

Primary Department Members

Siobhan Brady, Assistant Professor Anne Britt, Ph.D., Professor Simon Chan, Ph.D., Associate Professor Luca Comai, Ph.D., Professor Katayoon Dehesh, Ph.D., Professor S. P. Dinesh-Kumar, Professor John J. Harada, Ph.D., Professor

Academic Senate Distinguished Teaching Award Stacey Harmer, Ph.D., Professor Bo Liu, Ph.D., Professor William J. Lucas, Ph.D., Professor Julin Maloof, Ph.D., Professor Sharman O'Neill, Ph.D., Professor

Neelima Sinha, Ph.D., Professor Venkatesan Sundaresan, Ph.D., Professor Steven M. Theg, Ph.D., Professor

Secondary Department Members

Judy Callis, Ph.D., Professor

Academic Senate Distinguished Teaching Award James A. Doyle, Ph.D., Professor (Geology) Marilynn E. Étzler, Ph.D., Professor Charles S. Gasser, Ph.D., Professor J. Clark Lagarias, Ph.D., Professor Marcel Rejmanek, Ph.D., Professor Raymond L. Rodriguez, Ph.D., Professor

Emeriti Faculty

David E. Bayer, Ph.D., Professor Emeritus Bruce A. Bonner, Ph.D., Professor Emeritus Deborah Canington, Ph.D., Lecturer Academic Federation Excellence in Teaching

Paul A. Castelfranco, Ph.D., Professor Emeritus Deborah P. Delmer, Ph.D., Professor Emerita Emanuel Epstein, Ph.D., Professor Emeritus Richard H. Falk, Ph.D., Professor Emeritus Hendrick J. Ketellapper, Ph.D., Professor Emeritus Donald W. Kyhos, Ph.D., Professor Emeritus Norma J. Lang, Ph.D., Professor Emerita Terence M. Murphy, Ph.D., Professor Emeritus Thomas L. Rost, Ph.D., Professor Emeritus

Academic Senate Distinguished Teaching Award Alan J. Stemler, Ph.D., Professor Emeritus Robert M. Thornton, Ph.D., Senior Lecturer Emeritus Academic Senate Distinguished Teaching Award Larry N. Vanderhoef, Ph.D., Professor Emeritus Kenneth Wells, Ph.D., Professor Emeritus

Affiliated Faculty

John L. Bowman, Ph.D., Professor John Cozza, Ph.D., Academic Coordinator Andrew Groover, Ph.D., Adjunct Assistant Professor

The Major Program

As organisms that sequester carbon and convert solar energy to usable forms, plants are the primary source of food on the planet as well as important buffers against climate change. The Plant Biology major focuses on fundamental aspects of how plants function as organisms and interact with their environment. A wide variety of scientific disciplines are integrated within the Plant Biology major, including physiology, cell and molecular biology, develop ment, genetics and genomics.

The Program. The plant biology major consists of a Biosciences core covering the general principles of biology plus four plant-specific classes dealing with advanced aspects of plant biology including physiology, development, and anatomy. Two required electives allow student to tailor their degrees to suit their interests. Independent research in a laboratory setting is a requirement, and majors in Plant Biology are guaranteed this opportunity. Because of the value of plants as a model system for research in molecular genetics, cell biology, and biochemistry, Plant Biology makes an excellent minor or second major for student in these fields.

Career Alternatives. A degree in Plant Biology serves as an excellent launching point for a wide range of career options, including domestic and international opportunities in business, research and teaching in both governmental and private sectors. The program is excellent preparation for students wishing to enter graduate or other professional schools, including medicine, law (particularly environmental or patent law) or journalism. Plant biologists can work in the laboratory, in the field, in the forest, in botanical gardens or nurseries, in agricultural companies, or in biotechnology, pharmaceutical, energy or chemical industries, or in the area of environmental protection

A.B. Major Requirements:

Preparatory Subject Matter.....34 Biological Sciences 2A-2B-2C 14

Statistics 13 or 100 or 102 (or Plant	
Sciences 120)	
Depth Subject Matter41-	42
Biological Sciences 1014	
Plant Biology 102 or 1085	
Evolution and Ecology 140 or Plant	
Biology 116 4-5	
Plant Biology 105, 111, 112, 117 15	
Additional upper division units in Plant	
Biology or related natural science	
courses	
Total Units for the Major 75.	76

Total Units for the Major......75-76 Recommended

Chemistry 2C, Evolution and Ecology 100, and Plant Biology 148.

For students with interests in specialized areas of plant biology (e.g. agricultural botany, ecology, systematics and evolution, morphology, plant physiology, etc.), certain substitutions, including courses in other departments, may be allowed upon prior consultation with a Plant Biology major adviser.

B.S. Major Requirements:

gq	UNITS
Preparatory Subject Matter	55-65
Biological Sciences 2A-2B-2C	
Chemistry 2A-2B-2C	15
Chemistry 8A-8B or 118A-118B-	
118C	6-12
Mathematics* 17A-17B-17C or	
21A-21B (21C recommended)	
Physics 7A-7B-7C	
*Mathematics 16A-16B-16C accepted	
fulfill this requirement only for transfer standard admitted prior to fall 2013.	udents

Recommended

Biological Sciences 20Q

Biological ociclices 200
Depth Subject Matter43-46
Biological Sciences 101, 105
(or 102 + 103), 104 or equivalent 10-13
Statistics 100 or 1024
Plant Biology 105, 111, 112 11
Research internship: Plant Biology 92,
99, 189, 192, 199 or equivalent 3
Restricted electives15
Upper division courses in plant biology or
other fields relevant to the student's interest
chosen from the lists below. The student's
academic advisor may approve additional
courses as "restricted electives" at their
discretion

Total Units for the Major 98-111

Course Lists

Ecology

Environmental Science and Policy 121, 123, 124, 150C, 151, 151L, 155, 155L; Evolution and Ecology 101, 131, 138; Hydrologic Science 124; Plant Biology 117, 119; Plant Pathology 150; Plant Sciences 112, 130, 131, 134, 135, 142, 144.

Evolution and Diversity

Evolution and Ecology 100, 102, 108, 140, 149; Plant Biology 102, 108, 116, 143, 148.

Plant Genetics

Evolution and Ecology 100, 102; Molecular and Cellular Biology 161, 164; Plant Biology 113; Plant Pathology 123; Plant Sciences 152.

Plant Physiology, Development, and Molecular Biology

Biotechnology 160, 161A, 161B; Molecular and Cellular Biology 126; Plant Biology 113, 126; Plant Pathology 123, 130; Plant Sciences 153, 157,

Master Adviser. Bo Liu, Plant Biology Department office in 2165 Life Sciences

Minor Program Requirements:

UNITS

Minor Requirements 18 Upper division units, including at least one course from each of the following four (a) Anatomy and Morphology Evolution and Ecology 140; Plant Biology 105, 116 (b) Physiology and Development: Plant Biology 111, 112, 123; Plant Pathology 130 (c) Evolution and Ecology: Evolution and Ecology 100; Plant Biology 102, 108, 11*7*, 143 (d) Biochemistry and Molecular Genetics:

Biotechnology 160; Plant Biology 113, 126; Plant Sciences 152, 154, 171, 172 Minor Adviser. Same as for major above.

Honors and Honors Programs. Students on the honors list may elect to include a maximum of 5 units of 194H in their major programs. Refer to the Academic Information chapter and the appropriate College section for Dean's Honors List information.

Graduate Study. Consult the Plant Biology Gradu-

Courses in Plant Biology (PLB) **Lower Division Courses**

90X. Plant Science Seminar (1-4)

Prerequisite: consent of instructor. Examination of a special topic in a small group setting. Not open for credit to students who have completed course Plant Sciences 90X. (Former course Plant Sciences 90X.)

92. Internship (1-12)

Internship - 3-36 hours. Prerequisite: consent of instructor. Technical and/or professional experience on or off campus. Supervised by a member of the Plant Biology faculty. (P/NP grading only.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading

Upper Division Courses

For auestions about courses numbered 102 through 126, see the Plant Biology Department office in 1002 Life Sciences. For questions concerning courses numbered 1, 12, 140 through 188 and 196, see the Plant Science Advising Center in 1220 Plant and Environmental Sciences.

102. California Floristics (5)

Lecture—3 hours; laboratory—8 hours. Prerequisite: Plant Sciences 2, Biological Sciences 1C, 2C, or equivalent course in Plant Sciences. Survey of the flora of California, emphasizing recognition of important vascular plant families and genera and use of taxonomic keys for species identification. Current understanding of relationships among families. Principles of plant taxonomy and phylogenetic systematics. One Saturday field trip. (Same course as Plant Sciences 102.) GE credit: SE, VL.—III. (III.) Pot-

105. Developmental Plant Anatomy (5)

Lecture — 3 hours; laboratory — 6 hours. Prerequisite: Biological Sciences 2C or other similar preparation in plant biology. Restricted to 50 students; split equally into two lab groups. Structural anatomy of vascular plants. Training in basic tissue sectioning staining, and use of the compound microscope. GE credit: SciEng | SE.—I. (I.) O'Neill

108. Systematics and Evolution of Angiosperms (5)

Lecture—3 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C. Diversity and classification of angiosperms (flower-

ing plants) on a world scale, and current understanding of the origin of angiosperms and evolutionary relationships and trends within them based on morphological and molecular evidence. (Same course as Evolution and Ecology 108.) GE credit: SciEng.— III. (III.) Doyle

111. Plant Physiology (3)

Lecture — 3 hours. Prerequisite: Biological Sciences 1C, or 2A, 2B, and 2C; Chemistry 8B and Physics 7C (either may be taken concurrently); Plant Biology 105 recommended. The plant cell as a functional unit. The processes of absorption, movement, and utilization of water and minerals. Water loss, translocation, photosynthesis, respiration.—I. (I.) Dehesh,

111D. Problems in Plant Physiology (1)

Discussion - 1 hour. Prerequisite: course 111 concurrently. Discussion of problems and applications relating to principles presented in course 111. Students will be assigned problems each week showing novel applications of principles described in course 111 and will prepare answers to be delivered orally during the class period. (P/NP grading only.)—I. (I.) Lucas, Dehesh

112. Plant Growth and Development (3)

Lecture — 3 hours. Prerequisite: Biological Sciences 1C, or 2A, 2B and 2C; Chemistry 8B. Introduction to the mechanisms and control systems that govern plant growth and development and the responses of plants to the environment. Strong emphasis on vegetative development of flowering plants. GE credit: SciEng | QL, SE, SL.—II. (II.) Harada, Sundaresan

112D. Problems in Plant Growth and Development (1)

Discussion - 1 hour. Prerequisite: course 112 concurrently. Discussion of problems and applications relating to principles presented in course 112. Students will be assigned problems each week showing novel applications of the principles described in course 112 and will prepare answers to be delivered orally during class period. (P/NP grading only.)—II. (II.) Harada, Sundaresan

113. Molecular and Cellular Biology of Plants (3)

Lecture-3 hours. Prerequisite: Biological Sciences 1A and 1C, or 2A, 2B, 2C; 101; Biological Sciences 102 or 105 recommended. Molecular and cellular aspects of the growth and development of plants and their response to biological and environmental stresses. Primary focus on processes unique to plants. Experimental approaches will be emphasized. GE credit: QL, SL, VL.—III. (III.) Harada

113D. Problems in Molecular and Cellular Biology of Plants (1)

Discussion - 1 hour. Prerequisite: course 113 concurrently. Discussion of topics and applications related to principles presented in course 113. Assigned topics each week show novel applications of the principles described in course 113; discussion of topics during class period. (P/NP grading only.)—III. (III.) Harada

116. Plant Morphology and Evolution (5)

Lecture — 3 hours; laboratory — 6 hours. Prerequisite: introductory plant biology (e.g., Biological Sciences 1C, or 2A, 2B, and 2C); plant anatomy recommended (e.g., Plant Biology 105). Introduction to the form, development and evolution of vascular plants. Emphasis given to the form and development of reproductive structures in ferns and seed-producing plants as a basis for determining evolutionary relationships. GE credit: SciEng.—II. (II.) Jernstedt

117. Plant Ecology (4)

Lecture - 3 hours; fieldwork - 3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C; Plant Biology 111 recommended. The study of the interactions between plants, plant populations or vegetation types and their physical and biological environment. Special emphasis on California. Four full-day field trips and brief write-up of class project required. (Same course as Evolution and Ecology 117.)—I. (I.)

119. Population Biology of Invasive Plants and Weeds (3)

Lecture — 2 hours; laboratory — 3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C; introductory statistics recommended. Origin and evolution of invasive plant species and weeds, reproduction and dispersal, seed ecology, modeling of population dynamics, interactions between invasive species, native species, and crops, biological control. Laboratories emphasize design of competition experiments and identification of weedy species. (Same course as Evolution and Ecology 119.) GE credit: SE.—III. (III.) Rejmanek

123. Plant-Virus-Vector Interaction (3)

Lecture - 3 hours. Prerequisite: Biological Sciences 1A, 1C, 101; course 105, Plant Pathology 120, and Entomology 100 recommended. Analysis of the interactions necessary for viruses to infect plants. Interactions among insect vectors and host plants involved in the plant-virus life cycle. Evolutionary aspects of the molecular components in viral infection and modern experimental approaches to the interdiction of viral movement. Offered alternate years. (Same course as Entomology 123/Plant Pathology 123.)—(I.) Lucas, Gilbertson, Ullman

126. Plant Biochemistry (3)

Lecture—3 hours. Prerequisite: Biological Sciences 103 or 105. The biochemistry of important plant processes and metabolic pathways. Discussion of methods used to understand plant processes, including use of transgenic plants. (Same course as Molecular and Cellular Biology 126.)—II. (II.) Callis, Tian

143. Evolution of Crop Plants (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: Plant Sciences 2 or Biological Sciences 1C or 2C. Origins of crops and agriculture, including main methodological approaches, centers of crop biodiversity, dispersal of crops, genetic and physiological differences between crops and their wild progenitors, agriculture practiced by other organisms, and role and ownership of crop biodiversity. GE credit: SciEng, Div, Wrt | SE, SL, SS, WE. - III. (III.) Gepts

148. Introductory Mycology (4)

Lecture—2 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1A, 1B, 1C. Systematics, ecology, evolution, and morphology of fungi. Importance of fungi to humans. (Same course as Plant Pathology 148.)—I. MacDonald, Rizzo

189. Experiments in Plant Biology: Design and Execution (3)

Laboratory/discussion-6 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C, or the equivalent courses in Plant Sciences, and consent of the instructor. Provides an opportunity for undergraduate students to formulate experimental approaches to current questions in plant biology and to carry out their proposed experiments. May be repeated for credit for a total of 12 units. (P/NP grading only.)— 1, 11, 111. (1, 11, 111.)

190C. Research Conference in Plant Biology

Discussion - 1 hour. Prerequisite: upper division standing in Plant Biology or related discipline; consent of instructor. Introduction to research methods in plant biology. Design of field or laboratory research projects, survey of appropriate literature, and discussion of research by faculty and students. May be repeated for credit. (P/NP grading only.) - I, II, III. (I,

192. Internship (1-12)

Internship - 3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Technical and/or professional experience on or off campus. Supervised by a member of the Plant Biology Department faculty. May be repeated for credit. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.)

194H. Special Study for Honors Students

Prerequisite: open only to majors of senior standing on honors list. Independent study of selected topics under the direction of a member or members of the staff. Completion will involve the writing of a senior thesis. (P/NP grading only.)

197T. Tutoring in Plant Biology (1-5)

Discussion - 2-6 hours. Prerequisite: upper division standing and consent of instructor. Assisting the instructor by tutoring students in one of the Department's regular courses. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading

Plant Biology (A Graduate Group)

Kentaro Inoue, Ph.D., Chairperson of the Group

Group Office. 310 Life Sciences (530) 752-2981; Fax (530) 752-8822 http://www-plb.ucdavis.edu/pbgg http://biosci3.ucdavis.edu/GradGroups/PB/

Douglas Adams, Ph.D., Professor (Viticulture and Enology) Diane Beckles, Ph.D., Associate Professor (Plant Sciences)

Alan Bennett, Ph.D., Professor (Plant Sciences) Alison Berry, Ph.D., Professor (Plant Sciences) Arnold Bloom, Ph.D., Professor (Plant Sciences)
Arnold Blumwald, Ph.D., Professor (Plant Sciences)
Richard Bostock, Ph.D., Professor (Plant Pathology)
Kent Bradford, Ph.D., Professor (Plant Sciences) Siobhan Brady, Ph.D., Assistant Professor

(Plant Biology) Anne Britt, Ph.D., Professor (Plant Biology) Patrick Brown, Ph.D., Professor (Plant Sciences) Judy Callis, Ph.D., Professor

(Molecular and Cellular Biology) Academic Senate Distinguished Teaching Award Simon Chan, Ph.D., Assistant Professor

(Plant Biology)
Gitta Coaker, Ph.D., Assistant Professor (Plant Pathology)

Doug Cook, Ph.D., Professor (Plant Pathology) Luca Comai, Ph.D., Professor (Plant Biology) Abhaya Dandekar, Ph.D., Professor (Plant Sciences) Katayoon Dehesh, Ph.D., Professor (Plant Biology) Savithramma Dinesh-Kumar, Ph.D., Professor

(Plant Biology)
James Doyle, Ph.D., Professor

(Evolution and Ecology) Georgia Drakakaki, Ph.D. Assistant Professor (Plant Sciences)

Jorge Dubcovsky, Ph.D., Professor (Plant Sciences) Marilynn Etzler, Ph.D., Professor

(Molecular and Cellular Biology) Albert Fischer, Ph.D., Professor

(Plant Sciences) Charles Gasser, Ph.D., Professor (Molecular and Cellular Biology)

Paul Gepts, Ph.D., Professor (Plant Sciences) Thomas Gradziel, Ph.D., Professor (Plant Sciences) John Harada, Ph.D., Professor (Plant Biology)

Academic Senate Distinguished Teaching Award Stacey Harmer, Ph.D., Associate Professor

(Plant Biology) Kentaro Inoue, Ph.D., Associate Professor

(Plant Sciences)
Marie Jasienuik, Ph.D., Associate Professor (Plant Sciences)

Judy Jernstedt, Ph.D., Professor (Plant Sciences) Daniel Klienbenstein, Ph.D. Professor (Plant Sciences)

John Labavitch, Ph.D., Professor (Plant Sciences) Clark Lagarias, Ph.D., Professor

(Molecular and Cellular Biology)
J. Heiner Lieth, Ph.D., Professor (Plant Sciences) Bo Liu, Ph.D., Professor (Plant Biology) William Lucas, Ph.D., Professor (Plant Biology)

Julin Maloof, Ph.D., Associate Professor (Plant Biology)

Mark Matthews, Ph.D., Professor

(Viticulture and Enology)
Karen McDonald, Ph.D., Professor and Associate Dean (Chemical Engineering and Materials

Richard Michelmore, Ph.D., Professor (Plant Sciences)

Terence Murphy, Ph.D., Professor (Plant Biology)
David Neale, Ph.D., Professor (Plant Sciences)
Florence Negre-Zakharov, Ph.D., Assistant Professor (Plant Sciences)

Sharman O'Neill, Ph.D., Professor (Plant Biology)

Kyaw Tha Paw, Ph.D., Professor

(Land, Air and Water Resources) Vito Polito, Ph.D., Professor (Plant Sciences) Daniel Potter, Ph.D., Professor

(Plant Sciences)

Michael Reid, Ph.D., Professor (Plant Sciences) Marcel Rejmanek, Ph.D., Professor

(Evolution and Ecology) Eliska Rejmankova, Ph.D., Professor

(Environmental Science and Policy)

Jim Richards, Ph.D., Professor (Land, Air and Water Resources)

Raymond Rodriguez, Ph.D., Professor (Molecular and Cellular Biology)

Pamela Ronald, Ph.D., Professor (Plant Pathology) Jeffery Ross-Ibarra, Ph.D., Assistant Professor

(Plant Sciences) Mikal Saltveit, Ph.D., Professor (Plant Sciences)

Ken Shackel, Ph.D., Professor (Plant Sciences) Wendy Silk, Ph.D., Professor

(Land, Air and Water Resources) Neelima Sinha, Ph.D., Professor (Plant Biology)

Dina St. Clair, Ph.D. Professor (Plant Sciences)

Venkatesan Sundaresan, Ph.D., Professor (Plant Biology)

Steve Theg, Ph.D., Professor (Plant Biology) Li Tian, Ph.D., Assistant Professor (Plant Sciences) M. Andrew Walker, Ph.D., Professor

(Viticulture and Enology)
Larry Williams, Ph.D., Professor

(Viticulture and Enology)
John Yoder, Ph.D., Professor (Plant Sciences)

Emeriti Faculty

Don Durzan, Ph.D., Professor (Plant Sciences) David Gilchrist, Ph.D., Professor Emeritus (Plant Pathology)

Donald J. Nevins, Ph.D., Professor (Plant Sciences)
Donald Phillips, Ph.D., Professor (Plant Sciences)
Carlos Quiros, Ph.D., Professor (Plant Sciences) Michael Reid, Ph.D., Professor (Plant Sciences)

Affiliated Faculty

John Bowman, Ph.D., Professor (Plant Biology) Carlos Crisosto, Ph.D., Pomologist and Specialist (Plant Sciences)

Matthew Fidelibus, Ph.D., Associate Cooperative Extension Viticulture Specialist (Viticulture & Enology)

Sham Goyal, Ph.D., Agronomy Specialist (Plant Sciences)

Andrew Groover, Ph.D., Associate Adjunct Professor (Plant Biology)

Cai-Zhong Jiang, Research Plant Physiologist (Crops Path & Genentic Research) Elizabeth Mitcham, Ph.D., Cooperative Extension

and Pomologist Specialist (Plant Sciences)

Ann Powell, Ph.D., Professional Research Biochemist (Plant Sciences)

Alan Rose, Ph.D., Associate Project Scientist
(Molecular & Cellular Biology)

Thomas Tai, Ph.D., Associate AES (Plant Sciences) Allen Van Deynze, Ph.D., Professional Researcher (Plant Sciences)

Graduate Study. The Graduate Group in Plant Biology offers programs of study and research leading to the M.S. and Ph.D. degrees. The program prepares students for careers in teaching and research at universities and colleges, government and industrial laboratories. The graduate curriculum provides

both a breadth in the discipline and in-depth study and research in one of four areas of specialization: cell and developmental biology; environmental and integrative biology; molecular biology, biochemistry and genomics; and systematics and evolutionary biology. These areas of specialization permit individual study and research into diverse aspects of plant biology, including anatomy, biochemistry, biotechnology, cell biology, cytology, developmental biology, ecology, genetics, genomics, molecular biology, morphology, paleo-botany, physiology, population biology, systematics, and weed science. The graduate adviser, the major professor, and the student will design a program of advanced courses to meet individual academic needs within one of the specializations.

Preparation. For both the M.S. and Ph.D. programs, a level of scholastic development equivalent to a Bachelor's degree in biological sciences from a recognized college or university is required. Courses in the following areas are considered to be prerequisite to the advanced degrees in Plant Biology: biology, inorganic chemistry, organic chemistry, introductory physics, genetics, plant development and structure, biochemistry, introductory plant physiology, calculus, introductory statistics, ecology/systematics/evolution, and cell/molecular biology. Limited deficiencies can be made up after admis-

Graduate Adviser. Contact the Group office.

Courses in Plant Biology (PBI)

Graduate Courses

200A. PBGG Core Course Series-Fall quarter (5)

Lecture - 3 hours; discussion - 2 hours. Prerequisite: graduate standing; a broad background of undergraduate-level coursework in Plant Biology is recommended. The first of three PBGG graduate core courses. Coverage includes (1) plant genes, (2) biotechnology, (3) genomes and gene flow, (4) principles of plant systematics, and (5) the evolution of flowering plants.—I. (I.) Potter

200B. PBGG Core Course Series-Winter

Lecture—3 hours; discussion—2 hours. Prerequisite: course 200A. The second of three PBGG graduate core courses. Coverage includes (1) embryo development, (2) cytoskeleton and vesicle trafficking, (3) cell walls, (4) cell growth, (5) secondary metabolism, (6) plastids and (7) senescence.—II. (II.) Labavitch

200C. PBGG Core Course Series - Spring

Lecture—3 hours; discussion—2 hours. Prerequisite: course 200A and 200B. The third of three PBGG graduate core courses. Coverage includes (1) plant water relations, (2) cellular & long distance transport processes, (3) mineral nutrition, (4) environmental impacts on growth & development, (5) stress perception & responses, (6) canopy processes, and (7 plant interactions with other organisms. - III. (III.) Blumwald, Silk

203N. Biology of the Plant Cell (4)

Lecture - 3 hours; discussion/laboratory - 2 hours. Prerequisite: Plant Biology 111 or Biological Sciences 104, or the equivalent. Recent progresses in plant cell biology. Intracellular motility in plant cells.
Common techniques associated with the progress of plant cell biology. Open to senior undergraduate stu-dents in Plant Biology major. Offered in alternate years. (S/U grading only.)—Liu

210. Plant Ecophysiology (3)

Lecture - 3 hours. Prerequisite: Plant Biology 111, 112, 117. Study of the mechanisms of physiological adaptation of plants to their environment. Offered in alternate years. - (II.)

212. Physiology of Herbicidal Action (3)

Lecture—3 hours. Prerequisite: Plant Biology 112, 122. Study of the fundamental processes involved in the physiological action of herbicides. Detailed consideration of the fate of herbicides in plants. Offered in alternate years.—III.

214. Higher Plant Cell Walls (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: Plant Biology 112, and a course in biochemistry. Lectures focus on the structure, analysis, synthesis, and development-related metabolism of cell walls. Discussions center on analysis of scientific papers related to lecture topics. Offered in alternate years.—I. Labavitch

219. Reproductive Biology of Flowering Plants (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: Plant Biology 111 and Biological Sciences 101. Fundamental mechanisms of reproductive biology of flowering plants and their influence on genetic variation, evolution, and cultural practices. Offered in alternate years. (Former course Plant Sciences 270.) - (1.)

220. Plant Developmental Biology (4)

Lecture-3 hours; discussion-1 hour; term paper. Prerequisite: plant anatomy, physiology, and biochemistry. A survey of the concepts of plant development and organization. Examines plant cells, tissues, and organs with special emphasis on experimental evidence for mechanisms regulating developmental processes. Offered in alternate years. - Sinha

223. Special Topics in Scientific Method (2)

Discussion - 2 hours. Examine the historical and philosophical background of the scientific method. Analyze the rational, perceptual, causal, creative and social aspects of scientific knowledge. Clarify the roles of reason, experimentation and creativity in scientific research. (S/U grading only.)—I. (I.) Bradford

227. Plant Molecular Biology (4)

Lecture/discussion-4 hours. Prerequisite: Molecular and Cellular Biology 121 or 161. Molecular aspects of higher plant biology with emphasis on gene expression. Plant nuclear and organelle genome organization, gene structure, mechanisms of gene regulation, gene transfer, and special topics related to development and response to biological and environmental stimuli. Offered in alternate years. - Britt, Sinha

229. Molecular Biology of Plant Reproduction (3)

Lecture—3 hours. Molecular genetic basis of plant reproduction. Emphasis on understanding developmentally regulated gene expression as it relates to the major changes that occur during plant reproduction and on the genetic control of flowering. Offered in alternate years. -O'Neill

290A. Faculty Seminar (1)

Discussion - 1 hour. Discussion of research area of seminar speakers in Plant Biology Graduate Group Seminar Series. Restricted to Plant Biology graduate students (PBGG). May be repeated six times for credit. (S/U grading only.) -I, II, III. (I, II, III.)

290B. Seminar (1)

Seminar - 1 hour. Seminars presented by visiting scientists on research topics of current interest. (S/U grading only.) — I, II, İII. (I, II, III.)

290C. Research Conference in Botany (1)

Discussion—1 hour. Prerequisite: graduate standing and/or consent of instructor. Presentation and discussion by faculty and graduate students of research projects in botany. May be repeated for credit. (S/U grading only.)—Í, II, IIÍ. (I, II, ÍII.)

291. Graduate Student Seminar in Plant Biology (1)

Seminar - 1 hour. Prerequisite: graduate student standing. Student-given seminars on topics in plant biology, with critiques by instructor and peers. How to give a seminar, including preparation of visual and other teaching aids. Topic determined by instructor in charge. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

292. Seminars in Plant Biology (1)

Seminar—1 hour. Prerequisite: consent of instructor. Review of current literature in botanical disciplines. Disciplines and special subjects to be announced quarterly. Students present and analyze assigned topics. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

293. Seminar in Postharvest Biology (1)

Discussion - 1 hour. Prerequisite: consent of instructor; open to advanced undergraduates. Intensive study of selected topics in the postharvest biology of fruits, vegetables, and ornamentals. May be repeated for credit. (S/U grading only.)—I, II, III. (I,

297T. Tutoring in Plant Biology (1-5)

Tutorial - 3-15 hours. Offers graduate students, particularly those not serving as teaching assistants, the opportunity to gain teaching experience. (S/U grading only.)

298. Group Study (1-5)

May be repeated up to four times for credit. (S/Ú grading only.)

299. Research (1-12)

Prerequisite: graduate standing. (S/U grading only.)

Professional Course

390. The Teaching of Plant Biology (2)

Discussion - 2 hours. Prerequisite: graduate standing; concurrent appointment as a teaching assistant in Plant Biology. Consideration of the problems of teaching botany, especially of preparing for and conducting discussions, guiding student laboratory work, and the formulation of questions and topics for examinations. (S/U grading only.)—I, II, III. (İ, II, III.)

Plant Pathology

(College of Agricultural and Environmental Sciences) Thomas R. Gordon, Ph.D., Chairperson of the Department

Department Office. 354 Hutchison Hall (530) 752-0300;

http://plantpathology.ucdavis.edu/course/ index.htm

Faculty

Richard M. Bostock, Ph.D., Professor Gitta Coaker, Ph.D. Associate Professor Douglas R. Cook, Ph.D., Professor R. Michael Davis, Ph.D., Professor Lynn Epstein, Ph.D., Professor Bryce W. Falk, Ph.D., Professor Robert L. Gilbertson, Ph.D., Professor Thomas R. Gordon, Ph.D., Professor Bruce Kirkpatrick, Ph.D., Professor Johan Leveau, Ph.D., Associate Professor James D. MacDonald, Ph.D., Professor Neil McRoberts, Ph.D., Assistant Professor David Rizzo, Ph.D., Professor Pamela C. Ronald, Ph.D., Professor Ioannis Stergiopoulos, Ph.D., Assistant Professor Neal K. VanAlfen, Ph.D., Professor Valerie Williamson, Ph.D. Professor

Emeriti Faculty

George Bruening, Ph.D., Professor Emeritus Edward E. Butler, Ph.D., Professor Emeritus Robert N. Campbell, Ph.D., Professor Emeritus James E. DeVay, Ph.D., Professor Emeritus John M. Duniway, Ph.D., Professor Emeritus Raymond G. Grogan, Ph.D., Professor Emeritus Clarence I. Kado, Ph.D., Professor Emeritus Srecko John M. Mircetich, Ph.D., Lecturer (USDA)

Jerry K. Uyemoto, Ph.D., Lecturer (USDA) Emeritus Robert K. Webster, Ph.D., Professor Emeritus

Affiliated Faculty

Kendra Baumgartner, Ph.D. (USDA) Greg Browne, Ph.D. (USDA) Daniel Kluepfel, Ph.D. (USDA) Deborah A. Golino, Ph.D., Lecturer and Specialist in Cooperative Extension

W. Douglas Gubler, Ph.D., Lecturer and Specialist in Cooperative Extension
Themis Michailides, Ph.D., Lecturer and Plant

Pathologist Adib Rowhani, Ph.D., Lecturer

466 Plant Pathology

Krishna Subbarao, Ph.D., Lecturer and Specialist in Cooperative Extension

Mysore Sudarshana, Ph.D. (USDA) Takao Kasuga, Ph.D., Lecturer (USDA)

Related Major Program. See the major in Plant Biology, on page 462

Graduate Study. The Department of Plant Pathology offers programs of study and research leading to the M.S. and Ph.D. degrees. Information can be obtained from the graduate adviser. See also the Graduate Studies, on page 111.

Graduate Advisers. R.M. Davis, G.L. Coaker, R.M. Bostock

Courses in Plant Pathology (PLP) Lower Division Course

40. Edible Mushroom Cultivation (2)

Lecture - 1 hour; laboratory/discussion - 3 hours. Prerequisite: Biological Sciences 10 or Microbiology 20 recommended. Principles and practices of growing edible mushrooms, including culture maintenance, basic mushroom substrate preparation, composting, spawn generation techniques, inoculation methods, harvesting, and pests and pest management. - II. (II.) Davis

Upper Division Courses

120. Introduction to Plant Pathology (4)

Lecture - 2 hours; laboratory - 6 hours. Prerequisite: Biological Sciences 1C; Microbiology 102 recom-mended. The nature, cause, and control of plant diseases. - I, III. (I, III.) Bostock, Falk, Gilbertson, McRoberts

123. Plant-Virus-Vector Interaction (3)

Lecture - 3 hours. Prerequisite: Biological Sciences 1A, 1C, 101; Plant Biology 105, course 120, and Entomology 100 recommended. Analysis of the interactions necessary for viruses to infect plants. Interactions among insect vectors and host plants involved in the plant-virus life cycle. Evolutionary aspects of the molecular components in viral infection and modern experimental approaches to the interdiction of viral movement. Offered alternate years. (Same course as Entomology 123/Plant Biology 123.)—I. Gilbertson, Lucas, Üllman

130. Fungal Biotechnology and Biochemistry (3)

Lecture—3 hours. Prerequisite: Plant Biology 119, Biological Sciences 103. How fundamental physiological and biochemical activities of fungi impact the destructive and beneficial roles of these organisms in nature. Utilization and manipulation of fungi for biotechnological and industrial applications.—II. (II.) Gilchrist, Stergiopolous

135. Field Identification of Mushrooms (1)

Field work; three-day mandatory field trip. Prerequisite: introductory course in biological sciences; course in mycology recommended. Collection and identification of mushrooms and other fleshy fungi based on macro and microscopic features. (P/NP grading only.)—II. (II.) Davis

140. Agricultural Biotechnology and Public Policy (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: high school level biology, including genetics; Biological Sciences 10 recommended. Examination of the development and deployment of agricultural biotechnologies, particularly transgenic crop plants, microorganisms and animals, with consideration of conventional agriculture, public perceptions of technologies, food safety, environmental impact, public policies and regulations. GE credit: SciEng, Wrt | SL.—III. (III.) Cook, Newell-McGloughin

148. Introductory Mycology (4)

Lecture — 2 hours; laboratory — 6 hours. Prerequisite: Biological Sciences 1A, 1B, 1C. Systematics, ecology, evolution, and morphology of fungi. Importance of fungi to humans. (Same course as Plant Biology 148.) GE credit: SE.—I. MacDonald, Rizzo

150. Fungal Ecology (3)

Lecture—3 hours. Prerequisite: Biological Sciences 1C or equivalent. The ecological roles of fungi as saprobes, mutualists and parasites in native and managed ecosystems. Physiological and reproductive strategies associated with adaptations to diverse habitats. – II. (II.) Gordon

185. Advanced Mushroom Taxonomy (2)

Laboratory/discussion-3 hours; fieldwork-1 hour. Prerequisite: course 135 or 148, and Biological Sciences 101 or the equivalent. Microscopic and molecular methods used in the identification of mushroom species; molecular characterization including PCR-amplification of ribosomal nuclear DNA, digestion of the product with restriction enzymes, and DNA sequencing; a one-day field trip is required. Offered in alternate years. - I. Davis

192. Internship (1-12)

Internship - 3-36 hours. Prerequisite: course 120 and consent of instructor. Work experience off and on campus, supervised by a member of the faculty. (P/NP grading only.)

198. Directed Group Study (1-5)

(P/NP aradina only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

201A. Impacts, Mechanisms and Control of Plant Disease (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 120, graduate student status in the Plant Pathology Graduate Program, or consent of instructor. A case-studies approach to analysis of plant diseases caused by bacteria, fungi, oomycetes, and viruses, including impacts, etiology, pathogen taxonomy and epidemiology, biochemical and genetic aspects of pathogen-host interactions, virulence and resistance, and approaches to disease control.—II. (II.) Gordon

201B. Impacts, Mechanisms and Control of Plant Disease (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: course 120, course 201A, and graduate student status in the Plant Pathology Graduate Program, or consent of instructor. A case-studies approach to analysis of plant diseases, including emerging diseases, caused by bacteria, fungi, nematodes, and oomycetes: impacts, etiology, pathogen taxonomy, epidemiology, biochemical and genetic aspects of pathogen-host interactions, virulence, resistance, disease control and statistical analysis. Offered in alternate years. - III. (III.) McRoberts

205A. Diseases of Vegetable and Field Crops (3)

Lecture/discussion-3 hours; fieldwork-3 hours. Prerequisite: course 120. Clinical study of diseases of vegetable and field crops with emphasis on etiology, epidemiology, diagnosis, and control. Field trips required. Offered in alternate years.—III. Davis

205B. Diseases of Vegetable and Field Crops - Summer Field Trip (1)

Fieldwork-3 hours. Prerequisite: courses 120 and 205A. Continuation of course 205A-four-day field trip investigating diseases of vegetable and field crops (Deferred grading only, pending completion of sequence. S/U grading only.)—IV. (IV.) Davis

206A-206B. Diseases of Fruit, Nut, and Vine Crops (3-1)

Lecture - 2 hours; laboratory - 6 hours. Prerequisite: course 120; Plant Biology 119. Course 205 may be taken concurrently. Clinical study of fruit, nut, and vine crops diseases with emphasis on etiology, epidemiology, diagnosis, and control. Offered in alternate years. (Deferred grading only, pending completion of sequence.) - III-IV. (III-IV.) Kirkpatrick

210. Biochemistry and Molecular Biology of Plant-Microbe Interaction (4)

Lecture/discussion-4 hours. Prerequisite: Biological Sciences 101, 102, 103, and 104, or the equiva lent. Discussion of plant-microbe interactions, focused on the underlying cellular, biochemical, and molecular events that determine the diseased state. Offered in alternate years.—I. Bostock, Coaker

217. Molecular Genetics of Fungi (3)

Lecture—3 hours. Prerequisite: graduate standing in a biological science, Biological Sciences 101, 103, Molecular and Cellular Biology 161, Plant Biology 119, courses 130, 215X; Microbiology 215 recommended. Advanced treatment of molecular biology and genetics of filamentous fungi and yeasts, including gene structure, organization and regulation; plant pathogenesis; secretion; control of reproduction; molecular evolution; transformation; and gene manipulation. Offered in alternate years. (Same course as Biological Chemistry 217.)—II.

224. Advanced Mycology (4)

Lecture — 2 hours; laboratory — 6 hours. Prerequisite: course 148 or Plant Biology 148 or consent of instructor. Systematics, evolution, and ecology of the fungi. Topics include modern techniques and theories on classification of fungi, species concepts, sexual compatibility and vegetative compatibility. Laboratories emphasize various approaches to fungal identification. Offered in alternate years.-III. Epstein, Rizzo

228. Plant Bacteriology (5)

Lecture — 2 hours; laboratory — 9 hours. Prerequisite: course 120; Microbiology 2 or the equivalent; Biological Sciences 102, 103. Study of bacteria which have a saprophytic, symbiotic, or parasitic association with higher and lower plants. Clinical and molecular methods for identification and classification of these bacteria. Offered in alternate years.-(I.) Kirkpatrick, Gilbertson

230. Plant Virology (3)

Lecture - 3 hours. Prerequisite: upper division or graduate course in molecular biology or graduate student in plant pathology. Viruses as causal agents of plant disease and as tools for manipulating plants; structures of virus particles; mechanisms of transmission, replication, and spread in the plant; cytology and molecular biology in susceptible and resistant reactions to virus infection; virus disease control. Only 2 units of credit to students who have completed Microbiology 262. Not open for credit to students who have completed course 226. Offered in alternate years.—II. Bruening, Falk

290. Seminar (1)

Seminar-1 hour. Review and evaluation of current research in plant pathology. (S/U grading only.)—I, II, III. (I, II, III.)

290C. Advanced Research Conference (1)

Seminar-1 hour. Prerequisite: course 120 or consent of instructor. Presentation, evaluation, and critical discussions of research activities in the area of primarily designed for graduate students. (S/U grading only.)—I, II, III. (I, II, III.)

291. Seminar in Molecular Plant Pathology

Seminar-1 hour. Prerequisite: course 120 or consent of instructor. Review and evaluation of current literature and research in biochemistry and molecular biology of plant microbe interactions. May be repeated for credit. (S/U grading only.)—I, II. (I, II.) Bostock, Coaker, Cook, Gilchrist, VanAlfen

295. Seminar in Mycology (1)

Seminar - 1 hour. Review and evaluation of current literature and research in mycology. May be repeated for credit. (S/U grading only.)—III. (III.)

298. Special Group Study (1-5) 299. Research (1-12)

(S/U grading only.)

Plant Physiology

See Plant Biology, on page 462; and Plant Biology (A Graduate Group), on page 464.

Plant Sciences

(College of Agricultural and Environmental Sciences) Chris van Kessel, Ph.D., Chairperson of the Depart-

Department Office. 1210 Plant and Environmental Sciences (530) 752-1703; http://www.plantsciences.ucdavis.edu/

Faculty

Kassim Al-Khatib, Ph.D., Professor Diane M. Beckles, Ph.D., Associate Professor Alan B. Bennett, Ph.D., Professor Alison M. Berry, Ph.D., Professor Arnold J. Bloom, Ph.D., Professor Eduardo Blumwald, Ph.D., Professor Kent J. Bradford, Ph.D., Professor Patrick H. Brown, Ph.D., Professor David W. Burger, Ph.D., Professor Mary Cadenasso, Ph.D., Associate Professor Abhaya M. Dandekar, Ph.D., Professor Theodore M. DeJong, Ph.D., Professor Georgia Drakakaki, Ph.D., Assistant Professor Jorge Dubcovsky, Ph.D., Professor Jan Dvorak, Ph.D., Professor Valerie Eviner, Ph.D., Associate Professor Albert J. Fischer, Ph.D., Associate Professor Paul L. Gepts, Ph.D., Professor Matthew Gilbert, Ph.D., Assistant Professor Thomas M. Gradziel, Ph.D., Professor Kentaro Inoue, Ph.D., Associate Professor Kentaro Inoue, Ph.D., Associate Professor Marie A. Jasieniuk, Ph.D., Associate Professor Judy Jernstedt, Ph.D., Professor Daniel J. Kliebenstein, Ph.D., Professor John M. Labavitch, Ph.D., Professor John M. Labavitch, Ph.D., Professor Emilio A. Laca, Ph.D., Professor Andrew M. Latimer, Associate Professor J. Heinrich Lieth, Ph.D., Professor Richard W. Michelmore, Ph.D., Professor David B. Neale, Ph.D., Professor Michael P. Parrella, Ph.D., Professor

(Entomology) Vito S. Polito, Ph.D., Professor Daniel Potter, Ph.D., Professor Kevin J. Rice, Ph.D., Professor Jeffrey S. Ross-Ibarra, Ph.D., Associate Professor Dina St. Clair, Ph.D., Professor Mikal E. Saltveit, Ph.D., Professor Kenneth A. Shackel, Ph.D., Professor Douglas V. Shaw, Ph.D., Professor Johan W. Six, Ph.D., Professor Venkatesan Sundaresan, Ph.D., Professor

(Plant Biology) Larry R. Teuber, Ph.D., Professor Li Tian, Ph.D., Assistant Professor Chris van Kessel, Ph.D., Professor John I. Yoder, Ph.D., Professor Truman P. Young, Ph.D., Professor Florence Zakharov, Ph.D., Assistant Professor Maciej Zwieniecki, Ph.D., Associate Professor

Emeriti Faculty

Steffen Abel, Ph.D., Professor Emeritus David E. Bayer, Ph.D., Professor Emeritus Michael G. Barbour, Ph.D., Professor Emeritus
Academic Senate Distinguished Teaching Award Fredrick A. Bliss, Ph.D., Professor Emeritus R. William Breidenbach, Ph.D., Lecturer Emeritus Name W. Buddenhagen, Ph.D., Professor Emeritus Thomas G. Byrne, M.S., Lecturer Emeritus Robert M. Carlson, Ph.D., Lecturer Emeritus Peter B. Catlin, Ph.D., Lecturer Emeritus

William J. Clawson, M.S., Lecturer Emeritus Montague W. Demment, Ph.D., Professor Emeritus Don J. Durzan, Ph.D., Professor Emeritus Clyde L. Elmore, Ph.D., Lecturer Emeritus Theodore C. Foin, Jr., Ph.D., Professor Emeritus Shu Geng, Ph.D., Professor Emeritus William H. Griggs, Ph.D., Professor Emeritus James A. Harding, Ph.D., Professor Emeritus Richard W. Harris, Ph.D., Professor Emeritus

Academic Senate Distinguished Teaching Award Charles E. Hess, Ph.D., Professor Emeritus Ray C. Huffaker, Ph.D., Professor Emeritus Subodh K. Jain, Ph.D., Professor Emeritus Milton B. Jones, Ph.D., Lecturer Emeritus

Adel A. Kader, Ph.D., Professor Emeritus

Distinguished Graduate Mentoring Award

Andrew T. Leiser, Ph.D., Professor Emeritus

William C. Liebhardt, Ph.D., Lecturer Emeritus William C. Liebnard, Ph.D., Lecturer Emeritus
William M. Longhurst, Ph.D., Professor Emeritus
Robert S. Loomis, Ph.D., Professor Emeritus
James M. Lyons, Ph.D., Professor Emeritus
Vern L. Marble, Ph.D., Lecturer Emeritus
George C. Martin, Ph.D., Professor Emeritus
Warren C. Micke, M.S., Lecturer Emeritus F. Gordon Mitchell, M.S., Lecturer Emeritus Donald J. Nevins, Ph.D., Professor Emeritus Robert F. Norris, Ph.D., Professor Emeritus Jack L. Paul, Ph.D., Professor Emeritus Donald A. Phillips, Ph.D., Professor Emeritus Richard E. Plant, Ph.D., Professor Emeritus Harlan K. Pratt, Ph.D., Professor Emeritus Calvin O. Qualset, Ph.D., Professor Emeritus Carlos F. Quiros, Ph.D., Professor Emeritus Charles A. Raguse, Ph.D., Professor Emeritus D. William Rains, Ph.D., Professor Emeritus David E. Ramos, Ph.D., Lecturer Emeritus Lawrence Rappaport, Ph.D., Professor Emeritus Michael S. Reid, Ph.D., Professor Emeritus Roger J. Romani, Ph.D., Professor Emeritus Koga J. Kolladii, Fri.D., Frofessor Emeritus
Kay Ryugo, Ph.D., Professor Emeritus
Roy M. Sachs, Ph.D., Professor Emeritus
Charles W. Schaller, Ph.D., Professor Emeritus William L. Sims, Ph.D., Lecturer Emeritus
Paul G. Smith, Ph.D., Professor Emeritus Herman Timm, Ph.D., Lecturer Emeritus Robert L. Travis, Ph.D., Professor Emeritus Raymond C. Valentine, Ph.D., Professor Emeritus Ronald E. Voss, Ph.D., Lecturer Emeritus Barbara D. Webster, Ph.D., Professor Emeritus Steven A. Weinbaum, Ph.D., Professor Emeritus Lin L. Wu, Ph.D., Professor Emeritus Masatoshi Yamaguchi, Ph.D., Professor Emeritus

Affiliated Faculty

Husein Ajwa, Ph.D., Specialist in Cooperative Extension

Marita Cantwell, Ph.D., Lecturer and Specialist in Cooperative Extension

Roger T. Chetelat, Ph.D., Lecturer and Agronomist Carlos H. Crisosto, Ph.D., Lecturer and Specialist in Cooperative Extension

Joseph M. DiTomaso, Ph.D., Lecturer and Specialist in Cooperative Extension

Richard Y. Evans, Ph.D., Lecturer and Specialist in Cooperative Extension

Steven A. Fennimore, Ph.D., Lecturer and Specialist in Cooperative Extension

Louise Ferguson, Ph.D., Lecturer and Specialist in Cooperative Extension

Bradley Hanson, Ph.D., Associate Specialist in Cooperative Extension

Timothy K. Hartz, Ph.D., Lecturer, Agronomist and Specialist in Cooperative Extension
James E. Hill, Ph.D., Lecturer and Specialist in

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W. Thomas Lanini, Ph.D., Lecturer and Specialist in Cooperative Extension

Kirk Larson, Ph.D., Pomologist and Specialist in Cooperative Extension

Muhammad Marrush, Ph.D., Continuing Lecturer Elizabeth J. Mitcham, Ph.D., Lecturer, Pomologist and Specialist in Cooperative Extension

Jeffrey P. Mitchell, Ph.D., Lecturer, Horticulturist and Specialist in Cooperative Extension

Lorence R. Oki, Ph.D., Lecturer and Associate Specialist in Cooperative Extension

Dan E. Parfitt, Ph.D., Lecturer and Pomologist Daniel H. Putnam, Ph.D., Lecturer, Agronomist and Specialist in Cooperative Extension
Trevor V. Suslow, Ph.D., Lecturer, Postharvest

Horticulturist and Specialist in Cooperative Extension

Kenneth W. Tate, Ph.D., Lecturer and Specialist in Cooperative Extension

Allen Van Deynze, Ph.D., Lecturer and Researcher

Major Programs. See Biotechnology, on page 182, Ecological Management and Restoration, on page 223, Environmental Horticulture and Urban Forestry, on page 294, and Plant Sciences, on page

Related Courses. See the Biotechnology, Environmental Horticulture, Horticulture and Agronomy, and Plant Biology course listings.

Graduate Study. For related graduate study, see the M.S. degree program in International Agricultural Development, and the M.S. and Ph.D. degree programs in the graduate groups of Horticulture and Agronomy, Plant Biology, Ecology, Genetics, Geography, and Soils and Biogeochemistry. See also Graduate Studies, on page 111.

The Major Program

The Plant Sciences major is designed for students who are interested in a scientific understanding of how plants grow and develop in managed agricultural ecosystems and how plant products are utilized for food, fiber and environmental enhancement. Advances in science and technology have provided new insights and options for using plants to address the issues associated with providing renewable food, fiber and energy resources for a growing global population while minimizing adverse impacts on the natural environment. Graduates in Plant Sciences are able to apply their skills and knowledge to a diverse range of agricultural and environmental goals or pursue advanced degrees in plant sciences.

The Program. The curriculum provides depth in the biological and physical sciences and a sound understanding of how plants obtain and utilize resources from their environment to sustain their growth and development. The influences of genetics, management systems and environmental inputs on crop development and productivity are emphasized along with the postharvest preservation and marketing of plant products. Students will develop an area of specialization with options in Crop Production, Plant Genetics and Breeding, or Postharvest Biology and Technology. An Individual option is also available to match specific subject matter or career goal interests in the plant sciences. All students gain practical experience through a combination of practical laboratory courses and internships. Students may also pursue an Honors thesis in their senior year.

Career Alternatives. Graduates from this program are prepared to pursue a wide range of careers, including various technical and management positions in agricultural and business enterprises, farming, or consulting; public, private, and non-profit agencies; Cooperative Extension; international development; teaching; or agricultural and environmental journalism and communication services. Graduates are qualified to pursue graduate studies in the natural and agricultural sciences, such as plant biology, genetics, breeding, horticulture, agronomy, biotechnology, ecology, environmental studies, pest management, education, or business management.

468 Plant Sciences
B.S. Major Requirements:
UNITS
Preparatory Subject Matter 57-64
Biological Sciences 1A, 1B, or 2A, 2B
Depth Subject Matter
Plant Sciences 100A, 100B, 100C
Areas of Specialization (choose one) Crop Production Option
Complete the two courses in pest management not completed for the depth subject matter: Plant Pathology 120, Entomology 110, Nematology 100, Plant Sciences 176

Biotechnology 160 Plant Breeding and Genetics Option 27

Economics 130, 140, Hydrology 110, 124, Soil Sciences 109, Plant Sciences 158,

Select from: Agricultural and Resource

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Biological Sciences 1014	
Plant Sciences 1544	
Biotechnology 1603	
Biotechnology 161B6	
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Restricted Electives6	
Select from: Plant Sciences 110A, 110B,	
110C, 112, 113, 114, 141, 151, 158,	
170A, 170B, Environmental Horticulture	
125, 150, International Agricultural	
Development 170, Agricultural and Resource	:
Economics 100A, 130, 138, Biotechnology	
150, Hydrology 124	

Postharvest Biology and Technology Option 26

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Plant Sciences 196
Restricted Electives12
Select from: Agricultural and Resource
Economics 100A, 130, Food Science and
Technology 107, 109, 131, Plant Sciences
151 212

Individual Option 25

Select a minimum of 25 upper division units, with approval from a faculty advisor, to form a coherent program of study resulting in expertise and competence in a sub-discipline of plant sciences.

Total Units for the Major...... 118-147

Major Adviser. A.B. Bennett

Advising Center for the major is located in 1220 Plant and Environmental Sciences (530) 752-1715.

Courses in Plant Sciences (PLS)

(Formerly courses in Agricultural Management and Rangeland Resources, Agronomy, Crop Science and Management, Plant Biology, Pomology, Range Science and Vegetable Crops.)

Lower Division Courses

1. Agriculture, Nature and Society (3)

Lecture - 2 hours; discussion/laboratory - 1 hour. Multiple perspectives and connections between natural sciences, social sciences, and agriculture. Emphasizes agriculture's central position between nature and society and its key role in our search for a productive, lasting and hospitable environment. Several full-period field trips provide hands-on learning. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 1. (Former Course Agricultural Management and Rangeland Resources 1.) GE credit: SE. I. (I.) Gradziel

2. Botany and Physiology of Cultivated Plants (4)

Lecture - 3 hours; discussion/laboratory - 3 hours. Prerequisite: high school course in biology and chemistry recommended. A holistic introduction to the underlying botanical and physiological principles of cultivated plants and their response to the environment. Includes concepts behind plant selection, cultivation, and utilization. Laboratories include discussion and interactive demonstrations. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 2. (Former course Agricultural Management and Rangeland Resources 2.) GE credit: SE, SL.—II. (II.) Saltveit, Marrush

5. Plants for Garden, Orchard and Landscape (2)

Lecture - 1 hour; laboratory - 3 hours. Prerequisite: for non-majors. Hands-on experience with plants cultivated for food, environmental enhancement and personal satisfaction. Topics include establishing a vegetable garden, pruning and propagation activities, growing flowers and ornamental plants, and the role of plants in human health and well-being. Not open for credit to students who have completed Plant Biology 1 or Plant Sciences 2. (Former course Plant Biology 1.) GE credit: SE.—I, III. (I, III.) Marrush

6. Flower Power—Art and Science of Flowers and Their Uses (2)

Lecture/discussion-2 hours. Prerequisite: high school biology. Introduction to the art and science of using and growing flowers to harness the power that is represented by their aesthetic beauty. Handling, production, arranging, breeding and marketing of flowers. Emphasis on potted plants and cut-flowers. (P/NP grading only.)—III. (III.) Lieth

8. Fruits and Nuts of California and the World (3)

Lecture-3 hours. Field trip seventh week of quarter. Biological and environmental principles of tree-crop agriculture emphasizing California production. Topics include temperate and subtropical species, biotechnology and genetic improvement, environmental physiology, plant and crop growth, pest and disease control, consumer issues. Not open for credit to students who have completed Plant Sciences 10. (Former course Plant Sciences 10.) GE credit: SciEng. -II. (II.) Polito

12. Plants and Society (4)

Lecture—3 hours; extensive writing—3 hours. Prerequisite: high school biology. Dependence of human societies on plant and plant products. Plants as resources for food, fiber, health, enjoyment and environmental services. Sustainable uses of plants for food production, raw materials, bioenergy, and environmental conservation. Global population growth and future food supplies. Not open for credit to students who have complete Plant Biology 12. (Former course Plant Biology 12.) (Same course as

Science and Society 12.) GE credit: SciEng or Soc-Sci, Div, Wrt | SE or SS, WE.-I, II, III. (I, ĬI, III.) Drakakaki, Fischer, Jasieniuk, Tian

14. Introduction to Current Topics in Plant Biology (4)

Discussion—3 hours; term paper. Introduction to scientific methods and current understanding of genetics, metabolism, and cellular structure in plants, with special emphasis on topics related to societal issues, such as herbal medicines and genetically modified organisms. Designed for students not specializing in biology. Not open for credit to students who have completed Plant Biology 11. GE credit: SciEng, Wrt | SE, SL.—Inoue

15. Introduction to Sustainable Agriculture (4)

Lecture—3 hours; laboratory—3 hours. Multidisciplinary introduction to agricultural sustainability with a natural sciences emphasis. Sustainability concepts and perspectives. Agricultural evolution, history, resources and functions. Diverse agricultural systems and practices and their relative sustainability. Laboratories provide direct experience with selected agricultural practices and systems. GE credit: SE.-III. (III.) Van Horn, Williams

21. Application of Computers in Technology (3)

Lecture - 2 hours; laboratory/discussion - 2 hours. Prerequisite: high school algebra. Concepts of computing and applications using personal computers, spreadsheets, database management, word processing and communications. Not open for students who have completed Agricultural Management and Rangeland Resources 21. (Former course Agricultural Management and Rangeland Resources 21.)
GE credit: SE, VL.—I, II, III. (I, II, III.) Lieth

49. Organic Crop Production Practices (3)

Lecture—1 hour; discussion—1 hour; laboratory—3 hours. Principles and practices of organic production of annual crops. Including organic crops, soil, and pest management, cover cropping, composting, seeding, transplanting, irrigation, harvesting and marketing. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 49. (Former course Agricultural Management and Rangeland Resources 49.) (P/NP grading only.) GE credit: SE.-I, III. (I, III.) Van Horn

92. Internship (1-12)

Internship - 3-36 hours. Prerequisite: consent of instructor. Work experience on or off campus in subject areas pertaining to plant and environmental sciences. Internship supervised by faculty member. May be repeated for credit. (P/NP grading only.) —I, II, III, IV. (I, II, III, IV.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor; primarily for lower division students. (P/NP grading only.)—I, II, III, IV.

99. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor; primarily for lower division students. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.)

Upper Division Courses

100A. Metabolic Processes of Cultivated Plants (3)

Lecture - 3 hours. Prerequisite: course 2 or Biological Sciences 1C or consent of instructor. Principles of energy capture and photosynthesis, water use, and nutrient cycling. Conversion of these resources into products (carbohydrates, proteins, lipids, and other chemicals) by plants. Emphasis on the relationships between environmental resources, plant metabolism and plant growth. GE credit: SE.-I. (I.) Fischer, Zakharov

100AL. Metabolic Processes of Cultivated Plants Laboratory (2)

Lecture/discussion-3 hours. Prerequisite: course 100A or the equivalent (may be taken concurrently). Techniques and instruments used to study plant metabolic processes, including water relations, respiration, photosynthesis, enzyme kinetics, microscopy, immunochemistry, and nitrogen fixation. Quantitative methods, problem solving, and practical applications are emphasized. GE credit: SE.—(I.)

100B. Growth and Yield of Cultivated Plants (3)

Lecture—3 hours. Prerequisite: course 100A or consent of instructor. Principles of the cellular mechanisms and hormonal regulation underlying plant growth, development, and reproduction. Emphasis on how these processes contribute to the harvestable yield of cultivated plants and can be managed to increase crop productivity and quality. GE credit: SE.—II. (II.) Bradford, Labavitch, Saltveit

100BL. Growth and Yield of Cultivated Plants Laboratory (2)

Lecture/discussion—3 hours. Prerequisite: course 100B or equivalent (may be taken concurrently). Laboratory exercises in plant growth and development and their regulation, including photomorphogenesis, plant growth regulators, plant anatomy, seed germination, fruit ripening and senescence. Includes field trips to illustrate relationships to cropping and marketing systems. GE credit: SE.—[II.]

100C. Environmental Interactions of Cultivated Plants (3)

Lecture—3 hours. Prerequisite: course 100A or consent of instructor. Principles of plant interactions with their physical and biological environments and their acquisition of the resources needed for growth and reproduction. Emphasis on how management practices and environmental conditions affect crop productivity. GE credit: SE.—III. (III.) Brown

100CL. Environmental Interactions of Cultivated Plants Laboratory (2)

Lecture/discussion—3 hours. Prerequisite: course 100C (may be taken concurrently). Techniques and instruments used to study plant interactions with their physical and biological environments, including light responses, transpiration, microclimatology, nutrient availability and utilization, biomass accumulation. Quantitative methods and modeling are emphasized. GE credit: SE.—(III.) Shackel

101. Agriculture and the Environment (3)

Lecture—3 hours. Prerequisite: course 2 or consent of instructor. Interaction between agriculture and the environment. Focus on the interaction between agriculture and the environment to address the principles required to analyze conflict and develop solutions to complex problems facing society. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 101. (Former course Agricultural Management and Rangeland Resources 101.) GE credit: SE, SL.—II. (II.) Tate, Van Kessel

102. California Floristics (5)

Lecture — 3 hours; laboratory — 8 hours. Prerequisite: course 2, Biological Sciences 1C, 2C, or equivalent course in Plant Sciences. Survey of the flora of California, emphasizing recognition of important vascular plant families and genera and use of taxonomic keys for species identification. Current understanding of relationships among families. Principles of plant taxonomy and phylogenetic systematics. One Saturday field trip. (Same course as Plant Biology 102.) GE credit: SE, VL.—III. (III.) Potter

105. Concepts in Pest Management (3)

Lecture—2 hours; laboratory/discussion—3 hours. Prerequisite: Biological Sciences 1C or course 2, Chemistry 8B. Introduction to the ecological principles of integrated pest management, biology of different classes of pests and the types of losses they cause, population assessment, evaluation of advantages and disadvantages of different techniques used for pest management, IPM programs. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 105. (Former course Agricultural Management and Rangeland Resources 105.) GE credit: SE.—I. (I.) Al-Khatib, Flint

110A. Principles of Agronomic Crop Production in Temperate and Tropical Systems (3)

Lecture—3 hours. Prerequisite: course in general botany or course 2 recommended. Fundamentals of field crop production in temperate and tropical climates. Resource utilization and economic, political and social problems are considered in relation to technological problems and their influences on agricultural development. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 110A. (Former course Agricultural Management and Rangeland Resources 110A.) — (I.) Mitchell

110B. Management of Agronomic Crops in Temperate and Tropical Systems (3)

Lecture — 3 hours. Prerequisite: course in general botany or course 2; course 110A recommended. Application of agronomic principles in production of temperate and tropical crops. Specific crops discussed with reference to management and efficient use of physical and biological resources. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 110B. (Former course Agricultural Management and Rangeland Resources 110B.)

110C. Crop Management Systems for Vegetable Production (4)

Lecture—2 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: course 2; course 110A recommended. Horticultural principles applied to production and management systems for vegetable crops. Laboratory and discussion will illustrate efficient field management and resource use practices. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 110C. (Former course Agricultural Management and Rangeland Resources 110C.)—I. Mitchell

110L. Principles of Agronomy Laboratory (1)

Laboratory—3 hours. Prerequisite: course 110B (may be taken concurrently). Field-oriented introduction to principles of agronomic crop production. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 110L. (Former course Agricultural Management and Rangeland Resources 110L.)—(I.) Mitchell

112. Forage Crop Ecology (3)

Lecture—3 hours. Prerequisite: course 2, Biological Sciences 1C, 2C, or consent of instructor. Forages as a world resource in food production. Ecological principles governing the adaptation, establishment, growth and management of perennial and annual forages, including pastures, rangelands and hay; aspects of forage quality which affect feeding value to livestock. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 112. (Former course Agricultural Management and Rangeland Resources 112.) Offered in alternate years. GE credit: SE.—III. Teuber

113. Biological Applications in Fruit Tree Management (2)

Lecture—1 hour; laboratory—3 hours. Prerequisite: course 2, Biological Sciences 1C, 2C or equivalent. Physiology, growth, development and environmental requirements of fruit trees and the cultural practices used to maintain them. Emphasis on the application of biological principles in the culture of commercially important temperate zone fruit tree species. Not open for credit to students that have completed Plant Biology 173. (Former course Plant Biology 173.) GE credit: SE.—II. (II.) DeJong

114. Biological Applications in Fruit Production (2)

Lecture—1 hour; laboratory—3 hours. Prerequisite: course 2, Biological Sciences 1C or 2C; course 113. Reproductive biology of tree crop species. Biological principles of fruit production, tree nutrition and orchard management for optimizing cropping. Laboratories emphasize hands-on work with orchard tree systems that are done specifically to produce the

crop. Not open for credit to students who have completed Plant Biology 174. (Former course Plant Biology 174.) GE credit: SE.—III. (III.) DeJong

120. Applied Statistics in Agricultural Science (4)

Lecture—3 hours; discussion/laboratory—3 hours. Prerequisite: upper division standing. Application of statistical methods to design and analysis of research trials for plant, animal, behavioral, nutritional, and consumer sciences. Basic concepts and statistical methods are presented in lectures, laboratories emphasize data processing techniques, problem solving, and interpretation in specialized fields. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 120. (Former course Agricultural Management and Rangeland Resources 120.) GE credit: SciEng | QL.—I. (I.) Medrano, Teuber

130. Rangelands: Ecology, Conservation and Restoration (3)

Lecture—3 hours. Prerequisite: Biological Sciences 1C; introductory ecology course and junior standing recommended. Introduction to the ecological principles and processes important for an understanding of the dynamics of range ecosystems. Emphasis on ecological and evolutionary concepts underlying management strategies for conserving biological diversity and environmental quality in rangelands. Offered in alternate years. GE credit: SE, Wrt. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 130. (Former course Agricultural Management and Rangeland Resources 130.) GE credit: SE.—(II.) Rice

131. Identification and Ecology of Grasses (2)

Lecture—7.5 hours; laboratory—20 hours; discussion—5 hours. Prerequisite: Biological Sciences 1C or course 2; Plant Biology 102 and junior standing recommended. Taxonomy and identification of western grasses. Development of skills in using plant identification keys. Ecology and evolution of grasses in grazing ecosystems. Given the week following spring quarter. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 131. (Former course Agricultural Management and Rangeland Resources 131.) Offered in alternate years. GE credit: SE, VL.—III. Rice

135. Ecology and Community Structure of Grassland and Savannah Herbivores (3)

Lecture—3 hours. Prerequisite: Biological Sciences 1A or 1B and course 2, or Biological Sciences 1C; general ecology course (Environmental Science and Policy 100) recommended. Feeding ecology of grassland herbivores and its importance in evolution of herbivore communities and social systems. Optimal foraging, interspecific interactions, and primary productivity are considered as factors structuring natural and managed grassland and savannah systems. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 135. (Former course Agricultural Management and Rangeland Resources 135.)

140. Culinary and Medicinal Herbs (3)

Lecture/discussion—3 hours. Prerequisite: Plant Sciences 2, Biological Sciences 1C, or Biological Sciences 2C. Growth, identification, cultivation and use of common culinary and medicinal herbs; herbal plant families; effects of climate and soils on herbs; herbal medicine; ecology and geography of herbs; herbs garden design; secondary chemistry of active compounds. (Same course as Environmental Science and Management 140.) Not open for credit to students who have successfully completed Environmental and Resource Science 140 or Plant Biology 140.) GE credit: SE.

141. Ethnobotany (4)

Lecture—3 hours; laboratory/discussion—2 hours. Prerequisite: course 2, Biological Sciences 1C or 2C. Relationships and interactions between plants and people, including human perceptions, management, and uses of plants, influences of plants on human cultures, and effects of human activity on

plant ecology and evolution. Concepts, questions, methods, and ethical considerations in ethnobotanical research. Not open for credit to students who have completed Plant Biology 141. (Former course Plant Biology 141.) Offered in alternate years. GE credit: SciEng or SocSci, Wrt | OL, SE or SS, WE.—

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142. Ecology of Crop Systems (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Plant Sciences 2 or Biological Sciences 1C or 2C; Mathematics 16A or Physics 1A, or consent of instructor. Ecological processes governing the structure and behavior of managed ecosystems. Emphasis on mechanistic and systems views of the physical environment, photosynthetic productivity, competition, adaptation, nutrient cycling, energy relations and contemporary issues such as climate change. Not open for credit to students who have completed Plant Biology 142. (Former course Plant Biology 142.) GE credit: SciEng.

144. Trees and Forests (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Plant Sciences 2 or Biological Sciences 1C or 2C. Biological structure and function of trees as organisms; understanding of forests as communities and as ecosystems; use of forests by humans; tree phenology, photosynthesis, respiration, soil processes, life histories, dormancy, forest biodiversity, and agroforestry. (Same course as Environmental Science and Management 144.) Not open for credit to students who have completed Plant Biology 144 or Environmental Horticulture 144 or Environmental and Resource Science 144. (Former course Plant Biology/Environmental Horticulture/Environmental and Resource Science 144.) GE credit: SE, VL.—I. (I.) Berry, Dahlgren, Rice

145. Sierra Nevada Flora (3)

Lecture/laboratory—3 hours; fieldwork—5 hours. Prerequisite: Plant Biology 102 or 108 or Evolution and Ecology 121 or Environmental Horticulture 105. An introduction to the flora of the Sierra Nevada. Basic plant identification, the principal plant communities and species of the Sierra Nevada. Class offered the first two weeks in July in the Sierra Nevada. Offered in alternate years. Not open for credit to students who have completed Plant Biology 145. (Former course Plant Biology 145.)

147. California Plant Communities (3)

Lecture/discussion—3 hours. Prerequisite: course 2 or Biological Sciences 2C. Ecology, distribution, and species of California's plant communities. Environmental forces that determine these communities, the threats they face, and their conservation and restoration opportunities. Not open for credit to student who have completed Plant Biology 147. (Former course Plant Biology 147.) GE credit: SE, VL.—III. (III.) Young

147L. California Plant Communities Field Study (1)

Discussion/laboratory—3 hours. Prerequisite: course 2 or Biological Sciences 2C, and concurrent or previous enrollment in course 147. Visits to many of northern California's plant communities, from the north coast to the Central Valley to the Sierras. Discussion of community ecology and hands-on identification of species. Two Saturday and two three-day field trips required. Not open for credit to students who have completed Plant Biology 147. (Former course Plant Biology 147.) GE credit: SE, VL.—III. (III.) Young

150. Sustainability and Agroecosystem Management (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Soil Science 10, Chemistry 2A, and course 2, Biological Sciences 1C or 2C. Interdisciplinary analysis of agricultural production and food systems with primary emphasis on biophysical processes. General concepts governing the functioning of temperate and tropical agroecosystems in relation to resource availability, ecological sustainability, and socio-economic viability. Comparative ecological analyses of agroecosystems. Not open for credit to students who have completed Agricultural Management and

Rangeland Resources 150. (Former course Agricultural Management and Rangeland Resources 150.) GE credit: OL, SE, SL.—III. (III.) Six

152. Plant Genetics (4)

Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: Biological Sciences 1A or 2A or consent of instructor. Basic principles of transmission genetics, cytogenetics, population and quantitative genetics, and molecular genetics. Practical aspects of genetic crosses and analysis of segregating populations. Not open to students who have completed Plant Biology 152. (Former course Plant Biology 152.) GE credit: SE.

153. Plant, Cell, Tissue and Organ Culture

Lecture — 2 hours; discussion — 1 hour; laboratory — 3 hours. Prerequisite: course 2 or Biological Sciences 1C or 2C. Basic and applied aspects of plant tissue culture including media preparation, micropropagation, organogenesis, embryogenesis, anther culture, protoplast culture and transformation. Not open for credit to students who have completed Plant Biology 153. (Former course Plant Biology 153.) GE credit:

154. Introduction to Plant Breeding (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 152, Biological Sciences 101 or consent of instructor. The principles, methods and applications of plant breeding and genetics to the improvement of crop plants. Illustration of how plant breeding is a dynamic, multidisciplinary, constantly-evolving science. Laboratory emphasizes hands-on experience in the basics of breeding through experiments. Not open for credit to students who have completed Plant Biology 154. (Former course Plant Biology 154.) GE credit: SE.—II. (II.) St. Clair

157. Physiology of Environmental Stresses in Plants (4)

Lecture—2 hours; discussion—2 hours. Prerequisite: course 100C or Plant Biology 111 or 112 or Environmental Horticulture 102 or Viticulture and Enology 110. Stress concepts and principles; molecular, physiological, developmental and morphological characteristics enabling plants to avoid or tolerate environmental stresses; stress acclimation and adaptation processes; responses of wild and cultivated species to drought, flooding, nutrient deficiencies, salinity, toxic ions, extreme temperatures, etc. Not open for credit to students who have completed Plant Biology 157. (Former course Plant Biology 157.) GE

158. Mineral Nutrition of Plants (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 100A or Plant Biology 111 or Environmental Horticulture 102 or Viticulture and Enology 110. Evolution and scope of plant nutrition; essential elements; mechanisms of absorption and membrane transporters; translocation and allocation processes; mineral metabolism; deficiencies and toxicities; genetic variation in plant nutrition; applications to management and understanding ecological effects of nutrient availability or deficiency. Not open for credit to students who have completed Plant Biology 158. [Former course Plant Biology 158.) GE credit: SE.—III. Brown, Richards

160. Agroforestry: Global and Local Perspectives (3)

Lecture/discussion—3 hours. Prerequisite: Plant Sciences 2 or Biological Sciences 1C or 2C; Plant Sciences 142 or 150 or Biological Sciences 2B or a general ecology course. Traditional and evolving use of trees in agricultural ecosystems; their multiple roles in environmental stabilization and production of food, fuel, and fiber; and socioeconomic barriers to the adoption and implementation of agroforestry practices. Not open for credit to students who have taken previously taken Agricultural Management and Rangeland Resources 160. (Former course Agricultural Management and Rangeland Resources 160.) (Same course as International Agricultural Development 160.) Offered in alternate years. GE credit: SE.—I. Gradziel

162. Urban Ecology (3)

Lecture/discussion—3 hours. Prerequisite: a course in general or plant ecology (course 142, Plant Biology 117 Environmental Science and Policy 100, or Evolution and Ecology 101). Application of fundamental concepts and approaches in landscape and ecosystem ecology to urban ecosystems. Ecological and social drivers and responses. Landscape heterogeneity, nutrient dynamics, invasive species, altered hydrology and climate, and pollution. Discussion of primary literature. GE credit: SE, SL.—II. (II.) Cadenasso

163. Ecosystem and Landscape Ecology (4)

Lecture/discussion—4 hours. Prerequisite: course in general, plant, or soil ecology; Evolution and Ecology 117, Plant Biology 117, Environmental Science and Policy 100, Evolution and Ecology 101, Soil Science 112. Integration of concepts to understand and manage ecosystems in a complex and changing world. Emphasis on interactions among biotic, abiotic and human factors and changes over space/time. Local to global controls over water, carbon and nutrients across ecosystems/landscapes. Not open for credit to students who have completed Ecology 201.—II. (II.) Cadenasso, Eviner

170A. Fruit and Nut Cropping Systems (2)

Lecture — 1 hour; laboratory — 3 hours. Prerequisite: course 2, Biological Sciences 1C, or consent of instructor. Overview of production and handling systems of major pomological crops, analysis of current cultural and harvesting problems and concerns associated with commercial fruit growing. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 170A. (Former course Agricultural Management and Rangeland Resources 170A.) Offered in alternate years. GE credit: SE.—(I.) Gradziel

170B. Fruit and Nut Cropping Systems (2)

Lecture—1 hour; laboratory—3 hours. Prerequisite: course 2, Biological Sciences 1C, or consent of instructor. Overview of production and handling systems of major pomological crops, including analysis of current cultural and harvesting problems and concerns associated with commercial fruit growing. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 170B. (Former course Agricultural Management and Rangeland Resources 170B.) Offered in alternate years. GE credit: SE.—(III.) Gradziel

171. Principles and Practices of Plant Propagation (4)

Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: course 2, Biological Sciences 1C or 2C. Principles and practices of propagating plants covering anatomical, physiological, and practical aspects. Not open for credit to students who have completed Plant Biology 171. [Former course Plant Biology 171.] GE credit: SE.—III. (III.) Burger

172. Postharvest Physiology and Technology (4)

Lecture—3 hours; laboratory/discussion—2 hours. Prerequisite: general plant science background (e.g., courses 2, 12); course 196 recommended. Overview of physiological processes related to maturation and senescence of plant products and their responses to postharvest stresses. Targeted approaches and technologies to maintain product quality and limit postharvest disorders. Not open for credit to students who have completed Plant Biology 172. (Former course Plant Biology 172.) GE credit: SE.—I. (I.) Saltveit, Zakharov

173. Molecular and Cellular Aspects of Postharvest Biology (3)

Lecture/discussion—3 hours. Prerequisite: course 2, Biological Sciences 1C, 2C or equivalent. Basic concepts and current knowledge of issues relevant to postharvest biology. Mechanisms of fruit ripening, senescence, programmed cell death. Metabolism and functions of phytohormones, carbohydrates, lipids, pigments, flavor compounds, and phytonutrients at molecular and cellular levels. GE credit: SE.—(III.) Zakharov

174. Microbiology and Safety of Fresh Fruits and Vegetables (3)

Lecture - 3 hours. Prerequisite: course 2 or Biological Sciences 1C or 2C or equivalent. Overview of microorganisms on fresh produce, pre- and postharvest factors influencing risk of microbial contamination, attachment of microorganisms to produce, multiplication during postharvest handling and storage, and methods of detection. Mock outbreak trial and presentation of science-based forensic discovery. GE credit: SE. — (I.)

176. Introduction to Weed Science (4)

Lecture - 2 hours; laboratory/discussion - 4 hours. Prerequisite: course 2 or Biological Sciences 1C or 2C. Weed biology and ecology, methods of weed management, biological control, herbicides and herbicide resistance. Weed control in managed and natural ecosystems; invasive species. Laws and regulations. Application of herbicides. Sight and soft ware-assisted identification of common weeds. Not open for credit to students who have completed Plant Biology 176. (Former course Plant Biology 176.) GE credit: VL, SE.-II. (II.) DiTomaso, Fischer

178. Biology and Management of Aquatic Plants (3)

Lecture—3 hours. Prerequisite: course 2, Biological Sciences 1C or 2C; Chemistry 8B or 118B; course 100C, Plant Biology 111, Environmental Horticulture 102, or Hydrologic Science 122 recommended. Brief survey of common and invasive fresh water plants and macroalgae, their reproductive modes, physiology, growth (photosynthesis, nutrient utilization), development (hormonal interactions), ecology, modes and impacts of invasion, and management. Two Saturday field trips required. Offered in alternate years. Not open for credit to students who have completed former course Plant Biology 178. (Former course Plant Biology 178.) GE credit: SE. – I. Anderson

180. Introduction to Geographic Information Systems (4)

Lecture - 3 hours; laboratory/discussion - 3 hours. Prerequisite: course 21 or equivalent familiarity with computers, course 120 or the equivalent, Mathematics 16A. Management and analysis of georeferenced data. Spatial database management and modeling. Applications to agriculture, biological resource management and social sciences. Cartographic modeling. Vector and raster-based geographic information systems. Not open for credit to students who have completed Agriculture Systems and Environment 132 or Agricultural Management and Rangeland Resources 132 or 180. (Former course Agricultural Management and Rangeland Resources 180.) (Same course as Applied Biological Systems Technology 180.) GE credit: SE, VL.

188. Undergraduate Research Proposal (3)

Lecture/discussion-3 hours. Prerequisite: upper division standing. Preparation and review of a scientific proposal. Problem definition, identification of objectives, literature survey, hypothesis generation, design of experiments, data analysis planning, proposal outline and preparation. (Same course as Biotechnology 188.) GE credit: Wrt | OL, SE, WE.—III. (III.) Kliebenstein

189L. Laboratory Research in Plant Sciences (2-5)

Laboratory-3-12 hours; discussion-1 hour. Prerequisite: course 188 and consent of instructor. Formulating experimental approaches to current questions in Plant Sciences; performance of proposed experiments. May be repeated up to 12 units for credit. (P/NP grading only.)—I, II, III. (I, III.)

190. Seminar on Alternatives in Agriculture **(2)**

Seminar—2 hours. Prerequisite: upper division standing. Seminar on topics related to alternative theories, practices and systems of agriculture and the relationship of agriculture to the environment and society. Scientific, technological, social, political and economic perspectives. May be repeated for credit.

(Former course Agricultural Management and Rangeland Resources 190.) (P/NP grading only.) GE credit: SE.—II. (II.) Van Horn

190C. Research Group Conference (1)

Discussion - 1 hour. Prerequisite: advanced standing; consent of instructor. Weekly conference on research problems, progress and techniques in the plant sciences. May be repeated for credit. (P/NP grading only.) – I, II, III. (I, II, III.)

192. Internship (1-12)

Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience on or off campus in subject areas pertaining to plant and environmental sciences. Internship supervised by a faculty member. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.)

194H. Senior Honors Thesis (2-6)

Independent study. Prerequisite: senior standing; overall GPA of 3.250 or higher and consent of master adviser. Two or three successive quarters of guided research on a subject of special interest to the student. (P/NP grading only; deferred grading only, pending completion of thesis.) GE credit: SE,

196. Postharvest Technology of Horticultural Crops (3)

Lecture/discussion-45 hours; fieldwork-45 hours. Prerequisite: upper division or graduate student standing. Intensive study of postharvest considerations and current procedures and challenges in postharvest handling for fruits, nuts, vegetables, and ornamentals in California. Scheduled first two weeks immediately following last day of spring quarter. Not open for credit to students who have completed Plant Biology 196. (Former course Plant Biology 196.) (P/ NP grading only.) GE credit: SE.—III. (III.) Mitcham

197T. Tutoring in Plant Sciences (1-5)

Tutorial - 1-5 hours. Prerequisite: upper division standing, completion of course being tutored or the equivalent, consent of instructor. Leading small voluntary discussion or lab groups affiliated with one of the department's regular courses. May be repeated for up to eight units of credit. (P/NP grading only.)

198. Directed Group Study (1-5) (P/NP grading only.) - I, II, III, IV. (I, II, III, IV.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) - I, II, III, IV. (I, II, III, IV.)

Graduate Courses

205. Experimental Design and Analysis (5)

Lecture - 3 hours; discussion/laboratory - 2 hours. Prerequisite: course 120 or equivalent. Introduction to the research process and statistical methods to plan, conduct and interpret experiments. Not open for credit to students who have completed Agronomy 205. (Former course Agronomy 205.) - II. (II.) Dubcovsky

206. Applied Multivariate Modeling in Agricultural and Environmental Sciences (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: one of course 120, Statistics 106, 108, course 205 or equivalent. Multivariate linear and nonlinear models. Model selection and parameter estimation. Analysis of manipulative and observational agroecological experiments. Discriminant, principal component, and path analyses. Logistic and biased regression. Bootstrapping. Exercises based on actual research by UC Davis students. Not open for credit to students who have complete Agronomy 206. (Former course Agronomy 206.)—I. (I.) Laca

211. Principles and Practices of HPLC (2)

Lecture—1 hour; laboratory—3 hours. Prerequisite: undergraduate physics and chemistry; Biological Sciences 102, 103 recommended. Principles and theory of HPLC involving various modes of separation and detection. Optimization of separation using isocratic and gradient elution. Develop practical knowledge about the use, maintenance and troubleshooting of HPLC equipment, including HPLC columns. Development of new HPLC methods. Not open for credit to students who have completed Agronomy 211. (Former course Agronomy 211.)

212. Postharvest Biology and Biotechnology of Fruits and Nuts (3)

Lecture — 3 hours. Prerequisite: course 172. Review of postharvest biology of fruits and nuts and biotechnological approaches to address postharvest challenges. Morphology, biology and postharvest handling of fruits and nuts are presented along with current research, including biotechnology, and discussion of future research needs and approaches. Offered in alternate years. Not open for credit to students who have completed Pomology 212.—(III.) Crisosto, Mitcham, Zakharov

213. Postharvest Physiology of Vegetables (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: course 172 or course 100B or Plant Biology 112. Comparative physiology of harvest vegetables; emphasis on maturation, senescence, compositional changes, physiological disorders and effects of environmental factors. Concepts and research procedures. Not open for credit to students who have completed Vegetable Crops 212. (Former course Vegetable Crops 212.) Offered in alternate years. — (III.) Saltveit

220. Genomics and Biotechnology of Plant Improvement (3)

Lecture—3 hours. Prerequisite: Biological Sciences 101 or the equivalent. Integration of modern bio-technology and classical plant breeding including the impact of structural, comparative and functional genomics on gene discovery, characterization and exploitation. Also covers molecular markers, plant transformation, hybrid production, disease resistance, and novel output traits. Not open for credit to students who have completed Vegetable Crops 220. (Former course Vegetable Crops 220.) (Same course as Genetics 220.)—I. (I.) Neale

221. Genomics and Breeding of Vegetable Crops (3)

Lecture — 3 hours. Prerequisite: Biological Sciences 101 or equivalent. Preview of genome structure, mapping, gene tagging and development of other genetic resources applied to improvement of major vegetables. For graduate students contemplating a career in modern vegetable breeding and biotechnology. Not open for credit to students who have completed Vegetable Crops 221. (Former course Vegetable Crops 221.)

222. Advanced Plant Breeding (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 205; Genetics Graduate Group 201D or Animal Genetics 107; Plant Biology 154. Philosophy, methods, and problems in developing improved plant species. Topics include: inbreeding, heterosis, progeny testing, breeding methodology, index selection, germplasm conservation, and breeding for stress resistance. Laboratories include tours of breeding facilities and calculation and interpretation of quantitative data. Not open for credit to students who have completed Agronomy 221. (Former course Agronomy 221.) Offered in alternate years. — (III.) Teuber

290. Seminar (1-2)

Seminar - 1-2 hours. Topics of current interest related to Plant Sciences. (S/U grading only.)—I, II, III. (I, II, III.)

290C. Research Conference (1)

Discussion-1 hour. Prerequisite: consent of instructor. (S/U grading only.)—I, II, III. (I, II, III.)

297T. Tutoring in Plant Science (1-5)

Tutoring - 1-5 hours. Prerequisite: graduate standing; consent of instructor; completion of course to be tutored or the equivalent. Designed for graduate students who desire teaching experience but are not teaching assistants. May be repeated for credit for a total of five units. Same course may not be tutored more than once. (S/U grading only.)

298. Group Study (1-5) 299. Research (1-12)

Prerequisite: consent of instructor. (S/U grading only.) - I, II, III, IV. (I, II, III, IV.)

Professional Course

396. Teaching Assistant Training Practicum

Prerequisite: consent of instructor; graduate standing. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.)

Plastic Surgery

See Medicine, School of, on page

Political Science

(College of Letters and Science)

John T. Scott, Ph.D., Interim Chairperson of the

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Undergraduate Student Matters. 468 Kerr

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Faculty

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Daniel Y. Kono, Ph.D., Assistant Professor
Scott MacKenzie, Ph.D., Assistant Professor
Zeev Maoz, Ph.D., Professor Heather McKibbens, Ph.D., Assistant Professor Jeannette Money, Ph.D., Associate Professor Gabriella R. Montinola, Ph.D., Associate Professor Miroslav Nincic, Ph.D., Professor Ethan Scheiner, Ph.D., Professor John T. Scott, Ph.D., Professor

Academic Senate Distinguished Teaching Award Walter J. Stone, Ph.D., Professor Robert S. Taylor, Ph.D., Associate Professor

Emeriti Faculty

Larry Berman, Ph.D., Professor Emeritus Edmond Costantini, Ph.D., Professor Emeritus Richard W. Gable, Ph.D., Professor Emeritus Alexander J. Groth, Ph.D., Professor Emeritus Clyde E. Jacobs, Ph.D., Professor Emeritus Joyce K. Kallgren, Ph.D., Professor Emerita Lloyd D. Musolf, Ph.D., Professor Emeritus John R. Owens, Ph.D., Professor Emeritus Randolph M. Siverson, Ph.D., Research Professor and Professor Emeritus

Larry L. Wade, Ph.D., Professor Emeritus Geoffrey A. Wandesforde-Smith, Ph.D., Professor

Paul E. Zinner, Ph.D., Professor Emeritus

The Major Program

Political science is the study of politics and political systems at the local, national, and international levels. It concerns not only the institutions of government but also the analysis of such phenomena as political behavior, political values, political change and stability, parties, pressure groups, bureaucracies, administrative behavior, justice, national security, and international affairs

The Program. The Department of Political Science offers two major programs: political science and political science-public service. The political science major aims to provide the student with a broad understanding of political concepts, political institu-tions, political behavior, and political processes. The political science-public service major is for students who desire opportunities for practical hands-on experience in their major. It differs in particular from the political science major in its internship require ment and its focus on the American political system.

Internships and Career Alternatives. Both the proximity of UC Davis to the state capitol and the programs offered by the UC Davis Washington Center afford exceptional internship possibilities in local, state, and national government offices, providing students with actual experience in politics and government service while still attending school. A student who majors in political science acquires research and analytic skills relevant to many professional fields. Consequently, the majors offered in political science are valuable not only in providing students with a better understanding of politics and political systems, but also as a first step toward careers in teaching, law, management, government, urban planning, journalism, politics, administration, or for graduate studies in numerous fields.

UNITS

UNITS

Political Science

A.B. Major Requirements:

Preparatory Subject Matter
Depth Subject Matter 44-45
Four courses in one of the fields of concentration listed below

Fields of Concentration

American Politics (courses with Political Science 1 as a prerequisite): Political Science 100, 102, 104-109, 150-155, 160, 162-166, 168, 170-172, 174-176, 180, 183, 187, 195, 196A.

Comparative Politics (courses with Political Science 2 as a prerequisite): Political Science 126, 140A-140C, 142A-142B, 143A-143B, 144A-144B, 146A-146B, 147A-147D, 148A-148C, 179, 196B. International Relations (courses with Political

Science 3 as a prerequisite): Political Science 120-124, 126, 129, 130-132, 134-137, 139, 190, 196C, International Relations

Political Theory (courses with Political Science 4 as a prerequisite): Political Science 110, 112-117, 118A-118C, 119, 187, 196D

Total Units for the Major......72-73 Political Science—Public Service

A.B. Major Requirements:

Preparatory Subject Matter	20
Political Science 1	. 4
Two courses from Political Science 2, 3,	
15 7	0

Statistics 13 (or equivalent)
Political Science 51 (required course) 4
Recommended: Economics 1A-1B

Depth Subject Matter44-4	6
Core program 12	
Three courses chosen from Political Science	
100, 102, 104, 105, 106, 108, 109,	
113, 114, 180.	
Internship, Political Science 192A, 192B, or	
192W	
Research paper, Political Science 1932-4 Fields of concentration	
Select six upper division courses from two	
or three fields of concentration listed below	
with at least two courses in each field	
selected; at least 16 of the units must be in	
political science; Core Program courses	
may not be counted toward this	
requirement.	

Fields of Concentration

Field (1) Policy Process: Political Science 100, 102, 104, 105, 106, 108, 109, 140A, 160, 162, 163, 164, 165, 166, 168, 170, 171, 172, 174, 175, 180, 183, 187, 195; Economics 130, 131 Field (2) Policy Interpretation (public/prelaw): Political Science 119, 150, 151, 152, Field (3) State & Local Policy: Political Science 100, 102, 104; Environmental Science and Policy 173; Sociology 143A Field (4) Foreign Policy: Political Science 122, 130, 131, 132, 134, 139 Field (5) Environmental Policy: Political Science 107; Environmental Science and Policy 160, 161, 162, 166, 168A, 168B, 169, 171, 172, 173, 179 Field (6) Economic Policy: Economics 100, 130, 131, 151A, 151B Field (7) Social Policy: Sociology 104, 124, 141, 150, 151, 154, 155, 175, 181 Field (8) Policy Analysis Tools: Economics 102, 140; Political Science 114

Total Units for the Major64-66 Major Advisers. Consult Department office.

Minor Program Requirements:

Students electing a minor in Political Science may choose one of two plans.

UNITS Political Science24

Six upper division courses: Three courses in one of the fields of concentration and three courses outside of that field.

Public Affairs Internship Program. This program is open to upper division students in any major who want to obtain an internship in the area of government and public service. Information and applications are available from the Political Science Department in 1273 Social Sciences and Humanities Building

Graduate Study. The Department of Political Science offers a program of graduate study and research leading to a Ph.D. degree or an M.A./J.D. joint degree. The M.A./J.D. joint degree is done only in conjunction with UC Davis School of Law. Information concerning admission to these programs and requirements for completion are available in the Graduate Program Coordinator office.

Graduate Adviser. Consult Graduate Program Coordinator office.

American History and Institutions. This University requirement may be satisfied by passing any one of the following Political Science courses: 1, 5, 100, 102, 104, 105, 106, 108, 109, 113, 130, 131, 160, 163; see also under University requirements.

Courses in Political Science (POL) Lower Division Courses

1. American National Government (4)

Lecture - 3 hours; discussion - 1 hour. Survey of American national government, including the constitutional system, political culture, parties, elections, the presidency, Congress, and the courts. GE credit: SocSci, Wrt | ACGH, SS, WE.

2. Introduction to Comparative Politics (4)

Lecture—3 hours; discussion—1 hour. Introduction to basic concepts in political analysis and application of them in comparative studies of selected countries. Coverage is given to cultural and other informal dimensions of politics as well as to more formal political and governmental structures. GE credit: SocSci, Wrt | SS, WC, WE.

3. International Relations (4)

Lecture—3 hours; discussion—1 hour. International conflict and cooperation, including the Cold War, nuclear weapons, and new techniques for understanding international politics. GE credit: SocSci, SocSci, Wrt | SS, WC, WE.

4. Basic Concepts in Political Theory (4)

Lecture - 3 hours; discussion - 1 hour. Analysis of such concepts as the individual, community, liberty, equality, justice, and natural law as developed in the works of the major political philosophers. GE credit: SocSci, Wrt | AH or SS, WC, WE.

5. Contemporary Problems of the American Political System (4)

Lecture - 3 hours; discussion - 1 hour. In-depth treatment of selected problems and issues of American politics, governmental institutions, and policies. GE credit: SocSci, Wrt | ACGH, SS, WE

7. Contemporary Issues in Law and Politics

Seminar-4 hours. A seminar which focuses on the political dimensions of American law and institutions. Examines the role of courts in resolving contemporary issues of law and politics including abortion, capital punishment, and civil rights. Limited enrollment. Open to students having no more than 40.1 units. GE credit: SocSci, Wrt | ACGH, SS, WE.

51. Scientific Study of Politics (4)

Lecture - 3 hours; discussion - 1 hour. Introduction to the basic principles of the scientific study of politics. Research design and empirical analysis of data with applications to different methodological approaches and different substantive areas in political science. GE credit: SocSci | AH or SS, QL, SE, VL, WE.

90X. Lower Division Seminar (4)

Seminar-4 hours. Prerequisite: lower division standing and consent of instructor. Examines fundamental issues and concepts that shape the study and practice of politics. Students will read, discuss and write about some of the most significant texts in political science in order to develop a foundation for the study of politics. Limited enrollment.

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading

Upper Division Courses

100. Local Government and Politics (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1 and upper division standing or consent of instructor. Politics and government of local communities in the United States, including cities, counties and special districts. Emphasizes sources and varieties of community conflict, legislative and executive patterns, expertise, decision making and the politics of structure. Observation of local governing boards. Offered irregularly. GE credit: ŠocSci, Wrt | ACGH, SS, WE.

102. Urban Public Policy (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1, upper division standing in Political Science or consent of instructor. Political and economic relationships among central cities, suburbs, and regional, state, and federal governments. Focuses upon policy areas such as poverty, transportation, welfare, and housing, and upon who governs and who benefits from the policies in these areas. GE credit: SocSci, Wrt | ACGH, DD, QL, SS,

104. California State Government and Politics (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1 and upper division standing or consent of instructor. The California political system. Political culture, constitution, elections and parties, direct democracy, legislature, governor, executive branch, courts, finances, state-local relations and policy issues. Offered irregularly. GE credit: SocSci, Wrt | ACGH, SS, WE.

105. The Legislative Process (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1. The legislative process with emphasis on the United States Congress; legislative organization and procedures, legislative leadership and policy making, legislators and constituents, relations between Congress and other agencies. GE credit: SocSci, Wrt | ACGH, SS, WE.

106. The Presidency (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1. The American presidencies origins and development; presidential power and influence as manifest in relationships with Congress, courts, parties, and the public in the formulation and administration of foreign and domestic policy; nominations, campaigns, and elections. GE credit: Soc-Sci, Wrt | ACGH, SS, WE.

107. Environmental Politics and Administration (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or consent of instructor. Introduction to the environment as a political issue in the United States and to the development of administrative mechanisms for handling environmental problems. Changing role of Congress, the presidency, the bureaucracy, and the courts in environmental policy formulation and implementation. GE credit: SocSci, Wrt | ACGH, QL, SS, WE.

108. Policy Making in the Public Sector (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1 and upper division standing or consent of instructor. Theoretical rationale for governmental activity, program evaluation, PPBS, positive theories of policy making, the quantitative study of policy determinants, implementation, and proposals for improved decision making. Offered irregularly. G GE credit: SocSci, Wrt | ACGH, QL, SS,

109. Public Policy and the Governmental Process (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1. The processes of formulating public policy, including individual and collective decision making, political exchange, competition, bargaining, coalition formation and the allocation of public goods, resources and opportunities. GE credit: SocSci, Wrt | ACGH, QL, SS, WE.

110. The Strategy of Politics (4)

Lecture—3 hours; term paper or discussion—1 hour. Introduction to game theory. Explanation of the behavior of individuals in strategic interaction. Rational and behavioral approaches. Applications to political science and other fields. GE credit: SocSci, Wrt | QL, SS, WE.

112. Contemporary Democratic Theory (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 4. Major contemporary attempts to reformulate traditional democratic theory, attempts to replace traditional theory by conceptual models derived from modern social science findings. Offered in alternate years. GE credit: SocSci, Wrt | AH or SS, WE.

113. American Political Thought (4)

Lecture—3 hours, term paper or discussion—1 hour. Prerequisite: course 4. Origins and nature of American political thought. Principles of American thought as they emerge from the founding period to the present. GE credit: SocSci, Wrt | ACGH, AH or SS,

114. Quantitative Analysis of Political Data

Lecture-3 hours; term paper or discussion-1 hour. Logic and methods of analyzing quantitative political data. Topics covered include central tendency, probability, correlation, and non-parametric statistics Particular emphasis will be placed on understanding the use of statistics in political science research. Offered in alternate years. GE credit: SocSci, Wrt | AH or SS or SE, QL, VL, WE.

115. Medieval Political Thought (4)

Lecture — 3 hours; term paper. Prerequisite: course 118A. Examination of the ideas central to medieval political thinking. Emphasis will be upon the thoughts of the major political thinkers of the period, rather than upon political history. GE credit: SocSci, Wrt | AH or SS, WE.

116. Foundations of Political Thought (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 4. Analysis and evaluation of the seminal works of a major political philosopher or of a major problem in political philosophy. May be repeated one time for credit when topic differs. Offered in alternate years. GE credit: SocSci, Wrt | AH or SS, WC, WE.

117. Topics in the History of Political Thought (4)

Lecture — 3 hours; term paper or discussion — 1 hour. Prerequisite: course 4. The political thought of a specific historical period. Topics may include: Ancient Athens, the Italian Renaissance, the Enlightenment, or Nineteenth Century Germany. May be repeated once for credit. GE credit: Wrt | SS, WE.

118A. History of Political Theory: Ancient

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 4. Critical analyses of classical and medieval political philosophers such as Plato, Aristotle, Cicero and St. Thomas. GE credit: SocSci, Wrt | AH or SS, WC, WE.

118B. History of Political Theory: Early Modern (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 4. Critical analyses of the works of late modern political philosophers such as Rousseau, Kant, Hegel, Tocqueville, Mill, Marx and Nietzsche. GE credit: SocSci, Wrt | AH or SS, WC, WE.

118C. History of Political Theory: Late Modern (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 4. Critical analyses of the works of late modern political philosophers such as Rousseau, Kant, Hegel, Tocqueville, Mill, Marx and Nietzsche. GE credit: SocSci, Wrt | AH or SS, WC, WE.

119. Contemporary Political Thought (4)

Lecture - 3 hours; term paper or discussion - 1 Prerequisite: course 4. Contemporary political thought from the end of the nineteenth century to the present. Emphasis upon an individual philosopher, concept, or philosophical movement; e.g., Nietzsche, Continental political thought, Rawls and critics, theories of distributive justice, feminist theory Offered irregularly. GE credit: SocSci, Wrt | AH or

120. Theories of International Politics (4)

Lecture—3 hours: term paper or discussion—1 hour. Prerequisite: course 3, upper division standing or consent of instructor. Major contemporary approaches to the study of international politics, including balance of power, game theory, Marxist-Leninist theory, systems theory, and decision-making analysis. GE credit: SocSci, Wrt | SS, WE.

121. Scientific Study of War (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 3; course 51 or Statistics 13 with upper division standing. Restricted to upper division standing. An analysis of political processes

involved in the initiation, conduct and termination of modern interstate warfare. GE credit: SocSci, Wrt | QL, SS, WE.

122. International Law (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 3. Selected topics in international law; territory, sovereign immunity, responsibility, the peaceful settlement or nonsettlement of international disputes. GE credit: SocSci, Wrt | SS, WE

123. The Politics of Interdependence (4)

LLecture - 3 hours; term paper or discussion hour. Prerequisite: course 3, upper division standing or consent of instructor. In the past several decades, growing economic interdependence has generated new problems in international relations. Course deals with difficulties in managing complex interdependence and its implication on national policies and politics. GE credit: SocSci, Wrt | SS, WE.

124. The Politics of Global Inequality (4)

Lecture—3 hours; term paper or discussion_1 hour. Prerequisite: course 3, upper division standing; course 123 recommended. Analysis of current economic and political international relations resulting from a long standing division of the global system into rich and poor regions. GE credit: SocSci, Div, Wrt | SS, WC, WE.

126. Ethnic Self-Determination and International Conflict (4)

Lecture — 3 hours; term paper or discussion — 1 hour. Prerequisite: course 3. Compares the claims of the state and ethnic peoples in countries undergoing internal conflicts; e.g., South Africa, Northern Ireland. Analyzes the role of the international community in facilitating the peaceful resolution of conflicts. GE credit: SocSci, Div, Wrt | SS, WC, WE.

129. Special Studies in International Politics

Lecture — 3 hours; term paper. Prerequisite: course 3, upper division standing. Intensive examination of one or more special problems in international politics. May be repeated one time for credit when different topic is studied. GE credit: SocSci, Wrt | SS,

130. Recent U.S. Foreign Policy (4)

Lecture - 3 hours; term paper or discussion - 1 hour. Prerequisite: course 3, upper division standing or consent of instructor. Broad survey of the development of U.S. foreign policy in twentieth century with emphasis on transformation of policy during and after World War II, and the introduction to analytic tools and concepts useful for understanding of current foreign policy issues. GE credit: SocSci, Wrt | ACGH, SS, WE.

131. Analysis of U.S. Foreign Policy (4)

Lecture - 3 hours; term paper. Prerequisite: course 3, upper division standing or consent of instructor. Detailed presentation and examination of the formulation of execution of U.S. foreign policy. Survey of numerous factors influencing policy outcomes and how such determinants vary according to policy issue areas. GE credit: SocSci, Wrt | SS, WE.

132. National Security Policy (4)

Lecture-3 hours; term paper or discussion-1 hour. Prerequisite: course 3, upper division standing. Development of national security policies since 1945. Analysis of deterrence and assumptions upon which it is based. Effects of nuclear weapons upon conduct of war, alliance systems, and the international system. Prospects of security and stability through arms control. GE credit: SocSci, Wrt | SS,

135. International Politics of the Middle East (4)

Lecture -3 hours; term paper or discussion -1 hour. Prerequisite: course 3 or consent of instructor. Restricted to upper division standing. International politics of the Middle East as a microcosm of world politics. The Middle East as a regional system Domestic and International Politics in the Middle

East. Changing Political Structures in the Middle East. Superpower involvement in the Middle East. GE credit: SocSci, Wrt | SS, WE.

136. The Arab-Israeli Conflict (4)

Lecture – 3 hours; term paper or discussion – 1 hour. Prerequisite: course 3 or International Relations 1. Restricted to upper division standing. Causes, course, and implications of Arab-Israeli conflict. Competing Israeli and Arab narratives, politics of force, diplomacy. Domestic politics and A-I conflict, the superpowers and the A-I conflict, A-I conflict and world politics, potential solutions. GE credit: SocSci, Wrt | SS, WE.

137. International Relations in Western Europe (4)

Lecture — 3 hours; term paper or discussion — 1 hour. Prerequisite: course 3, upper division standing. Analysis of European unity, problems of the Atlantic alliance, Atlantic political economy, East-West relations, communism in Western Europe and the relationship between domestic politics and foreign policy. GE credit: SocSci, Wrt | SS, WC, WE.

140A. Comparative Political Institutions: Electoral Systems (4)

Lecture—3 hours; term paper or discussion—1 hour.
Prerequisite: course 2. Workings of electoral institutions, focusing on systems used to elect presidents and assemblies, pass laws, and generally make decisions. Examples from systems throughout the world, including cases from both the advanced industrial and developing worlds. Offered in alternate years. GE credit: SocSci, Wrt | QL, SS, WE.

140B. Comparative Political Institutions: Parties (4)

Lecture -3 hours; term paper or discussion -1 hour. Prerequisite: course 2 or consent of instructor. Restricted to upper division standing. The factors shaping political parties and their role in democratic representation. Offered in alternate years. GE credit: SocSci, Div, Wrt | SS, WE.

140C. Comparative Political Institutions: Legislatures (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 2 or consent of instructor; upper division standing. Examination of legislatures from a comparative perspective. Offered in alternate years. GE credit: SocSci, Wrt | SS, WE.

142A. Comparative Development: Political **Development in Modernizing Societies (4)**

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 2 or consent of instructor; upper division standing. Nature and sequence of political development; its economic and social concomitants; role of elites, military, bureaucracy, and party systems; social stratification and group politics; social mobilization and political participation; instability, violence, and the politics of integration. Offered in alternate years. GE credit: SocSci, Wrt | SS, WC,

142B. Comparative Development: Politics and Inequality (4)

Lecture — 3 hours; term paper or discussion — 1 hour. Prerequisite: course 2 or consent of instructor; upper division standing. Linkages between politics and the distribution of social and economic goods. Impact of civil rights legislation, the politics of welfare states, and the effects of political participation on the distribution of goods. Offered in alternate years. GE credit: SocSci, Wrt | SS, WC, WE

143A. Latin American Politics (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 2. Issues related to democratic consolidation in Latin America, with a regional focus on South America. Topics include transitions to democracy, the role of the military, political economy, and political behavior. GE credit: SocSci, Div, Wrt | SS, WC, WE.

143B. Mexican Politics (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 2. Introduction to the politics of contemporary Mexico. Focus on rise, fall, and aftermath of Mexico's one-party dominant system. GE credit: SocSci, Div, Wrt | SS, WC, WE.

144A. Politics of Post-Communist Countries: East European Politics (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 2 or consent of instructor; restricted to upper division standing. Post-war democratization, state-building and economic reform in East European states. GE credit: SocSci, Wrt | SS, WC, WE.

144B. Politics of Post-Communist Countries: Russia (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 2 or consent of instructor; restricted to upper division standing. Democratization, state-building and economic reform; creation of new institutions; impacts of Soviet rule. GE credit: SocSci, Wrt | SS, WC, WE.

146A. Politics of Africa: Issues in **Contemporary African Politics (4)**

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 2 or consent of instructor; course 134 recommended; upper division standing. African politics since the end of the Cold War. Topics include: Strategic Security Approach, Democratiza-tion, Human Rights, HIV/AIDS, African Peacekeep-ing, Terrorism, Religious and Ethnic Conflict, Debt and Stalled Development. Offered in alternate years. GE credit: SocSci, Div, Wrt | SS, WC, WE.

146B. Politics of Africa: Development in Africa (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 2 or consent of instructor; course 134 recommended; upper division standing. Political and economic development within Sub-Saharan Africa. States and institutions, democracy, party systems, military coups/rule, bureaucracy/corruption, race/ethnicity, national/regional integrations, trade unions, economic development strategies, class formation, and women's roles and ideology. Offered in alternate years. GE credit: SocSci, Div, Wrt | SS, WC, WE

147A. West European Politics (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 2 or consent of instructor; upper division standing. The evolution, politics, and contemporary problems of selected political systems of Western Europe. Offered in alternate years. GE credit: SocSci, Wrt | SS, WC, WE.

147B. West European Politics: British Politics (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 2 or consent of instructor; upper division standing. The evolution, politics, and contemporary problems of Britain's political system. GE credit: SocSci, Wrt | SS, WC, WE.

147C. West European Politics: French Politics (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 2 or consent of instructor; upper division standing. The evolution, politics and contemporary problems of France's political system. Offered in alternate years. GE credit: ŚocSci, Wrt | SS, WC, WE.

147D. West European Politics: German Politics (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 2 or consent of instructor; open to upper division Political Science & International Relations Majors. Evolution, politics and contemporary problems of Germany's political system. GE credit: SocSci, Wrt | SS, WC, WE.

148A. Government and Politics of East Asia: China (4)

Lecture — 3 hours; term paper or discussion — 1 hour. Prerequisite: course 2 or consent of instructor; upper division standing. Evolution of political institutions and political culture in China with emphasis on the

post-1949 period. Primary attention to nationalism, modernization and political efficacy. Offered in alternate years. GE credit: SocSci, Wrt | SS, WC,

148B. Government and Politics in East Asia: Japan (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 2 or consent of instructor; upper division standing. Japanese politics, with an emphasis on the postwar period. Particular emphasis on political parties, elections, political economy, and social problems. Offered in alternate years. GE credit: SocSci, Div, Wrt | SS, WC, WE.

148C. Government and Politics in East Asia: Southeast Asia (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 2 or consent of instructor; upper division standing. Evolution of political institutions and economy of selected nations in Southeast Asia. Emphasis on imperialist legacy, nation building in multi-ethnic communities, and contrasts in economic performance. Offered in alternate years. GE credit: SocSci, Div, Wrt | SS, WC, WE.

150. Judicial Politics and Constitutional Interpretation (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1 and upper division standing or consent of instructor. Politics of judicial policy making, issues surrounding constitutional interpretation and decision making, prerequisite for courses on the politics of constitutional law. GE credit: Soc-Sci, Wrt | ACGH, DD, SS, WE.

151. The Constitutional Politics of the First Amendment and the Right to Privacy (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: courses 1 and 150 with upper division standing or consent of instructor. The constitutional politics surrounding such issues as the right to free expression, associational rights, the right to free exercise of religious beliefs and the right to privacy. GE credit: SocSci, Wrt | ACGH, DD, SS, WE.

152. The Constitutional Politics of Equality (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: courses 1 and 150 with upper division standing or consent of instructor. Constitutional politics of equality in the American political system; issues surrounding constitutional doctrine and judicial policymaking; special attention on racial and sexual equality. Offered in alternate years. GE credit: SocSci, Wrt | ACGH, DD, SS, WE.

153. The Constitutional Politics of the Justice System (4)

Lecture -3 hours; term paper or discussion -1 hour. Prerequisite: course 150 with upper division standing or consent of instructor. Constitutional politics of the American criminal justice system. Issues surrounding constitutional doctrine and judicial policymaking on issues such as search and seizure. Arrest, trial, incarceration and other issues of due process. Offered in alternate years. GE credit: SocSci, Wrt | ACGH, DD, SS, WE.

154. Legal Philosophy (4)

Lecture — 3 hours; term paper or discussion — 1 hour. Prerequisite: course 1 or 4, upper division standing or consent of instructor. Analysis of the behavior of judges and courts in the political process. Techniques of judicial decision making. Relationships among courts and other decision making bodies. Offered irregularly. GE credit: SocSci, Wrt | SS,

155. Judicial Process and Behavior (4)

Lecture — 3 hours; term paper or discussion — 1 hour. Prerequisite: course 1, upper division standing.

Analysis of the behavior of judges and courts in the political process. Techniques of judicial decision making. Relationships among courts and other decisionmaking bodies. Offered in alternate years. GE credit: SocSci, Wrt | ACGH, SS, WE.

160. American Political Parties (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1, upper division standing or consent of instructor. Analysis of the structured operations of the party system in the United States; party functions and organizations, nomination processes, campaigns and elections, party trends and reforms. GE credit: SocSci, Wrt | ACGH, DD, QL, WE.

162. Elections and Voting Behavior (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1, upper division standing or consent of instructor. Analysis of American elections and partisan behavior; political socialization, political participation, partisanship and individual and group determinants of voting. Offered irregularly. GE credit: SocSci, Wrt | ACGH, DD, SS, WE.

163. Group Politics (4)

Lecture - 3 hours; term paper or discussion - 1 hour Prerequisite: course 1, upper division standing or consent of instructor. Groups, institutions and individuals, especially in American politics. Historical and analytical treatment of group theories as applied to interest groups (especially labor, business, agriculture, science, military); to racial, ethnic and sectional groups; to parties, public and legislative groups, bureaucracies. GE credit: SocSci, Wrt | ACGH, DD, SS, WE.

164. Public Opinion (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: upper division standing and course 1 or 5, or consent of instructor. Nature of public opinion in America as it is supposed to be and as it is. Distribution of opinions among different publics and the significance of that distribution for system stability and institutions. Opinion polling and its problems. GE credit: SocSci, Wrt | ACGH, DD, SS, WE.

165. Mass Media and Politics (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1. Organization of and decision making within the media; media audiences and the effect of the media on attitudes and behavior; the relationship of the government to the media (censorship, secrecy, freedom of the press, government regulation); the media in election campaigns. GE credit: SocSci, Wrt | SS, WE.

166. Women in Politics (4)

Lecture—3 hours; discussion—1 hour or seminar—1 hour. Prerequisite: course 1. The role of women in American politics. Historical experiences; contemporary organizations and strategies; areas of legislative concern; the impact of differences in social class, race, and ethnicity upon the involvement of women in politics. GE credit: SocSci, Wrt | ACGH, DD. SS. WE.

168. Chicano Politics (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1. Political aspects of Chicano life in America; examines the Chicanos political role as it has been historically defined by different groups in society and the Chicanos responses to his/ her political environment. GE credit: SocSci, Wrt | ACGH, DD, SS, WE.

170. Political Psychology (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 51 or consent of instructor; upper division standing. Overview to the growing literature on political psychology. Introduction to how psychological concepts (personality, attitudes, stereo-types, heuristics, affect, identity, group dynamics) help us understand how citizens think about politics. GE credit: SocSci, Wrt | SS, WE.

171. The Politics of Energy (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1, upper division standing. Nature and performance of political processes for making energy choices at the international, national and state levels. Interaction of energy policy with other political goals and the ability of governmental institutions to overcome constraints on policy innovation. GE credit: SocSci, Wrt | SS, WE.

172. American Political Development (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1, some background in American politics is strongly recommended. Systematic analysis of contemporary issues in American political development: historical determinants of political change; the timing and character of institutional development; conditions for successful political action. Democratization, cultural change, party formation, state-building, constitutionalism, race rela tions. GE credit: SocSci, Wrt | ACGH, DD, SS, WE.

174. Government and the Economy (4)

Lecture - 3 hours; term paper or discussion - 1 hour. Prerequisite: course 1, upper division standing in Political Science or consent of instructor. Political basis of economic policy (taxation, spending and regulation); impact of prices, employment and growth on political demands; elite responses to economic conditions; policy alternatives and the public interest. GE credit: SocSci, Wrt | SS, WE.-III. (III.)

175. Science, Technology, and Policy (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1; consent of instructor. Analysis of policymaking for science and the use of scientific expertise for making decisions about technology. Topics include funding of basic research, relationship of science to technological development, science and military policy, technological risks, technology assessment and scientists and politics. GE credit: SocSci, Wrt | QL, SS, WE.

176. Racial Politics (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1. Race, racial attitudes and racial policies in the United States with a specific emphasis on African Americans. GE credit: SocSci, Div, Wrt | ACGH, DD, SS, WE.

179. Special Studies in Comparative Politics

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 2, consent of instructor and upper division standing. Intensive examination of one or more special problems appropriate to comparative politics. Coverage is given to formal and informal political institutions, economically developing and developed countries, and non-democratic, democratic, and democratizing countries. May be repeated once for credit. GE credit: SocSci, Wrt | SS, WE.

180. Bureaucracy in Modern Society (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1 or 2, upper division standing in Political Science or consent of instructor. Role of bureaucracy in a complex society, with emphasis upon changing relationships between government and the economy; consequences of rapid technological and social change for bureaucratic structures and processes; the problems of reconciling expertise and democracy and increasing the responsiveness of public bureaucracy. GE credit: SocSci, Wrt | ACGH, SS, WE.

183. Administrative Behavior (4)

Lecture - 3 hours; term paper or discussion - 1 hour. Prerequisite: course 1 and upper division standing or consent of instructor. The implications for American public administration of evolving concepts about behavior in organizations. Offered irregularly. GE credit: SocSci, Wrt | ACGH, SS, WE.

187. Administrative Theory (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1 and upper division standing or consent of instructor. Historical and critical analysis of the principal theories of organization and management of public agencies in light of such concepts as decision making, bureaucracy, authority and power, communication and control; examination of role of government bureaucracies in the total society. GE credit: SocSci, Wrt | SS, WE.

190. International Relations (4)

Lecture—3 hours; term paper or discussion—1 hour. Open to majors in International Relations, or consent of instructor. Analysis and evaluation of substantive issues in contemporary international relations. Readings drawn from current academic and non-academic periodicals. GE credit: SocSci, Wrt | SS,

192A. Internship in Public Affairs (5)

Prerequisite: enrollment dependent on availability of intern positions with highest priority assigned to students with Political Science-Public Service major; upper division standing. Supervised internship and study in political, governmental, or related organizations. (P/NP grading only.) GE credit: SocSci, Wrt | ACGH, SS, WE.

192B. Internship in Public Affairs (5)

Prerequisite: course 192A; enrollment dependent on availability of intern positions with highest priority assigned to students with Political Science-Public Service major; upper division standing. Supervised internship and study in political, governmental, or related organizations. (P/NP grading only.) GE credit: SocSci, Wrt | ACGH, SS, WE

193. Research in Practical Politics (2)

Research project-6 hours. Prerequisite: courses 192A, 192B; open only to Political Science-Public Service majors, for whom it is required. Supervised preparation of an extensive paper relating internship experience to concepts, literature, and theory of political science. GE credit: SS, WE.

193W. Washington Center Research

Lecture/discussion-1 hour; independent study-3 hours; tutorial—0.5 hour. Prerequisite: course 192W concurrently. Core academic component of Washington Program. Topics coordinated with internships. Research draws on resources uniquely available in Washington, DC. Supervised preparation of extensive paper. (Same course as UC Davis Washington Center 193.) GE credit: Wrt | OL, SS, WE.

194HA-194HB. Special Study for Honors Students (4-4)

Seminar-2 hours; independent study-2 hours. Prerequisite: major in Political Science with upper division standing and a GPA of 3.500 in the major. Directed reading, research and writing culminating in preparation of a senior honors thesis under the direction of faculty adviser. (Deferred grading only, pending completion of sequence.) GE credit: OL, SS, VL, WE.

195. Special Studies in American Politics (4)

Seminar-4 hours. Prerequisite: consent of instructor and upper division standing. Intensive examination of one or more special problems appropriate to American politics. May be repeated one time for credit when topic differs. GE credit: ACGH, SS, WE.

196A. Seminar in American Politics (4)

Seminar-3 hours; term paper. Prerequisite: upper division political science major or consent of instructor. Intensive reading, discussion, research, writing in American politics. Topics may include Congress, the Presidency, the Supreme Court, federalism, voting behavior, interest groups, ethnic groups or other topics with a more specialized content than normal course offerings. May be repeated one time for credit when topic differs. GE credit: ACGH, SS, WE.-I, II, III.

196B. Seminar in Comparative Politics (4)

Seminar - 3 hours; term paper. Prerequisite: upper division political science major or consent of instructor. Intensive reading, discussion, research, writing in comparative politics. Topics may include one country or geographical area, political institutions or behavior across countries, political development, or other topics that are more specialized than normal course offerings. May be repeated one time for credit when topic differs. GE credit: SS, WE.

196C. Seminar in International Relations

Seminar-3 hours; term paper. Prerequisite: upper division political science major or consent of instructor. Intensive reading, discussion, research, writing in international relations including study of international political institutions (UN, EÜ, or NATO) or interstate relations (war, trade, immigration) and

other topics with more specialized content than normal course offerings. May be repeated one time for credit when topic differs. GE credit: SS, WE.

196D. Seminar in Political Theory (4)

Seminar-3 hours; term paper. Prerequisite: upper division political science major or consent of instructor. Intensive reading, discussion, research, writing in political theory. Topics may include study of a single political thinker, a group of related thinkers, development of political concepts, or other topics with more specialized content than normal course offerings. May be repeated one time for credit when topic differs. GE credit: SS, WE.

196E. Seminar in Research Methods (4)

Seminar — 3 hours; term paper. Prerequisite: upper division political science major or consent of instructor. Intensive reading, discussion, research, and writing in selected topics in research methods such as research design, statistics, game theory. May be repeated one time for credit when topic differs. GE credit: QL, SS, VL, WE.

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

201. Urban Government and Politics (4)

Seminar—4 hours. Survey and analysis of the literature in the field of local government and politics in the United States. Approaches to the study of political reform, local autonomy, community power, representation, expertise, service delivery, policymaking and political change. Offered in alternate years.

202. American State Government and Politics (4)

Seminar-4 hours. Survey and analysis of the literature in the field of state government, politics, and policy. Approaches to the study of the American states as political systems, including their governing institutions and processes and their role in the Federal system. Offered in alternate years.

203A. American Government: The Presidency (4)

Seminar - 3 hours; term paper. Restricted to graduate students only. Thorough overview of the current research on political executives, with particular emphasis on the American presidency. Two principal goals: the development of important and innovative student research programs; and adequate preparation for qualifying examinations.

203B. American Government: Congress (4)

Seminar-3 hours; term paper. Restricted to graduate students only. Thorough overview of the current research on Congress, with particular emphasis on political representation. Two principal goals: the development of important and innovative student research programs; and adequate preparation for qualifying examinations.

203C. American Government: Courts (4)

Seminar-4 hours. Survey and analysis of the literature in the field of American government with a focus on courts. Emphasis on the development and testing of theories of behavior and processes

207. Environmental Public Policy (4)

Seminar — 4 hours. Analysis of the interface between the world of academic reflection about ecological and environmental problems and the world of political action. Evaluation of alternative approaches to policy analysis and recommendation. Individual research, including field research, will parallel discussion of the literature

208. Policy Analysis (4)

Seminar-4 hours. Social science techniques applied to public policy formation and evaluation.

209. The American Political System (4)

Seminar-3 hours; term paper. Restricted to graduate students only. Analysis of selected theoretical and empirical issues posed by contemporary research in American government and politics.

210. Research Design in Political Science (4)

Seminar-3 hours; discussion/laboratory-1 hour. Prerequisite: graduate standing. Introduction to philosophy of science and research design for political science. Topics include: logic of empirical research, overview of research design approaches for political science research.

211. Research Methods in Political Science (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing. Pass 1 open to graduate majors; pass 2 open to graduate students. Introductory seminar introducing data analysis methods critical to basic empirical investigations in political science.

212. Quantitative Analysis in Political Science (4)

Seminar — 3 hours; term paper. Prerequisite: course 211. Pass 1 open to graduate majors; pass 2 open to graduate students. Introductory statistics course with an emphasis on applications in political science. Topics include descriptive statistics for samples, probability and probability distributions, hypothesis testing, ANOVA, bivariate regression, and introduction to multiple regression.

213. Quantitative Analysis in Political Science II (4)

Seminar — 3 hours; term paper. Prerequisite: courses 211, 212. Pass 1 open to graduate majors; pass 2 open to graduate students. More advanced topics in the use of statistical methods, with emphasis on political applications. Topics include: properties of least squares estimates, problems in multiple regression, and advanced topics (probit analysis, simultaneous models, time-series analysis, etc.)

214A. Research in Political Science (4)

 ${\sf Discussion-2\ hours;\ lecture-1\ hour;\ term\ paper.}$ Prerequisite: course 213. Research seminar sequence required of all Ph.D. students. Design, execution, and defense of an original piece of research in political science, culminating in a paper of publishable quality. (Deferred grading only, pending completion of sequence.)

214B. Research in Political Science (4)

Discussion – 2 hours; lecture – 1 hour; term paper. Prerequisite: courses 212 and 214A; advanced level graduate students in the Department of Political Science only. Research seminar sequence required of all Ph.D. students. Design, execution, and defense of an original piece of research in political science, culminating in a paper of publishable quality. (Deferred grading only, pending completion of sequence.

215. Introduction to Modeling Political Behavior (4)

Seminar-3 hours; term paper. Prerequisite: courses 211, 212. Pass 1 open to graduate majors; pass 2 open to graduate students. Introduction to formal and game theoretic analyses of politics. Students will learn basic game theory and modeling skills. We examine the benefits of modeling, and look at examples of formal analysis in a variety of political science subfields.

216. Qualitative Research Methods (4)

Seminar-3 hours; term paper. Methodology for utilizing theoretically-oriented case studies and controlled comparison of a small number of cases to develop and test theories. Examination of how the case study method compliments experimental, statistical and deductive modes of research. Offered in alternate years

217. Social Choice Theory and Spatial Modeling (4)

Seminar-4 hours. Introduction to social choice theory and formal spatial modeling including Arrow's Theorem, the paradox of voting, cycling and agenda control. Focus on mastering modeling techniques as well as interpretation of classic works. Offered in alternate years.

218. Topics in Political Theory (4)

Seminar - 3 hours; term paper. Topics vary and may be the work of a single theorist, time period, or political concept, such as justice. May be repeated three times for credit when topic differs.

219A. Political Theory Sequence (4)

Seminar—3 hours; term paper. Survey of the great works in ancient and medieval political theory including such writers as Plato, Aristotle, Cicero, St. Augustine, Aquinas, Alfarabi and Marsilius. Discussion of various interpretations of these authors. Offered in alternate years.

219B. Political Theory Sequence (4)

Seminar - 3 hours; term paper. Survey of the great works in early modern to contemporary political theory including such writers as Machiavelli, Hobbes, Locke, Rousseau, Marx, Mill, Nietzsche, and Rawls. Discussion of various interpretations of these authors. Offered in alternate years.

219C. Contemporary Political Theory (4)

 ${\sf Seminar-3\ hours;\ term\ paper.\ Survey\ of\ important}$ works in contemporary political theory including such writers as Nietzsche, Heidegger, Arendt, Rawls, Nozick, Sandel. May be repeated for credit if topic differs.

220. Seminar in Political Theory (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing. Introduction to political theory and current debates over its study. Readings from and textual interpretations of political theory including the Federalist Papers and major works by thinkers such as Plato, Aristotle, Machiavelli, Hobbes, Locke, Rousseau, and Rawls. Other readings addressing issues of textual interpretation.

223. International Relations (4) Seminar-3 hours; term paper.

225. The International System (4)

Seminar -3 hours; term paper. Analysis of the international system by means of theory formulation and integration; critique of research designs; use of various techniques of data generation and analysis.

226. Seminar in International Political Economy (4)

Seminar — 3 hours; term paper. Restricted to graduate students. Research in international political economy. Structure of the global economy, as well as specific dimensions of international economic relations, including trade, capital flows, global production structures, and migration. Offered in alternate

229. Theories of International Relations (4)

Seminar-3 hours; term paper. Central concepts, debates, and paradigms in international relations; overview of research in international security and international political economy; inter-state and intrastate war; cooperation and conflict resolution; trade and finance; relationship between domestic and international politics, norms and institutions. Open to political science graduate students only unless consent of instructor. Offered in alternate years.

230. American Foreign Policy (4)

Seminar-3 hours; term paper.

231. U.S. Political Culture and Foreign Relations (4)

Seminar—3 hours; term paper. Relates U.S. political culture to formulation of foreign policy. Analyzes American ideological preferences in historical perspective, contemporary public opinion, decision making and implementation. Concludes by examining linkages between foreign policy behavior and democratic process. Offered in alternate years.

241. Communist Political Systems (4)

Seminar-4 hours. Prerequisite: course 141 or the equivalent, or consent of instructor. Systematic analysis of selected topics dealing with the political process of communist political systems.

242. Seminar in Comparative Politics (4)

Seminar - 3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Systematic survey of theories and methods used in the study of comparative politics.

243. Comparative Institutional Change (4)

Seminar — 3 hours; term paper. Restricted to graduate students. Comparison of institutional changes in countries of the former Soviet Union and Eastern Europe during the period of transition to democracy. Special attention to institutions of mass representation-electoral and party systems and national legislatures. Offered in alternate years.

246. Policymaking in Third-World Societies (4)

Seminar-3 hours. Prerequisite: graduate standing or consent of instructor. Included in an analysis of policymaking process in Third-World countries are such topics as political resources, institutional resources, decision making, resource allocations, planning, and budgeting, implementation, and distribution of world resources. Offered in alternate years.

250. Policy Development and Impact in U.S. Courts (4)

Seminar—3 hours; term paper. Prerequisite: graduate standing. Thorough overview of the literature regarding courts as policymaking institutions of government, with emphasis on the formation and implementation of judicial policy. Differences and similarities across the judicial, congressional, and executive branch policy processes. Offered in alternate years.

260. Political Parties (4)

Seminar - 3 hours; term paper. Survey of selected topics in American and comparative parties.

261. Political Behavior (4)

Seminar-3 hours; term paper. Survey of selected topics in political behavior and public opinion. May be repeated three times for credit when topic differs.

274. Political Economy (4)

Seminar-3 hours; term paper. Restricted to graduate students. Politics of economic policy as reflected in taxation, spending and regulation; impact of prices, employment, and growth on political demands; government responses to economic conditions; electoral politics and the political business cycle. Offered in alternate years

279. Political Networks: Methods and Applications (4)

Seminar—3 hours; term paper. Prerequisite: graduate standing. Structure of political networks, sociomatrices and affiliation networks; general networks characteristics: density, centralization, polarization, interdependence, dyadic and triadic characteristics: structural and role equivalence; subsets of networks: cliques, blocks and bloc modeling; characteristics of individuals in networks: centrality and prestige.

280. Bayesian Methods: for Social and **Behavioral Sciences (4)**

Seminar — 3 hours; term paper. Prerequisite: course 212 or equivalent. Pass 1 open to graduate majors only; pass 2 open to graduate students. Methodology seminar introducing Bayesian quantitative methods to issues and problems in political science and other social and behavioral sciences. Offered in alternate years

281. Statistical Computing Issues in Political Science (4)

Seminar-3 hours; discussion/laboratory-1 hour. Prerequisite: course 213 or equivalent; graduate standing. Methodology seminar introducing computing issues in empirical models for political science and other social and behavioral sciences. Offered in alternate years.

282. Advanced Modeling of Political Behavior (4)

Seminar—3 hours; term paper. Prerequisite: course 215 or equivalent; graduate standing or consent of instructor. Applications of formal theory to political science. Review of relevant contributions in other social sciences. Consideration of advanced techniques in game theory. Rational and behavioral approaches.

283. Organizational Behavior (4)

Seminar-4 hours. Organizational behavior as it relates to public sector decision making.

290A. Research in American Government and Public Policy (4)

Seminar-3 hours; term paper. Restricted to graduate students. Special research seminar on problems and issues in the study of American government and public policy. May be repeated up to 6 times for credit if topic différs.

290B. Research in Political Theory (4)

Lecture — 3 hours; term paper. Restricted to graduate students only. Special research seminar on problems and issues in the study of political theory. May be repeated six times for credit if topic varies.

290C. Research in International Relations (4)

Lecture — 3 hours; term paper. Restricted to graduate students only. Special research seminar on select problems and issues in the study of international relations. May be repeated six times for credit if topic

290D. Research in Judicial Politics (4)

Seminar-4 hours. Prerequisite: graduate standing in political science or consent of instructor. Contemporary research on judicial politics, judicial institutions, jurisprudence, and judicial behavior.

290E. Research in Political Parties, Politics, and Political Behavior (4)

Seminar—4 hours. Special research seminar on selected problems and issues in the study of political parties, politics, and political behavior.

290F. Research in Comparative Government and Policy (4)

Lecture—3 hours; term paper. Restricted to graduate students only. Special research seminar on select problems and issues in the study of comparative government and policy. May be repeated six times for credit if topic varies.

290G. Research in Methodology (4)

Lecture-3 hours; term paper. Prerequisite: course 212. Special research seminar on selected problems and issues in methods in political science. May be repeated three times for credit if topic varies

297. Internships in Political Science (2)

Seminar-2 hours. Prerequisite: open only to persons who have internships or other positions in governmental agencies, political parties, etc.

Application and evaluation of theoretical concepts through work experience or systematic observation in public and political agencies. May be repeated for credit. (S/Ü grading only.)

298. Group Study (1-5)

(S/U grading only.)

299. Research (1-12)

(S/U grading only.)

299D. Directed Reading (1-12)

(S/U grading only.)

Professional Courses

390. The Teaching of Political Science (1)

Seminar — 1 hour. Prerequisite: graduate student standing in Political Science. Methods and problems of teaching political science at the undergraduate level. (S/Ŭ grading only.)

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)

Pomology

See Plant Sciences, on page 467.

Population Biology (A Graduate Group)

David J. Begun, Ph.D., Chairperson of the Group Group Office. 2320 Storer Hall (530) 752-1274; http://www.eve.ucdavis.edu/eve/pbg/

Faculty

Marissa L. Baskett, Ph.D., Assistant Professor (Environmental Science and Policy) David J. Begun, Ph.D., Professor (Evolution and Ecology) Monique Borgerhoff Mulder, Ph.D., Professor (Anthropology) Louis W. Botsford, Ph.D., Professor (Wildlife, Fish, and Conservation Biology) (Wildlife, Fish, and Conservation Biology)
Tim Caro, Ph.D., Professor
(Wildlife, Fish, and Conservation Biology)
Graham M. Coop, Ph.D., Associate Professor
(Evolution and Ecology)
Howard V. Cornell, Ph.D., Professor
(Environmental Science and Policy)

Jonathan A. Eisen, Ph.D., Professor (Evolution and Ecology)

Valerie Eviner, Ph.D., Associate Professor (Plant Sciences)

James R. Griesemer, Ph.D., Professor (Philosophy) Richard K. Grosberg, Ph.D., Professor (Evolution and Ecology) Academic Senate Distinguished Teaching Award, UC Davis Prize for Teaching and Scholarly Achievement Susan P. Harrison, Ph.D., Professor

(Evolution and Ecology) Alan M. Hastings, Ph.D., Professor

(Evolution and Ecology)

Richard Karban, Ph.D., Professor (Entomology) Artyom Kopp, Ph.D., Associate Professor (Evolution and Ecology)

Charles H. Langley, Ph.D., Professor (Evolution and Ecology) Sharon P. Lawler, Ph.D., Professor

(Entomology)

Richard McElreath, Ph.D., Associate Professor (Anthropology)

Brian R. Moore, Ph.D., Assistant Professor

Evolution and Ecology)
David B. Neale, Ph.D., Professor (Plant Sciences)
Gail L. Patricelli, Ph.D., Associate Professor (Evolution and Ecology)
Bruce H. Rannala, Ph.D., Professor

(Evolution and Ecology)
Kevin J. Rice, Ph.D., Professor (Plant Sciences)
Jay Rosenheim, Ph.D., Professor (Entomology) Academic Senate Distinguished Teaching Award
Jefferey Ross-Ibarra, Ph.D., Assistant Professor

(Plant Sciences) Fric D. Sanford, Ph.D., Associate Professor (Evolution and Ecology) Thomas W. Schoener, Ph.D., Professor

(Evolution and Ecology) Sebastian Schreiber, Ph.D., Professor

(Evolution and Ecology)
Mark W. Schwartz, Ph.D., Professor (Environmental Science and Policy) Academic Senate Distinguished Teaching Award

H. Bradley Shaffer, Ph.D., Professor

(Evolution and Ecology) Arthur M. Shapiro, Ph.D., Professor (Evolution and Ecology) Academic Senate Distinguished Teaching Award

Andrew Sih, Ph.D., Professor (Environmental Science and Policy) John J. Stachowicz, Ph.D., Professor (Evolution and Ecology) Academic Senate Distinguished Teaching Award

Maureen L. Stanton, Ph.D., Professor (Evolution and Ecology) UC Davis Prize for Teaching and Scholarly Achievement

Sharon Y. Strauss, Ph.D., Professor (Evolution and Ecology)
Donald R. Strong, Ph.D., Professor (Evolution and Ecology) Michael Turelli, Ph.D., Professor

(Evolution and Ecology)
Geerat J. Vermeij, Ph.D., Professor (Geology)
Peter C. Wainwright, Ph.D., Professor (Evolution and Ecology) Academic Senate Distinguished

Teaching Award
Philip S. Ward, Ph.D., Professor (Entomology) Louie H. Yang, Ph.D., Assistant Professor

(Entomology) Truman P. Young, Ph.D., Professor (Plant Sciences)

Emeriti Faculty

Hugh Dingle, Ph.D., Professor Emeritus John H. Gillespie, Ph.D., Professor Emeritus Timothy G. Prout, Ph.D., Professor Emeritus Judy A. Stamps, Ph.D. Professor Emeritus

Graduate Study. The Graduate Group in Population Biology emphasizes programs of study and research leading to the Ph.D. degree. The Group concentrates on population biology as the broad discipline that blends ecology, evolution, population genetics and systematics into a unified field. The course curriculum consists of first-year core courses offered by the Group faculty, seminars, and advanced courses in population biology, and related disciplines, chosen in consultation with a guiding

Graduate Adviser. Consult the Population Biology Graduate Group office or website.

Courses in Population Biology (PBG)

Graduate Courses

200A. Principles of Population Biology (5)

Lecture - 3 hours; discussion - 2 hours. Prerequisite: course 231 concurrently and consent of instructor. Principles of single-species ecology and evolution. Topics include ecology of individuals, population growth models, structured populations, life history strategies, stochastic populations, basic population genetics theory, deleterious alleles in natural populations, and molecular population genetics.—I. (I

200B. Principles of Population Biology (6)

Lecture - 5 hours; discussion - 1 hour. Prerequisite: course 200A, 231. Principles of multi-species communities. Topics include competition, mutualism, metapopulations, food webs and trophic cascades, interactions between simple ecological communities, island biogeography, succession, and large-scale patterns.—II. (II.)

200C. Principles of Population Biology (6)

Lecture - 5 hours; discussion - 1 hour. Prerequisite: course 200B. Principles of microevolution and macroevolution. Topics include evolutionary quantitative genetics, analysis of hybrid zones, speciation, the fossil record, biogeography, and phylogeny recon-

203. Advanced Evolution (3)

Lecture - 1 hour; discussion - 2 hours. Prerequisite: graduate standing. Adaptation and speciation, and biochemical and morphological evolution in plants and animals with emphasis on the appropriateness of different methods of analysis. Offered in alternate years.

206. Ecology of Insect Parasitoids (4)

Lecture — 3 hours; seminar — 1 hour. Prerequisite: introductory animal ecology or behavior. Insect parasitoids will be investigated as model systems to address current topics in behavioral, population, and evolutionary ecology. Theory will be synthesized and critical empirical tests of ecological hypotheses emphasized. (Same course as Entomology 206.) Offered in alternate years.

207. Plant Population Biology (3)

Lecture - 2 hours; laboratory/discussion - 1 hour. Prerequisite: advanced undergraduate ecology course (e.g., Environmental Science and Policy 100, Evolution and Ecology 101, Entomology 104, Plant Biology 117), and advanced undergraduate course in genetics and/or evolution (e.g., Biological Sciences 101 or Evolution and Ecology 100). Introduction to theoretical and empirical research in plant population biology. Emphasis placed on linking ecological and genetic approaches to plant population biology. (Same course as Ecology 207.) Offered in alternate years. - II. Rice

212. Topics in Invertebrate Evolution (2)

Seminar-2 hours. Prerequisite: graduate standing or consent of instructor and Evolution and Ecology 112-112L; courses in evolutionary biology, systematics, and ecology highly recommended. Advanced seminar that critically examines problems relevant to evolutionary patterns among the invertebrates. May be repeated for credit when topic differs. (S/U grading only.) - (III.) Grosberg

220. Spatio-Temporal Ecology (2)

Lecture/discussion—2 hours. Prerequisite: course 200B or Ecology 204 or Evolution and Ecology 104 or Environmental Science and Policy 121 or consent of instructor. Spatiotemporal ecological theory focus-ing on population persistence and stability, predatorprey and host-parasitoid interactions, species coexistence and diversity maintenance, including effects of environmental variation, spatial and temporal scale, life-history traits and nonlinear dynamics. Topics vary. (Same course as Ecology 220.) May be repeated one time for credit. (S/U grading only.)

221. Animal Behavior, Ecology and Evolution (3)

Lecture - 3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 102, Evolution and Ecology 100, 101 or the equivalent, graduate standing, and consent of instructor. The interface between animal behavior, ecology and evolution. New developments in behavioral ecology and development and testing of hypotheses in this discipline. (Same course as Animal Behavior 221.)

224. Field Reconnaissance for Population Biologists (2)

Fieldwork – 6 hours. Prerequisite: graduate student in Population Biology, or consent of instructor. Biweekly field trips to acquaint students with plant and animal communities, biodiversity, and ecological and evolutionary research opportunities in northern and central California. May be repeated for credit. (S/U grading only.)

225. Terrestrial Field Ecology (4)

Seminar-1 hour; field work-12 hours. Prerequisite: introductory ecology and introductory statistics, or consent of instructor. A field course conducted over spring break and four weekends at Bodega Bay emphasizing student projects. Ecological hypothesis testing, data gathering, analysis, and written and oral presentation of results will be stressed. (Same course as Ecology/Entomology 225.)—III. (III.) Karban

231. Mathematical Methods in Population Biology (3)

Lecture - 3 hours. Prerequisite: Mathematics 16C or 21C or the equivalent. Mathematical methods used in population biology. Linear and nonlinear difference equation and differential equation models are studied, using stability analysis and qualitative methods. Partial differential equation models are introduced. Applications to population biology models are stressed. (Same course as Ecology 231.)—I. (I.)

250A. Interdisciplinary Approaches to Biological Invasions (4)

Lecture/discussion-4 hours. Prerequisite: graduate standing. An integrative consideration of biological invasions, including an overview of concepts from ecology, ecological theory, evolution, genetics, philosophy, and other areas. Emphasis on potential contributions of each area for interdisciplinary problem solving. - I. (I.)

250B. Interdisciplinary Approaches to Biological Invasions (4)

Lecture/discussion-4 hours. Prerequisite: graduate standing. An integrative consideration of biological invasions, including an overview of concepts from history, sociology, communications, law, policy, management, and other areas. Emphasis on potential contributions of each area for interdisciplinary problem solving. - II. (II.)

251. Collaborative Project in Biological Invasions (3)

Project; discussion - 1 hour. Prerequisite: course 250A, 250B, or equivalent; and consent of instructor. A year-long interdisciplinary collaborative project focusing on biological invasions, resulting in a paper or other suitable product presented at a symposium at the conclusion of the project. May be repeated up to five times. (S/U grading only.)-I, II, III. (I, II, III.)

270. Research Conference in Evolutionary Biology (1)

Seminar - 1 hour. Prerequisite: consent of instructor. Critical presentation and evaluation of current literature and ongoing research in evolutionary biology. May be repeated for credit. (S/U grading only.)—I, 11, 111. (1, 11, 111.)

271. Research Conference in Ecology (1)

Seminar - 1 hour. Prerequisite: consent of instructor. Critical presentation and evaluation of current literature and ongoing research in ecology. Requirements include active participation in weekly discussions and the presentation of a paper or chapter once per quarter. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

287. Advanced Animal Behavior (2)

Seminar—2 hours. Prerequisite: graduate standing and consent of instructor, courses in animal behavior (Neurobiology, Physiology, and Behavior 102 or the equivalent), and either evolution (Evolution and Ecology 100 or the equivalent) or ecology (Evolution and Ecology 101 or the equivalent). Reading, reports and discussion on current topics in animal behavior, with a focus on topics that lie at the interface between animal behavior, ecology and evolution. (Same course as Animal Behavior 287.) May be repeated two times for credit.

290. Seminar (1)

Seminar — 1 hour. Prerequisite: graduate standing and consent of instructor. Seminars presented by visiting lecturers, UC Davis graduate students and faculty. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

290C. Research Conference in Population Biology (1)

Discussion - 1 hour. Prerequisite: graduate standing and consent of instructor; concurrent enrollment in course 299. Presentation and discussion of faculty and graduate student research in population biology. May be repeated for credit. (S/U grading only.) — I, II, III. (I, II, III.)

292. Topics in Ecology and Evolution (1)

Seminar - 1 hour. Prerequisite: graduate standing. Seminar presented by visiting lecturers, UC Davis faculty and graduate students. May be repeated for credit. (Same course as Ecology 296.) (S/U grading only.)—I, II, III. (I, II, III.)

296. Seminar in Geographical Ecology (2)

Seminar—2 hours. Prerequisite: Evolution and Ecology 100 or 101 or consent of instructor. Recent developments in theoretical and experimental biogeography, historical biogeography and related themes in systematics, the biology of colonizing species, and related topics. May be repeated for credit. (S/U grading only.)—III. (III.) Shapiro

298. Group Study (1-5)

Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

299. Research (1-12)

Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

Population Health and Reproduction

See Veterinary Medicine, School of, on page 523.

Precision Agriculture

(College of Agricultural and Environmental Sciences)

The Department of Biological and Agricultural Engineering offers a minor in Precision Agriculture, the latest farming concept that optimizes fertilizer, pesticide and water use, while minimizing environmental

Minor Program Requirements:

This minor acquaints students with recent developments and their applications to agriculture, in geographic information systems (GIS), global positioning systems (GPS), variable rate technologies (VRT), crop and soil sensors, and remote sensing. The minor prepares students for challenging positions in site-specific crop management as we enter the "information age" in agriculture.

UNITS

Precision Agriculture......18

Applied Biological Systems Technology/ Landscape Architecture 150 and Environmental remote Sensing 186 and Select 9 or more units from Applied Biological Systems Technology 181N, 182, Plant Sciences 100A, 100AL, 100B, 100BL, 100C, 100CL, 110A, 110B, 110BL, 110C, Plant Sciences 120 or Statistics 100,

Minor Advisers. S.K. Upadhyaya, D.K. Giles

Preventive Veterinary Medicine

See Veterinary Medicine, School of, on page 523.

Psychiatry

See Medicine, School of, on page

Psychology

(College of Letters and Science) Debra Long, Ph.D., Chairperson of the Department Department Office. 135 Young Hall (530) 752-1880; http://psychology.ucdavis.edu

Karen L. Bales, Ph.D., Professor Shelley Blozis, Ph.D., Associate Professor Cameron S. Carter, M.D., Professor (Psychiatry and Behavioral Sciences) Rand Conger, Ph.D., Professor David Corina, Ph.D., Professor Richard G. Coss, Ph.D., Professor Robert A. Emmons, Ph.D., Professor Arne Ekstrom, Ph.D., Assistant Professor Emilio Ferrer, Ph.D., Professor Joy Geng, Ph.D., Assistant Professor Simona Ghetti, Ph.D., Associate Professor Gail S. Goodman, Ph.D., Professor Katharine Graf Estes, Ph.D., Assistant Professor Kevin Grimm, Ph.D., Associate Professor Paul Hastings, Ph.D., Professor Gregory M. Herek, Ph.D., Professor Petr Janata, Ph.D. Associate Professor Joel T. Johnson, Ph.D., Professor Leah A. Krubitzer, Ph.D., Professor Kristin Lagattuta, Ph.D., Associate Professor Alison Ledgerwood, Ph.D., Assistant Professor Debra L. Long, Ph.D., Professor

Academic Senate Distinguished Teaching Award Steven Luck, Ph.D., Professor George R. Mangun, Ph.D., Professor Wesley Moons, Ph.D., Assistant Professor Lisa Oakes, Ph.D., Professor Cynthia Pickett, Ph.D. Associate Professor Charan Ranganath, Ph.D., Associate Professor Susan Rivera, Ph.D., Professor Richard W. Robins, Ph.D., Professor Jeffrey Schank, Ph.D., Professor Phillip R. Shaver, Ph.D., Professor Jeffrey W. Sherman, Ph.D. Professor Dean K. Simonton, Ph.D., Professor UC Davis Prize for Teaching and Scholarly Achievement

Tamara Swaab, Ph.D., Associate Professor Ross Thompson, Ph.D., Professor Brian Trainor, Ph.D., Associate Professor Matthew Traxler, Ph.D., Professor Keith F. Widaman, Ph.D., Professor Andrew P. Yonelinas, Ph.D., Professor Nolan Zane, Ph.D., Professor

Emeriti Faculty

Linda P. Acredolo, Professor Emerita Jarvis R. Bastian, Ph.D., Professor Emeritus Alan C. Elms, Ph.D., Professor Emeritus Karen P. Ericksen, Ph.D., Professor Emerita Albert A. Harrison, Ph.D., Professor Emeritus Kenneth R. Henry, Ph.D., Professor Emeritus Neal E. A. Kroll, Ph.D., Professor Emeritus William A. Mason, Ph.D., Professor Emeritus Sally Mendoza, Ph.D., Professor Emerita G. Mitchell, Ph.D., Professor Emeritus Robert M. Murphey, Ph.D., Professor Emeritus Thomas Natsoulas, Ph.D., Professor Emeritus Theodore E. Parks, Ph.D., Professor Emeritus Robert B. Post, Ph.D., Professor Emeritus Robert Sommer, Ph.D., Professor Emeritus Stanley Sue, Ph.D., Professor Emeritus Charles T. Tart, Ph.D., Professor Emeritus

Affiliated Faculty

Katherine Gibbs, Ph.D., Lecturer Jacqueline Horn, Ph.D., Lecturer Elizabeth Post, Ph.D., Lecturer Joanna Scheib, Ph.D., Associate Adjunct Professor Eva Schepeler, Ph.D. Lecturer

The Major Programs

The psychology program at UC Davis is broad and includes students and faculty with a variety of inter-

ests. The department has developed around five major areas of emphasis: Developmental Psychology, which involves the study of changes in behavior and abilities that occur as development proceeds and includes such topics as imaging the developing brain, development of self esteem, problem solving, attachment theory, symbolic representation in infants and children, development of children's understanding of mental states; Perception-Cognition, which involves the study of awareness and thought, and includes such topics as perception, learning, memory, and consciousness; Psychobiology, which involves the study of the biological correlates of behavior and includes such topics as physiological psychology, sensory processes, health psychology, and animal behavior; Social-Personality Psychology, which involves the study of the individual in his or her social environment and includes such topics as personality theory, abnormal psychology, individual differences, developmental psychology, and social psychology; and Quantitative which involves the study of linear models and psychometrics which includes topics, such as experimental design and the analysis of variance, regression analysis, and multivariate analysis.

The department offers the Bachelor of Arts (A.B.) program for students interested in the liberal arts and the Bachelor of Science (B.S.) program geared for students with an interest in either biology or mathematics. The main objective of both programs is a broad introduction to the scope of contemporary psychology. In addition to completing a number of common core courses for their degree, students may take specialty courses on such far-ranging topics as sex differences, genius and creativity, and environmental awareness. The department strongly encourages students to become involved in individual research projects under the direction of faculty members and to participate in our internship program to broaden your experiences and understanding of the field of psychology.

Preparatory Requirements. Before declaring a major in psychology, students must complete the following courses with a combined grade point average of at least 2.500. All courses must be taken for a letter grade. (Students in the Bachelor of Science, Biology program must complete Biological Sciences 2A.):

Biological Sciences 2A

Biological Sciences 10 and one course from Anthropology 1, Molecular and Cellular Biology 10, Neurobiology, Physiology, and Behavior 104 or 8 units Sociology or cultural anthropology 4 units

Career Alternatives. A degree in psychology provides broad intellectual foundations which are useful to the graduate for the development of careers in a variety of areas, including social work, the ministry, teaching, business, and counseling. An undergraduate education in psychology also provides excellent preparation for graduate study. Individuals with degrees in psychology may enter graduate programs to prepare for teaching, research, or clinical/ counseling careers in psychology, or may go on to professional schools for training in veterinary and human medicine, law, and other professions.

A.B. Major Requirements:

Preparatory Subject Matter 16-20 Psychology 1 or the equivalent......4 Psychology 414 Strongly recommended that Psychology 41 and Statistics 13 or 102 be completed in the first year. Biológical Sciences 2A; or a combination of Biological Sciences 10 and one course from Anthropology 1, Molecular and Cellular Biology 10, or Neurobiology, Physiology, and Behavior 10......4-8

Depth Subject Matter 40
Two courses from two of the following four
groups and one course from the remaining
two groups
Group A: Psychology 100, 130, 131, 132,
135, 136
Group B: Psychology 101, 113, 121, 122,
123, 126, 127, 129
Group C: Psychology 151, 152, 154, 161, 162, 168
Group D: Psychology 140; or Human
Development 100A or 100B, Psychology
141/Human Development 101, Psychology
142/Human Development 102, 143, 146,
148
Additional units to achieve a total of 40 upper
division units in psychology 16-17
A maximum of 12 approved upper division
Human Development units can be credited toward satisfaction of the 40-unit
requirement.
Total Units for the Major56-60
· ·
Biology Emphasis
B.S. Major Requirements:
UNITS
Preparatory Subject Matter 52-60
Psychology 1 or the equivalent 4
Psychology 41 4
Psychology 41
Psychology 41
Psychology 41
Psychology 41
Psychology 41
Psychology 41
Psychology 41
Psychology 41
Psychology 41
Psychology 41
Psychology 41
Psychology 41
Psychology 41
Psychology 41
Psychology 41
Psychology 41
Psychology 41
Psychology 41
Psychology 41
Psychology 41
Psychology 41

101, 113, 121, 122, 123, 120, 127,
129 11-12
Group C: one course from Psychology 151,
152, 154, 161, 162, 168
Group D: one course from Psychology 140
(or Human Development 100A or 100B),
Psychology 141/Human Development 101,
Psychology 142/Human Development
102, 143, 146, 1484
Additional units to achieve a total of 40 upper
division units in psychology 12-13
(A maximum of 12 approved upper division
Human Development units can be credited
toward satisfaction of the 40-unit
requirement.)
Biological Sciences 101 4
Neurobiology, Physiology, and Behavior
1015

Total Units for the Major......101-109 Recommended

Psychology 180B, 199; on a psychobiological topic, Anthropology 154A, Environmental Science and Policy 110, Evolution and Ecology 100, 101.

Mathematics Emphasis

B.S. Major Requirements:

	UNIIS
Preparatory Subject Matter	40-54
Psychology 1 or the equivalent	
Psychology 41	4
Statistics 13 or 102	4
Strongly recommended that Psychology	41
and Statistics 13 or 102 be completed i	n
the first year.	
Mathematics 21A, 21B, 21C	12

Computer Science Engineering 30 or Computer Science Engineering 10	
Anthropology 1, Molecular and Cellular Biology 10, or Neurobiology, Physiology,	
and Behavior 104-8	
Depth Subject Matter49	9

Five Psychology courses, distributed as
specified:
Group A: two courses from 100, 130, 131,
132, 135, 136 8
Group B: two courses from Psychology
101, 113, 121, 122, 123, 126, 127,
129

Group C: one course from Psychology 151, 152, 154, 161, 162, 168

Group D: one course from Psychology 140 (or Human Development 100A or 100B), Psychology 141/Human Development 101, Additional units to achieve a total of 40 upper

division units in psychology......11-12

A maximum of 12 approved upper division Human Development units can be credited toward satisfaction of the 40-unit requirement.

Total Units for the Major89-103

Recommended for All Majors. Students who plan to do graduate work in any area of psychology are strongly encouraged to complete Statistics 13 and Psychology 103A or both Statistics 13 and 102. Psychology 41 is a prerequisite for most upper division courses. Psychology 41 and Statistics 13 or

102 should be completed in the first year.

Major Advisers. K. Bales, S. Blozis, R.G. Coss, R.A. Emmons, A. Ekstrom, E. Ferrer, J. Geng, S. Ghetti, G.S. Goodman, K. Graf Estes, K. Grimm, P. Hastings, G.M. Herek, P. Janata, J.T. Johnson, L.A. Krubitzer, K. Lagattuta, A. Ledgerwood, D.L. Long, S. Luck, G.R. Mangun, W. Moons, L. Oakes, C. Pickett, C. Ranganath, S. Rivera, R.W. Robins, J. Schank, P.R. Shaver, J. Sherman, D.K. Simonton, T. Swaab, R. Thompson, B Trainor, M. Traxler, K.F. Widaman, A.P. Yonelinas, N.W. Zane

Human Development course credit. Human Development 100A, 100B, 100C, 101, 102, 120, and 121 can be used toward satisfying the 40-unit upper division major requirement to a maximum of 12 units. Students who have completed Human Development 100A or 100B will receive 2 units of credit for Psychology 140.

Minor Program Requirements:

Psychology......24 Psychology 1 or the equivalent 4 One course from each of the following 135, 136 Group B: Psychology 101, 113, 121, 122, 123, 126, 127, 129 Group C: Psychology 151, 152, 154, 161, 162, 168 Group D: Psychology 140, 141, 142, 143, Additional units to achieve a total of 20 upper One course selected from Human Development 100A, 100B, 100C, 101, 102, 120, 121 can be used toward satisfying the minor upper division unit requirement.

Honors and Honors Program. In order to be eligible for high or highest honors in Psychology, the student must both meet the college criteria and complete a research project involving a minimum of six units of course work over at least two quarters which represents an original analysis of data on psychological phenomena. Course 194HA-194HB or other approved courses can be used to satisfy the unit requirement. This project is to be written in thesis form and approved by the department. The quality of the thesis work will be the primary determinant for designating high or highest honors at graduation.

Graduate Study. The Department offers programs of study and research leading to the Ph.D. degree in psychology. Detailed information regarding graduate study may be obtained by writing the Graduate Adviser, Department of Psychology.

Graduate Adviser. See Registration Guide.

Courses in Psychology (PSC) **Lower Division Courses**

1. General Psychology (4)

Lecture-4 hours. Introduction emphasizing empirical approaches. Focus on perception, cognition, personality and social psychology, and biological aspects of behavior. Only two units allowed to those who have taken course 15 or 16; no credit allowed to those who have taken both courses 15 and 16. GE credit: SocSci | SS.-I, II, III. (I, II, III.) Shaver, Johnson, E. Post, Thompson, Traxler

20. Freshman Psychology Seminar (4)

Seminar-4 hours. Prerequisite: freshman standing. Instructor will acquaint students with his or her program of research, the development of scientific questions from the literature, and the application of research methods to examine these questions. Critical thinking will be encouraged via expository writing and brief presentations.

41. Research Methods in Psychology (4)

Lecture — 3 hours; autotutorial. Prerequisite: course 1 or the equivalent; Statistics 13 or 102 recommended. Introduction to experimental design, interviews, questionnaires, field and observational methods, reliability, and statistical inference. GE credit: QL.-I, II, III. (I, II, III.)

41S. Research Methods in Psychology (4)

Lecture/laboratory-10 hours; web virtual lecture-10 hours. Prerequisite: course 1 or equivalent. Introduction to experimental design, interviews, questionnaires, observational research, qualitative approaches, case studies, content analysis, sampling, descriptive statistics, and statistical inference. Limited enrollment. Not open for credit to students who have taken course 41.—IV.

90X. Lower Division Seminar (1-2)

Seminar - 1-2 hours. Prerequisite: lower division standing and consent of instructor. Examination of a special topic in Psychology through shared readings, discussions, written assignments, or special activities such as fieldwork or laboratory work. May not be repeated for credit. Limited enrollment.

98. Directed Group Study (1-5)

Primarily for lower division students. (P/NP grading only.)

99. Special Study for Lower Division Students (1-5)

(P/NP grading only.)

Upper Division Courses 100. Introduction to Cognitive Psychology

Lecture - 4 hours. Prerequisite: courses 1 and 41. Introduction to human information processing, mental representation and transformation, imagery, attention, memory, language processing, concept formation, problem solving, and computer simulation. Not open for credit to students who have completed former course 136.—I, II, III. (I, II, III.) Ekstrom, Gibbs, Long, Luck

101. Introduction to Psychobiology (4)

Lecture-4 hours. Prerequisite: courses 1, 41. Survey and integration of the relationships between behavior and biological processes, including physiology, genes, development, ecology, and evolution. - I, II, III. (I, II, III.) Coss, Krubitzer, Schank, Trainor

103A. Statistical Analysis of Psychological Data (5)

Lecture-4 hours; laboratory-2 hours; term paper Prerequisite: course 1, 41 and Statistics 13 or 102. Pass 1 open to Psychology majors. Design and statistical analysis of psychological investigations and the interpretation of quantitative data in psychology. Not open for credit to students who have completed course 103. GE credit: QL.-I, II. (I, II.) Blozis, Grimm, Widaman

103B. Statistical Analysis of Psychological Data (4)

Lecture-4 hours. Prerequisite: course 103A and Statistics 13 or 102. Pass 1 open to Psychology majors. Probability theory, sampling distributions, hypothesis testing, statistical inference, one-way and two-way analysis of variance, nonparametric statistics, with applications in psychology. Not open for credit to students who have completed course 105. GE credit: QL.-II, III. (II, III.) Blozis, Ferrer, Grimm, Widaman

104. Applied Psychometrics: An Introduction to Measurement Theory (4)

Lecture-4 hours. Prerequisite: upper division standing in Psychology, courses 41 and 103, Statistics 13. Examination of the basic principles and applications of classical and modern test theory. Topic include test construction, reliability theory, validity theory, factor analysis and latent trait theory. GE credit: QL.—Grimm, Widaman

107. Questionnaire and Survey Research Methods (4)

Lecture/discussion-2 hours; laboratory/discussion - 2 hours. Prerequisite: consent of instructor; course 1; course 41 or an equivalent course on social or behavioral research methods. Introduction to survey and questionnaire research methods with emphasis on how to ask questions. Social and psychological factors that influence survey response. Practical aspects of fielding survey and question-naire research. Limited enrollment. Not offered every year. GE credit: QL.—Herek

113. Developmental Psychobiology (4)

Lecture—3 hours; laboratory—2 hours. Prerequisite: course 101. The biology of behavioral development; survey and integration of the organismic and environmental processes that regulate the development of behavior. — I, II. (II, III.) Schank

120. Agent-Based Modeling (4)

Lecture/laboratory-4 hours. Prerequisite: course 100 or 101. Introduction to agent-based computer simulation and analysis with emphasis on learning how to model animals, including humans, to achieve insight into social and group behavior. Limited enrollment. GE credit: QL. - Schank

121. Physiological Psychology (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 1, 41, 101. Pass 1 open to Psychology majors. Relationship of brain structure and function to behavior, motivation, emotion, language, and learning in humans and other animals. Methodology of physiological psychology and neuroscience. Not open for credit to students who have completed course 108. (Former course 108.)—I, II, III. (I, II, III.) Bales, Krubitzer

122. Advanced Animal Behavior (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 101 or Neurobiology, Physiology, and Behavior 102. Pass 1 open to Psychology majors. Advanced integrative survey of biological principles of behavioral organization, emphasizing historical roots, current research directions, conceptual issues and controversies. Laboratory exercises on the description and analysis of the behavior of captive and free living animals. (Same course as Neurobiology, Physiology, and Behavior 150.) Not open for credit to students who have completed course 150. (Former course 150.)—III. (III.)

123. Hormones and Behavior (3)

Lecture - 3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101 and either course 101 or Neurobiology, Physiology, and Behavior 102. Pass 1 open to Psychology majors. Endocrine physiology with an emphasis on the principles of behavior. Fundamental relationships between hormones and various behaviors engaged in by the organism during its lifetime. Role of hormones in behavioral homeostasis, social behavior, reproductive behavior, parental behavior, adaptation to stress. (Same course as Neurobiology, Physiology, and Behavior 152.) Not open for credit to students who have completed course 152. (Former course 152.)—III. (III.) Bales, Trainor

124. Comparative Neuroanatomy (4)

Lecture — 3 hours; laboratory — 2 hours. Prerequisite: course 101 or Neurobiology, Physiology, and Behavior 100 or 101. Overview of the neuroanatomy of the nervous system in a variety of mammalian and non-mammalian vertebrates. Examine changes or modifications to neural structures as a result of morphological or behavioral specializations. (Same course as Neurobiology, Physiology, and Behavior 124.)—II. (II.) Krubitzer, Recanzone

126. Health Psychology (4)

Lecture - 4 hours. Prerequisite: course 1, 41, 101. Pass 1 open to Psychology majors only. Psychological factors influencing health and illness. Topics include stress and coping, personality and health, symptom perception and reporting, heart disease, cancer, compliance, and health maintenance and promotion. Not open for credit to students who have completed course 160.—III. (III.) Emmons

127. Animal Cognition (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: courses 1, 41, 101. Pass 1 open to Psychology majors. Integrative review of the historical backdrop, theoretical issues, and scientific methods of studying animal cognition in a wide range of species. Emphasis on learning processes, pattern recognition, and the neurobiology of learning and memory. Not open for credit to students who have completed course 134. (Former course 134.)—II, III. (II, III.) Coss

129. Sensory Processes (4)

Lecture - 3 hours; term paper. Prerequisite: course 1, 41, 101. Pass 1 open to Psychology majors. Psychobiology of sensory systems in humans and other animals. The relationship of behavior to the physiology, structure, and function of the senses. GE credit: Wrt | WC.-III. (III.) Krubitzer

130. Human Learning and Memory (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: courses 1, 41, 100, and either Statistics 13 or 102; or consent of instructor. Consideration of major theories of human learning and memory with critical examination of relevant experimental data. - I, II, III. (I, II, III.) Ranganath, Yonelinas

131. Perception (4)

Lecture — 3 hours; independent library work. Prerequisite: courses 1, 41. The cognitive organizations related to measurable physical energy changes mediated through sensory channels. The perception of objects, space, motion, events.—I, II, III. (I, II, III.) Geng, Post

132. Language and Cognition (4)

Lecture—3 hours; term paper. Prerequisite: courses 1, 41, 100; or consent of instructor. Introduction to the cognitive processes involved in language comprehension and production. Topics include the biological foundations of language, speech perception, word recognition, syntax, reading ability, and pragmatics. GE credit: WE.—I, II, III. (I, II, III.) Long, Swaab, Traxler

135. Cognitive Neuroscience: The Biological Foundations of the Mind (4)

Lecture—3 hours; writing. Prerequisite: courses 1, 41, and 100 or 131, or consent of instructor; course 101, 121, or 129 recommended. Neuroscientific

482 Psychology

foundations of higher mental processes including attention, memory, language, higher-level perceptual and motor processes, and consciousness. Emphasis on the neural mechanisms which form the substrates of human cognition, and the relationship of mind to brain.—I, II. (I, II.) Ekstrom, Geng, Janata, Mangun, Raganath

136. Psychology of Music (4)

Lecture/discussion—3 hours; term paper. Prerequisite: courses 1, 41, and either 100 or 131 or Music 6C; or consent of instructor. Introduction to the mental and neural representations of musical structures and processes involved in perceiving, remembering, and performing music. Music and emotion. GE credit: WE.—Janata

140. Developmental Psychology (4)

Lecture—4 hours. Prerequisite: courses 1, 41. Pass 1 open to Psychology majors. Ontogenetic account of human behavior through adolescence with emphasis on motor skills, mental abilities, motivation, and social interaction. Two units of credit allowed to students who have completed Human Development 100A or 100B. Not open for credit to students who have completed course 112. (Former course 112.)—1, II, III. (I, II, III.) Ghetti, Gibbs, Goodman, Graf Estes, Lagattuta, Oakes

141. Cognitive Development (4)

Lecture—3 hours; term paper. Prerequisite: Human Development 100A or 100B or course 140. Pass 1 restricted to Human Development or Psychology majors. Theories, methods, evidence, and debates in the field of cognitive development, such as nature/nurture, constraints on learning, and the role of plasticity. Topics include attention, memory, concepts about the physical and social world, and language. (Same course as Human Development 101.) GE credit: Wrt | WE.—I, II, III. (I, III, III.) Chen, Ghetti, Gibbs, Goodman, Graf Estes, Lagattuta, Rivera

142. Social and Personality Development (4)

Lecture—3 hours; term paper. Prerequisite: Human Development 100A or 100B or course 140. Pass 1 open to Human Development or Psychology majors. Social and personality development of children, infancy through adolescence. Topics include the development of personality, achievement motivation, self-understanding, sex-role identity, and antisocial behavior. Emphasis on the interface between biological and social factors. (Same course as Human Development 102.) GE credit: SocSci, Wrt | SS, WE.—I, II, III. (I, II, III.) Belsky, Gibbs, Hastings, Thompson

143. Infant Development (4)

Lecture—3 hours; lecture/discussion—1 hour; extensive writing. Prerequisite: courses 1 and 41, and either course 140 or Human Development 100A. Psychological development in infancy. Topics include physical and motor development, sensory and nervous system development, and memory and cognitive development. Emphasis will be on evaluating theories, empirical research, and experimental methods for understanding infant development.—III. (III.) Oakes

146. The Development of Memory (4)

Lecture—3 hours; term paper. Prerequisite: courses 1, 41. Pass 1 open to Psychology majors. Theory and research on memory development with focus on infancy and childhood. Not open for credit to students who have completed course 133. (Former course 133.) GE credit: WE.—III. (III.) Ghetti, Rivera

148. Developmental Disorders (4)

Lecture/discussion—3 hours; term paper. Prerequisite: courses 1, 41, and either 140 or 141 or Human Development 100A or 100B. Current scientific knowledge of the influences of biological, cognitive, and environmental factors on the emergence of disorders with onset in childhood. Examples include autism spectrum, ADD/ADHD, dyslexia and dyscalculia. Emphasis placed on understanding these disorders, their causes and their treatments.—Ill. Rivera

151. Social Psychology (4)

Lecture—4 hours. Prerequisite: courses 1, 41. Pass 1 open to Psychology majors. Behavior of the individual in the group. Examination of basic psychological processes in social situations, surveying various problems of social interaction; group tensions, norm-development, attitudes, values, public opinion, status. Not open for credit to students who have completed course 145. [Former course 145.]—I, II, III. [I, III.] Johnson, Ledgerwood, Sherman

152. Social Cognition (4)

Lecture—4 hours. Prerequisite: courses 1 and 41. Examines how social factors influence how we attend to, encode, and process information and how these mental processes affect subsequent judgments and behavior.—III. (III.) Pickett, Sherman

153. Psychology and Law (4)

Prerequisite: courses 1, 41. Pass 1 open to Psychology majors. Current theoretical and empirical issues in the study of psychology and law. Topics include eyewitness testimony, child abuse, jury decision making, juvenile delinquency and criminology, prediction of violence, insanity defense, and memory for traumatic events. Not open for credit to students who have completed course 115. (Former course 115.) Offered in alternate years.—I. Goodman

154. Psychology of Emotion (4)

Lecture—4 hours. Prerequisite: course 1, 41. Pass 1 open to Psychology majors. Introduction to current theories and research on emotion and bodily feelings with special reference to self-knowledge. Not open for credit to students who have completed course 143. (Former course 143.)—I, II, III. (I, II, III.) Moons, Shaver

155. Environmental Awareness (4)

Lecture—4 hours. Prerequisite: course 1. Pass 1 open to Psychology majors. Interactions of people and the environments they construct. Research methods for evaluating designed environments and reviews of current research in environmental psychology. Not open for credit to students who have completed course 1444. (Former course 1444.) GE credit: SocSci | SS.—1. (I.) Coss

157. Stereotyping, Prejudice, and Stigma

Lecture/discussion—3 hours; term paper. Prerequisite: course 151. Social psychological underpinnings of stereotyping, prejudice, and stigma from sociocultural, motivational, and cognitive perspectives. Topics include: origins, maintenance, change, effects on person perception and memory, and the automaticity/controllability of stereotyping and prejudice. Offered in alternate years. GE credit: Div.—(I, III.) Sherman

158. Sexual Orientation and Prejudice (4)

Lecture/discussion—4 hours. Prerequisite: course 1, 41. Pass 1 open to Psychology majors. Current scientific knowledge about sexual orientation and prejudice based on sexual orientation. Emphasis on learning the skills necessary for a critical understanding of science and public policy issues relevant to sexuality. GE credit: SocSci, Div, Wrt | ACGH, DD, SS, WE.—II. (I, II.) Herek

159. Gender and Human Reproduction (4)

Lecture—4 hours. Prerequisite: course 1 and 41. Pass 1 open to Psychology majors. Psychology of reproduction. Reproductive events over the course of an individual's life, including sexual development, mate choice, relationships, and reproduction. Biological and social psychological explanations at the levels of mechanism and evolutionary function. Not open for credit to students who have completed former course 149. (Formally course 149.)—III. Scheib

161. Psychology of the Self (4)

Lecture—4 hours. Prerequisite: courses 1 and 41. Psychological theory and research on the self. Topics include: self-knowledge, self-esteem, self-regulation, self-presentation, cognitive and emotional aspects of the self, and the role of the self in shaping social interaction.—I. (I.) Pickett

162. Personality Theory (4)

Lecture—4 hours. Prerequisite: courses 1, 41. Pass 1 open to Psychology majors. The theories of Freud, Erikson, and other major twentieth-century contemporary approaches to personality. Not open for credit to students who have completed course 147. (Former course 147.) GE credit: SocSci, Wrt | SS, WE.—I, II, III. (I, II, III.) Robins, Shaver

165. Introduction to Clinical Psychology (4) Lecture—4 hours. Prerequisite: courses 1, 41, 168, and either 140 or 151. Major theoretical formulations in the history of clinical psychology, from classical psychoanalysis to contemporary existentialism and behavior modification. A survey, based on lectures, films, and tapes, of what clinical psychologists do, including methods of appraisal, professional roles, and approaches to treatment.—I, II, III. (I, II,

168. Abnormal Psychology (4)

III.) Horn, Zane

Lecture—4 hours. Prerequisite: courses 1, 41. Descriptive and functional account of behavioral disorders, with primary consideration given to neurotic and psychotic behavior. GE credit: SocSci | SS.—I, II, III. (I, II, III.) Schepeler, Zane

170. Psychology of Religion (4)

Lecture—4 hours. Prerequisite: courses 1 and 41. Major theories, issues, data, and research methodologies of the psychology of religion. Religious experience and expression; religious development in childhood, adolescence, and adulthood; conversion; religious influences on physical and mental health; cross-cultural perspectives. GE credit: Div, Wrt | WE.—III. (III.) Emmons

175. Genius, Creativity, and Leadership (4)

Lecture—3 hours; term paper. Prerequisite: course 1 and 41 or the equivalent or consent of instructor. The phenomenon of genius examined from a diversity of theoretical, methodological, and disciplinary perspectives, with an emphasis on outstanding creativity and leadership in art, music, literature, philosophy, science, war, and politics. GE credit: SocSci, Wrt | SS, WE.—I, III. (I, III.) Simonton

180A. Research in Cognitive and Perceptual Psychology (4)

Lecture — 2 hours; laboratory — 4 hours. Prerequisite: course 41, and four upper division Psychology courses and consent of instructor. Empirical research on selected topics in general experimental psychology (general research design and analysis, perception, cognition, cognitive development, etc.). Specific content will vary from quarter to quarter. May be repeated one time for credit when content differs.—III.

180B. Research in Psychobiology (4)

Lecture — 2 hours; laboratory — 4 hours. Prerequisite: course 101, three additional upper division courses in Psychology, and consent of instructor. Empirical research on selected topics in psychobiology (animal learning, animal behavior, physiological and sensory psychology, developmental psychobiology, computer modeling of neural systems). Content varies. May be repeated one time for credit when content differs.—III. (III.)

180C. Research in Personality and Social Psychology (4)

Lecture — 2 hours; laboratory — 4 hours. Prerequisite: course 41, and four upper division Psychology courses and consent of instructor. Empirical research on selected topics in personality and social psychology (personality, social psychology, organizational psychology, etc.). Content will vary from quarter to quarter. May be repeated one time for credit when specific content differs. — III.

185. History of Psychology (4)

Lecture—3 hours; term paper. Prerequisite: courses 1, 41, upper division standing or consent of instructor. Pass 1 open to Psychology majors. Development of psychological thought and research in context of history of philosophy and science. Not open for credit to students who have completed course 120. (Former course 120.) GE credit: SocSci, Wrt | SS, WE.—I. (I.) Simonton

190. Seminar in Psychology (4)

Seminar—4 hours. Prerequisite: junior or senior standing; major in psychology or consent of instructor. Intensive treatment of a special topic or problem of psychological interest. May be repeated for credit in different subject area.—I, II, III. (I, II, III.)

190X. Upper Division Seminar (1-2)

Seminar – 1-2 hours. Prerequisite: upper division standing and consent of instructor. In-depth examination at an upper division level of a special topic in Psychology. Emphasis on student participation in learning. May not be repeated for credit. Limited

192. Fieldwork in Psychology (1-6)

Fieldwork — 1-6 hours. Prerequisite: upper division standing in psychology and consent of instructor. Supervised internship off and on campus, in community and institutional settings. Maximum of four units may be used towards satisfaction of upper division major requirement. May be repeated one time for credit. Limited enrollment (P/NP grading only.)

194HA-194HB. Special Study for Honors Students (3-3)

Independent study—9 hours. Prerequisite: senior standing in Psychology and qualifications for admission into college honors program, and consent of instructor; at least one course from 180A, 180B, 180C or 199 strongly recommended. Directed research. Supervised reading, research and writing leading to submission of a Senior Honors thesis under the direction of faculty sponsor. (Deferred grading only, pending completion of sequence.) GE credit: WE.

197T. Tutoring in Psychology (1-3)

Tutoring - 1-3 hours. Prerequisite: upper division standing and consent of instructor. Intended for advanced undergraduate students who will lead discussion sections in Psychology courses. May be repeated for credit for a total of 8 units. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

200. Proseminar in Psychology (3)

Seminar—2 hours; independent study—1 hour. Pre-requisite: graduate standing in Psychology or consent of instructor. Introduces matriculating graduate students to research activities of departmental faculty. (S/U grading only.)—I. (I.)

201. Research Preceptorship (4)

Laboratory - 3-4 hours; discussion - 3-5 hours. Prerequisite: consent of instructor. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

202. Research Seminar (1)

Seminar — 1 hour. Prerequisite: graduate standing in psychology. Presentation of graduate research to program faculty and graduate students. May be repeated for credit. (S/U grading only.)-I, II, III. (I, II, III.)

204A. Statistical Analysis of Psychological Experiments (4)

Lecture-4 hours. Prerequisite: Statistics 102 or the equivalent and graduate standing in Psychology or consent of instructor. Probability theory, sampling distributions, statistical inference, and hypothesis testing using standard parametric and correlational approaches. Analysis of variance, factorial and repeated measures, and tests of trends. Not open for credit to students who have completed course 206.—I. Ferrer, Widaman

204B. Causal Modeling of Correlational Data (4)

Lecture — 4 hours. Prerequisite: course 204A or the equivalent or consent of instructor. Examination of how to make causal inferences from correlational data in the behavioral sciences. Emphasis on testing rival causal models using correlations among

observed variables. Beginning with multiple regression analysis, discussion advances to path analysis and related techniques.—II. Widamar

204C. Applied Psychometrics and Measurement Theory (4)

Lecture-4 hours. Prerequisite: course 204A or the equivalent or consent of instructor. Examination of the basic principles and applications of classical and modern test theory. Topics include test construction, reliability theory, validity theory, factor analysis, and latent trait theory. Not open for credit to students who have completed course 204. (Former course 204.) Offered in alternate years.—III. Wida-

204D. Advanced Statistical Inference from **Psychological Experiments (4)**

Lecture - 4 hours. Prerequisite: course 204A or the equivalent or consent of instructor. Advanced topics in statistical inference, which may include probability theory, sampling distributions, statistical inference and hypothesis testing, nonparametric statistics, Bayesian approaches, and advanced issues in analysis of variance. Not open for credit to students who have completed course 205. (Former course 205.) Offered in alternate years.—III. Blozis

205A. Applied Multivariate Analysis of Psychological Data (4)

Lecture-4 hours. Prerequisite: three courses from 204A, 204B, 204C, 204D or the equivalents, or consent of instructor. Review of the major methods of multivariate data analysis for psychological data. Statistical routines_using a linear algebra-based computing language. Topics include multivariate analysis of variance, discriminant analysis, canonical analysis factor analysis, and component analysis. Not open for credit to students who have completed course 207B. (Former course 207B.) Offered in alternate years.—II. Ferrer

205B. Factor Analysis (4)

Lecture — 4 hours. Prerequisite: graduate standing, course 204A and 204B or the equivalent or consent of instructor. Theory and methods of factor analysis, including exploratory factor analysis, confirmatory factor analysis, and principal component analysis. Offered in alternate years. - II. Widamar

205C. Structural Equation Modeling (4)

Lecture - 3 hours; term paper. Prerequisite: graduate standing; course 204A and 204B or the equivalent or consent of instructor. Theory and methods of structural equation modeling, including path analysis, confirmatory factor analysis, multiple-group modeling and latent growth curve modeling. Offered in alternate years.—Ferrer, Grimm, Widaman

205D. Multilevel Models (4)

Lecture - 4 hours. Prerequisite: course 204A, graduate standing or consent of instructor. Introduction to statistical techniques for the analysis of normal, hierarchically structured data, such as cross-sectional clustered data or repeated-measures data. Topics include hierarchical linear models, latent growth curve models, and how these methods handle unbalanced and/or missing data. - II. (II.) Blozis

206A. Theoretical Foundations: Research Methods in Psychology (4)

Lecture/discussion-3 hours; term paper. Restricted to graduate student status. Examines the philosophy and research practices underlying experimental psychology. Topics to be covered include philosophy of science/epistemology, research design, inference and bias in research, theory development, validity, the social context of research, and critical thinking about research. Offered irregularly. - III. (III.) Pickett,

206B. Research Methods in Psychology: Applications in Social-Personality Research

Lecture/discussion-3 hours; term paper. Restricted to graduate student status. Overview of the research designs, assessment methods, and statistical procedure used by social-personality psychologists. Focus on the practical issues that arise when using each method in specific research contexts. Offered in alternate years. — (II.) Robins

207. Survey and Questionnaire Research

Lecture/discussion-4 hours. Prerequisite: completion of a course on social or behavioral research methods, graduate standing. Survey and question-naire research methods with emphasis on how to ask questions. Cognitive, motivational, and social processes that influence how respondents answer questions; sampling techniques; Internet resources; practical aspects of fielding survey and questionnaire research. Not offered every year.—I. Herek

208. Physiological Psychology (4)

Seminar-4 hours. Prerequisite: graduate standing in psychology or consent of instructor. A conceptual analysis of the contributions of neuroanatomy, neurophysiology and neurochemistry to an understanding of animal and human behavior.—III. Bales

208A. Fundamentals of Human Electrophysiology (4)

Lecture/discussion - 1.5 hours; laboratory - 3 hours; extensive problem solving-1.5 hours.; project-3 hours. Restricted to 15 students. In-depth introduction and hands-on experience with the event-related potential (ERP) method in the study of attention, executive control, memory, language and social cognitive neuroscience. — II. (II.) Luck, Swaab

209A. Introduction to Programming: Matlab (4)

Lecture/laboratory-3 hours. Prerequisite: graduate standing or consent of instructor. The Matlab programming environment as a means of organizing, analyzing, and visualizing scientific data. Basic programming concepts such as variables, loops, conditional branching, and efficient programming techniques will be emphasized. Not offered every year.—Janata

210. Fundamentals of Cognitive Neuroimaging (3)

Lecture/discussion-3 hours. Prerequisite: basic knowledge of inferential statistics and experimental psychology. Introduction to empirical foundations and methodology of neuroimaging, emphasizing pragmatics of functional magnetic resonance imaging (fMRI) to study cognition. Topics include MR physics, the relationship between neural activity and the BOLD response, experimental design, and analysis of fMRI data. - Ranganath

211. Advanced Topics in Neuroimaging (2)

Seminar-2 hours. Prerequisite: course 210 or consent of instructor, Restricted to 16 students, Critical presentation and discussion of the most influential advanced issues in neuroimaging, emphasizing fMRI design/analysis and the integration of fMRI with EEG/MEG. (Same course as Neuroscience 211 and Neurobiology, Physiology, and Behavior 211.) (S/U grading only.)—II. (II.) Miller

212A. Developmental Psychology: Cognitive and Perceptual Development (4)

Seminar-4 hours. Prerequisite: graduate standing or consent of instructor, completion of undergraduate or graduate course on developmental psychology or human development. Theories and empirical find ings concerning human cognitive and perceptual development. Development of perception, memory, concepts (e.g., theory of mind, concepts about number), problem solving, and language from infancy to adolescence.—I. Ghetti, Goodman, Graf Estes, Lagattuta, Rivera

212B. Developmental Psychology: Social, **Emotional, and Personality Development**

Seminar—4 hours. Prerequisite: graduate standing or consent of instructor, completion of an undergraduate or graduate course on developmental psychology or human development. Theories and empirical findings concerning human social, emotional, and personality development. Development of emotions, moral reasoning and behavior, personality, self-concept, and social cognition from infancy to adolescence (may include adulthood). - Thompson

217. Behavioral Genetics (4)

Lecture—3 hours; laboratory/discussion—1 hours; term paper. Prerequisite: graduate standing. Restricted to 20 students. Review basic principles in genetics and select topics in molecular genetics with emphasis on behavior. Use of modern molecular methods to outline complex relationships between genes, environment, and behavior. Not open for credit to students who have completed course 251.—II, III. (II, III.) Trainor

218A. Fundamentals of Animal Behavior

Lecture/discussion-4 hours; discussion-1 hour. Prerequisite: consent of instructor; upper-division undergraduate introduction to the biology of behavior, such as course 101, 122, 123, Neurobiology, Physiology, and Behavior 102, 150, 152, Wildlife, Fish, and Conservation Biology 141, Entomology 104, or Animal Science 105. Survey of the phenomena and theory of animal behavior from the perspectives of multiple biological disciplines, including evolution, ecology, psychology, genetics, neurobiology, endocrinology, and animal science. (Same course as Animal Behavior 218A.)—I. (I.) Sih

218B. Fundamentals of Animal Behavior

Lecture/discussion-4 hours; discussion-1 hour. Prerequisite: consent of instructor; course 209A. Survey of the phenomena and theory of animal behavior from the perspectives of multiple biological disciplines, including evolution, ecology, psychology, genetics, neurobiology, endocrinology, and animal science. (Same course as Animal Behavior 218B.)-II. (II.) Sih

220. History of Psychology (4)

Lecture - 2 hours; seminar - 2 hours. Prerequisite: graduate standing in psychology or consent of instructor. A lecture-seminar on the history of psy chology and on the applicability of early psychological theory and research to contemporary investigations. Offered in alternate years. -

230. Cognitive Psychology (4)

Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Analysis of the mental processes by which knowledge is acquired, manipulated, stored, retrieved and used. Offered in alternate years.—I. Long, Mangun

231. Sensation and Perception (4)

Seminar-4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Analysis of the role of sensory processes and perception in experience and their effects on behavior. Offered in alternate years.—III.

241. Attitudes and Social Influence (4)

Lecture/discussion-3 hours; term paper. Prerequisite: consent of instructor. Survey of theory and research in the field of attitudes and social influence. Topics include attitude definition and measurement, major theories of attitude formation and change, the relationship between attitudes and behavior, and recent directions and controversies. Offered irregularly.-I, II, III. (I, II, III.) Ledgerwood

243. Social Cognition (4)

Lecture/discussion-3 hours, term paper. Prerequisite: consent of instructor. Processes underlying the perception, memory, and judgment of social stimuli, the effects of social and affective factors on cognition, and the interpersonal consequences of those processes. Topics include automaticity/control, motivated cognition, person perception, stereotyping, attitudes, and persuasion. Not offered every year. -Pickett, Sherman

244. Stereotyping, Prejudice, and Stigma

Lecture/discussion-3 hours, term paper. Prerequisite: consent of instructor. This course examines the social psychological underpinnings of stereotyping, prejudice, and stigma, including sociocultural, motivational, and cognitive factors. Not offered every year. — I, II, III. (I, III.) Herek, Sherman

245. Social Psychology (4)

Seminar-4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Theory and research in social psychology.—III. (III.) Johnson, Pickett, Robins

247. Personality (4)

Seminar-4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Theory and research in human personality.—II. (II.) Robins

250. Comparative Psychology (4)

Seminar-4 hours. Prerequisite: graduate standing in psychology or consent of instructor. The study of animal behavior in an evolutionary and comparative

251. Topics in Genetic Correlates of Behavior (4)

Seminar-4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Theory and experiment in the genetic contributions to animal and human behavior. May be repeated for credit when topic differs. Offered in alternate years.

252. Topics in Psychobiology (4)

Seminar-4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Critical study in a selected area of psychobiology. May be repeated for credit when content differs. Offered in alternate years.

261. Cognitive Neuroscience (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: graduate student standing in Psychology or Neuroscience or consent of instructor. Graduate core course for neuroscience. Neurobiological bases of higher mental function including attention, memory, language. One of three in three-quarter sequence. (Same course as Neuroscience 223.)—III. (III.) Ranganath, Swaab

263. Topics in Cognitive Psychology (4)

Seminar-4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Selected topics in language processing, memory, perception, problem solving, and thinking, with an emphasis on the common underlying cognitive processes. May be repeated for credit when content differs. Offered in alternate years.

264. Topics in Psycholinguistics (4)

Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Discussion of fundamental issues in the psychology of language. May be repeated for credit when content differs. Offered in alternate years.

270. Topics in Personality and Social Psychology (4)

Seminar – 4 hours. Prerequisite: graduate standing or consent of instructor. Critical study of a selected area of personality or social psychology. May be repeated for credit when topic differs.—I. (I.)

272. Topics in Developmental Psychology

Seminar—4 hours. Prerequisite: graduate standing in Psychology or consent of instructor. Selected topics in developmental psychology, including developmental neuroscience, memory development, infancy, cognitive development, social development, child maltreatment, children and law, perceptual development, emotional development, children at risk, and adolescence, with emphasis on developmental processes and developmental theory. May be repeated for credit. Not offered every year.

289A. Current Research in Psychology (2)

Seminar-2 hours. Prerequisite: graduate standing in Psychology or consent of instructor. Contemporary theory and empirical research in specialized topics in psýchology. Topics include developmental attachment, social neuroscience, mental health, emotion, sexual orientation and identity. May be repeated for credit if topic differs. (Deferred grading only, pending completion of sequence.)

289B. Current Research in Psychology (2)

Discussion - 2 hours. Prerequisite: course 289A; graduate standing in Psychology or consent of instructor. Intensive examination of contemporary theory and empirical research on a specialized topic in psychology. Sample topics include developmental attachment, social neuroscience, culture and mental health, electrophysiology and cognitive neuroscience, emotion, implicit cognitive processes, sexual orientation and identity, and attention. May be repeated for credit if content differs. (Deferred grading only, pending completion of sequence.)

290. Seminar (4)

Seminar-4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Seminar devoted to a highly specific research topic in any area of basic psychology. Special topic selected for a quarter will vary depending on interests of instructor and students.—I, II, III. (I, II, III.)

298. Group Study (1-5)

(S/U grading only.)

299. Research (2-9)

(S/U grading only.)

299D. Dissertation Research (1-12)

Prerequisite: consent of instructor. (S/U grading

Professional Courses

390A-390B. The Teaching of Psychology

Discussion, lecture, practice. Prerequisite: advanced graduate standing in psychology or a closely related discipline and consent of instructor. Methods and problems of teaching psychology at the undergraduate and graduate levels; curriculum design and evaluation. Practical experience in the preparation and presentation of material. (S/U grading only; deferred grading only, pending completion of sequence.)—II-III. (II-III.)

396. Teaching Assistant Training Practicum (1-4)

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, Iİ, III.)

Quantitative Biology and Bioinformatics

(College of Biological Sciences)

The interdisciplinary minor in Quantitative Biology and Bioinformatics is an integrative program that introduces students to the quantitative and computational approaches that are redefining all disciplines in the biological sciences, from molecular and cell biology, through genetics and physiology, to ecology and evolutionary biology. Students in this minor will learn research tools that apply mathematical and computational methods, increase their insight into the strengths and limitations of quantitative approaches, and develop the interdisciplinary perspective that is now the foundation of modern biological research and training.

The minor in Quantitative Biology and Bioinformatics is open to all undergraduates regardless of major and is sponsored by the College of Biological Sci-

Minor Program Requirements:

UNITS

Quantitative Biology and Bioinformatics18-24

Core Courses Programming: Computer Science Engineering 10 or 30 or the equivalent* 4 Quantitative Biology: Biological Sciences 132 or Mathematics 124...... 4 Bioinformatics: Computer Science Preparation Complete one course from the following: Applied Science Engineering 115; Biomedical Engineering 105; Computer Science Engineering 122, 130;

Mathematics 128A, 128B, 128C, 135A;
Statistics 130A, 131A, 141A
Restricted Electives 6-8
Complete two or more courses from the
following list to achieve a total of 18-24
units: Biological Sciences 134, 180L, 181,
183; Biomedical Engineering 102, 117,
140, 141, 151; Biotechnology 150;
Computer Science Engineering 165A, 166;
Evolution and Ecology 102, 103, 104,
175; Microbiology 105; Molecular and
Cellular Biology 123, 143, 182;
Neurobiology, Physiology, and Behavior
166, 167; one course from Environmental
Science and Policy 121 or Wildlife, Fish,
and Conservation Biology 122

Restrictions. No more than two upper division courses from a single department may be offered in satisfaction of the minor requirements. Only one course used to satisfy a requirement for the minor may be applied toward a student's major.

*The programming requirement may be satisfied by previous experience and therefore may not entail college course credit. Please see your minor adviser for this determination and its possible impact on your unit requirements for the minor.

Minor Adviser. Consult the College of Biological Sciences Dean's office in 202 Life Sciences (530) 752-0410.

Radiation Oncology

See Medicine, School of, on page 390.

Radiology

See Medicine, School of, on page 390.

Range Science

(College of Agricultural and Environmental Sciences)

Faculty. See Plant Sciences, on page 467.

Related Program. See Ecological Management and Restoration, on page 223.

Related Courses. See Plant Sciences 101, 112, 130, 131, 135; Nutrition 115: Soil Science 105, 120; Wildlife, Fish, and Conservation Biology 151.

Religious Studies

(College of Letters and Science)

Catherine Chin, Ph.D., Program Director

Program Office. 213 Sproul Hall (530) 752-1219; http://religions.ucdavis.edu

Committee in Charge

Catherine Chin, Ph.D. (Religious Studies) Allison Coudert, Ph.D. (Religious Studies) Mark Elmore, Ph.D. (Religious Studies) Naomi Janowitz, Ph.D. (Religious Studies) W. Flagg Miller, Ph.D. (Religious Studies) Baki Tezcan, Ph.D. (History, Religious Studies) Archana Venkatesan, Ph.D. (Comparative Literature, Religious Studies)

Moulie Vidas, Ph.D. (Religious Studies) Keith Watenpaugh, Ph.D. (Religious Studies)

Catherine Chin, Ph.D., Associate Professor Allison Coudert, Ph.D., Professor Mark Elmore, Ph.D., Assistant Professor Naomi Janowitz, Ph.D., Professor W. Flagg Miller, Ph.D., Associate Professor Baki Tezcan, Ph.D., Associate Professor Archana Ventakesan, Ph.D., Assistant Professor Moulie Vidas, Ph.D., Assistant Professor Keith Watenpaugh, Ph.D., Associate Professor

Emeriti Faculty

Whalen W. Lai, Ph.D., Professor Emeritus

The Major Program

Religion is a major force in human experience. It has shaped the world's history, literature, art, culture, politics, ethics, and economics. In addition to offering courses in all the major religious traditions (Judaism, Christianity, Islam, Hinduism, and Chinese and Japanese religions), the Religious Studies Program has developed cross-cultural courses dealing with religious symbols, myths, and rituals in written texts, art, theater, and film, and the internet, as well as, thematic courses dealing with such topics as religion and the body, the rise of fundamentalism, religion and science, and religion and violence.

The Program. The major introduces students to the academic study of religion. Students can choose from a broad range of courses both in the program itself and in other departments and programs—history, philosophy, psychology, sociology, anthropology, American studies, classics, and medieval studies. In addition to studying religious thought per se, students in the major can also study the way religion has shaped human behavior in such matters as family life, gender roles, ethics, artistic life, concepts of individual freedom, the pursuit of science, and economics. For some students, Religious Studies is an appropriate second major and combines well with anything from philosophy to international agricultural development, political science, and the phys-

Career Alternatives. Because of the program's focus on developing critical thinking, writing, and reading skills, students who major in Religious Studies are well prepared to enter a variety of careers, including teaching, the health professions, law, business, and government. In an increasingly global society, knowledge of the world's religious traditions and practices has become an essential part of a student's education.

A.B. Major Requirements:

	UNITS
Preparatory Subject Matter	20
(a) One course from the Religious Studie	s 1
series	4
(b) Four courses from other Religious Studower division offerings	dies . 16
Depth Subject Matter	40
Religious Studies 100 Nine upper division Religious Studies	4
courses'*	. 36
* Four of these courses may be upper div	
courses related to religion that are offere	d by
other departments and taken with the	
approval of a Religious Studies adviser.	
Total Units for the Major	60

Recommended. A reading knowledge of a for-

eign language is highly recommended. Course Equivalents. The major advisers have a

list of lower and upper division courses that can be substituted for courses suggested above.

Major Advisers. Consult the Program office.

Minor Program Requirements:

	UNITS
Religious Studies	20
Lower division course	4
Upper division courses	16
Religious Studies 100 required.	
Some substitutions from other departm	ents
or programs allowed with consent of	
adviser.	

Minor Advisers. Same as major advisers.

Honors and Honors Program. A student becomes eligible for graduation with honors by meeting the minimum GPA and course requirements established by the College of Letters and Science. Upon successful completion of the additional requirements of the College of Letters and Science Honors Program, individual students may be recommended by the program for graduation with high honors or highest honors on the basis of an evaluation of their academic achievements in the major.

Education Abroad Program. The Religious Studies program encourages students to study in the Summer Abroad program, the Quarter Abroad program, or the Education Abroad program. With the approval of a major adviser, applicable courses taken abroad may be accepted in the major or

Teaching Credential Subject Representative. See the Teaching Credential/M.A. Program on page 115.

Hebrew. Students interested in Hebrew courses should see http://classics.ucdavis.edu/hebrew.

Human Rights Minor. Students interested in the Human Rights minor should see http:// humanrightsminor.ucdavis.edu.

Jewish Studies. Students interested in Jewish Studies should see http://jewishstudies.ucdavis.edu

Courses in Religious Studies (RST) **Lower Division Courses**

1. Survey of Religion (4)

Lecture - 3 hours; discussion - 1 hour. Basic concepts introduced through readings of the primary religious literature. Discussion of central ideas (creation, history, law, prophecy, suffering, mysticism, asceticism, karma, reincarnation, moksha, etc.); readings from the Bible, Bhagavad Gita, the Koran, selections from Plato and early Buddhist writings. GE credit: ArtHum, Div, Wrt | AĆGH, AH, DD, ŎL, VL, WE. — II. (II.)

1A. Topics in Comparative Religion (4)

Lecture - 3 hours; discussion - 1 hour. Introduction to comparative religion, focusing on a particular theme in a number of religious traditions: (A) Pilgrimage. Not available to those who have taken course 3A. GE credit: ArtHum, Div, Wrt | AH, WC, WE.-I, II, III, IV. (I, II, III, IV.) Tezcan, Venkatesan

1B. Topics in Comparative Religion (4)

Lecture - 3 hours; discussion - 1 hour. Introduction to comparative religion, focusing on a particular theme in a number of religious traditions: (B) Death and After-life. Not available to those who have taken course 3A. GE credit: ArtHum, Div, Wrt | AH, OL, VL, WC, WE.—I, II, III, IV. (I, Iİ, III, İV.)

1C. Topics in Comparative Religion (4)

Lecture - 3 hours; discussion - 1 hour. Introduction to comparative religion, focusing on a particular theme in a number of religious traditions: (C) Sacrifice; (D) Conversion. Not available to those who have taken course 3A. GE credit: ArtHum, Div, Wrt | AH, OL, VL, WC, WE.-I, II, III, IV. (I, II, III, IV.) Coudert

1D. Topics in Comparative Religion (4)

Lecture - 3 hours; discussion - 1 hour. Introduction to comparative religion, focusing on a particular theme in a number of religious traditions: (D) Conversion. Not available to those who have taken course 3A. GE credit: ArtHum, Div, Wrt | AH, WC, WE.-I, II, III, IV. (I, II, III, IV.)

1E. Topics in Comparative Religion (4)

Lecture - 3 hours; discussion - 1 hour. Introduction to comparative religion, focusing on a particular theme in a number of religious traditions: (E) Fundamentalism. Not available to those who have taken course 3A. GE credit: ArtHum, Div, Wrt | AH or SS, OL, VL, WE.-I, II, III, IV. (I, II, III, IV.) Watenpaugh

1F. Topics in Comparative Religion (4)

Lecture - 3 hours; discussion - 1 hour. Introduction to the methods used in comparative religion, focusing on a particular theme in a number of religious traditions: (F) Contemporary Religion. GE credit: ArtHum, Div, Wrt | AH, OL, VL, WC, WE.-I, II, III, IV. (I, II, III, IV.) Elmore, Miller

1G. Myth, Ritual, and Symbolism (4)

Lecture-3 hours; discussion-1 hour. Myths, rituals and religious symbols found in a variety of religious traditions including examples from ancient and contemporary religious life. Variety of religious phenomena; validity of different approaches to the study of religion. Not open to students who have taken and received unit credit for course 2. GE credit: ArtHum, Div, Wrt | AH, OL, VL, WC, WE.-I, II. (I, II) Janowitz

1H. Religion and Law (4)

Lecture - 3 hours; discussion - 1 hour. Methods used in the study of religion, focusing on a particular theme in a number of religious traditions. Offered in alternate years. GE credit: AH, OL, WC, WE.-

10. Contemporary Ethical Issues (2)

Lecture - 2 hours. This course presents challenging, contemporary perspective. Rotating topics wil include Ethical Eating, Capital Punishment, Animal Rights. May be repeated for credit. GE credit: Wrt.—II. (IÍ.) Coudert, Janowitz

10A. Contemporary Ethical Issues (2)

Discussion - 1 hour; extensive writing. Prerequisite: concurrent enrollment in course 10 required. Restricted to students enrolled in course 10. GE topical breadth and diversity credit only with concurrent enrollment in course 10. Discussion of the readings assigned for course 10 and completion of a major research paper. May be repeated for credit. GE credit: ArtHum, Div, Wrt | AH, WE.-II. (II.) Coudert, Janowitz

11. Ethical Eating (4)

Lecture—3 hours; extensive writing. Prerequisite: concurrent enrollment in course 10 required. Restricted to students enrolled in course 10. Introduction to the complex and varied ethical, religious, and cultural meanings that food has had across the centuries and globe. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, OL, VL, WC, WE.—

12. The Emergence of Judaism, Christianity and Islam (4)

Lecture - 3 hours; discussion - 1 hour. History of religion in the ancient Near East and Mediterranean, from the Persian period through the rise of Islam. Emphasis on historical and social contexts of the formation of new traditions, in particular Judaism, Christianity, and Islam. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, OL, WC, WE.— I, II. (I, II.) Vidas

21. Hebrew Scriptures (4)

Lecture - 3 hours; term paper. Selected texts from the Hebrew Scriptures (Genesis-II Chronicles) and review of modern scholarship on the texts from a variety of perspectives (historical, literary, sociological, psychological). Course work is based on an English translation and no knowledge of Hebrew is required. GE credit: ArtHum, Div, Wrt | AH, WC, WE.-I. (I.)

23. Introduction to Judaism (4)

Lecture/discussion-3 hours; term paper. Introduction to the study of religion using examples from the rituals, art and holy texts of Judaism. No prior knowledge of either Judaism or the study of religion is necessary. GE credit: ArtHum, Div, Wrt | ACGH, AH, DD, WC, WE.—II. (II.)

30. Religions of South Asia (4)

Lecture—3 hours; term paper. Introduction to South Asian religions, including Hinduism, Buddhism, Islam, Jainism and Sikhism. Traces historical developments from Vedic texts and their ascetic reformulation by sages such as Yajnavalkya, Siddhartha Gautama, and Mahavira into our global present. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.—I, II. (I, II.) Elmore, Venkatesan

40. New Testament (4)

Lecture - 3 hours; discussion - 1 hour. New Testament literature from critical, historical, and theological perspectives. GE credit: ArtHum, Wrt | AH, WC, WE.-I. (I.) Chin

42. Religion and Science Fiction (4)

Lecture-3 hours; term paper. Representations of actual and fictional religious movements in science fiction and fantasy writing and film. Examination of: the characteristics of religion and religiosity in fictional religious movements; the relationship between religion, science, and technology in modern speculative fiction. Offered irregularly. GE credit: ArtHum, Div, Wrt. - I, II, III, IV. (I, II, III, IV.)

45. Christianity (4)

Lecture/discussion—3 hours; term paper. Major concepts and practices in the Christian tradition. Survey of the history of Christianity and Christian expansion from antiquity to modern times. Offered in alternate years. - (I, II.)

60. Introduction to Islam (4)

Lecture/discussion-3 hours; extensive writing. Introduction to topics central to the Islamic tradition Muhammad, the Qur'an, Islamic law, theology, philosophy, cosmology, worship, and mysticism. Race and gender in Islam, Islamic revival, and varying experiences of Islam in different historical and cultural settings. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH, WC, WE. - (I.)

65C. The Qur'an and Its Interpretation (4)

Lecture/discussion-3 hours; extensive writing. The Qur'an, its history, its various functions in the lives of Muslims, and its different interpretations. Quranic themes such as God and humankind, nature and revelation, eschatology and Satan. Islam and other religions; women, gender, and sexuality. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC, WE.-(III.) Tezcan

67. Modern Hinduism (4)

Lecture—3 hours; term paper. Historical survey of modern Hinduism from the early nineteenth century to the present. Topics include Rammohun Roy, Sir William Jones, and Mahatma Gandhi, nationalism, post-colonialism and diasporic religion. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH or SS, VL, WC, WE.-II. Elmore, Venkatesan

68. Hinduism (4)

Lecture—3 hours; writing. Hindu tradition from ancient to modern times. Multiplicity of religious forms within Hinduism with mention of Jainism, Buddhism, and Sikhism and their relation to the mainstream of Hindu religion. Offered in alternate years. GE credit: ArtHum, Ďiv, Wrt | AH, VL, WC, WE.-I.

69. Introduction to Hindu Mythology (4)

Lecture—3 hours; term paper. Survey of the major narrative traditions within Hinduism, including epic literature and local stories in oral, textual, visual and performative forms. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.—Ven-

70. Religion and Language (4)

Lecture/discussion-3 hours; term paper. Provides students with a basic toolkit for studying religious discourse in a variety of traditions. Concentrates on the sacred and profane, the wondrous and ordinary, the mystical and reasonable. - I, II, III. (I, II, III.) Mil

75. Introduction to Chinese Philosophy (4)

Lecture/discussion-4 hours. Introduction to Chinese philosophy from classical pre-modern times; emphasis on basic concepts and their impact on social conduct; the Age of Philosophers, the Han synthesis, the medieval Buddhist contribution. Not offered every

80. Religion, Gender, Sexuality (4)

Lecture/discussion-3 hours; term paper. Constructions of gender and sexuality within one or more religious traditions, pre-modern and modern. Emphasis on the interaction between religious, medical, and ethical definitions of the human body and sexual behavior. Offered in alternate years. GE credit: Div, Wrt | AH, WE.-II.

90. Human Rights (4)

Lecture/discussion—3 hours; term paper. Introduction to the interdisciplinary study of the origins, evolution, denial and protection of Human Rights. GE credit: ArtHum, Div | AH or SS, WC, WE.-I, II. (I, II.) Watenpaugh

98. Directed Group Study (1-5)

Prerequisite: consent of instructor; primarily for lower division students. (P/NP grading only.)

99. Special Study for Lower Division Undergraduates (1-5)

(P/NP grading only.)

Upper Division Courses

100. Study of Religion: Issues and Methods

Lecture—3 hours; term paper. Principal issues and methods of Religious Studies and associated fields. GE credit: AH or SS, WC, WE.-III. (III.)

102. Christian Origins (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 40. Development of Christianity from the end of the first century through the major controversies of the fifth century. Emphasis on the relationship between the new religious movement and the Roman Empire, and issues of early Christian identity and diversity. Offered irregularly. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—Chin

103. Medieval and Byzantine Christianity (4)

Lecture/discussion—3 hours; term paper. Prerequisite: courses 40 or 45. Christianity in Europe and the Near East from the year 600 to 1450. Focus on the development of Catholic and Orthodox traditions in ritual, art, and thought, with attention to interactions between regional groups, and Christian interaction with Islam. Offered irregularly. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—I, II. Chin

104. Christianity 1450-1700 (4)

Lecture/discussion-3 hours; term paper. History of Reformation conflicts over the authority of scripture, the nature of man and the universe, and the basis of morality with the goal of understanding how these conflicts laid the foundation for the modern world. Offered irregularly. GE credit: ArtHum, Div, Wrt. -

105. Christianity and Modernity, 1700-1920 (4)

Lecture—3 hours; term paper. Reaction of Christian critics and apologists to the profound cultural and scientific transformations resulting from the Scientific Revolution, the Enlightenment, and the advent of the modern critical study of religion. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, OL, VL, WC, WE.—(II.) Coudert

106. Christianity in the Contemporary World (4)

Lecture — 3 hours; term paper. Christianity in the 20th and 21st centuries. Relationship of Christianity to globalization, industrialization, mass media, and the contemporary secular state. Focus on Christianity in America and developing nations, and on the rela-tionship of established Christian institutions to new Christian movements. Offered irregularly. GE credit: ArtHum, Div, Wrt | ACGH, AH, WC, WE.—I, II, III. (I, II, III.) Chin, Coudert

110. Life, Meaning and Identity (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 1 or 2 or upper division standing. Study of religious lives, the quest for meaning and for personal identity; how religions frame the problems of

life; how cultural and personal crises affect youthful identity; the nature and structure of dreams, myths, and ideals. Offered in alternate years. GE credit: AH, WE.-II. Elmore

115. Mysticism (4)

Lecture-3 hours; term paper. Prerequisite: one lower division Religious Studies course (except 10, 98, or 99). Historical and descriptive analysis of selected key figures in mystical traditions and readings of representative mystical texts. Analytic term paper. Offered every three-four years. GÉ credit: ArtHum, Div, Wrt | AH, OL, VL, WC, WE.—(III.)

120. Religion, Magic and Science (4)

Lecture - 3 hours; extensive writing. Religion, magic, and science from the middle ages to the present. Contrast between modern scientific methodology and religious and magical thinking. (Same course as Science and Technology Studies 120.) Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, OL, VL, WC, WE.—(I.) Coudert

122. Studies in Biblical Texts (4)

Lecture—3 hours; term paper. Prerequisite: course 21. Study of a book from the Prophets or writings from critical, historical, and religious perspectives. May be repeated one time for credit in different subject area. GE credit: AH, WE.-III. (III.)

124. Topics in Judaism (4)

Lecture — 3 hours; term paper. Prerequisite: course 23. Examination of selected aspects of Jewish life, religion, or literature. Potential topics include: Jewish Perspectives on Jesus; The Golem: History and Legend; Sexuality and Gender in Late Antique Judaism and Early Christianity. May be repeated for credit when topic differs. -II.

125. Dead Sea Scrolls, Apocrypha, and Pseudepigrapha (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 21 or 40 or consent of instructor. Survey of the Dead Sea Scrolls, apocryphal and pseudepigraphical writings of Judaism and Christianity and their historical, social, and religious importance. GE credit: Wrt | AH, WC, WE.—II.

126. The Formation of the Rabbinic Tradition (4)

Lecture/discussion-3 hours; term paper. Prerequisite: courses 21, 23, 40 or 125. Survey of the classical rabbinic Jewish texts such as the Talmud and of the social and historical contexts of their production in Palestine and Babylonia. Offered in alternate years. GE credit: Wrt | WC.-II. (II.) Vidas

130. Topics in Religious Studies (4)

Lecture/discussion-3 hours; term paper. Prerequisite: one from course 1, 2, 3A, 3B, or 3C or consent of instructor. Thematic study of a phenomenon in more than one religious tradition or of the relationship between religion and another cultural phenomenon. Topics may include archeology and the Bible, women and religion, religion and violence. May be repeated for credit when topic differs. GE credit: WC, WE.-II, III.

131. Genocide (4)

Lecture/discussion-3 hours; term paper. Prerequisite: one course from courses 1, 2, 3A, 3B, 3C, 3E or permission of instructor. Comparative and critical study of the modern phenomenon of genocide from religious, ethical and historical perspectives. Offered in alternate years. GE credit: ArtHum, Div | AH or SS, VL, WC, WE.—(I.) Watenpaugh

132. Topics in Mediterranean Ancient

Lecture/discussion—3 hours; term paper. Prerequisite: course 21, 40 or consent of instructor. Thematic study of specific sociological, literary or theological theme across the religious traditions of the ancient Mediterranean/Near East: Greek and Roman religions, Judaism, Christianity, Zoroastrianism, Manichaeism, etc. Topics may include creation, sacrifice, priesthoods, prophecies, holy books, the afterlife. Offered in alternate years. May be repeated two times for credit when topic differs. GE credit: AH, WC, WE.—I. Vidas

134. Human Rights (4)

Lecture/discussion—3 hours; term paper. Introduction to the interdisciplinary study of the origins, evolution, denial and protection of Human Rights. Students who have completed course 90 are ineligible to receive credit for course 134. GE credit: ArtHum, Div | AH or SS, WC, WE.—III, IV. (III, IV.) Watenpaugh

135. The Bible and Film (4)

Lecture - 2 hours; term paper; film-viewing - 3 hours. Prerequisite: Humanities 10 recommended. Examination of the uses of the Judeo-Christian scriptures in film. Topics include dramatic depictions of biblical stories, the tension between science and religion, allegorical treatments of biblical themes, and the problems of religious conviction.—III.

140. Christian Theology (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 40; course 102 recommended. Historical and systematic introduction to Christian doctrine, with attention to divergent traditions and the problem of orthodoxy and heresy. GE credit: AH, WC, WE.-I. (I.)

141A. New Testament Literature: Synoptic Gospels (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 40. Life and thought of the early Church as reflected by the Synoptic Tradition—Matthew, Mark, Luke and Acts. Offered every third year to alternate with 141B, 141C. GE credit: ArtHum, Wrt | AH, WC, WE.

141B. New Testament Literature: John (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 40. Life and thought of the early Church as reflected by the Johannine Tradition—the Gospel and letters of John. Offered every third year to alternate with 141A, 141C. GE credit: ArtHum, Wrt | AH, WC, WE.—III.

141C. New Testament Literature: Paul (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 40. Life and thought of the early Church as reflected by the Pauline tradition—the letters of Paul. Offered every third year to alternate with 141A, 141B. GE credit: ArtHum, Wrt | AH, WC, WE.-

143. New Testament Apocrypha (4)

Lecture—3 hours; term paper. Prerequisite: course 40. Extra-canonical Christian writings and their reception, from antiquity to the present. Emphasis on the importance of New Testament figures both as literary characters and as authors within different Christian traditions. Offered irregularly. GE credit: ArtHum, Div, Wrt.-I, II, III. (I, II, III.) Ćhin

144. History of the Bible (4)

Lecture — 3 hours; term paper. Prerequisite: course 23 or 40. History of the formation of the Christian biblical canon, with emphasis on differences between Christian traditions; survey of translations and adaptations of the Bible in and outside of Western Christianity; and brief history of issues in biblical interpretation. Offered irregularly. GE credit: ArtHum, Div, Wrt.—I, II, III. (I, II, III.) Chin

145. Contemporary American Religion (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 40 and History 17B recommended. Examination of several major movements and phenomena in twentieth-century American religion. Offered in alternate years. GE credit: ACGH, AH, DD, WE.-II.

150. Religious Ethics (4)

Lecture/discussion-3 hours; term paper or discussion. Prerequisite: course 10 recommended. Study of the religious bases of ethics through concentration on the ethical tracts of one major tradition, or through a comparison of the attitudes of two or more traditions to a common ethical issue. GE credit: AH, WE.-Chin, Coudert

156. Religion and the Performing Arts in India (4)

Lecture-3 hours; term paper. Prerequisite: course 30, 68, or consent of the instructor. Survey of religion and performing arts in India. Emphasis on the influence of colonialism, nationalism, and regionalism on the history of Indian performing arts. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—II. Venkatesan

157. Hindu Women and Goddesses (4)

Lecture - 3 hours; term paper. Prerequisite: course 10 recommended. Hindu goddesses and the religious lives of Hindu women in India and the diaspora. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.—I, III. (I, III.) Venkatesan

160. Introduction to Islamic Thought (4)

Lecture - 3 hours; extensive writing. Prerequisite: course 60 recommended. The development of Islamic thought from the first centuries of Islam to the eighteenth century. Theology, philosophy, ethics, Sufism, historiography, political theory, fundamentalism, al-Farabi, al-Ghazzali, Ibn Rushd, Tusi, Ibn al-Arabi, Rumi, Molla Sadra, Ibn Khaldun, Ibn Abd al-Wahhab. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH, WC, WE.—II.

161. Modern Islam (4)

Lecture/discussion-3 hours; term paper. Prerequisite: course 60 or consent of instructor. The response of Islam to modernity: secularism, reformism, fundamentalism. Islam and imperialism, women, media and immigration. Islamic modernism, political Islam, Islam in Europe and America. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—II. (II.)

162. Introduction to Islamic Law (4)

Lecture — 3 hours; extensive writing. Prerequisite: course 60 recommended. The development of Islamic law in the formative centuries of Islam, ca. 600-1000, as well as its adaptation to changing economic, social, and political conditions in subsequent periods. Legal schools, legal theory, the Shari'a, reformist movements, human rights. Offered in alternate years. GE credit: ArtHum or SocSci, Div. Wrt | AH, WC, WE.—II. Tezcan

163. The Social Life of Islam (4)

Lecture-3 hours; term paper. Introduction to culture and social life in Muslim societies. Focus on the plurality of traditions in Muslim faith, reason, and everyday practice. Special attention to Muslim rituals, ethical values, verbal genres, family life, sexuality and veiling, and youth culture. Offered in alternate years.—II. Miller

165. Islam in Asia (4)

Lecture/discussion - 3 hours; extensive writing. Islam as a lived religion in the Indian sub-continent, Central Asia, China, and Southeast Asia. Emphasis is on primary sources studied comparatively and historically. GE credit: ArtHum, Div, Wrt.—III.

167. Iraq (4)

Seminar—3 hours; term paper. Origins, causes and ethical challenges of conditions in Iraq; larger historical, cultural and ethical dimensions of mass violence, war, liberation, neocolonialism, terrorism and resistance. - III. (III.) Watenpaugh

170. Buddhism (4)

Lecture-3 hours; term paper. Buddhism in its pan-Asian manifestations, from its beginning in India to its development in Sri Lanka and Southeast Asia, Central Asia, China and Japan; teachings and practices, socio-political and cultural impact. Offered in alternate years. GE credit: AH, VL, WC.-III. Elmore

172. Ch'an (Zen) Buddhism (4)

Lecture/discussion-3 hours; term paper. Doctrines and methods of the Ch'an Buddhism, both ancient and modern. Review of ritual techniques, including meditation.-II.

175A. Chinese Intellectual Traditions: Daoist Traditions (4)

Lecture/discussion-4 hours. Prerequisite: Chinese 11 or a course in Chinese history recommended. English-language survey of key Daoist texts and scholarship. Topics include Daoist concepts of the cosmos, the natural world, scripture, the body, and immortality; Daoist divinities; Daoism and the state. Offered in alternate years. (Same course as Chinese 100A) GE credit: ArtHum, Div, Wrt | AH, WC. (II.) Halperin

189. Senior Colloquium (4)

Seminar - 3 hours; term paper. Prerequisite: consent of instructor. Primarily for seniors in Religious Studies. Discussion in depth of a problem in religion which requires the methods of several disciplines and is important in the encounter between religions.—Iİ. (II.)

190. Seminar (4)

Seminar — 3 hours; term paper. Prerequisite: consent of instructor; required of all Religious Studies majors. Allows majors to integrate their disciplined study of the field. Emphasis on current scholarly debate about the methods for analyzing and comparing diverse religious traditions. - (I.)

194HA-194HB. Special Study for Honors Students (1-5)

Independent study. Open only to majors of senior standing who qualify for honors program. Guided research, under the direction of a faculty member approved by the Program Director, leading to a senior honors thesis on a religious studies topic. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

201. Methods and Issues in Religious Studies (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing. Focuses on controversies in the study of comparative religion. How is religion best defined? Are there methods unique to the study of religion? What does the study of religion contribute to the study of society in general? May be repeated two times for credit when topic differs. Offered in alternate years. (III.)

205. Religion and Media (4)

Lecture/discussion-3 hours; term paper. Many communities are finding global media technologies useful for religious practice. This course examines how religious revitalization is historically situated. A phenomenological approach will enable students to situate media and religion within the social and material world of practitioners. - IV. (IV.) Miller

210. Religion and Postcoloniality, or Savages, Civilization, and Spirituality (4)

Seminar - 3 hours; term paper. Prerequisite: graduate standing. This course examines relations between religion and colonialisms. Using specific historical situations it explores some of our thorniest theoretical problems. Students acquire a solid understanding of postcolonial theory and the historical tools to critically engage religion in the present. - III. (III.) Elmore

212. Religion and Violence (4)

Seminar—3 hours; term paper. Comparative and critical study of the ideological, cultural, and theological relationship between forms of violence and religion and religious practice. Offered in alternate years. - (II.) Watenpaugh

215. Topics in the History of Christianity (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing. Selected topics in the history of Christianity. Intended for graduate students seeking to do advanced work in the study of Christianity. May cover issues in Christian thought from antiquity, the middle ages, the early modern or modern period. May be repeated for credit when topic differs. Offered irregularly. — I, II, III. (I, II, III.) Chin, Coudert

299. Directed Research (1-12)

(S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Russian

(College of Letters and Science) Elisabeth Krimmer, Ph.D., Program Director

Program Office. 209 Sproul Hall (530) 752-4999; http://russian.ucdavis.edu

Committee in Charge

Carlee Arnett, Ph.D. (German and Russian) Jenny Kaminer, Ph.D. (German and Russian) Elisabeth Krimmer, Ph.D. (German and Russian) Olga Stuchebrukhov, Ph.D. (German and Russian)

James Gallant, Ph.D., Lecturer Emeritus Daniel Rancour-Laferriere, Ph.D., Professor Emeritus

Emeriti Faculty

James Gallant, Ph.D., Lecturer Emeritus Daniel Rancour-Laferriere, Ph.D., Professor Emeritus Valerie A. Tumins, Ph.D., Professor Emerita

The Major Program

The Russian major introduces students to a culture rich in art, music, theater, film, language, and litera-ture. The major offers an opportunity to learn skills needed to enter the fields of foreign affairs, world politics, and international trade, or to begin graduate work in literature, history, cultural studies and international relations

The Program. The major program instructs students in speaking, understanding, reading, and writing the Russian language. The program also acquaints students with the intellectual and cultural contributions of the Russian world through the study of its literature, traditions, and institutions

Internships and Career Alternatives. Russian majors may participate in internships where they can serve as translators and interpreters for schools and business firms throughout Northern California. Upon graduation, many Russian majors enter the business world or enter graduate programs in Slavic studies and international relations. The program encourages students to supplement their Russian studies with courses in related fields such as international relations, political science, computer science, cultural studies, or economics in order to maximize their career possibilities.

A.B. Major Requirements:

71.D. Major Requirements.
UNITS
Preparatory Subject Matter 0-27
Russian 1 through 6; or the
equivalent 0-27
Depth Subject Matter 36
Russian 101A, 101B, 101C12
Russian 102 or 103 or 104 or 105 4
20 Additional upper division units chosen in
consultation with adviser from the following
selection of Literature and Culture courses
taught in Russian and English
Russian 121, 123, 126, 127, 128, 129, 130, 139, 140, 141, 142, 150
The elective upper-division courses in
English can be satisfied in part by one or
more courses in History, Political Science,
Comparative Literature and other
departments after consultation with, and
prior approval of, the major advisor.
The total of 36 upper-division units may
include units earned in the Education Abroad
Program.
Total Units for the Major36-63
Major Adviser. Olga Stuchebrukhov
Minor Program Requirements:
UNITS

T 63

N

Russian	•••••	2
Russian 101A, 101B, 101C	12	
Other upper division Russian courses	8	

Honors and Honors Program. The honors program comprises at least one quarter of study under course 194H, which will include a research paper. For details consult the major advisor.

Study Abroad. Students who have completed one or two years of Russian language study can participate in the Education Abroad Program (EAP) in Moscow. Many of our students also participate in summer, semester, and year-long programs spon-sored by CIEE and ACTR in St. Petersburg and Mos-

Prerequisite Credit. Credit normally will not be given for a course if that course is the prerequisite for a course already completed.

Courses in Russian (RUS)

Lower Division Courses

Course Placement. Students who have learned Russian at home must consult the department for placement instructions. Students with two years of Russian in high school normally continue in Russian 2; those with three years, Russian 3; those with four years, Russian 4

1. Elementary Russian (5)

Discussion-5 hours; laboratory-1 hour. Introduction to Russian grammar and development of all language skills in a cultural context with special emphasis on communication. (Students who have successfully completed Russian 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student's P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed.) GE credit: AH, WC.-I. (I.)

1A. Accelerated Intensive Elementary Russian (15)

Lecture/discussion-15 hours. Special 12 week accelerated, intensive summer session course that combines the work of courses 1, 2, and 3. Introduction to Russian grammar and development of all language skills in a cultural context with emphasis on communication. Not open to students who have completed course 1, 2, or 3-IV. (IV.) Arnett

2. Elementary Russian (5)

Discussion-5 hours; laboratory-1 hour. Prerequisite: course 1. Continuation of grammar and lan guage skills developed in course 1. GE credit: AH, WC.-II. (II.)

3. Elementary Russian (5)

Discussion-5 hours; laboratory-1 hour. Prerequisite: course 2. Continuation of grammar and lan guage skills developed in course 2. GE credit: AH, WC.—III. (III.)

4. Intermediate Russian (4)

Discussion—4 hours; laboratory—1 hour. Prerequisite: course 3. Grammar review and conversational practice. GE credit: AH, WC.—I. (I.)

5. Intermediate Russian (4)

Discussion—4 hours; laboratory—1 hour. Prerequisite: course 4. Grammar review. Introduction to literature. Conversational practice. GE credit: AH, WC.-II. (II.)

6. Intermediate Russian (4)

Discussion-4 hours; laboratory-1 hour. Prerequisite: course 5. Grammar review. Intermediate conversation and continued reading of literature. GE credit: AH, WC.—III. (III.)

45. Russian Fantasy and Science Fiction (4)

Lecture/discussion-3 hours; extensive writing. Genres of fantasy and science fiction in Russian literature from pre-revolutionary to post-Soviet times. Topics include the role of science and the supernatural in literature, history and types of science fiction. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—III. (III.) Stuchebrukhov

98. Directed Group Study (1-5)

Discussion - 1-5 hours. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) (P/NP grading only.)

Upper Division Courses 101A. Advanced Russian (4)

Lecture/discussion—3 hours; extensive writing. Prerequisite: course 6 or consent of instructor. Topics in Russian. Grammar for the advanced student. Reading and discussion of journalistic texts and classic and contemporary literature. Conversation exercises utilizing literary and colloquial variants of current Russian speech. GE credit: AH, WC.—I. (I.)

101B. Advanced Russian (4)

Lecture/discussion—3 hours; extensive writing. Prerequisite: course 101A or consent of instructor. Continuation of course 101A. Topics in Russian grammar for the advanced student. Reading and discussion of journalistic texts and classic and contemporary literature. Conversational exercises utilizing literary and colloquial variants of current Russian speech. GE credit: AH, WC.—II. (II.)

101C. Advanced Russian (4)

Lecture/discussion—3 hours; extensive writing. Prerequisite: course 101B. Continuation of course 101B. Topics in Russian grammar for the advanced student. Reading and discussion of journalistic texts and classic and contemporary literature. Conversational exercises utilizing literary and colloquial variants of current Russian speech. GE credit: AH, WC.—III. (III.)

102. Russian Composition (4)

Lecture/discussion—3 hours; tutorial—1 hour. Prerequisite: course 6 or consent of instructor. Practice in writing Russian. One composition on a different topic each week. Topics include history, geography, politics, and literature of Russia; comparison of Russian and American lifestyles; current events. Conducted in Russian. Offered in alternate years. GE credit: ArtHum | AH, WC, WE.—II.

103. Literary Translation (4)

Discussion—3 hours. Prerequisite: course 101C. Translation of Russian literary texts into stylistically equivalent idiomatic English. Offered in alternate years.—(III.)

105. Advanced Russian Conversation (4)

Recitation—3 hours; practice—1 hour. Prerequisite: course 6. Intensive conversational practice and discussion based on current events and contemporary texts. Offered in alternate years. GE credit: AH, OI.—II

122. 19th-Century Russian Literature (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 101C when the course offered in Russian; no prerequisite when offered in English. Students who have taken course 121 and course 127 will not be allowed to take Russian 122. Study of Russian literature (prose fiction, drama, poetry) from the period between 1800 and the end of the 19th century. May include authors like Pushkin, Lermontov, Gogol, Turgenev, Dostoevsky, Tolstoy, Chekov. Offered alternately in English or Russian. GE credit: ArtHum, Wrt | AH, WC, WE.—I, II, III. [I, II, III.] Stuchebrukhov

123. Twentieth-Century Russian Prose (4)

Lecture—3 hours; term paper. Prerequisite: course 101C or consent of instructor. Examination of various trends including Symbolism, Neorealism, and Socialist Realism in development of prose. Readings from such writers as Bely, Gorky, Sholokhov, Pasternak, Solzhenitsyn and others. Conducted in Russian. Offered in alternate years. GE credit: ArtHum | AH, WC, WE.—I.

124. Twentieth-Century Russian Literature (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 101C when offered in Russian; no prerequisite when offered in English. Study of Russian literature (prose, drama, poetry) from the period between 1900 and the end of the 20th century. May include authors like Y. Olesha, M. Bulgakov, D. Kharms, and L. Petrushevskaia. Offered alternately in English or Russian. Not open for credit to students who have taken courses 123 or 128. GE credit: AH, WC, WE.—I, II, III. (I, II, III.) Kaminer

126. The Russian Theater (4)

Lecture—3 hours; term paper. Prerequisite: course 101C or consent of instructor. The main works of Russian dramatists from Fonvizin to the present, including Gogol, Turgenev, Tolstoy, Ostrovsky, Chekhov, Blok, Mayakovsky, Kharms. Conducted in Russian. Offered in alternate years. GE credit: ArtHum | AH, WC, WE.

128. Twentieth-Century Russian Poetry (4)

Discussion—3 hours; term paper. Prerequisite: course 101C or consent of instructor. Introduction to principles of Russian versification followed by historical and poetic analysis of the following figures: Brjusov, Blok, Akhmatova, Mandelshtam, Esenin, Mayakovsky, Khlebnikov, Pasternak, Evtushenko, Voznesensky, and Brodsky. Conducted in Russian. Offered in alternate years. GE credit: ArtHum | AH, OL, WC, WE.—III.

129. Russian Film (4)

Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: completion of Subject A requirement. History of Russian film; film and social revolution, the cult of Stalin, dissident visions; film and the collapse of the Soviet empire; gender and the nation in Russian film. Course taught in English; films are in Russian with English subtitles. Offered in alternate years. (Same course as Film Studies 129.) GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.—(II.)

130. Contemporary Russian Culture (4)

Lecture—3 hours; term paper. Current trends in Russian culture and the relationship between artists and the government. Topics include recent changes in the cultural scene, postmodernist trends in literature, visual art, film, and theater. Offered in alternate years. GE credit: ArtHum | AH, OL, WC, WE.— (III.)

133. Post-Soviet Literature (4)

Lecture/discussion—3 hours; term paper. Major authors and trends in Russian literature in post-1991 period. Discussion of impact of economic, social, and cultural turmoil of post-Soviet period on literary marketplace. Analysis of development of literary postmodernism in Russia. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC, WE.—I. (I.) Kaminer

139. Pushkin (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 101C or consent of instructor. The course covers three major periods of Pushkin's poetical works: his early Lyceum verse; his poetry of the early 1820s; and the mature period. The course also includes Pushkin's prose fiction, drama, and journalism. GE credit: ArtHum, Div | AH, WC, WE.—I. (I.)

140. Dostoevsky (in English) (4)

Lecture—3 hours. Reading and analysis of Dostoevsky's principal works such as Crime and Punishment, The Idiot, The Brothers Karamazov, and The Diary. Study of social and political views as reflected in Dostoevsky's works. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—(II.)

141. Tolstoy (in English) (4)

Lecture—3 hours. Study of Leo Tolstoy's literary evolution and moral quest. Readings include his Confession, a major novel such as War and Peace or Anna Karenina, and representative shorter fiction. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—1.

142. Women's Autobiography (in English) (4)

Lecture—2 hours; discussion—1 hour; term paper. Prerequisite: any introductory course in literature. An examination of Russian women's autobiography from the 18th through the 20th centuries, emphasizing the way in which the genre of autobiography serves as a means of the writer's creation of herself, as opposed to her definition by others. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC, WE.

143. Chekhov (in English) (4)

Lecture/discussion—3 hours; extensive writing. Examination of Chekhov's short stories and major plays, such as The Seagull, Uncle Vanya, The Three Sisters, The Cherry Orchard, and Ivanov, in the broader cultural context of European and Russian fin de siecle. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC, WE.

150. Russian Culture (4)

Discussion — 3 hours; term paper. Knowledge of Russian not required. Study of Russian culture in nineteenth and twentieth centuries. Brief introduction of the beginnings up to nineteenth century. Russian art, music, philosophy, church, traditions, and daily life. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—II. (II.)

192. Research Essay (2)

Prerequisite: a Russian literature course (may be taken concurrently). A research essay, based on primary and secondary sources, dealing in depth with a topic arising from or related to the prerequisite literature course. May be repeated for credit. GE credit: AH, WC, WE.

194H. Special Study for Honors Students (4)

Independent study—4 hours. Prerequisite: open only to majors of senior standing who qualify for honors program. Guided research, under the direction of a faculty member, leading to a senior honors thesis on a topic in Russian studies.

195H. Honors Thesis (4)

Independent study—4 hours. Prerequisite: course 194H. Writing an honors thesis, under the direction of a faculty member, on a topic in Russian studies.

198. Directed Group Study (1-5)

(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Science and Society

(College of Agricultural and Environmental Sciences)
David M. Rizzo, Ph.D., Program Director

Program Office. 156 Hutchison Hall (530) 754-9506

Faculty

Arnold Bloom, Ph.D., Professor (Plant Sciences)
Richard M. Bostock, Ph.D., Professor
(Plant Pathology)
James Carey, Ph.D., Professor (Entomology)

James Carey, Ph.D., Professor (Entomology Gita Coaker, Ph.D., Assistant Professor

(Plant Pathology)
Edward Caswell-Chen, Ph.D., Professor
(Nematology)

(Nematology)
Douglas R. Cook, Ph.D., Professor (Plant Pathology)
Randy Dahlgren, Ph.D., Professor (Land, Air and
Water Resources) Academic Senate Distinguished
Teaching Award

R. Michael Davis, Ph.D., Professor and Specialist in Cooperative Extension (*Plant Pathology*)

Lynn Epstein, Ph.D., Professor (Plant Pathology) Albert Fischer, Ph.D., Professor (Plant Sciences) Graham Fogg, Ph.D., Professor

(Land, Air and Water Resources)

David Gilchrist Ph.D. Professor (Plan

David Gilchrist, Ph.D., Professor (Plant Pathology)
Thomas R. Gordon, Ph.D., Professor
(Plant Pathology)

John Harada, Ph.D., Professor (Plant Biology) Academic Senate Distinguished Teaching Award

Peter Hernes, Ph.D., Associate Professor (Land, Air and Water Resources)

William R. Horwath, Ph.D., Professor (Land, Air and Water Resources)

Benjamin Z. Houlton, Ph.D., Assistant Professor (Land, Air and Water Resources

Lovell Jarvis, Ph.D., Professor (Agricultural & Resouce Ecomnomics

Marie Jasieniuk, Ph.D., Assistant Professor (Plant Sciences)

Annie King, Ph.D., Professor (Animal Science) Johan Leveau, Ph.D., Assistant Professor (Plant Pathology) James D. Murray, Ph.D., Professor (Animal Science) Terrence Nathan, Ph.D., Professor (Land, Air and Water Resources) Sanjai J. Parikh, Ph.D., Assistant Professor (Land, Air and Water Resources) Gregory Pasternack, Ph.D., Professor (Land, Air and Water Resources) James H. Richards, Ph.D., Professor (Land, Air and Water Resources) David Rizzo, Ph.D., Professor (Plant Pathology) Pamela C. Ronald, Ph.D., Professor (Plant Pathology) Wendy Silk, Ph.D., Professor (Land, Air and Water Resources)

Li Tian, Ph.D., Assistant Professor (Plant Sciences) Barry W. Wilson, Ph.D., Professor (Animal Science, Environmental Toxicology)

The Program. Science and Society is an interdepartmental teaching program administered by the College of Agricultural and Environmental Sciences that offers students throughout the campus the opportunity to discover the connections that link the social, biological, and physical sciences with societal issues and cultural discourses. Course work examines discovery processes in relation to societal values, public policy and ethics, including issues associated with cultural diversity. Whenever possible, opportunities outside the classroom are included as part of the learning experience.

The Science and Society teaching program serves students of all majors and interests. It can allow lower division students who have not yet declared a major a meaningful context for exploring diverse subject matters. The minor for the program includes, in addition to Science and Society courses, upper division courses from both the College of Agricultural and Environmental Sciences and the College of Letters and Science in the areas of history and philosophy of science, policy and decision making, communication of science, and culture, ethics and applications.

Minor Program Requirements:

Science and Society 22-27 Science and Society 1

Science and Society 2, 5, 15, 20, 30 ... 2-4 One course from each of the four following

History and Philosophy of Science: Community and Regional Development 118, 162, History 185A, 185B, History and Philosophy of Science 150, Nature and Culture 100, Philosophy 107, 108, Policy and Decision Making: Agricultural and Resource Economics 120, 147, 150, Consumer Science 100, Environmental Science and Policy 160, 165, Political Science 175, Sociology 155, or Communication of Science: Agricultural Education 172, Agricultural Management and Rangeland Resources 122, Anthropology 120, Communication 115, 130, 135, 138, 140, Community and Regional Development 174, Linguistics 163, Political Science 165 3-4 Culture, Ethics and Applications: Agricultural Management and Rangeland Resources 101, Community and Regional Development 142, Environmental Science and Policy 126, 164, Fiber and Polymer Science 110, International Agricultural Development 104, Plant Biology 151, Plant Pathology 140, or Sociology 144......34 Science and Society 1203

Minor Adviser. D. M. Rizzo

Related Courses. See Agricultural and Resource Economics 120, 147, Agricultural Management and Rangeland Resources 1, 101, 122, Communication 115, 140, Community and Regional Development 118, 142, 162, 174, Avian Sciences 13, Environmental Science and Policy 126, 160, 164, 165,

Fiber and Polymer Science 110, History 185A, 185B, History and Philosophy of Science 150, Nature and Culture 100, Plant Biology 12, Plant Pathology 140, Political Science 175, Wildlife, Fish, and Conservation Biology 10.

Courses in Science and Society (SAS)

Lower Division Courses

1. Critical Inquiry into Contemporary Issues (4)

Lecture/discussion-3 hours; discussion-1 hour. Contemporary issues, including global population trends, economic and environmental changes, cultural diversity and biodiversity, nutrition and food safety, fiber and textiles, changing consumer cultures. Inquiry processes emphasize ethics, multiple disciplines, and multiple perspectives. GE credit: Sci-Eng or SocSci, Div, Wrt | SE or SS, WE.—I. (I.) Cas-

2. Feeding the Planet: Influences on the Global Food Supply (3)

Lecture/discussion - 3 hours. Scientific principles and dynamic interactions involved in food production, food processing, nutrition, shelf life and marketing from differing viewpoints. Physical, biological and social science issues influencing the availability and safety of the food supply worldwide. GE credit: SciEng or SocSci, Wrt | SE, SL, SS.—II. (II.) Bostock, Davis

3. Science, Technology and Society (4)

Lecture — 4 hours. Impact of developments in science and technology on the individual in society and how economics, politics, culture and values affect technological development. Not open for credit to students who have completed former course Applied Behavioral Sciences 18. GE credit: SciEng or SocSci, Wrt | SE, SS. - (III.)

4. Water in Popular Culture (3)

Film viewing -2 hours; discussion -1 hour; lecture-1 hour. Importance of water in many aspects of society as revealed through a survey of its depictions in film. GE credit: SciEng or SocŚci, Wrt | SE, SL, SS.-I. (I.) Pasternack

5. Pathways to Discovery: Science and Society (3)

Lecture/discussion—3 hours. Highlights a current issue and/or controversy found in contemporary society and looks at how this problem impacts and is affected by the physical, social and biological sciences. Course varies with topic offered. May be repeated two times for credit. Course not offered every year. GE credit: SciEng or SocSci, Wrt | SE, SS.

7. Terrorism and War (4)

Lecture—3 hours; discussion—1 hour; term paper. Exploration of terrorism and war from science and social sciences perspectives. Terrorist cells and groups; biological, chemical, nuclear, and environmental terrorism; intelligence gathering and espio nage; military strategy; genocide; epochal wars; clash of civilizations; nation building; and future global scenarios. GE credit: SciEng or SocSci, Div, Wrt | SE or SS, WE.-III. (III.) Carey

8. Water Quality at Risk (3)

Lecture - 2 hours; discussion - 1 hour. Natural and human threats to water quality. Balance of science and policy in all aspects of attaining, maintaining, and managing water quality, water contamination.

Decoding popular media coverage of water quality and water contamination. (Same course as Environmental Science and Management 8.) Not open to students who have successfully completed Environ-mental and Resource Sciences 8. (Formerly Environmental and Resource Sciences 8.) GE credit: SciEng or SocSci, Wrt | SE, SL, SS, WE.-II. (II.) Hernes

9. Crisis in the Environment (3)

Lecture—3 hours. Explores contemporary environmental issues by examining the causes, effects and solutions to a wide range of environmental problems facing the global ecosystem. Integrated discussion of political, societal and economic impact linkages with environmental problems. GE credit: SciEng or Soc-Sci, Wrt | SE or SS, WE.—III. (III.) Dahlgren, Houlton

10. Water, Power, Society (3)

Lecture - 2 hours; discussion - 1 hour. Water resources issues. How water has been used to gain and wield socio-political power. Water resources development in California as related to current and future sustainability of water quantity and quality. Roles of science and policy in solving water prob-lems. (Same course as Hydrologic Science 10.) GE credit: SciEng or SocSci, Wrt | SE, SS.—III. (III.) Fogg

11. California Geography (3)

Lecture — 2 hours; discussion — 1 hour; term paper. Introduction to cultural/societal patterns of California and their relationship to natural resources, biomes, geomorphology, and physiography. Focus on diversity of California's environments and their impacts on and alterations by human activities. Environmental issues in the State. GE credit: SciEng, Soc-Sci, Wrt | SE or SS, WE.-I. (I.) Richards

12. Plants and Society (4)

Lecture - 3 hours; extensive writing - 3 hours. Prerequisite: high school biology. Dependence of human societies on plant and plant products. Plants as resources for food, fiber, health, enjoyment and environmental services. Sustainable uses of plants for food production, raw materials, bioenergy, and environmental conservation. Global population growth and future food supplies. Not open for credit to students who have complete Plant Biology 12. (Former course Plant Biology 12.) (Same course as Plant Sciences 12.) GE credit: SciEng or SocSci, Div, Wrt | SE, SS.-I, İI, III. (I, II, III.) Fischer, Jasieniuk, Nevins, Tian

13. Disease and Society (3)

Lecture—3 hours. Limited enrollment. Introduction to the concept of disease, the societal and personal impacts of past, present and future diseases, and the science behind disease discoveries, causes, evolution, diagnosis, treatment, and prevention. GE credit: SciEng or SocSci | SE or SS, SL.-II. (II.)

15. AIDS and Society (4)

Lecture - 3 hours; discussion - 1 hour. Biology of HIV transmission and AIDS and how a biological agent acts on and influences the structure of contemporary society. Includes the psychology of risk and stigma, gender issues, changes in social relationships and public policy, global implications. GE credit: SciEng or SocSci, Div, Wrt | SE, SS.—III. (III.) Radke

18. GIS and Society (3)

Lecture—2 hours; Laboratory—3 hours; term paper or discussion—0.3 hours. Geographic Information Systems (GIS) as a spatial technology and a tool for change in society. Evaluate physical, biological and social impact of GIS in the context of case studies such as land, water and community planning. GE credit: SciEng or SocSci, Wrt | QL, SE, SL, SS, VL.— III. (III.) Wallender

20. Genetics and Society (4)

Lecture — 3 hours; discussion — 1 hour. Not open for credit to students who have completed course 140. Basic concepts of genetics, modern methods of biotechnology, the process of scientific discovery and the public perception of the process; present and future impact of genetics on society. GE credit: Sci-Eng or SocSci, Wrt | OL, SE, SL, SS, WE.—I, II. (I, II.) Coaker, Cook, Epstein, Ronald

25. Global Climate Change: Convergence of Biological, Geophysical, & Social Sciences

Lecture - 2 hours; discussion - 1 hour. Causes of global climate change and the biological, geophysical, and social consequences of such change. Methods used by different scientists for predicting future events. Complexity of global affairs. Decision making under uncertainty. GE credit: SciEng or SocSci, Div, Wrt | OL, QL, SE, SL, SS, VL, WC, WE.—II. (II.)

25V. Global Climate Change: Convergence of Biological, Geophysical, & Social Sciences (3)

Web virtual lecture; web electronic discussion—2 hours; autotutorial—5 hours; extensive writing—2 hours. Causes of global climate change and the biological, geophysical, and social consequences of such change. Methods used by different scientists for predicting future events. Complexity of global affairs. Decision making under uncertainty. Students cannot take both course 025 and 025V for credit. GE credit: SE or SS, DD, OL, QL, SL, VL, WC, WE.-II. (II.) Bloom

30. Mushrooms, Molds, and Society (3)

Lecture/discussion - 3 hours. Fungi as organisms with which humans interact daily, societal issues arising from these interactions. Fungi in medicine, religion, agriculture, and industry, as well as cultural perceptions of fungi. GE credit: SciEng or SocSci, Wrt | SE, SS. -I, II. (I, II.) Gilchrist, Gordon, Rizzo

40. Photography: Bridging Art and Science

Lecture/discussion-2 hours; studio-3 hours. Photography is used to explore the common ground between art and science. Photographic processes, creativity and aesthetics, chaos and order, principles of space, time and light. Photographic interpretation and documentation of the natural world. GE credit: ArtHum or SciEng or SocSci, Div, Wrt | AH or SE, SL, VL, WE.—III. (III.) Nathan

42. Earth, Water, Science, Song (3)

Lecture - 2 hours; studio - 3 hours. Fusion of water and soil science with performing arts. Creative communication of scientific concepts and facts through exercises in song writing and poetry. Design, discuss and conduct public performances related to the functioning of the natural world. GE credit: ArtHum or SciEng | AH, OL, SE.-II. (II.) Silk

70A. Genetic Engineering in Medicine, Agriculture, and Law (5)

Lecture - 5 hours. Historical and scientific study of the impact of genetic engineering in medicine, agriculture, and law, including examination of social, ethical, and legal issues raised. Offered in a distance-learning format. Not open to students who have taken Biological Sciences 1A, Biological Sciences 2A or equivalent, or course 20. Concurrent enrollment in a two unit seminar course, Plant Biology 98, is required. GE credit: SciEng or SocSci | SE, SL, SS.—II. (II.) Harada

90A. Issues in Environmental and Resource Sciences (2)

Seminar-2 hours; two Saturday field trips. Prerequisite: limited to lower division students. Discussion of historical and current issues in environmental and resource sciences. Lectures, reading and field trips will provide background for selected topics. — I, Iİ. (I,

90B. Observing and Writing in Biology (2)

Seminar — 1 hour; laboratory — 1 hour; term paper. Students will observe the interactions between microscopic organisms, conduct simple laboratory experiments, describe and analyze observations and discuss scientific observations and writing.

90C. Herbal Medicine: Relevance for the 21st Century (2)

Seminar - 2 hours. Medicinal usage of plants from biological, historical, and cultural perspectives. Broad contexts of holistic and scientific paradigms for understanding herbal medicine. Saturday field trip to teach herb identification. - II. (II.)

90D. Saving Endangered Plant Species: Problems and Prospects (2)

Seminar-2 hours. Endangered plant species illustrate the value of conservation biology. Topics include societal issues and plant germplasm conservation, comparisons to animal conservation issues, and the economics of and justification for preserving endangered plants.—I. (I.) Parfitt

90E. Biotechnology—a New Era, a New Struggle (2)

Seminar-2 hours. Animal biotechnology and its applications. Discussion topics include potential societal impacts of various technologies, factors shaping public opinion, and ethical and moral questions arising from new biotechnology applications.—I. (I.)

90F. Food Distribution in a Hungry World (2)

Seminar — 2 hours. The biological, technological, environmental, and socioeconomic factors related to food distribution systems at local, regional, national, and international levels. The potential for increasing world food supply by reducing losses between harvest and consumption. —I. (I.)

90G. Science, Society and the Environment

Seminar-2 hours. Contemporary environmental issues, scientific approaches to addressing these issues, and accompanying societal and ethical considerations. —I. (I.) Wilson

90X. Lower Division Seminar (1-4)

Seminar — 1-4 hours. Prerequisite: lower division standing and consent of instructor. Examination of a special topic in Science and Society through shared readings, discussions, written assignments, or special activities such as fieldwork, laboratory work, etc. May be repeated for credit. Limited enrollment. - Í, II, III. (I, II, III.)

91A. Explorations in Science and Society: **Cultures and Identities (2)**

Seminar - 1 hour; extensive writing or discussion - 1 hour. Prerequisite: participation in the summer Special Transitional Enrichment Program (STEP) or consent of instructor; course 1 concurrently. Exploration of linkages among identity and culture, multi-disciplinary inquiry, and agricultural and environmental science issues. - I. (I.)

91B. Explorations in Science and Society: Leadership and Collaboration (2)

Seminar—1 hour; extensive writing or discussion—1 hour. Prerequisite: course 91A or consent of instructor. Extends understanding of culture and identity to issues of leadership, collaboration, and social action in science and society. Includes a mandatory two and half day retreat.—II. (II.)

91C. Explorations in Science and Society: Engagement (2)

Seminar-1 hour; internship-3 hours. Prerequisite: course 91B or consent of instructor. Explorations of the concept of engagement in science and society from philosophical and practical perspectives. Exploration of the concept of engagement based on lea tures, self reflection, discussions and three hours of K-12 school internships per week. — III. (III.)

92. Internship in Science and Society (1-12)

Internship—3-36 hours. Prerequisite: lower division standing and consent of instructor. Supervised internship on and off campus, in the community, or in institutional settings. (P/NP grading only.)

97T. Tutoring in Science and Society (2-3)

Discussion/lecture-6-9 hours. Prerequisite: lower division standing; completion of course being tutored; consent of instructor. Tutoring in undergraduate Science and Society courses. Assisting with leading discussion groups under supervision of instructor(s) and teaching assistants. Acting as liaison between the students and course instructor(s) to foster effective communication and interaction. May not be repeated. (P/NP grading only.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)

Discussion - 3-15 hours. Prerequisite: lower division standing and consent of instructor. (P/NP grading only.)

Upper Division Courses 120. Science and Contemporary Societal Issues (3)

Lecture/discussion-3 hours. Prerequisite: upper division standing. Study of a contemporary societal issue/problem emphasizing critical thinking with information drawn from several disciplines. Multiple instructors illustrate the necessity of an interdisciplinary and cooperative approach in solving important issues. Topic will vary. May be repeated one time for credit. Course not offered every year. GE credit: Sci-Eng or SocSci, Wrt | SE, SS.—III. (III.)

130. Contemporary Leadership (4)

Lecture—3 hours; seminar—1 hour. Prerequisite: consent of instructor. Leadership, including issues, skills, and practices as they relate to individuals, organizations, diverse social settings and communities. Written and verbal communications, personality styles for collaborative work, and ethics. Limited enrollment. GE credit: OL.-II, III. (II, III.) King

135S. Biodiversity and Society in South

Lecture/discussion-3 hours; term paper or discussion-2 hours; fieldwork-2 hours. Prerequisite: acceptance into the Quarter Abroad Program "Biodiversity & Conservation in South Africa" and attendance in South Africa. Biodiversity in social context of South Africa; race, politics and conservation; use of indiaenous plants and animals; weeds; water issues; ecotourism. Weekend and other field trips Not offered every year. GE credit: SciEng or SocSci, Div, Wrt | SE, SS.—II. Cranston, Gullan

140. Genetics and Social Issues (4)

Lecture/discussion-3 hours; discussion-1 hour. Prerequisite: Biological Sciences 1A, 1B, 1C. Social issues arising from the development and use of modern methods of biotechnology. Presentation, evaluation, and critical discussions of the present and future impact of genetics on society. Not open for credit to students who have completed course 20. GE credit: SocSci, Wrt.-II. (II.) Epstein

190X. Science & Society Seminar (1-4)

Seminar — 1-4 hours. Prerequisite: upper division standing and consent of instructor. In-depth examination at an upper division level of a special topic in Science and Society. Emphasis upon student participation in learning. Emphasis upon student participation in learning. May be repeated for credit. Limited enrollment. (P/NP grading only.)—I, II, III. (I, II, III.)

192. Internship in Science and Society (1-12)

Internship – 3-36 hours. Prerequisite: upper division standing and consent of instructor. Supervised internship on or off campus, in the community, or in institutional settings. (P/NP grading only.)

197T. Tutoring in Science and Society (1-5)

Tutoring — 3-15 hours. Prerequisite: upper division standing; completion of course being tutored or the equivalent. Tutoring of students in Science and Society courses. Assistance with discussion groups and laboratory sections under supervision of instructor. May be repeated for credit if tutoring another Science and Society course. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study in Science and Society

Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

Graduate Courses

298. Group Study (1-5)

Prerequisite: consent of instructor. May be repeated for credit when topic differs. (S/U grading only.)

299. Graduate Research (1-12)

Prerequisite: graduate student and consent of instructor. May be repeated for credit. (S/U grading only.)

Professional Course 390. Teaching Methods in Science and Society (1)

Discussion - 1 hour. Prerequisite: graduate level and consent of instructor. Practical experience in methods and problems related to teaching Science and Society courses. Discussion of critical pedagogies specific to teaching of science-societal issues, preparing for and conducting discussion sessions, analyses of texts and supporting material, formulation of assignments, exams. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Science and **Technology Studies**

(College of Letters and Science) Joseph Dumit, Ph.D., Program Director

Program Office. 1240 Social Sciences and Humanities Building (530) 752-0703; http://sts.ucdavis.edu

Committee in Charge

Thomas Beamish, Ph.D. (Sociology) Mario Biagioli, Ph.D. (Science and Technology Studies, School of Law)

Patrick Carroll, Ph.D. (Sociology) Timothy Choy, Ph.D. (Anthropology, Science and

Technology Studies)

Marisol de la Cadena, Ph.D. (Anthropology) Joseph Dumit, Ph.D. (Anthropology, Science and Technology Studies)

James Griesemer, Ph.D. (Philosophy) Caren Kaplan, Ph.D. (American Studies)
Colin Milburn, Ph.D. (English)
Roberta Millstein, Ph.D. (Philosophy)
Daniel Stolzenberg, Ph.D. (History) Madhavi Sunder, J.D. (School of Law)

The Major Program

The Science and Technology Studies (STS) major is designed to facilitate the analysis and synthesis of science, technology, and medicine in a way that actively creates connections between the varieties of perspectives and concerns in the humanities and the sciences. The STS major takes science, technology, medicine, and their social, political, economic, and cultural contexts as its objects of study. As such, the STS major draws on the research programs of faculty in a wide range of departments, including American Studies, Anthropology, Economics, Environmental Science and Policy, History, Philosophy, Political Science, Science and Technology Studies, and Sociology. Students in STS pursue a broader understanding of science than is available within traditional science majors and is also suitable for students in the social sciences interested in interpreting science, technology and medicine as part of society and culture.

The Program. Graduation with a degree in Science and Technology Studies requires completion of introductory courses in the social sciences and humanities, in the natural sciences, and introductory, laboratory and seminar courses in STS. Upper division work includes twelve units from each of two different, complementing areas of concentration ("modules") and twelve units (plus prerequisites) providing depth, concentration and field work opportunities in the sciences. The modules are: (1) Cultural Studies of Science and Technology; (2) Éthics, Values, and Science Policy; (3) History and Philosophy of Science; IV. Medicine, Society, and Culture. Courses in the modules require careful selection to make the best use of the STS major. Prerequisites for courses in the sciences can be extensive and require substantial advance planning for timely completion. Students are encouraged to take advantage of faculty and staff advising to plan their course of study.

Career Alternatives. The STS major will create an opportunity to analyze science and allied prac-

tices from historical, philosophical, sociological, political, anthropological, and cultural perspectives. STS prepares students for careers that must address the broader social, cultural and political ramifications of science, technology and medicine such as law, journalism, public policy, economics, government, and science education. Careers that students of STS from many universities nationwide have pursued, in addition to academic careers in STS, include employment in: systems engineering, website design, science museums, non-profit health organizations, government service, libraries, law, medicine, veterinary medicine, dentistry, nursing, teaching, public health administration, media companies, management consultant practice, and the Peace Corps.

A.B. Major Requirements

Preparatory Subject Matter 16 Science and Technology Studies 1............4 Science and Technology Studies 20...... 4 Eight units selected from American Studies 1Ă; Environmental Studies 1; Nature and Culture 1; Philosophy 30, 31, 32; Science

Depth Subject Matter 44-46

Twelve units each from two of the following Technology: Community and Regional Development 118, 162; History 139A, 139B; Nature and Culture 100, 180: Science and Technology Studies 130A, 131, 150; Sociology 176......(2) Ethics, Values, and Science Policy: Agricultural and Resource Economics 120, 147; Environmental Science and Policy 165; History 185B; Nature and Culture 120; Philosophy 115, 116; Physics 137, 160; Plant Pathology 140; Political Science 171, 175; Veterinary Medicine 170 ... 12 (3) History and Philosophy of Science: History 135A, 135B, 136, 185A, 185B; Philosophy 104, 108, 109; Science and Technology Studies 130A, 130B, (4) Medicine, Society, and Culture: Epidemiology and Preventive Medicine more than one module, that course may satisfy only one requirement. Science and Technology Studies 180...... 4 Science and Technology Studies 190, or 190HA-HB Science Electives: Select twelve units, at least eight of which must be from upper division courses, from the Approved Science Electives list below. (Unit totals will vary with required science elective courses in consultation with faculty advisors. Some courses in some areas may require prerequisites too extensive to be

Total Units for the Major......60-82

used for the STS major.

Approved Science Electives. Courses may be drawn from any of the following approved subject areas:

Aeronautical Science and Engineering; Animal Genetics; Animal Science; Anthropology; Applied Behavioral Sciences; Applied Biological Systems Technology; Atmospheric Science; Avian Sciences; Biological Chemistry; Biological Sciences; Cell Biology and Human Anatomy; Chemistry; Engineering; Engineering: Applied Science; Engineering: Biological Systems; Engineering: Chemical; Engineering: Civil and Environmental; Engineering: Computer Science; Engineering: Electrical and Computer; Engineering: Mechanical; Entomology; Environmental and

Resource Sciences; Environmental Horticulture; Environmental Science and Policy; Environmental Toxicology; Evolution and Écology; Exercise Science; Fiber and Polymer Science; Food Science and Technology; Geology; Hydrologic Science; Material Science and Engineering; Medical Microbiology; Medical Pharmacology and Toxicology; Microbiology; Molecular and Cellular Biology; Nematology; Neurobiology, Physiology, and Behavior; Nutrition; Pathology, Microbiology, and Immunology; Physics; Plant Biology; Plant Pathology; Population Health and Reproduction; Psychology; Soil Science; Wildlife, Fish, and Conservation Biology.

Major Adviser. J. Dumit

Courses in Science and Technology Studies (STS)

Lower Division Courses

1. Introduction to Science, Technology and **Medicine Studies (4)**

Lecture - 3 hours; discussion - 1 hour. History, philosophy, sociology, politics, and cultural studies of science, technology, and medicine. Emphasis on a broad range of perspectives. GE credit: SciEng or SocSci | SS, WE.—Carroll

20. Methods in Science, Technology and Medicine Studies (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 1 recommended. Methodological issues concerning the historical, philosophical, sociological, ethical, and political analysis of science, technology, and medicine. Detailed case studies to illustrate different methods of analysis. GE credit: SciEng or SocSci, Wrt | SS, WE. - Carroll

32. Drugs, Science and Culture (4)

Lecture - 3 hours; discussion - 1 hour. Drugs, politics, science, society in a cultural perspective: emphasis on roles of science, government and the media in shifting attitudes toward alcohol, marijuana, Prozac and other pharmaceuticals; drug laws, war on drugs and global trade in sugar, opium, cocaine. (Same course as Anthropology 32.) GE credit: SocSci, Div, Wrt | SS, VL.—I. (I.) Dumit

92. Internship (1-12)

Internship - 3-36 hours. Prerequisite: consent of instructor. Work experience off and on campus in all subject areas offered in the program in Science & Technology Studies under the supervision of a member of the faculty. May be repeated up to 12 units for credit. (P/NP grading only.)—I, II, III, IV. (I, II, III,

98. Directed Group Study (1-5)

Prerequisite: consent of instructor (P/NP grading only.) GE credit: SS.

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor (P/NP grading

Upper Division Courses 108. Intellectual Property in Science (4)

Lecture/discussion-4 hours. Prerequisite: course 1, or other Social Science or Humanities writing course. Historical and conceptual framework for contemporary debates about intellectual property and science. Topics include US patent system and copyright law, interaction between patents and industrial policy, credit in academic and industrial science, role of IP in global knowledge. GE credit: SocSci, Wrt | ACGH, SS, WE.—I. (I.) Biagioli

109. Visualization in Science (4)

Lecture - 3 hours; extensive writing or discussion - 1 hour. Prerequisite: course 1 or 20 or Anthropology 2. Anthropological approaches to scientific visualization techniques, informatics, simulations. Examination of different visualization techniques toward understanding the work involved in producing them, critical assessment of their power and limits, especially when visualizations are used socially to make

claims. Offered in alternate years. (Same course as Anthropology 109.) GE credit: SocSci, Wrt | SS, VL, WE.—II. Dumit

120. Religion, Magic and Science (4)

Lecture—3 hours; extensive writing. Religion, magic, and science from the middle ages to the present. Contrast between modern scientific methodology and religious and magical thinking. (Same course as Religious Studies 120.) Offered in alternate years. GE credit: ArtHum, Div, Wrt.—Coudert

121. Special Topics in Medical Anthropology (4)

Lecture/discussion—4 hours. Prerequisite: course 1 or Anthropology 2. Introduction to critical medical anthropology. Topics include anthropological analysis of bio-medicine, psychiatry, systems of knowledge and healing, the body, emotions, and clinical encounters in a cross-cultural perspective. (Same course as Anthropology 121.) GE credit: SocSci, Div, Wrt | SS, WC, WE.—III. (III.) Giordano

129. Health and Medicine in a Global Context (4)

Lecture/discussion—4 hours; term paper. Prerequisite: course 1 or Anthropology 2. Recent works in medical anthropology and the science studies of medicine dealing with global health issues such as AIDS, pandemics, clinical trials, cultural differences in illnesses, diabetes, organ trafficking, medical technology and delivery, illness narratives, and others. (Same course as Anthropology 129.) GE credit: SocSci, Div, Wrt | SS.—II. (II.) Dumit

130A. From Natural History to the History of Nature (4)

Lecture/discussion—3 hours; term paper. Prerequisite: History 135A recommended. Evolution and demise of natural history as a discipline from Aristotle to Linnaeus. Considers ancient views of nature and its Renaissance rediscovery; the emergence of biology, botany, geology, and zoology; the history of taxonomy and classification. Offered in alternate years. GE credit: ArtHum or SciEng, Wrt | AH or SE, WE.—II.

130B. History of Modern Biology (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 130A recommended. Development of modern biology from pre-Darwinian roots to the present. Considers emergence of modern biological specialities and consolidation of biological theory around evolutionary ideas. History of allied fields such as genetics, paleontology, embryology, ecology, systematics and molecular biology. GE credit: ArtHum or SciEng, Wrt | AH or SE, WE.—III. (III.)

131. Darwin (4)

Lecture—3 hours; term paper. Prerequisite: upper division standing or consent of instructor. Students will explore the life and times of Charles Darwin and will trace the development of evolutionary thinking before and after the *Origin of Species* to appreciate its place in Victorian society and in the corpus of Darwin's thought. GE credit: ArtHum or SciEng, Wrt | AH or SE, WE.—Griesemer

150. Gender and Science (4)

Lecture/discussion—3 hours; term paper. An interdisciplinary approach to the relations between gender and science. Topics include the biological and cultural construction of sexual difference, the role of women as practitioners of science, and feminist approaches to science. GE credit: SocSci, Div, Wtt | ACGH, DD, SS, WE.

161. Time: Mechanism and Measurement (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 1. Cultural concepts of time; units and instruments of time measurement; historical differences in the social organization of time; and time measurement in twentieth-century science. GE credit: SocSci, Wrt | SS, WE.

163. History of Communication Technologies (4)

Lecture/discussion—3 hours; term paper. History of communication technologies from the late Middle Ages to the 20th century. Questions of technology,

knowledge, power and culture. Particular attention to questions about information and truth. Offered in alternate years. GE credit: SocSci | SS, WE.

164. Writing Science (4)

Lecture/discussion—3 hours; extensive writing. Prerequisite: English 3 or course 1, or equivalent. Texts and writing practices in the production of scientific knowledge. Surveys the literary structure of scientific arguments; history of scientific genres; rhetoric and semiotics in scientific culture; graphical systems in the experimental laboratory; narratives of science, including science fiction. (Same course as English 164.) Offered in alternate years. GE credit: Wrt | AH, SL, WE.—I. Milburn

165. Built Environments (4)

Lecture—3 hours; extensive writing. Built environments, which are designed to support forms of life. Their role as carriers of cultural memory and in turning knowledge of nature into social assets. Historical constellations of knowledge, social order, and power. Offered in alternate years. GE credit: SocSci, Wrt | SS.

173. Science Fiction (4)

Lecture/discussion—3 hours; extensive writing. Prerequisite: course 3 or Science and Technology Studies 1, or equivalent. The literary modes and methods of science fiction. Representative texts, authors, and themes of the genre—e.g., time travel, alternative universes, and utopias. Relations of science fiction to science, philosophy, and culture. (Same course as English 173.) GE credit: ArtHum, Wrt | AH, WE.

175. Laboratory Studies Lab (4)

Lecture/discussion—4 hours. Prerequisite: upper division standing or consent of instructor. Hands-on training in Science and Technology Studies field-work, interviewing, archival research and data analysis. Review of laboratory studies literature, informed consent procedures, ethics, and care of the data. Individual and group projects possible. GE credit: SS, WE.—III. (III.)

176. Sociology of Knowledge, Science, and Scientific Knowledge (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: upper division standing preferred. Social, cultural, and historical dimensions of knowledge, especially scientific knowledge. Problems, methods, and theory in sociology of scientific knowledge. Laboratory and historical case studies. Scientific and technical knowledge in institutional and organizational contexts. (Same course as Sociology 176.) GE credit: SS.—Carroll

180. Topics in History and Philosophy of Science (4)

Seminar—3 hours; term paper. Prerequisite: course in History and Philosophy of Science or other coursework relevant to topic. In depth treatment of selected topics in the history and philosophy of science. Possible topics include history of modern physics, history of molecular biology, science and society, science and power, scientific explanation, technology and culture, theory testing. May be repeated for credit with consent of instructor.

190. Seminar in Science, Technology and Medicine Studies (4)

Lecture/discussion—3 hours; term paper. Prerequisite: open to junior and senior Science and Technology Studies majors only. Intensive reading, discussion, research and writing by small groups in selected topics of science, technology, and medicine studies scholarship. Emphasis on individual research projects.

192. Internship (1-12)

Internship—3-36 hours. Prerequisite: consent of instructor. Work experience off and on campus in all subject areas offered in the program in Science & Technology Studies under the supervision of a member of the faculty. May be repeated three times for up to 12 units for credit. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

250. History and Philosophy of Science (4)

Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Interdisciplinary seminar in the history and philosophy of science. Focuses on issues such as historiography, methodology, and the conceptual foundations of science. May be repeated for credit with consent of instructor.

298. Group Study (1-5)

Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12)

Prerequisite: consent of instructor. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Sexuality Studies

(College of Letters and Science)

http://wms.ucdavis.edu/wgssite/sexualitystudies/

The interdisciplinary minor in Sexuality Studies offers students a unique opportunity to study the human-made aspects of sexual identities, desires, and practices, which differ across cultures and historical moments, and are not reducible to biology or anatomy. The minor in Sexuality Studies core and elective courses have sexuality at their center. Additional courses invite students to integrate their study of sexuality with issues of gender; race and ethnicity; class; politics and activism; literature and popular culture; law; and other domains.

The minor is sponsored by the Program in Women and Gender Studies.

Minor Program Requirements:

UNITS

Sexuality Studies18-20

Two Elective courses from Field A:

Women and Gender Studies 1704

Two Elective courses from the following:

Anthropology 139 BN, English 186, Epidemiology and Preventative Medicine 163, History 184, Human Development 12, Psychology 158, Science and Society 15, Women and Gender Studies 70........7-8

Two Elective courses from Field B (below) or seminars/individual study by petition to achieve a total of 18-20 units:

American Studies 115, Asian American Studies 112, Chicana/o Studies 160, English 166, German 145, History 132, Political Science 152, Sociology 120, Women and Gender Studies 140, Women and Gender Studies 179......8

Restrictions.

(a) Students may take no more than one lower division course to satisfy requirements for the minor.

(b) To satisfy the interdisciplinary component of the minor, students must either split their coursework roughly equally between two programs/departments or take coursework in at least three programs/departments.

(c) Students may petition the minor adviser to accept Special Topics courses and Capstone/Senior Seminars as additional courses, as long as their course of study follows the minor's lower-division restriction and interdisciplinary requirements.

(d) Students may petition the minor adviser to accept up to four units of registered individual study, group study or internship towards the minor program, as long as their course of study follows the minor's lower-division restriction and interdisciplinary requirements.

Advising. Program in Women and Gender Studies, 2222 Hart Hall (530) 752-6429 7

Social and Ethnic Relations

(College of Letters and Science)

The interdisciplinary minor in Social and Ethnic Relations explores the racial, ethnic, class and gender aspects of human relations in the modern world. Students study human societies and cultures from a multi-ethnic perspective and across established academic departmental lines. The minor is jointly sponsored by African American and African Studies, Asian American Studies, Native American Studies, and Women and Gender Studies.

Minor Program Requirements:

units

Social and Ethnic Relations 24

Select one course from each of the following six groups to total 24 units.

(a) African American and African Studies 100; Anthropology/Native American Studies 134; Women's Studies 102

(b) African American and African Studies 123, 133, 145A

(c) Asian American Studies 1, 2, 100, 110, 130

(d) Chicana/o Studies 130, 132 (e) Native American Studies 1, 10, 115, 119, 130A, 130B, 130C, 157, 180

(f) Women's Studies 103, 104, 180

Restrictions. (a) Courses applied toward the satisfaction of a major may not also be offered in satisfaction of the minor. (b) No more than four units (one course) may be lower division.

Advising. Contact the Program in Women and Gender Studies in 2222 Hart Hall (530) 752-4686.

Social Sciences

(College of Letters and Science)
Marianne Page, Ph.D., Program Director **Program Office.** 469 Kerr Hall;
(530) 752-0741

Committee in Charge

Michael Kurlaender, Ph.D. (School of Education) Dina Okamoto, Ph.D. (Sociology) Marianne Page, Ph.D. (Economics) Heather Rose, Ph.D. (School of Education) Kimberlee Shauman, Ph.D. (Sociology) Ann Stevens, Ph.D. (Economics)

Emeriti Faculty

Nigel Allan, Ph.D. Professor Emeritus Dennis J. Dingemans, Ph.D., Senior Lecturer Emeritus Howard F. Gregor, Ph.D., Professor Emeritus Frederick J. Simoons, Ph.D., Professor Emeritus Kenneth Thompson, Ph.D., Professor Emeritus

The Program of Study

The Program in Social Sciences promotes the development of innovative curricular initiatives across the social sciences, including offering broadly conceived, integrative undergraduate-level and graduate-level courses. Faculty affiliated with the program are often engaged in interdepartmental teaching and research.

Social Theory and Comparative History

(College of Letters and Science)

This designated emphasis was disestablished effective September 19, 2011.

Program Office. Center for History, Society, and Culture, 5211 Social Sciences and Humanities Building (530) 752-3046

Courses in Social Theory and Comparative History (STH)

Graduate Courses

250. Research in Social Theory and Comparative History (4)

Seminar—3 hours; term paper. Prerequisite: admission to Social Theory and Comparative History Designated Emphasis. Theoretically informed research in comparative history. Students read exemplary works and learn to frame their own research projects. Presentations include Center for History, Society, and Culture faculty and visitors discussing current research.—III. (III.)

290. Advanced Topics in Social Theory and Comparative History (4)

Seminar—3 hours; term paper. Prerequisite: consent of instructor and History 204 or Sociology 242A. Interdisciplinary study of particular substantive problems in social theory and comparative history. Topics vary.—I, II, III. (I, II, III.)

295. Advanced Group Research in Social Theory and Comparative History (1)

Discussion—1 hour. Prerequisite: consent of instructor. Participation in research workshops sponsored by the Center for Comparative Research for History, Society, and Culture. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

296. Theory and Society Journal Editorial Workshop (1-4)

Workshop—1 hour; independent study—3 hours. Reading and offering workshop critiques of papers submitted for publication. Reading and discussion of other relevant work in history and the social sciences. May be repeated for credit up to 36 units or with consent of instructor. [5/U grading only.]—I, II, III. (I, II, III.) Gouldner

Sociology

(College of Letters and Science)

Bill McCarthy, Ph.D., Chairperson of the Department

Department Office. 1283 Social Sciences and Humanities Building (530) 752-0782; http://sociology.ucdavis.edu

Faculty

Thomas D. Beamish, Ph.D., Associate Professor Patrick Carroll, Ph.D., Associate Professor Lawrence E. Cohen, Ph.D., Professor Robert Faris, Ph.D., Assistant Professor T. Ryken Grattet, Ph.D., Professor Laura Grindstaff, Ph.D., Professor Laura Grindstaff, Ph.D., Professor Drew Halfmann, Ph.D., Associate Professor John R. Hall, Ph.D., Professor Erin R. Hamilton, Ph. D., Associate Professor Bruce D. Haynes, Ph.D., Associate Professor Mary Jackman, Ph.D., Professor David J. Kyle, Ph.D., Associate Professor Ming-Cheng Lo, Ph.D., Professor Bill McCarthy, Ph.D., Professor Michael McQuarrie, Ph.D., Assistant Professor Stephanie L. Mudge, Ph.D., Associate Professor Dina G. Okamoto, Ph.D., Associate Professor Kimberlee A. Shauman, Ph.D., Associate Professor Kimberlee A. Shauman, Ph.D., Associate Professor

Xiaoling Shu, Ph.D., Associate Professor Vicki Smith, Ph.D., Professor Eddy U, Ph.D., Associate Professor Diane L. Wolf, Ph.D., Professor

Emeriti Faculty

Fred Block, Ph.D., Research Professor and Professor Emeritus

James C. Cramer, Ph.D., Professor Emeritus Diane H. Felmlee, Ph.D., Professor Emerita Carole E. Joffe, Ph.D., Professor Emerita Carl C. Jorgensen, Ph.D., Professor Emeritus John F. Lofland, Ph.D., Professor Emeritus Iyn H. Lofland, Ph.D., Research Professor and Professor Emerita

John T. Walton, Ph.D., Professor Emeritus

Affiliated Faculty

Lalia Kiburi, Ph.D., Lecturer Debora Paterniti, Ph.D., Associate Adjunct Professor Ellen Robert, Ph.D., Lecturer

The Major Programs

Sociology is the study of human society in all its manifestations. Its aim is to discover the process and structure of human interaction, to identify the main forces that sustain or weaken social groups, and to determine the conditions that transform social life. Sociology, like any science, is a disciplined, intellectual quest for knowledge about the fundamental nature of things.

The Program. The Department of Sociology offers two major programs, Sociology and Sociology– Organizational Studies. Students selecting the Sociology major may choose from four options in the major. The General Sociology emphasis allows students to obtain a broad understanding of the concepts, methods, and theories of sociology. Students with a special interest in the areas of Law and Society or Social Services may choose a more specialized program of courses and practical experience within the sociology major. The Comparative Studies and World Development emphasis provides a sociological perspective on social and economic changes throughout the world, with a stress on relationships between "developed" and "underdeveloped" societies. In their junior year, students are encouraged to consider the Education Abroad Program - especially one in a developing country.

The Sociology–Organizational Studies major develops a broad understanding of the political, social, and economic organizations that comprise modern society. This major emphasizes a sociological perspective, but incorporates a multidisciplinary field of study. The major introduces students to a range of theories and methods that social scientists use in the analysis of organizations.

Career Opportunities. In the Sociology major, the General option is for students desiring a solid liberal arts education as well as those interested in graduate work in the social sciences. Options in Law and Society or Social Service prepare students for careers in such areas as law, corrections, social work or counseling. The Comparative Studies and World Development emphasis prepares students for graduate training leading to careers in international fields. Majors in Sociology–Organizational Studies will be prepared for a variety of career options, particularly in the field of management. The major spe cifically meets entry requirements for programs of professional training leading to a Masters degree in public or private management, and may also lead to further study in any of the disciplinary áreas incorpo rated in the major.

Sociology

A.B. Degree Requirements: General emphasis:

	UNITS
Preparatory Subject Matter	28-29
Sociology 1; 46A, and 46B Sociology 2, 3, 4, 5, 11, 30A, or	13
30B	3-4

Anthropology 2 or 204	
Select from History 4A, 4B, 4C, 6, 7A, 7B,	
7C, 8, 9A, 9B, 10C, 15, 17A, 17B4 Select from Philosophy 5, 14, 244	
Depth Subject Matter 44	4
(A) Sociology 100	
(B) Select one course from each of the	
following four categories:	
Individual, Culture and Society: Sociology 125, 126, 1354	•
Stratification and Social Differentiation:	
Sociology 130, 132, 1404	·
Organizations and Institutions: Sociology 118, 131, 146, 180A4	
Social Dynamics: Sociology 104, 141,	
143A, 170 4	
(C) Select three upper division courses from	
one of the following clusters, not counting courses taken to fulfill requirement B 12	
(1) Individual, Culture and Society:	
Sociology 102, 120, 122, 125, 126, 127, 128, 129, 131, 132, 134, 135, 137,	I
126, 129, 131, 132, 134, 133, 137, 143B, 148, 150, 152, 153, 172, 173,	
1 <i>7</i> 4, 1 <i>7</i> 5, 1 <i>7</i> 6	
(2) Stratification and Social Differentiation:	
Sociology 118, 128, 129, 130, 132, 133, 134, 140, 145A, 145B, 171, 172, 185,	
188, and not more than one of the	
following courses: African American and	
African Studies 123; Asian American	
Studies 100; Chicana/o Studies 110; or Native American Studies 115	
(3) Organizations and Institutions:	
Sociology 118, 124, 131, 133, 139, 144,	
146, 149, 150, 151, 154, 155, 159, 160, 180A, 180B, 181, 182, 183, 185	
(4) Social Dynamics: Sociology 104, 123,	
125, 138, 141, 143A, 145A, 145B, 147,	
148, 156, 157, 158, 170	
(5) Student-Initiated Thematic Cluster: developed with a faculty adviser and	
approved by the Sociology Undergraduate	
Curriculum Committee	
(D) Eight units of Sociology beyond courses taken to fulfill above requirements, and	
outside of the course cluster used to fulfill	
requirement C8	
(E) One integrative course (prerequisite: senior standing and completion of	
requirement for Preparatory Subject Matter,	
Depth Subject Matter, requirement A, and at	,
least two of the courses for requirement B).	
Choose from Sociology 190X, 191, 192/ 193, 194HA-194HB, 1954	
Total Units for the Major72-73	3
	-
Law and Society emphasis:	c
UNIT	
Preparatory Subject Matter	7
46B17	ı
Anthropology 2 or 204	
Select from History 4A, 4B, 4C, 6, 7A,	
7B, 7C, 8, 9A, 9B, 1OC, 15, 17A, 17B 4 Philosophy 5 or 144	
Depth Subject Matter 44	4
Sociology 100 and 155 8	-
Select courses from the following categories:	
Individual Culture and Society: Sociology	
125, 126, 1354 Stratification and Social Differentiation:	
Sociology 130, 132, 1404	
Organizations and Institutions: Sociology	
118, 131, 146, 160, 180A4	
Crime and Social Dynamics: Sociology 120, 150, 151, 152, 171,	
120, 150, 151, 152, 17112 Stratifications and Social Dynamics:	
120, 150, 151, 152, 17112 Stratifications and Social Dynamics: Sociology 118, 137, 148, 156, 157, 158;	
120, 150, 151, 152, 171	
120, 150, 151, 152, 17112 Stratifications and Social Dynamics: Sociology 118, 137, 148, 156, 157, 158;	
120, 150, 151, 152, 171	
120, 150, 151, 152, 171	

Policy 161; Environmental Toxicology 138;	
Hydrology 150; Philosophy 119; Political	
Science 122, 151, 152, 154; Psychology 153; Women's Studies 140	
Methodology: Prerequisite: senior standing	
and completion of requirement for preparatory subject matter; select one	
course from Sociology 190X, 192/193,	
194HA-194HB, 195 4	
Total Units for the Major	73
Social Services emphasis:	
Preparatory Subject Matter26-	28
Sociology 2; 3; 46A and 46B 16	
Psychology 1	
Select from African American and African Studies 10, 15; Asian American Studies 1,	
2; Chicana/o Studies 10, 50; Native	
American Studies 1, 10; Sociology 4, 11,	
30A, or 30B6-8	
Depth Subject Matter	44
Sociology 131, 140, 185	
Select courses from the following categories:	
Social Issues: Sociology 104 120 122	
124, 139, 143A, 144, 146, 149, 150, 152, 153, 154, 155, 156, 158, 160,	
152, 153, 154, 155, 156, 158, 160, 170, 171 4	
Social Interaction: Sociology 126, 127,	
128, 143B, 148, 157 4	
Race and Ethnicity: African American and African Studies 100; Asian American	
Studies 110, 111, 150; Chicana/o Studies	
110; Community and Regional	
Development 176; Native American	
Studies 115; Sociology 129, 130, 134, 137, 172	
137, 172	
172 4	
Organizational Behavior: Sociology 139, 146, 151, 154, 159, 180A, 180B, 181,	
140, 101, 104, 107, 1007, 1008, 101,	
182, 183 4	
182, 183	
Methodology: Prerequisite — senior standing and completion of requirement for	
Methodology: Prerequisite—senior standing and completion of requirement for preparatory subject matter: Sociology 103,	
Methodology: Prerequisite—senior standing and completion of requirement for preparatory subject matter: Sociology 103, 106 (or the equivalents), 190X, 192/193, 194HA-194HB, 195	
Methodology: Prerequisite—senior standing and completion of requirement for preparatory subject matter: Sociology 103, 106 (or the equivalents), 190X, 192/193,	72
Methodology: Prerequisite—senior standing and completion of requirement for preparatory subject matter: Sociology 103, 106 (or the equivalents), 190X, 192/193, 194HA-194HB, 195	72
Methodology: Prerequisite—senior standing and completion of requirement for preparatory subject matter: Sociology 103, 106 (or the equivalents), 190X, 192/193, 194HA-194HB, 195	72
Methodology: Prerequisite—senior standing and completion of requirement for preparatory subject matter: Sociology 103, 106 (or the equivalents), 190X, 192/193, 194HA-194HB, 195	
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Methodology: Prerequisite—senior standing and completion of requirement for preparatory subject matter: Sociology 103, 106 (or the equivalents), 190X, 192/193, 194HA-194HB, 195	-59
Methodology: Prerequisite—senior standing and completion of requirement for preparatory subject matter: Sociology 103, 106 (or the equivalents), 190X, 192/193, 194HA-194HB, 195	
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Methodology: Prerequisite—senior standing and completion of requirement for preparatory subject matter: Sociology 103, 106 (or the equivalents), 190X, 192/193, 194HA-194HB, 195	-59

advisor); Religious Studies 162; Women's Studies 184 (4) Asia-China & Japan: African American and African Studies 107C; Anthropology 148A, 148B, 148C, 149A, 149B; East Asian Studies 113; Economics 171; History 191 (series), 194A, 194B, 194C; Political Science 148A, 148B; Religious Studies Science 146A, 146B, Religious Siudies 165, 170, 172; Sociology 147, 188 (5) Southeast Asia/Pacific: Anthropology 143A, 143B, 145, 147; Economics 171; History 191 (series), 195B, 196A, 196B; Political Science 148B, 148C; Religious Studies 165, 170, 172

Siddles 103, 170, 172
Total Units for the Major77-107
Sociology—Organizational Studies
<i>e, e</i>
A.B. Degree Requirements:
UNITS
Preparatory Subject Matter29
Sociology 1; 2; 5 or 11; 46A and
46B 21
Economics 1A and 1B8
Depth Subject Matter44
Sociology 1004
Sociology 180A
Sociology 106 (or its equivalent)4
Select from Communication 134, 136,
172; Sociology 1264
Select five courses from below, at least three
courses from Sociology20
Agricultural and Resource Economics 112,
130; American Studies 125; Community
and Regional Development 151, 152, 154,
156, 158, 162, 164, 168; Economics
116, 121A, 121B, 151A, 151B; History 185B, 194D; Political Science 107, 180,
187; Sociology 103, 124, 138, 139, 141,
154, 159, 160, 180B, 181, 183, 185
Select from Sociology 128, 130, 132,
134, 140, 145A, 145B, 1724
Methodology: Prerequisite: senior standing
and completion of requirement for
preparatory subject matter; select one course
from Sociology 190X, 192/193, 194HA-194HB, 1954
194HA-194HB, 1954
Total Units for the Major73

Building. **Minor Program Requirements:**

Sociology......20

Major Advisers. Consult the Departmental Advising office in 1282 Social Sciences and Humanities

Choose any five upper division courses in Sociology, except the following: SOC190X, 191, 192/193, 194HA, 194HB, 195, 197T, 198, 199

Minor Advisers. Consult the departmental Advising office in 1282 Social Sciences and Humanities Building.

Honors Program. An Honors Program is available to Sociology and Sociology-Organizational Studies majors who have demonstrated excellence in their field of study. To be eligible for the program, students must have a grade-point average of 3.500 in the major and the recommendation of a faculty sponsor familiar with their work. In addition to meeting the standard major requirements, students are encouraged to take a 199 course with their sponsor in the spring of their third year, prior to the seminar courses. The honors student writes an honors thesis and participates in a two-quarter honors seminar (course 194HA-194HB). Successful completion of the Honors Program, when combined with College GPA requirements, enables the student to graduate with Highest Honors or with High Honors. Applications for the program are due in August before the student begins their fourth year.

Honors Program Advisor. Drew Halfmann, dhalfmann@ucdavis.edu

Graduate Study. The Department offers programs of study and research leading to the M.A. and Ph.D. degrees in sociology. Further information regarding graduate study may be obtained at the Department office or on our website.

Graduate students in Sociology have the opportunity to pursue designated emphases in Critical Theory, Social Theory and Comparative History, Native American Studies, Economy, Justice and Society, or Feminist Theory and Research. See these headings for further details on these interdisciplinary pro-

Graduate Advisers. Consult the Graduate Program Coordinator in 330 Young Hall.

Courses in Sociology (SOC)

Lower Division Courses

1. Introduction to Sociology (5)

Lecture - 4 hours; discussion - 1 hour. Principles and basic concepts of sociology. The study of groups, culture, collective behavior, classes and caste, community and ecology, role, status, and personality. GE credit: SocSci | ACGH, DD, SS.)

2. Self and Society (4)

Lecture—3 hours; discussion—1 hour. Principles and basic concepts of sociological social psychology. Includes the study of the character of the self, identity, roles, socialization, identity change, emotion and social interaction. GE credit: SocSci, Wrt | ACGH, DD, SS.

3. Social Problems (4)

Lecture-3 hours; discussion-1 hour. General sociological consideration of contemporary social problems in relation to sociocultural change and programs for improvement. GE credit: SocSci, Wrt | ACGH, DD, SS.

4. Immigration and Opportunity (4)

Lecture—3 hours; discussion—1 hour or term paper. Social and demographic analysis of immigration: motives and experiences of immigrants; immigration and social mobility; immigration, assimilation, and social change; multicultural societies. Detailed study of immigration into the U.S., with comparative studies of Europe, Australia, and other host countries. GE credit: SocSci, Div, Wrt | ACGH, DD, SS, WC.

5. Global Social Change: An Introduction to Macrosociology (4)

Lecture - 3 hours; discussion - 1 hour. An introduction to change and diversity in world history, including the United States. Examines population and family, technological change and economic development, power and status, culture and identity. GE credit: SocSci, Div, Wrt | ACGH, SS, WC

11. Sociology of Labor and Employment (4)

Lecture-3 hours; discussion-1 hour. Labor and employment issues in the contemporary United States with some use of historical and comparative materials. Topics will include strategies pursued by employers and employees, labor market discrimination and the role of social policies in shaping labor markets. GE credit: SocSci, Wrt | SS.

25. Sociology of Popular Culture (4)

Lecture - 3 hours; discussion - 1 hour. Social mechanisms that shape modern popular culture. High, folk, and mass culture: historical emergence of popular culture. Mass media, commercialization, ideology and cultural styles. Theories and methods for analyzing cultural expressions in pop music, street art, film, television, and advertising. GE credit: SocSci Wrt | SS, VL.

30A. Intercultural Relations in Multicultural Societies (3)

Lecture - 1.5 hours; discussion - 1.5 hours. Macrostructural analysis of contemporary multicultural societies; immigration and assimilation in comparative perspective; social construction of racial and ethnic group identities; ethnicity and gender; group conflict and cooperation; controversies surrounding multiculturalism. First course in a two-course Multicultural Immersion Program. GE credit: SocSci, Div | ACGH, DD, SS.

30B. Intercultural Relations in Multicultural

Lecture - 1.5 hours; discussion - 1.5 hours. Prerequisite: course 30A or consent of instructor. Social-psychological analysis of personal experiences living in a multicultural society; conforming to or rejecting group identity or stereotypes; managing and reducing conflict; cross-cultural communication; promises and problems of diversity at UC Davis. Second course in a two-course Multicultural Immersion Program. GE credit: SocSci, Div | ACGH, DD, SS.

46A. Introduction to Social Research (4)

Lecture - 3 hours; discussion - 1 hour; term paper Examination of the methodological problems of social research. Selection and definition of problems of investigation, data-gathering techniques, and sampling. GE credit: SS.

46B. Introduction to Social Research (4)

Lecture-3 hours; discussion-1 hour; term paper. Data-analysis techniques, measurement, scaling, multivariate analysis, and quantitative measures of association. GE credit: QL, SS

90X. Lower Division Seminar (1-2)

Seminar — 1-2 hours. Prerequisite: lower division standing and consent of instructor. Examination of a special topic in sociology through shared readings, discussions, written assignments, or special activities such as fieldwork, laboratory work, etc. May not be repeated for credit. Limited enrollment. GE credit:

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. Primarily intended for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading

Upper Division Courses

100. Origins of Modern Sociological Theory

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1; consent of instructor; restricted to upper division standing. The origins of modern sociological thought. Special emphasis on three major theorists from the classical tradition of nineteenth century European social thought: Karl Marx, Max Weber, and Emile Durkheim. GE credit:

102. Society and Culture of California (4)

Lecture-3 hours; term paper or discussion-1 hour. Prerequisite: introductory course in Sociology recommended. California's distinctive society and culture; sociological analyses of topical issues concerning diversity, environment, cities. GE credit: ACGH, DD,

103. Evaluation Research Methods (4)

Lecture—3 hours; discussion—1 hour; term paper; project. Prerequisite: course 46A and 46B, or Statistics 13 or the equivalent. Surveys applications of research methods to the evaluation of social programs, primarily emphasizing methodological issues, e.g., research design and data collection; uses of evaluation research are also discussed and placed in theoretical context. Participation in an evaluation project. GE credit: SL, SS.

104. The Political Economy of International Migration (4)

Lecture — 3 hours; term paper or discussion — 1 hour. Prerequisite: upper division standing. Analysis of worldwide migration patterns, and social scientific theories of international and transnational migration. Focus in economical, political, and social impact of immigration and potential for international and regional cooperation. (Same course as International Relations 104). GE credit: SS, WC

106. Intermediate Social Statistics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 46B or Statistics 13 or the equivalent. Intermediate level course in statistical analysis of social data, emphasizing the logic and use of statistical

measures, procedures, and mathematical models especially relevant to sociological analysis. GE credit: QL, SL, SS

118. Political Sociology (4)

Lecture - 3 hours; discussion - 1 hour; term paper; project. Relation of social cleavages and social cohesion to the functioning of political institutions; the social bases of local and national power structures; social sources of political movement, analysis of concepts of alienation, revolution, ideology, ruling class, and elite. GE credit: SS.

120. Deviance (4)

Lecture—3 hours; term paper or discussion. Social structural sources, institutional practices and microprocesses associated with illegality, evil, disease, immorality, disability, racial and class differences, citizenship, and the body. Special emphasis on expert knowledge and the production and management of social difference. GE credit: Wrt | SS.

122. Sociology of Adolescence (4)

Lecture—3 hours; discussion—1 hour or term paper or research project. Chronological age and social status; analysis of social processes bearing upon the socialization of children and adolescents. The emergence of "youth cultures." Generational succession as a cultural problem. GE credit: SS.

123. American Society (4)

Lecture—3 hours; discussion—1 hour or term paper or research project. The demographic and social structure of American society and population, with emphasis on ethnic and class groups as bases for political and economic interest. Attention to selected current social controversies. GE credit: ACGH, DD,

124. Sociology of Education (4)

Lecture—3 hours; discussion—1 hour; term paper; project. Education and the social structure. Class size, curriculum, and economies of scale. Relations between families and schools in socialization; familial ascription and educational achievement. Education and industrialization. Organizational and occupational structure of schools. Discussion of selected controversies. GE credit: SS.

125. Sociology of Culture (4)

Lecture/discussion-3 hours; term paper. Sociological approaches to study of historical and contemporary culture and mass media, and their structuring in relation to social actors, institutions, stratification, power, the production of culture, audiences, and the significance of culture in processes of change. GE credit: SocSci | SS

126. Social Interaction (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 2. Everyday interaction in natural settings; ethnographic approaches to the understanding of social meanings, situations, personal identity and human relationships. Particular attention to the work of Erving Goffman and to principles of field observation and qualitative analysis. GE credit: Wrt | SS.

127. Sociology of Death (4)

Lecture - 3 hours. Prerequisite: course 1 or the equivalent. Overview of attitudes toward, structural effects of, and methods of coping with death and deathrelated behaviors. Particular attention to social psychological aspects of death and dying, to death occupations, and to death rituals in various cultures. GE credit: Wrt | SS.

128. Interracial Interpersonal Dynamics (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: one course from courses 1, 2, 3, Afro-American Studies 10, Asian American Studies 1, 2, Chicano Studies 10, Native American Studies 1, 20. Analysis of the influences of cultural differences and racial stratification on interpersonal interaction in instrumental settings (e.g., work, education, political action) and intimate settings (e.g., friendship, love, marriage, family). Minority/majority relationships. GE credit: Div, Wrt | SS.

129. Sociology of Black Experience in America (4)

Lecture—3 hours; discussion—1 hour; term paper; project. Survey of historical and contemporary theoretical sociological perspectives on the Black experience in United States. Emphasis on comparisons of Black sociological perspectives and mainstream perspectives of specific sociologists. GE credit: Div | ACGH, DD, SS.

130. Race Relations (4)

Lecture - 3 hours; term paper or discussion - 1 hour. Functions of the social definitions of race and racial groups. Analysis of racial conflict, oppression, and other forms of ethnic stratification. Models of ethnic interaction and social change. Emphasis on racial relationships within the U.S. GE credit: Div | ACGH, DD, SS.

131. The Family (4)

Lecture - 3 hours; discussion - 1 hour. Contemporary family life in historical and cross-cultural perspective. How different family forms arose, their significance today and prospects for further family change. Attention to power relations within and beyond the family and to the social implications of family transformation. GE credit: SocSci, Div, Wrt | ACGH, DD, SS.

132. The Sociology of Gender (4)

Lecture - 3 hours; discussion - 1 hour. Analysis of biological, psychological, cultural and structural conditions underlying the status and roles of men and women in contemporary society, drawing on a historical and comparative perspective. GE credit: Soc-Sci, Div | ACGH, DD, SS.

133. Sexual Stratification and Politics (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 132 or the equivalent or consent of instructor. Analysis of origins, dynamics, and social implications of sexual stratification. Examination of classical and contemporary theorists such as Engels, Freud, J.S. Mill, de Beauvoir, Juliet Mitchell, D. Dinnerstein. Attention to selected issues in social movements for and against sexual equality. GE credit: Div | SS.

134. Sociology of Racial Ethnic Families (4)

Lecture—3 hours; discussion—1 hour or term paper. Asian American, Black, Chicano, and Native American family life in comparative historical perspective. Family structure and gender roles are considered in relation to socio-historical dynamics. Offered in alternate years. GE credit: Div, Wrt | ACGH, DD, SS.

135. Social Relationships (4)

Lecture—3 hours; discussion—1 hour or term paper. Prerequisite: course 1, 2 or 3, and upper division standing. Social and cultural factors influencing friendships and intimate relationships. Topics include relationship development, relationship maintenance, and relationship loss. GE credit: Div, Wrt | SS.

137. African American Society and Culture 1790-1990 (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1. Political and social transformations of African American communities between 1790 and 1990, as seen through film, literature, and music. Topics include: Black consciousness, Afro-Slave culture, The Harlem Renaissance, and contemporary Hip Hop. GE credit: ACGH, DD, SS.

138. Economic Sociology (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A or 1B and upper division standing in the social sciences. Overview of the rapidly growing field of economic sociology. Focus on variations in the ways that markets are organized. The relationship between individual and collective rationality will also be emphasized. GE credit: ACGH, SS,

139. Corporations and Society (4)

Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: course 1 or 2 or 3, and upper division standing. The study of the history and power of the modern corporation; corporate organization; politics, the state, and the corporation; labor unions and the labor process; competition, regulation and international markets; the multinational and conglomerate corporation; and mass markets and consumerism. GE credit: ACGH, SS.

140. Social Stratification (4)

Lecture - 3 hours; discussion - 1 hour or term paper or research project (instructor's option). Systems of social ranking, theories of stratification; power, prestige, culture, and styles of life of various social classes; social mobility and its consequences for social structure. GE credit: ACGH, DD, SS.

141. Industrialization and Social Change (4)

Lecture—3 hours; discussion—1 hour or term paper or research project. Selected technological and social factors. Preconditions of economic develop ment and industrialization. Social, political, and cultural issues at various levels of economic development. Major historical differences and major current trends. Emphasis either on highly industrialized countries or on less developed countries. GE credit: Wrt | SS.

143A. Urban Society (4)

Lecture - 3 hours; discussion - 1 hour or term paper or project (instructor's option). Prerequisite: course 1 or the equivalent. Theories of city origins. Analysis of the historic process of urbanization and of varying city types. Comparison of American and European experience of metropolitanization, counterurbanization, and neighborhood change. Consideration of competing theories of urban growth and change and competing visions of the urban future. Offered in alternate years. GE credit: SS.

143B. Sociology of City Life (4)

Lecture-3 hours; discussion-1 hour or term paper or project (instructor's option). Prerequisite: course 1 or the equivalent; course 143A recommended. Critical dissection of the "loss of community" issue. Analysis of the organization of primary ties in the city, of the culture of urban public life and of the learning of city skills. Offered in alternate years. GE credit: Wrt | SS.

144. Agriculture and Society (4)

Lecture—3 hours; discussion—1 hour or term paper or research project. Prerequisite: advanced standing in the social sciences or one year of course work in agricultural and environmental sciences. Development of agriculture as a major enterprise in modern society with the concomitant reduction in the labor force and family farms. Analysis of issues including mechanization, migrant labor, corporate farming, and public resource policy. Offered in alternate years. GE credit: SS.

145A. Sociology of Third World Development (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 1; upper division standing. Introduction to theories and contemporary issues in the sociology of development. Topics such as urbanization, rural/ agrarian change, class, status groups, international division of labor, sectoral shifts, international capital, informal economy, gender, and political processes are analyzed within a comparative-historical framework. GE credit: Div, Wrt | SS, WC.

145B. Gender and Rural Development in the Third World (4)

Seminar-4 hours. Prerequisite: course 1; upper division standing. Political-economic analysis of women and work during the process of socioeco nomic change in the world with particular attention to the family/household context. Offered in alternate years. GE credit: Div, Wrt | SS, WC.

146. Sociology of Religion (4)

Lecture - 3 hours; discussion - 1 hour or term paper or research project. Relationship between social structures and religions. The social setting of the major world religions. Religious innovators and institutionalization (churches, sects, cults). Secularization in the modern world and the rise of secular ideologies. Offered in alternate years. GE credit: SocSci, Div, Wrt | SS.

147. Sociological Perspectives on East Asia

Lecture—3 hours; discussion—1 hour or term paper or research project. Sociological theories and concepts applied toward understanding East Asian society. Emphasis on the political structure, stratification, and economy in China and Japan. Analysis of historical and contemporary similarities and differences. Offered in alternate years. GE credit: SS, WC.

148. Collective Behavior (4)

Lecture—3 hours; discussion—1 hour or term paper or project (instructor's option). Prerequisite: course 1 or the equivalent. Study of behavior of human crowds and masses in extraordinary circumstances, including crowd panics, mass scares, collective protests, riots, revolutionary situations, ecstatic and revivalist gatherings, crazes, fads, and fashions. GE

149. Religion and American Society (4)

Lecture - 3 hours; class project. Historical, contemporary survey of religious traditions and organizations and their relation to U.S. social and cultural patterns. Civil religion, religious pluralism, minority and deviant communities, religious migration, U.S. religion as a social institution, and religion, politics, and social stratification. Offered in alternate years. GE credit: Div, Wrt | ACGH, DD, SS.

150. Criminology (4)

Lecture-3 hours; discussion-1 hour or term paper or research project. Sociological analysis of criminal behavior in relation to social structure and the criminalization process. GE credit: SS.

151. The Criminal Justice System (4)

Lecture — 3 hours; term paper or discussion — 1 hour. Prerequisite: course 150 and upper division standing. Sociological analysis of the different components of the criminal justice system including the emergence and interpretation of criminal laws, the contemporary roles and functions of the police, criminal courts and correctional institutions. GE credit:

152. Juvenile Delinquency (4)

Lecture—3 hours; discussion—1 hour or term paper or research project. Study of juvenile delinquency in relation to the family, peer groups, community, and institutional structures. Consideration of processing of the delinquent by formal agencies of control. GE credit: SS.

153. The Sociology of Childhood (4)

Lecture—3 hours; term paper. Prerequisite: upper division standing. Contemporary childhood in historical, cross-cultural, and global perspectives. Examine changes in understanding of the nature of childhood and "best interests of the child" by class, race, gender, geographic region, and historical period. GE credit: ACGH, DD, SS, WC.

154. Sociology of Health Care (4)

Lecture—3 hours; discussion—1 hour or term paper or research project. Overview of sociological research in medicine and health care, with emphasis on the organizational, institutional, and social psychological aspects. GE credit: SS.

155. Sociology of Law (4)

Lecture - 3 hours; discussion - 1 hour or term paper or research project. Law considered as social control; relation of legal institutions to society as affecting judicial decision making and administration of justice. Lawyers as an occupational group. Legal reform. GE credit: SS.

156. Social Movements (4)

Lecture—3 hours; discussion—1 hour or term paper or project (instructor's option). Analysis of several aspects of social movements: mobilization, forms of organization, ideology, recruitment, leadership, strategies and tactics, development, effects. Frequent use of sound and film materials. GE credit: SocSci | SS

157. Social Conflict (4)

Lecture-3 hours; discussion-1 hour or term paper or project. Analysis of the causes, dynamics, and regulation of social conflict within and between various kinds of social groupings with particular reference to nonviolent methods of waging and regulating conflict. GE credit: SS

158. Women's Social Movements in Latin America (4)

Lecture-3 hours; term paper. Restricted to upper division standing. Contemporary women's social movements in Latin America, focusing on Honduras, El Salvador, Brazil, and Nicaragua. Examination of exploitation and oppression in Latin America. GE credit: DD, SS, WC.

159. Sociology of Work and Employment

Lecture-3 hours; term paper or discussion-1 hour. Pass 1 restricted to upper division majors and graduate students. Historical and contemporary overview of employment, work, and occupations in American society. Study of authority and power relations, labor markets, control systems, stratification, and corporate structures, and how these factors shape work in diverse or organizational and employment setting. GE credit: SS.

160. Sociology of the Environment (4)

Lecture-3 hours; term paper or discussion-1 hour. Prerequisite: upper-division standing in Sociology strongly recommended. Production, consumption, and urban expansion. Basic social logics surrounding current problems of resource scarcity (environmental extractions) and excess wastes (environmental additions). Ways that society can change and re-organize itself to become more environmentally conscious and hence ecologically sustainable. GE credit: ACGH, DD, SS, WC.

170. Population (4)

Lecture-3 hours; discussion-1 hour or term paper or research project. Introduction to the study of human population, including theories and statistical measures; social causes and consequences of population trends; changes in population structure; geographical distribution, migration, sociopsychological factors affecting fertility. GE credit: SocSci | QL, SS.

171. Sociology of Violence and Inequality (4)

Lecture/discussion-4 hours. Prerequisite: upperdivision standing or consent of instructor. How systems of social inequality organize the practice of violence. Definitions of violence and issues affecting the social capacity for violence. Analysis and comparison of different forms of violence associated with race, class, gender relations and social organization. GE credit: SS.

172. Ideology of Class, Race and Gender (4)

Lecture — 4 hours. Examination of popular belief systems that accompany relations between social classes, whites and blacks, and men and women in the United States. How do dominant groups attempt to justify each relationship, and is there ideological conflict or consensus between groups. GE credit: Div, Wrt | ACGH, DD, SS.

173. Sociology Through Literature (4)

Lecture—3 hours; discussion—1 hour or term paper or research project. Introduction to analysis of literature as sociological data. Reading of numerous works on American and other societies by authors such as Steinbeck, Lewis, Dreiser, Schulberg, Orwell, etc. GE credit: SS.

174. Sociology of the Jewish Experience (4)

Lecture-3 hours; term paper or discussion-1 hour. Prerequisite: upper division standing required. The sociology of Jewish life, analyzing challenges to Jewish identity and community in the diaspora. Diversity within the Jewish community, Americanization, women, new immigrants, post-Holocaust Jewish identity, and Black-Jewish relations. Offered in alternate years. GE credit: SS.

175. Mass Communication (4)

Lecture—3 hours; term paper. Prerequisite: course 1 or 2. Examines the relationship between the media and social structures. History of media-state relations. Media as reflector and shaper of values.

Emphasis on current European and Marxist and pluralist theories rather than on content analysis. Offered in alternate years. GE credit: SS

176. Sociology of Knowledge, Science, and Scientific Knowledge (4)

Lecture-3 hours; term paper or discussion-1 hour. Prerequisite: upper division standing preferred. Social, cultural, and historical dimensions of knowledge, especially scientific knowledge. Problems, methods, and theory in sociology of scientific knowledge. Laboratory and historical case studies. Scientific and technical knowledge in institutional and organizational contexts. (Same course as Science and Technology Studies 176.) GE credit: SS.

180A. Complex Organizations (4)

Lecture—3 hours; discussion—1 hour or term paper or research project. Prerequisite: course 1; Economics 1A and 1B recommended. Develops a sociologi cal approach to organizations theory. Designed to introduce sociological concepts, address the alternative psychological and economic models, and involve students in the practice of organizational analysis. GE credit: SS.

180B. Complex Organizations (4)

Lecture - 3 hours; discussion - 1 hour or term paper or research project. Prerequisite: course 180A or consent of instructor. Builds on concepts and skills developed in course 180A. Deals with the issues of organizational decision making, design, and survival. Emphasis on relations between organizations and the effects of those relations in both the public and private sectors. GE credit: SS.

181. Social Change Organizations (4)

Lecture—3 hours; discussion—1 hour or term paper Prerequisite: course 1. Analysis of organizations with social change and improvement goals and programs, emphasizing voluntary associations and grassroots citizen groups. Topics treated include formation, decision making and leadership, strategies and tactics, factionalism and coalitions, effectiveness. Offered in alternate years. GE credit: Wrt | SS.

182. Experimental and Utopian Communities (4)

Lecture - 3 hours; discussion - 1 hour. The social structure of intentional, experimental or Utopian settlements and communitarian movements, including comparison with other small settlement forms: vil lages, neighborhoods, monasteries, encampments and nonsettlement communities based on occupation, ethnicity, and religion.

183. Comparative Organizations (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 180A or 180B; upper division standing. Examination of economic and political organizations of major industrial nations. Discussion of historical, cultural, social, and political influences on industrial patterns and practices, alternative theoretical models for explaining differential development. Societies may include Šweden, Japan, Germany, Taiwan, and South Korea. Offered in alternate years. GE credit: ACGH, SS, WC.

185. Sociology of Social Welfare (4)

Lecture - 3 hours; discussion - 1 hour or term paper or research project. Sociological analysis of the evolution and current organization of welfare functions in modern societies. GE credit: SS.

188. Social Stratification in China (4)

Lecture-3 hours; term paper. Prerequisite: upper division standing. Social and political systems and patterns of social stratification in relation to change in state power and economic institutions in China since 1949. Offered in alternate years. GE credit: SS. WC.

189. Social Science Writing (4)

Lecture-3 hours; discussion-1 hour or term paper. Prerequisite: course 46A, upper division standing, and 12 units of social science. Improved analytic writing and methods for reporting social science research to a wider public. Sociological analysis of the conditions of good and bad writing. GE credit: SS

190X. Seminar in Sociological Analysis (4)

Seminar — 3 hours; term paper. Prerequisite: upper division standing and course 100 (former course 165A). In-depth examination at an upper division level of a special topic in Sociology. Emphasis on student participation in learning. May not be repeated for credit. Limited enrollment.

191. Workshop in Contemporary Sociological Theory (4)

Lecture - 2 hours; workshop - 1 hour; term paper. Prerequisite: course 100 (former 165A) and senior standing. Workshop in contemporary sociological theory that allows students to explore the uses of theory in empirical inquiry on problems of interest to students. Contemporary theory considered in relation to classical and modern influences, concept formation, theory construction, and explanation. Not open for credit to students who have received credit for course 165B. GE credit: SS

192. Internship and Research Practicum (2-6)

Internship - 6-18 hours. Prerequisite: course 46A, upper division standing, approval of proposed internship and course 193 concurrently or consent of instructor. Supervised internship and study in an agency, organization, or institution; application of sociological concepts to the work experience. May be repeated for credit with consent of instructor. Maximum of 4 units may be counted toward the major. (P/NP grading only.)

193. Workshop in Field Research (2)

Lecture/discussion-2 hours. Prerequisite: course 46A, course 192 or 199 concurrently for two-four units, senior standing. Overview of the process of collecting, recording, analyzing, and reporting qualitative social data. Emphasis on application of principles; each participant completes an original research project. Not open for credit to students who have completed course 194HA. GE credit: SS, WE.

194HB. Special Study for Honors Students

Seminar-3 hours; term paper. Prerequisite: senior standing and admission to the Honors Program. Directed reading, research and writing culminating in the preparation of a Senior Honors Thesis under direction of faculty adviser. (Deferred grading only pending completion of sequence.) GE credit: SS

195. Special Topics in Sociological Analysis (4)

Seminar—3 hours; term paper. Prerequisite: upper division standing and consent of instructor. In-depth examination of topics in sociology. Emphasis on student research and writing. May be repeated for credit when topic differs. GE credit: SS.

197T. Tutoring in Sociology (1-4)

Tutorial - 3-12 hours. Prerequisite: upper division standing; completion of appropriate course with distinction. Activities vary depending on the nature of the course assignment. May include (but not limited to) tutoring on course material, advising on projects and papers, and leading discussion groups. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: open to seniors only. (P/NP grading only.)

Graduate Courses

201. Social Research (4)

Lecture/discussion-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Comparative survey of sociological inquiry, taught as a practicum. Philosophy of social science; values and research; research agendas and research problem formulations; research process; explanations. interpretation; study design; concept formation, measure, sampling, data acquisition, inference; rhetoric and presentation of findings.

206. Quantitative Analysis in Sociology (4)

Lecture - 4 hours. Prerequisite: course 106. Survey of the statistical models and methods that serve as a foundation for quantitative research in sociology, with an emphasis on multivariate regression analysis, as well as measurement theory and time series analysis. (S/U grading only.)—II. (II.)

207A-207B. Methods of Quantitative Research (4-4)

Lecture—3 hours; paper. Prerequisite: course 106 or the equivalent. Principles of study design, examination of measurement, survey research methods and multivariate analysis. Course will stress actual practice of techniques. Students will carry out quantitative data analysis using packaged computer programs. (Deferred grading only, pending completion of sequence.)

208. Topics in Advanced Quantitative Methods in Social Science (4)

Seminar—3 hours; term paper. Prerequisite: course 206 or the equivalent and graduate standing; major graduate student. Analysis of the logic and application of an advanced statistical model; the particular model chosen may vary. Emphasis on the model's assumptions, its strengths and weaknesses, its application for social science inquiry, and the relationship between methods and social theory. May be repeated up to 12 units for credit. Offered in alternate years.

215. Economy, Polity, and Society (4)

Seminar — 3 hours; paper. Prerequisite: consent of instructor. Open to graduate students in sociology and related disciplines. Course introduces students to topics and selected issues in the related fields of economic and political sociology and political econ-

220. Deviance, Law, and Social Control (4)

Seminar - 3 hours; projects. Prerequisite: course 120 or consent of instructor. Report and discussions of literature on selected forms of deviance in relation to law and formal social control. Agency contacts and exploratory research projects.

224. Sociology of Education (4)

Seminar — 3 hours; term paper. Prerequisite: course 206 or the equivalent recommended. Overview of sociological theories accounting for the form, role, and evolution of educational systems. Emphasis on empirical research on education and social stratification and application to educational policy. Topics include tracking, racial/ethnic achievement inequalities, school organization, and the immigrant experience.

225. Cultural Sociology (4)

Seminar—3 hours, term paper. Explores the varied ways in which culture is understood in the social sciences and the research questions that follow from contrasting viewpoints. The approach is historically informed and focused on changing cultural forms in relation to industrialization and post-modernism. Offered in alternate years.

226. Sociological Social Psychology (4)

Seminar - 3 hours; seminar paper - 1 hour. Prerequisite: graduate standing or consent of instructor. Advanced study of the varying approaches, methods, issues and topical concerns of sociological social psychology. Analysis of central and representative historical and contemporary works.

227. Sociology of Reproduction (4)

Lecture—3 hours; discussion—1 hour. Recent social science scholarship in such areas as teenage pregnancy, family planning, abortion, adoption, AIDS, and new reproductive technologies; focus on the current situation in the United States. Offered in alternate years.

230. Ethnic (Race) Relations (4)

Lecture - 3 hours; term paper. Advanced study of the determinants of ethnic groupings and their interrelationships. Major theme will be the patterns of ethnic stratification and causes of ethnic conflict. Specific focus upon dominance and resistance to dominance. Influence of social science research.

233. Gender, Culture, and Local/Global Transformation (4)

Seminar—3 hours; term paper. Focus on critical approach to women and development; analyze local transformations with global connections within specific cultural contexts. Course covers theory, methodological issues, and relationship between theory and practice. Offered in alternate years.

234. Gender, Family, and Society (4)

Seminar — 3 hours; seminar paper. Prerequisite: graduate standing or consent of instructor. The major theoretical traditions and concerns in family sociology and sociology of gender. Analysis of selected classical and contemporary works representative of functionalist, Marxist, psychoanalytic, feminist and critical theoretical approaches to these subjects (e.g., Engels, Parsons, Freud, Horkheimer, Goode, Lasch, Mitchell). Emphasis on macro and historical

242A-242B. Comparative Methods in Historical Sociology (4-4)

Seminar-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Comparative approaches to major historical phenomena such as nationalism, bureaucratization, feudalism, and capitalism; the relevance of psychological and sociological theories to historical interpretation; the verifiability of historically grounded hypothesis; the meaning of analogy, correspondence and causality. (If taken as a sequence, deferred grading only, pending completion of sequence.)

243. Urban Society (4)

Seminar—3 hours; term paper. Broad overview of the issues and concerns of the field of urban sociology. Special emphasis on the human experience of urban living in contemporary, cross-cultural or historical settings.

245. Developing Societies (4)

Seminar-3 hours; term paper or project. Prerequisite: graduate student status or familiarity with problems of developing societies. Analysis of social and economic problems of developing societies from the standpoint of theory and research on modernization and underdevelopment. Nature of third world dependency and interdependence in the global political economy. Offered in alternate years.

248. Social Movements (4)

Seminar—3 hours; term paper. Analysis of current issues in and contributions to the study of collective behavior and social movements; particular focus upon the strategies and tactics of social movements.

254. Sociological Issues in Health Care (4)

Seminar-3 hours; term paper. Prerequisite: open to graduate or professional students. Sociological perspectives and methods directed to health care issues. Students select topics for supervised research. The course will have a theme (described in advance) each time it is offered. Paper on research will be required. (S/U grading only.)

255. Sociology of Law (4)

Seminar-4 hours. Prerequisite: consent of instructor. Analysis of the nature of the legal process and its impact on social behavior. Will consider (1) nature and functions of law, (2) the organization and administration of law, and (3) the capacity of law to affect social behavior.

265A. Classical Sociological Theory (4)

Lecture - 3 hours; discussion - 1 hour. Introduces graduate students to the work of the main classical thinkers in the tradition of social theory, such as Marx, Durkheim, Weber, Simmel, Freud, G.H. Mead, and Parsons, locating them within the historical, cultural, and philosophical milieu in which their ideas originated.

265B. Theory in Contemporary Sociology

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 265A. Explores the uses of theories in contemporary sociology by tracing their connections with classical sociological writings and their relations to broader theoretical concerns of contemporary social thought, with particular emphasis on relevance to the current historical, cultural and social

270. Social Demography (4)

Seminar-4 hours. Prerequisite: course 170 or consent of instructor. How social institutions affect and are affected by the level and variation of mortality, migration, and fertility. Special emphases on the determinants of fertility-related attitudes and behavior, on less-developed countries, and on contemporary empirical studies.

280. Organizations and Institutions (4)

Seminar—4 hours. Theory of formal organizations and bureaucracy. Methods of research in organizational and institutional studies. Historical and comparative analysis of political, religious, educational, military, and economic structure.

290. Seminar (4)

Seminar-3 hours; term paper. (S/U grading only.)

292A-292B. Field Research (4-4)

Seminar-3 hours; field trips. Prerequisite: graduate standing in Sociology or consent of instructor. The process of collecting, analyzing and reporting qualitative social data: techniques of intensive interviewing, participant-observation and document analysis; generating, developing, and evaluating analytic frameworks; recording, storing, retrieving, and writ-ing up qualitative data. Emphasis on application of principles; each participant completes a fieldwork project. (Deferred grading only, pending completion of sequence.)

293. Proseminar in Sociology (2)

Seminar — 2 hours. Prerequisite: first-year Sociology graduate students only. Introduction to graduate training in sociology. A seminar designed to introduce students entering graduate work in the department to its ongoing research activities. (S/U grading only.) -(I.)

295. Special Topics Seminar. (4)

Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Research topics in Sociology. Specific topic will vary according to faculty interest and student demand.

May be repeated for credit when topic differs.—I, II, III. (İ, II, III.)

298. Group Study (1-5)

Prerequisite: consent of instructor. (S/U grading only.)

299. Individual Study (1-12)

(S/U grading only.)

Professional Courses

390A. The Teaching of Sociology (2)

Lecture - 1 hour; discussion - 1 hour. Prerequisite: graduate standing; required for first-time teaching assistants. Practical instruction in teaching methods for qualitative and quantitative courses. Pedagogical issues involved in critical sociological analysis. (S/U grading only.)—I. (I.)

390B. The Teaching of Sociology (2)

Lecture - 1 hour; discussion - 1 hour. Prerequisite: graduate standing. Practical instruction in devising course syllabi, lectures and assignments for Associate-Instructors and others interested in college teaching. Discussion of pedagogical methods of teaching qualitative and quantitative courses. (S/U grading only.) — II. (II.)

396. Teaching Assistant Training Practicum (1-4)

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Professional Course

466. Research Paper Workshop (2)

Workshop - 1.5 hours; discussion - 0.5 hours. Prerequisite: Master of Arts standing. A workshop to assist advanced graduate students in the preparation of an original research paper. Students present their research papers and discuss issues in theory, research design, data, empirical inference, and verbal and written presentation of a professional research paper. (S/U grading only.)

Soil Science

See Geology, on page 321; Soil Science, on page 500; Soils and Biogeochemistry (A Graduate Group), on page 501; and Soil and Water Science, on page

Soil Science

(College of Agricultural and Environmental Sciences) Faculty. See Land, Air and Water Resources, on

Major Programs. See the Soils and Biogeochemistry track in Environmental Science and Manage ment, on page 295.

Minor Program Requirements:

The Department of Land, Air and Water Resources, Soils and Biogeochemistry Program, offers a minor program in soil science. The minor is especially geared toward students in the environmental sciences including Hydrologic Science, Environmental Science and Management, Environmental Toxicology, Ecological Management and Restoration, International Agricultural Development, Crop Science and Management, Environmental Horticulture and Urban Forestry, Geology, and Plant Biology

UNITS

Soil Science	21
Soil Science 1005	
Courses selected from Soil Science 102,	
105, 107, 109, 111, 112, 118, 120, Plant	
Sciences 158, Hydrologic Science 124,	
13416	

Minor Adviser. R.J. Southard (Land, Air and Water Resources)

Graduate Study. Programs of study leading to the M.S. and Ph.D. degrees in Soils and Biogeochemistry are available. Information regarding these programs can be obtained from the graduate advisers, at http://soils.ucdavis.edu/ and in the Graduate Announcement. See also Graduate Studies, on page

Graduate Adviser. Wendy Silk (Land, Air and Water Resources)

Courses in Soil Science (SSC)

Questions pertaining to the following courses should be directed to the instructor, to the Resource Sciences Teaching Center in 1152 Plant and Environmental Sciences Building (530) 752-1669, or see undergraduate and graduate Soils and Biogeochemistry courses at http://lawr.ucdavis.edu/undergrad_sws.htm or http://lawr.ucdavis.edu/graduate_sbg.htm.

Lower Division Courses

10. Soils in Our Environment (3)

Lecture - 3 hours; independent study. Soils in our global ecosystem; soils as natural bodies formed by interactive environmental processes; soil response to use and management; sustainable use of soil resources; role of soils in agricultural and environmental issues; role of soils in our daily lives. Limited enrollment. GE credit: SciEng | QL, SE, SL.—I. (I.) Dahlgren

92. Soil Science Internship (1-12)

Internship - 3-36 hours. Prerequisite: lower division standing and consent of instructor. Work experience off and on campus in soil science. Internship supervised by a member of the faculty. (P/NP grading only.)

Upper Division Courses 100. Principles of Soil Science (5)

Lecture—3 hours; laboratory—3 hours; term paper. Prerequisite: Chemistry 2A-2B, Physics 1A-1B, Biological Sciences 1A; Geology 50, Biological Sciences 1C recommended. Soil as part of natural and managed ecosystems and landscapes. Solid, liquid, and gas phases and their interactions in the soil. Water, gas and heat movement in soil. Soil biology. Plant nutrient acquisition and use. Soil development, management and use. GE credit: QL, SE, SL, VL.-I. (I.) Scow, Southard

102. Environmental Soil Chemistry (3)

Lecture — 3 hours. Prerequisite: course 100 or the equivalent; general chemistry. Soil chemistry processes related to the fate and transport of contaminants in soil. Soil minerals, natural organic matter, surface charge, soil solution chemistry, redox reactions in soil, and sorption of inorganic and organic contaminants. GE credit: QL, SE, SL.-II. (II.) Parikh

105. Field Studies of Soils in California Ecosystems (5)

Prerequisite: courses 100 and 120, or equivalent recommended. Field-based studies of soils in California ecosystems, away from campus, throughout California. Emphasis on description and classification of soils; relationships among soils, vegetation, geology, and climate; physical, chemical, and biological processes in soils on the landscape; and the role of soils in land use. May be repeated one time for credit. GE credit: QL, SE, SL, VL, WE.—IV. (IV.) Amundson, Dahlgren, O'Geen, Southard

107. Soil Physics (5)

Lecture—3 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: course 100, Environmental and Resource Sciences 100, Mathematics 16A, or the equivalent. Physical properties of soil. Principles of water, gas, heat, and solute movement in soil with selected examples related to soil and water management. Influence of soil properties on transfer processes. GE credit: SE. - I. (I.) Hopmans

109. Sustainable Nutrient Management (4) Lecture - 3 hours; laboratory - 3 hours. Prerequisite: course 100 or the equivalent. Availability of nutrients in organic and conventional agricultural, vineyard, orchard and plantation forest soils; management of fertilizers, cover crops, compost, sewage sludge and manures for crop production and to prevent loss to the environment is emphasized. GE credit: OL, QL, SE, SL, VL, WE.—III. (III.) Horwath

111. Soil Microbiology (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Chemistry 1C and Biological Sciences 1C. Major groups of microorganisms in soil, their interrelationships, and their responses to environmental variables. Role of microorganisms in cycling of nutrients. Plant-microbe relationships. Transformations of organic and inorganic pollutants. GE credit: QL, SE, SL, WE.—II. (II.) Scow

112. Soil Ecology (3)

Lecture - 2 hours; laboratory/discussion - 2 hours. Prerequisite: Biological Sciences 1B, 1C, course 100. The biology and ecology of soil communities, emphasizing the soil food web and litter decomposi-tion. Role of specific biota, ranging from microorganisms to earthworms. Applications to restoration, remediation, ecosystem science, and agriculture. GE credit: Wrt | SE, SL.—I. (I.) Jaffee

118. Soils in Land Use and the Environment

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 100 or consent of instructor. Soils are considered as elements in land use planning and environ-mental quality. Topics include: soil survey reports, remote sensing, land capability classification, soil erosion/conservation, waste disposal on soils and soil reclamation. One one-day field trip. GE credit: SE, SL.—III. (III.) O'Geen

120. Soil Genesis, Morphology, and Classification (5)

Lecture—4 hours; laboratory—3 hours (includes five one-day weekend field trips). Prerequisite: course 100; Geology 50 recommended. Recognition and description of soils; chemical, biological and physical processes of soil formation. Factors of soil formation. Interactions of soils with diverse ecosystems. Introduction to soil classification. Practice using soil taxonomy. Practical experience describing soil properties in the field. GE credit: QL, SE, SL, VL.-III. (III.) Southard

192. Soil Science Internship (1-12)

Internship - 3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience off and on campus in soil science. Internship supervised by a member of the faculty. (P/NP grading

198. Directed Group Study (1-5)

(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

202. Topics in Advanced Soil Chemistry (3)

Lecture/discussion-3 hours. Prerequisite: undergraduate course in soil chemistry, water chemistry, or consent of instructor. Reviews of current research in soil chemistry. Topics include double layer theory; clay mineral and oxide surface chemistry; adsorp tion on soil surfaces; speciation and modeling of solution ions; solubility and mineral stability diagrams. Discussion of current journal articles. May be repeated one time for credit when topic differs. Offered in alternate years.—II. Parikh

205. Field Studies of Soils in California Ecosystems (5)

Fieldwork-50 hours; discussion-15 hours; lecture—5 hours. Prerequisite: courses 100 and 120 or equivalent recommended. Field-based soil studies in California ecosystems. Description and classification of soils; relationships among soils, vegetation, geology, and climate; physical, chemical, and biological processes; their role in land use. Similar to SSC 105; requires additional work for graduate credit. May be repeated one time for credit if geographic locale changes. Limited enrollment.—IV. (IV.) Amundson, Dahlgren, Southard

208. Soil-Plant Interrelationships (3)

Lecture-3 hours. Prerequisite: course 100, Plant Biology 111B, or consent of instructor. Plant needs, occurrence and reactions of water and mineral nutrients in soils; root systems and their growth in soils; mass flow and diffusion mechanisms in nutrient acquisition; models relating nutrient uptake to soil and plant characteristics; nutrient assimilation and crop quality. Offered in alternate years. - (II.) Rich-

209. Physiology and Ecology of Mycorrhizal Symbioses (3)

Lecture/discussion-3 hours. Prerequisite: Plant Biology 111 or consent of instructor; course 100 recommended. Structure, function and evolutionary development of mycorrhizal fungi and the root-fungal symbiosis. Emphasis on regulation of carbon and nutrient exchanges between host and symbiont. Course integrates mycorrhizal physiology and ecology in an ecosystem context. Offered in alternate years. — (I.) Bledsoe

211. Advanced Soil Microbiology (3)

Lecture - 3 hours. Prerequisite: Chemistry 8A-8B; course 111; Biological Sciences 102, 103 or an equivalent course recommended. Microbial metabolism of organic chemicals in soil, both natural and xenobiotic. Decomposition of organic matter. Kinetics of microbial processes in soil. Offered in alternate years. — (III.) Scow

216. Physical Geochemistry (3)

Lecture - 3 hours. Prerequisite: course 102 or Chemistry 110A or Geology 115 and Mathematics 119. First half emphasizes equilibrium thermodynamics, including choices of standard states, ideal solutions,

and use of the Gibbs-Duhem relation. Second half covers geochemical kinetics including simple rate laws, transition state theory, solute diffusion, and experimental methods.—I. (I.) Casey

218. Soil Erosion and Conservation (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: graduate standing; courses 118, 120. Processes of soil erosion by wind and water in agricultural areas, and methods of soil conservation will be discussed. Methods of predicting rates of soil erosion will be considered. Offered in alternate years.—(II.) Singer

219. Ecosystem Biogeochemistry (4)

Lecture—3 hours; laboratory/discussion—2 hours. Prerequisite: introductory courses in ecology/biology and soils recommended; undergraduates accepted with consent of instructor. Multidisciplinary analysis of energy and nutrient transfers within ter restrial ecosystems. Examination of processes and inter- and intra-system interactions between the atmosphere, biosphere, lithosphere and hydrosphere. Laboratory section uses biogeochemical simulation models to examine case studies. (Same course as Ecology 219.)-III. (III.) Houlton

220. Pedology (3)

Lecture—3 hours. Prerequisite: consent of instructor; course 120 recommended. Topics selected from studies of soil-forming processes, soil-geomorphic relations, mineral weathering, new developments in soil classification, and development of pedologic theory. Topics vary from year to year. May be repeated one time for credit. Offered in alternate years. — (I.) Southard

222. Global Carbon Cycle (3)

Lecture - 3 hours. Prerequisite: Chemistry 8A, 8B, Mathematics 16A, 16B, course 100 or the equivalent. Global carbon cycle from Phanerozoic epoch to modern times. Examination of long and short-term carbon cycles. Transfer of carbon among ocean, land and life with emphasis on humic substance formation, methods of characterization, reactions with organics and soil carbon stabilization. Offered in alternate years.—II. Horwath

290. Special Topics in Soil Science (1-4)

Seminar - 1-4 hours. Prerequisite: graduate standing. Seminars and critical review of problems, issues, and research in soil science. May be repeated for credit. (S/U grading only.)-I, II, III. (I,

298. Group Study (1-5)

Prerequisite: consent of instructor.

299. Research (1-12)

(S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Soils and **Biogeochemistry** (A Graduate Group)

A.Toby O'Geen, Ph.D., Chairperson of the Group Group Office. 1152 Plant & Environmental Sciences Building (530) 752-1669; http://soils.ucdavis.edu/; http://lawr.ucdavis.edu/ssgg/index.htm

Eduardo Blumwald, Ph.D., Professor (Plant Sciences) Patrick Brown, Ph.D., Professor (Plant Sciences) William Casey, Ph.D., Professor (Chemistry)

Randy Dahlgren, Ph.D., Professor Academic Senate Distinguished Teaching Award Valerie Eviner, Ph.D., Assistant Professor (Plant Sciences)

Graham Fogg, Ph.D., Professor Mark Grismer, Ph.D., Professor Peter Hernes, Ph.D., Associate Professor Jan Hopmans, Ph.D., Professor William Horwath, Ph.D., Professor Ben Houlton, Ph.D., Assistant Professor Louise Jackson, Ph.D., Professor Mark Matthews, Ph.D., Professor

(Viticulture and Enology)
Alexandra Navrotsky, Ph.D., Professor
Parikh, Sanjai, Ph.D., Assistant Professor
Eliska Rejmankova, Ph.D., Professor
(Environmental Science and Policy)

(Environmental Science and Policy) James Richards, Ph.D., Professor Kate Scow, Ph.D., Professor Kenneth Shackel, Ph.D., Professor (*Plant Sciences*) Wendy Silk, Ph.D., Professor Johan Six, Ph.D., Professor (Plant Sciences) David Smart, Ph.D., Associate Professor

(Viticulture and Enology) Randal Southard, Ph.D., Professor Kerri Steenwerth, Ph.D., Adjunct Assistant Professor (Viticulture and Enology)

Shrinivasa Upadhyaya, Ph.D., Professor (Agricultural & Biological Engineering) Susan Ustin, Ph.D., Professor Chris van Kessel, Ph.D., Professor (Plant Sciences)

Emeriti Faculty

Caroline Bledsoe, Ph.D., Professor Emeritus André Läuchli, Ph.D., Professor Emeritus Roland Meyer, Ph.D., Professor Emeritus Michael Singer, Ph.D., Professor Emeritus

Affiliated Faculty

Victor Claassen, Ph.D., Associate Researcher Stephen Grattan, Ph.D., Water Relations Specialist Krassimira Hristova, Ph.D. Assistant Researcher Jeffrey P. Mitchell, Ph.D., Specialist in Cooperative Extension (Plant Sciences)

A. Toby O'Geen, Ph.D., Specialist in Cooperative Extension

G. Stuart Pettygrove, Ph.D., Soils Specialist Ken Tate, Ph.D., Specialist in Cooperative Extension (Plant Sciences)

Graduate Study. The Soils and Biogeochemistry Graduate Group offers programs of study and research leading to the M.S. and Ph.D. degrees. The focus of Soils and Biogeochemistry is on the physical, chemical and biological processes occurring in soils of different landforms and ecosystems. The goal is to understand the complex processes of mass and energy flow that control agricultural and natural ecosystem functions, productivity, and sustainability. Investigations assess impacts and implications of natural processes and anthropogenic effects, such as climate change, on soil and ecosystem behavior and development. Examples include: fate and emission of greenhouse gases; soil carbon sequestration; fate and transport of native and applied chemicals; soil microbial ecology; nutrient uptake and management; nutrient cycling in managed and wildland ecosystems; pesticide and trace element adsorption on surfaces; mineral weathering; organic agriculture; bioavailability of toxics; soil erosion; conservation; ecosystem productivity and sustainability; and the study of soil evolution on the landscape. These studies are carried out within a framework of integrating applied chemical, physical, mathematical, and biological sciences

Graduate Advisers. Wendy Silk, Ph.D.; Kate

Graduate Admissions Officer. Randy Southard,

Soil and Water Science

(College of Agricultural and Environmental Sciences) This major has been discontinued as of Fall 2008; see Environmental Science and Management, on page 295.

Spanish and **Portuguese**

(College of Letters and Science)

Cecilia Colombi, Ph.D., Chairperson of the Depart-

Department Office. 215 Sproul Hall; (530) 752-0835; http://spanish.ucdavis.edu

Faculty

Marta E. Altisent, Ph.D., Professor Emilio Bejel, Ph.D., Professor Leopoldo Bernucci, Ph.D., Professor Robert Blake, Ph.D., Professor Travis Bradley, Ph.D., Associate Professor Cecilia Colombi, Ph.D., Professor Linda Egan, Ph.D., Professor Cristina González, Ph.D., Professor Robert Irwin, Ph.D., Professor Michael Lazzara, Ph.D., Associate Professor Adrienne Martín, Ph.D., Professor Cristina Martínez-Carazo, Associate Professor Robert Newcomb, Ph.D., Assistant Professor Ana Peluffo, Ph.D., Associate Professor

Emeriti Faculty

Samuel G. Armistead, Ph.D., Professor Emeritus Zunilda Gertel, Ph.D., Professor Emerita Fabián A. Samaniego, M.A., Senior Lecturer Emeritus

Hugo J. Verani, Ph.D., Professor Emeritus

Affiliated Faculty

Francisco Alarcón, M.A., Lecturer Norma López-Burton, M.A., Lecturer Charles Oriel, Ph.D., Lecturer

The Major Program

The Spanish major program assures proficiency in all four language skills-speaking, understanding, reading, and writing-and acquaints students with the intellectual and cultural contributions of the Spanishspeaking world through a study of its language, literature, and cultural productions.

The Program. The department's lower division program gives students a solid foundation in the Spanish language, either through the traditional elementary and intermediate language series or through an accelerated three-course sequence of Spanish for native speakers. Linguistics 1 introduces students to a systematic study of language in general and serves as an introduction to upper division courses in Spanish linguistics. At the upper division level, students receive a broad introduction to basic concepts and the practice of literary and cultural criticism and to the four areas of study represented in the department's curriculum: Spanish linguistics Spanish literature and culture, Latin-American literature and culture, and Latino literatures and cultures in the United States. Students are encouraged to work closely with the department's academic advisers in designing a program of studies tailored to their individual needs and interests. Many students combine the Spanish major with another major in the humanities or social sciences.

Student Learning Outcomes. Educational

- Demonstrate effective communicative skills in Spanish in the Interpersonal, Interpretative and Presentational modes.
- Demonstrate cultural awareness with respect to the diversity of the Spanish speaking world by comprehending Spanish for native speakers in a variety of settings, types of discourse, topics, registers, and broad regional variations
- Demonstrate awareness of genre and register in an oral and written mode.
- Demonstrate analytic, interpretive and critical thinking skills with respect to linguistics, literature and cultural studies.

Career Alternatives. The program, alone or in combination with other major programs, may lead to advanced study of the language or literature and culture of Spain and Spanish America, and to careers not only in teaching, but also in other professions such as library science, law, medicine, and in government, social service, business, or international relations.

A.B. Major Requirements:

UNITS

Depth Subject Matter 45-48

One course in each of the following five

Spanish 117, 174, 176, or 177 4
Students place: Students planning to take Spanish 110 should do so at the beginning of the upper division sequence or concurrently with Spanish 100, 100S, 141, 141S, 170 or

Seven elective courses to be chosen in consultation with the student's major

Students may, with the approval of their adviser, take up to two elective courses outside the Spanish department in such programs as Anthropology (Anthropology 144), Chicana/o Studies (Chicana/o Studies 154, 155, 156, 160, 170, 171), Comparative Literature (Comparative Literature 152, 165, Education (Education 151, 152), History (History 159, 160, 161A, 161B, 164, 165, 166A, 166B, 167, 168, 169A, 169B), Linguistics (Linguistics 166), Native American Studies (Native American Studies 120, 133, 184), Art History (Art History 151), African American and African Studies (African American and African Studies 107A, 180). A maximum of six units of course 199 may be counted toward the major. Course 199 cannot be used to replace regular departmental courses.

Total Units for the Major......49-85

Major Advisers. Consult Department.

Advising. Given the great flexibility in the Spanish major, it is important that students design their programs in close consultation with their major adviser. This is especially important for students who intend to use their major as preparation for graduate study, for those who are planning a teaching career, and

for those who wish to take advantage of our EAP

Minor Program Requirements:

UNITS Spanish 23-24

One course in each of the following five
areas:
Spanish 100, 100S, 141, 141S, 170, or
170S4
Spanish 111N, 115, or 116 3-4
Spanish 130, 131N, 134A, or 142 4
Spanish 150N, 151, 157, 159 or
15984
Spanish 117, 174, 176, or 177 4
One upper division elective in
Spanish
Consult a departmental adviser if any of
these courses are to be taken abroad.

Honors Program. Candidates for high or highest honors in Spanish must write a senior thesis under the direction of a faculty member. For this purpose, honors candidates must enroll in at least six units of Spanish 194H distributed over two quarters. Normally, a student will undertake the honors project during the first two quarters of the senior year; other arrangements must be authorized by the department chair. Only students who, at the end of their junior year (135 units), have attained a cumulative GPA of 3.500 in courses required for the major will be eligible for the honors program. The requirements for earning high and highest honors in Spanish are in addition to the regular requirements for the major in Spanish.

Education Abroad Program Options. The department encourages its majors to consider study in a Spanish-speaking country with our Education Abroad Program [EAP]. It is now possible for our stu-dents to complete significant portions of the Spanish major in the EAP centers at both the lower (Preparatory Subject Matter) and upper division levels through newly introduced options.

UC Davis Quarter Abroad. The Quarter Abroad Program offers programs in Mendoza, Argentina and in Madrid, Spain. These programs aim at providing students with opportunities to increase their knowledge of the Spanish language and cultures by experiencing the life-learning challenges of living and studying abroad.

Students will earn 15-22 UC Davis units toward the Spanish major, minor, or foreign language requirement. Each program may offer an upper division course taught by the UC Davis Program Director focusing on history, culture and society.

For more information, contact C. Colombi or C. Martínez-Carazo or see http://quarterabroad.ucdavis.edu.

Teaching Credential Subject Representative. C. Colombi; see the Teaching Credential/M.A. Program on page 115.

Graduate Study. The Department offers courses leading to the M.A. degree in Spanish to students who have completed with distinction the A.B. degree in Spanish, or the equivalent. Candidates will be recommended for admission to graduate studies in Spanish provided they meet the requirements of the Graduate Studies office and the Department of Spanish. The Department also offers programs of study and research leading to the Ph.D. degree. Detailed information may be obtained by writing to the Chairperson or the Graduate Director of the Spanish Department.

Graduate Adviser. Consult Department.

Prerequisite Credit. Credit normally will not be given for a course if that course is the prerequisite of a course already successfully completed. Exceptions can be made by the Department Chairperson only.

Courses in Portuguese (POR) Lower Division Courses

1. Elementary Portuguese (5)

Lecture/discussion-5 hours; laboratory-1 hour. Introduction to Portuguese grammar and development of all language skills in a cultural context with special emphasis on communication. Students who have successfully completed Portuguese 2 or 3 in the 10th or higher grade of high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student's P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed. GE credit: WC.—I. (I.)

2. Elementary Portuguese (5)

Lecture/discussion-5 hours; laboratory-1 hour. Prerequisite: course 1. Continuation of course 1 in the areas of grammar and development of all basic language skills in cultural context with special emphasis on communication. GE credit: WC.-II.

3. Elementary Portuguese (5)

Lecture/discussion-5 hours; laboratory-1 hour. Prerequisite: course 2. Continuation of course 2 in the areas of grammar and development of all basic language skills in cultural context with special emphasis on communication. GE credit: WC.-III. (III.)

21. Intermediate Portuguese (5)

Lecture/discussion—5 hours; laboratory—1 hour. Prerequisite: course 3. Review and develop the grammar, vocabulary, and composition acquired in first year Portuguese through exercises and reading of modern texts. GE credit: WC.—I. (I.) Bernucci

22. Intermediate Portuguese (5)

Lecture/discussion-5 hours; laboratory-1 hour. Prerequisite: course 21. Continuation of course 21. Focus on more difficult grammar concepts and further composition practice. Development of all language skills through exercises and reading of modern texts. GE credit: WC.-II. (II.) Bernucci

23. Portuguese Composition I (4)

Lecture — 3 hours; extensive writing. Prerequisite: course 22. Development of writing skills by way of reading, discussion, and analysis of authentic materials, literary texts, and videos. Selective review of grammar. Class activities include composition, journals, letters, individual and group projects. GE credit: WC, WE.—III. (III.)

31. Intermediate Portuguese for Spanish Speakers (4)

Lecture/discussion—3 hours; laboratory—1 hour. Prerequisite: course 3 or the equivalent, or consent of instructor. Development of linguistic and learning skills required for Spanish-speaking students in upper-division courses in Portuguese. — II. (II.)

Upper Division Courses

100. Principles of Luso-Brazilian Literature and Criticism (4)

Lecture — 3 hours; term paper. Prerequisite: course 3 or Spanish 24, 24S or 33. Principles of literary criticism applied to the study of fiction, poetry, and essays of major literary writers of the Luso-Brazilian world. GE credit: AH, WC, WE.—I. (I.) Newcomb

159. Special Topics in Luso-Brazilian Literature and Culture (4)

Lecture -3 hours; term paper. Prerequisite: course 3or Spanish 24, 24S or 33. Special Topics in Luso-Brazilian Literature and Culture. May be repeated one time for credit. GE credit: AH, WC, WE.-I, II. (I, II.) Bernucci, Newcomb

161. Luso-Brazilian Literature and Culture

Lecture/discussion-3 hours; term paper. Prerequisite: first year Portuguese or the equivalent. Colonial Brazilian literature survey. Readings include 16th-18th centuries manuscripts and books of cultural importance in a society dominated by censorship and with no printing presses. Study of the role literary Academies played in the so called "culture of manuscripts." GE credit: AH, WC, WE.-III. (III.) Bernucci, Newcomb

162. Introduction to Brazilian Literature (4)

Lecture/discussion—3 hours; term paper. Prerequisite: first year Portuguese or the equivalent. Narrative and poetic texts of the 19th and 20th centuries in Brazil. In-depth and comparative study of Romantic and (Neo) Naturalist movements as a forum for discussion about literary tradition and modernity in Latin America. GE credit: AH, WE.—I. (I.) Bernucci, Newcomb

163. 20th C Masters in Brazilian Literature (4)

Lecture/discussion-3 hours; term paper. Prerequisite: first year Portuguese or the equivalent. Over view of modern Brazilian literature from early 20th C to the poetry by João Cabral de Melo Neto and the Concretists (1960s), including European avantgarde movements and literary and cultural manifestos leading to a revolutionary body of literature. GE credit: AH, WC, WE.-II. (II.) Bernucci, Newcomb

198. Directed Group Study (1-5)

Prerequisite: consent of instructor and Department Chairperson. (P/NP grading only.) GE credit: AH, WC, WE.—I, II. (I, II.) Bernucci

Courses in Spanish (SPA)

Course placement. Students with two years of high school Spanish normally take Spanish 2, those with three years take Spanish 3, and those with four ears take Spanish 21. It is recommended that transfer students who have successfully completed a twoyear sequence at the junior college level continue their study by taking Spanish 24, 24S, 100, 100S, 141, 141S, 170, or 170S. Consult a departmental

Lower Division Courses

1. Elementary Spanish (5)

Lecture/discussion-5 hours; laboratory-1 hour. Introduction to Spanish grammar and development of all language skills in a cultural context with special emphasis on communication. Not open for credit to students who have completed course 1S. Students who have successful completed Spanish 2 or 3 in the 10th or higher grade of high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student's P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed. GE credit: WC.-I, II, III. (I, II, III.)

1A. Accelerated Intensive Elementary Spanish (15)

Lecture/discussion - 15 hours. Introduction to Spanish grammar and development of all language skills in a cultural context with emphasis on communication. Special 12-week accelerated, intensive summer session course combining the work of courses 1, 2 and 3. Not open to students who have completed course 1, 1S, 2, 2S, 3 or 3S. GE credit: WC.-IV. (IV.) López-Burton

1S. Elementary Spanish (5)

Lecture/discussion-5 hours; laboratory-1 hour. Introduction to Spanish grammar and development of all language skills in a cultural context with special emphasis on communication. Offered in a Spanish speaking country under the supervision of a UC Davis faculty/lecturer. Not open for credit to students who have completed course 1. GE credit:

2. Elementary Spanish (5)

Lecture/discussion-5 hours; laboratory-1 hour. Prerequisite: course 1 or 1S. Continuation of courses 1 and 1S in the areas of grammar and basic language skills. Not open for credit to students who have completed course 2S. GE credit: WC.-I, II, III.

2S. Elementary Spanish (5)

Lecture/discussion-5 hours; laboratory-1 hour. Prerequisite: course 1 or 1S. Continuation of Spanish 1 in the areas of grammar and basic language

skills. Offered in a Spanish speaking country under the supervision of UC Davis faculty/lecturer. Not open for credit to students who have completed course 2. GE credit: WC.-III.

2V. Elementary Spanish (5)

Lecture/discussion-3 hours; web electronic discussion - 2 hours. Prerequisite: course 1 or 1S. Continuation of course 1 or 1S in the areas of grammar and basic language skills. Hybrid format combining classroom instruction with technologically based materials. Not open to students who have taken course 2 or 2S. GE credit: WC.-I, II, III, IV. (I, II, III,

3. Elementary Spanish (5)

 $\label{lecture} Lecture/discussion - 5 \ hours; laboratory - 1 \ hour.$ Prerequisite: course 2 or 2S. Completion of grammar sequence and continuing practice of all language skills using cultural texts. Not open for credit to students who have completed course 3S. GE credit: WC.-I, II, III. (I, II, III.)

3S. Elementary Spanish (5)

Lecture/discussion-5 hours; laboratory-1 hour. Prerequisite: course 2 or 2S. Completion of grammar sequence and continuing practice of all language skills using cultural texts. Offered in a Spanish speaking country under the supervision of UC Davis faculty. Not open for credit to students who have completed course 3. GE credit: WC.-III. (III.)

3V. Elementary Spanish (5)

Lecture/discussion—3 hours; web electronic discussion—2 hours. Prerequisite: course 2, 2S, or 2V. Completion of grammar sequence and continuing practice of all language skills using cultural texts Hybrid format combining classroom instruction with technologically based materials. Not open to students who have taken course 3 or 3S. GE credit: WC.-I, II, III, IV. (I, II, III, IV.)

8. Elementary Spanish Conversation (2)

Discussion—3 hours. Prerequisite: course 3; course 21 (concurrently) recommended. Designed to develop oral communication skills. Emphasis on increasing vocabulary, improving listening compre hension, pronunciation, accuracy and grammar control. Practice of everyday situations. Not open to native speakers or to upper division students. GE credit: OL, WC.-I, II, III. (I, II, III.)

21. Intermediate Spanish (5)

Lecture/discussion-5 hours; laboratory-1 hour. Prerequisite: course 3 or 3S. Review and develop the grammar, vocabulary and composition acquired in the first year through exercises and reading of modern texts. Students transferring from other institutions are recommended to start the second year program at this point. Not open for credit to students who have completed course 21S. GE credit: WC.-1, II, III. (I, II, III.)

215. Intermediate Spanish (5)

Lecture/discussion-5 hours; laboratory-1 hour. Prerequisite: course 3 or 3S. Review and develop the grammar, vocabulary and composition acquired in the first year through exercises and reading of modern texts. Students transferring from other institutions are recommended to start the second year program at this point. Not open for credit to students who have completed course 21. GE credit: WC. –

21V. Intermediate Spanish (5)

Lecture/discussion-3 hours; web electronic discussion-2 hours. Prerequisite: course 3, 3S, or 3V. Not open to students who have taken course 21 or 21S. Continuation of courses 3 or 3V in the areas of grammar and basic language skills. Hybrid format combining classroom instruction with technologically based materials where learning takes place both face-to-face and online. Not open to students who have taken course 21 or 21S. GE credit: WC.—I, II, III. (I, II, III.)

22. Intermediate Spanish (5)

 $\label{lecture} \mbox{Lecture/discussion-5 hours; laboratory-1 hour.}$ Prerequisite: course 21 or 21S. Continuation of course 21 and 21S. Focus on more difficult grammar concepts and further practice on composition. Development of all language skills through exercises and reading of modern texts. Not open for credit to students who have completed course 22S. GE credit: WC.—I, II, III. (I, II, III.)

225. Intermediate Spanish (5)

Lecture/discussion-5 hours; laboratory-1 hour. Prerequisite: course 21 or 21S. Continuation of course 21 and 21S. Focus on more difficult grammar concepts and further practice on composition. Development of all language skills through exercises and reading of modern texts. Offered in a Spanish speaking country under the supervision of UC Davis faculty. Not open for credit to students who have completed course 22. GE credit: WC.-III. (III.)

23. Spanish Composition I (4)

Lecture—3 hours; extensive writing. Prerequisite: course 22 or 22S. Development of writing skills by way of reading, discussion, and analysis of authentic materials, literary texts, and videos. Selective review of grammar. Composition, journals, individual and group projects. Not open for credit to students who have completed 23S. GE credit: WC, WE.—I, II, III. (I, II, IIİ.)

23S. Spanish Composition I (4)

Lecture - 3 hours; extensive writing. Prerequisite: course 22. Development of writing skills by way of reading, discussion, and analysis of authentic materials, literary texts, and videos. Selective review of grammar. Composition, journals, individual and group projects. Course is taught in a Spanish speaking country. Not open for credit to students who have completed course 23. GE credit: WC, WE.-

24. Spanish Composition II (4)

Lecture—3 hours; extensive writing. Prerequisite: course 23 or 23S. Development of advanced level writing skills, with emphasis on how to write argumentative prose, essays, and research papers. Introduction to the analysis of literary genres. Compositions, journals, individual and group projects. Not open for credit to students who have com pleted course 24S. GE credit: WC, WE.-I, II, III. (I,

245. Spanish Composition II (4)

Lecture - 3 hours; extensive writing. Prerequisite: course 23. Development of advanced level writing skills, with particular emphasis on how to write argumentative prose, essays, and research papers. Introduction to the analysis of literary genres. Compositions, journals, individual and group projects. Course is taught in a Spanish speaking country. Not open for credit to students who have completed course 24. GE credit: WC, WE.-III.

28. Intermediate Spanish Conversation (2)

Discussion—3 hours. Prerequisite: course 8 or 22. Continuation of course 8. Designed to develop oral communication skills at a more advanced level. Practice in more complex situations. (Former course 9.) GE credit: OL, WC.-I, II, III. (I, II, III.)

31. Intermediate Spanish for Native Speakers I (5)

Lecture/discussion-3 hours; tutorial-1 hour; frequent writing assignments. Prerequisite: course 3 or the equivalent, or consent of instructor. First course of a three-quarter series designed to provide bilingual students whose native language is Spanish with the linguistic and learning skills required for successfully completing upper division courses in Spanish. Intensive review of grammar and composition. GE credit: OL, WC, WE.-I. (I.)

32. Intermediate Spanish for Native Speakers II (5)

Lecture/discussion-3 hours; tutorial-1 hour; frequent writing assignments. Prerequisite: course 31 or consent of instructor. Continuation of intensive review of grammar and composition. Development of all language skills through reading of modern texts, presentation/discussion of major ideas, vocabulary expansion, and writing essays on topics discussed. Designed for students whose native language is Spanish. (Former course 7B.) GE credit: OL, WC, WE.—II. (II.)

33. Intermediate Spanish for Native Speakers III (5)

Lecture/discussion-3 hours; tutorial-1 hour; frequent writing assignments. Prerequisite: course 32 or consent of instructor. Development of writing skills. with emphasis on experimenting with various writing styles: analytical, argumentative, and creative. Analytical review of literary genres. Written essays will be assigned. Students will develop a research paper. Designed for students whose native language is Spanish. (Former course 7C.) GE credit: OL, WC, WE. —III. (III.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor and Department Chairperson. Primarily for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses 100. Principles of Hispanic Literature and Criticism (4)

Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 24 or 24S or 33. Principles of literary criticism applied to the study of fiction, drama, poetry, and essay of major literary writers of the Hispanic world. Not open for credit to students who have completed course 100S. GE credit: AH, OL, WC, WE.-I, II, III. (I, II, III.)

100S. Principles of Hispanic Literature and Criticism (4)

Lecture - 3 hours; extensive writing or discussion - 1 hour. Prerequisite: course 24 or 33. Principles of literary criticism applied to the study of fiction, drama, poetry and essay of major literary writers of the Hispanic world. Offered in a Spanish speaking country under the supervision of a UC Davis faculty/lecturer. Not open for credit to students who have completed course 100. GE credit: AH, OL, WC, WE.-III.

110. Advanced Spanish Composition (4)

Lecture - 3 hours; frequent writing assignments. Prerequisite: course 24 or 33. Practice in expository writing with emphasis on clarity and idiomatic expression. Practical application and review of selected grammar topics. (Part of former courses 110A and 110B.) GE credit: WE.—I, II, III. (I, II, III.)

111N. The Structure of Spanish: Sounds and Words (3)

Lecture-3 hours. Prerequisite: Linguistics 1 and course 24 or 33, or consent of instructor. A linguistic description of the sound patterns of Spanish and how those sounds can be used to form larger units, such as morphemes and words. Theoretical and practical comparisons with English and with other Romance languages. (Former course 132.) GE credit: SS.-I, II, III. (I, II, III.)

112N. The Structure of Spanish: Words and Phrases (3)

Lecture - 3 hours. Prerequisite: course 111N. A study of Spanish word and phrase structure, with special emphasis on the constituent structure of noun and verb phrases. Theoretical and practical comparisons with English and with other Romance languages. (Former course 131.) GE credit: SS.-II, III. (II, III.) Blake, Colombi

113. Spanish Pronunciation (4)

Lecture—3 hours; term paper. Prerequisite: Linguistics 1 and course 24 or 33. The sound structure of modern Spanish; theoretical analysis of selected problems in pronunciation. Strongly recommended for prospective teachers of Spanish. GE credit: SS. – I, II, III. Bradley

114N. Contrastive Analysis of English and Spanish (4)

Lecture-3 hours; extensive writing. Prerequisite: Linguistics 1 and course 24 or 33, or consent of instructor; courses 111N and 112N recommended. Contrastive analysis of English and Spanish, error analysis, introduction to structuralist and transformational linguistics. Individual and group conferences. (Former course 137.) GE credit: SS.—III. (III.) Colombi

115. History of the Spanish Language (4)

Lecture — 3 hours; extensive writing or discussion — 1 hour. Prerequisite: course 24 or 24S or 33 and Linguistics 1 or consent of instructor. The Spanish language from its roots in spoken Latin to modernity. Emphasis on the close relationship between historical events and language change, and the role that literature plays in language standardization. Not open for credit to students who have completed course 115S. GE credit: AH or SS.—I, II. (I, II.) Blake

115S. History of the Spanish Language (4)

Lecture - 3 hours; extensive writing or discussionhour. Prerequisite: course 24 or 33 and Linguistics 1 or consent of instructor. The Spanish language from its roots in spoken Latin to modernity. Emphasis on the close relationship between historical events and language change, and the role that literature plays in language standardization. Offered in a Spanishspeaking country under the supervision of a UC Davis faculty/lecturer. Not open for credit to students who have completed course 115. GE credit: AH or SS.-III.

116. Applied Spanish Linguistics (4)

Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: Linguistics 1 and course 24 or 33, or consent of instructor. Exploration of the major theoretical and practical issues concerning learning Spanish as a second language. For students interested in teaching Spanish as a career. GE credit: SS.—I, II. (I, II.) Blake, Colombi

117. Teaching Spanish as a Native Tongue in the U.S.: Praxis and Theory (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: Linguistics 1; course 24, 24S or 33 or consent of the instructor. Designed for students interested in teaching Spanish to native speakers. Focus on cultural diversity of the Spanish speaking population in the United States; applied language teaching methodologies in the context of teaching Spanish to native speakers at different levels. Offered in alternate years. GE credit: OL.-I, II, III. Colombi

118. Topics in Spanish Linguistics (4)

Lecture — 3 hours; term paper. Prerequisite: courses 111 and 112. A study of specialized topics in Spanish linguistics, for example: language and use; text and context; language and society; bilingualism; Spanish dialectology; syntax and semantics. May be repeated one time for credit when topic differs. GE credit: SS.-III. (III.)

123. Creative Writing in Spanish (4)

Discussion-4 hours. Prerequisite: course 24 or 33, or consent of instructor. Intensive writing of poetry or fiction in Spanish or in a bilingual (Spanish/English) format. Students will write both in prescribed forms and in experimental forms of their own choosing. Offered in alternate years. GE credit: WE. - (III.) Alarcón

130. Survey of Spanish Literature to 1700 (4)

Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Survey of Spanish literature (narrative, poetry and drama) to 1700, Emphasis on the multicultural birth of the Spanish culture, the formation and growth of the Spanish language and letters through its written records and the literature of the early period. GE credit: AH, WC.-I. (I.) Martín

131N. Survey of Spanish Literature: 1700 to Present (4)

Lecture—3 hours; term paper or discussion—1 hour.
Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Survey of modern Spanish literature, providing an overview of main literary movements (romanticism, realism, naturalism, modernism, avantgarde). Emphasis on the philosophical and historical background and on the European context for modern Spanish literature. (Part of former courses 104A and 104B.) GE credit: AH, WC.-II. (II.) Altisent

132. Golden Age Drama and Performance (4)

Lecture – 1.5 hours; performance instruction – 1.5 hours. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Golden Age drama: text and performance. Study of Spanish Baroque drama as performance art. Close reading of plays and related aspects of seventeenth-century theater: theatrical spaces, staging, performance, actors, public, language, costumes. Final project is performance of a play. May be repeated two times for credit. Limited enrollment. Offered in alternate years. GE credit: AH, OL, VL, WC.-II, III. Martín

133N. Golden Age Literature of Spain (4)

Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Introduction to the study of the principal authors and literary movements of 16th- and 17th-century Spain and Spanish American colonial literature. May be repeated three times for credit with consent of instructor. GE credit: AH, OL, WC, WE.-II. (II.) Martín

134A. Don Quijote I (4)

Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Critical interpretation of Don Quijote Part One by Cervantes. Focused study of key elements within the socio-cultural context of Golden Age Spain. Don Quijote as prototype for the modern novel. Offered in alternate years. GE credit: AH, WC, WE.—(I, II.) Martín

134B. Don Quijote II (4)

Lecture—3 hours; term paper. Prerequisite: course 134A. Critical interpretation of Don Quijote Part Two by Cervantes. Focused study of key elements within the socio-cultural context of Golden Age Spain. Don Quijote as prototype for the modern novel. Offered in alternate years. GE credit: AH, WC, WE.-II, III. Martín

135N. Spanish Romanticism (4)

Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Romanticism as a philosophical concept, and as a literary movement in Spain, with emphasis on its distinctive, specific "romantic" qualities and its literary expression in five leading authors of the early nineteenth century. (Former course 114.) GE credit: AH, WC.—III. (III.) Altisent

136N. The Spanish Novel of the 19th Century (4)

Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Literary realism in Spain, focusing on Leopoldo Alas (Clarín), Emilia Pardo Bazán and Benito Pérez Galdós unique characteristics of Spanish realism and its historical roots in Cervantes and the picaresque. GE credit: AH, WC, WE.-II. (II.) Altisent

137N. Twentieth-Century Spanish Fiction

Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Study of the main literary trends and authors of the modern Spanish novel and short story. Selected works by Unamuno, Valle-Inclán, Sender, Cela, Matute, Ayala and others. GE credit: AH, WC, WE.—III. (III.) Altisent

138N. Modern and Contemporary Spanish Poetry (4)

Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Study of the main literary trends and authors of modern and contemporary Śpanish poetry. Selected works by Machado, Juan Ramón Jiménez, García Lorca Guillén, Aleixandre, Hernández Hierro and others. (Former course 120C.) Offered in alternate years. GE credit: AH, OL, WC. – (III.) Altisent

139. Modern Spanish Theater (4)

Lecture — 3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Study of the main dramatic trends and playwrights of modern Spanish theater. Selected works by Valle Inclán, García-Lorca, Mihura, Buero-Vallejo, Arrabal and others. Offered in alternate years. GE credit: ArtHum, Div | AH, WC.—I. (I.) Altisent

140N. Modern Spanish Essay (4)

Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Ortega, Unamuno and the modern Spanish essay. Their concept of Spain and their relations with other movements and thinkers. GE credit: AH, WC, WE.-II.

141. Introduction to Spanish Culture (4)

Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 24, 24S, or 33. Introduction to history, geography and culture of Spain. Art, history of ideas, and everyday cultural manifesta-tions. Introduction to critical reading and textual analysis. Not open for credit to students who have completed course 141S. GE credit: ArtHum, Div | AH, VL, WC.-I. (I.) González, Martínez-Carazo

141S. Introduction to Spanish Culture (4)

Lecture — 3 hours; extensive writing or discussion — 1 hour. Prerequisite: course 24, 24S, or 33. Introduction to history, geography and culture of Spain. Art, history of ideas, and everyday cultural manifestations. Introduction to critical reading and textual analysis. Offered in a Spanish speaking country under the supervision of UC Davis faculty. Not open for credit to students who have completed course 141. GE credit: ArtHum, Div | AH, VL, WC.-III. (III.) Martínez-Carazo

142. Special Topics in Spanish Cultural and Literary Studies (4)

Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Special topics in the study of Spanish literature and culture. May be repeated two times for credit. GE credit: AH, OL, WC, WE.—I, II, III. (I, II, III.) Altisent, Armistead, González, Martín, Martínez-Carazo

143. Spanish Art (4)

Lecture—3 hours, term paper or discussion—1 hour. Spanish art and the different historical, sociological and political manifestations that frame it. History of art, including Paleolithic, Roman, Visigothic, Romanesque, Goth, Renaissance, Baroque, Neoclassic and Contemporary art. GE credit: ArtHum | AH, VL, WC.-IV. (IV.) Martínez-Carazo

144. Topics in Spanish Cultural Studies (4)

Lecture - 3 hours; project. Prerequisite: course 24 24S, or 33. Study of specific historical tendencies in Spanish culture(s) from the Romans to the present. Sources studied may include literature, film, art, journalism, and performance. Approaches to material may address issues of aesthetics, politics, identity, and globalization. May be repeated one time for credit. GE credit: ArtHum | AH, WC.-I. (I.) González, Martínez-Carazo

147. Anglos, Latinos and the Spanish Black Legend: The Origins and Educational Implications of Anti-Hispanic Prejudice (4)

Lecture—3 hours; field work; term paper. Prerequisite: upper-division standing or consent of instructor. Examination of Anti-Hispanic prejudice in the United States focusing on the "Black Legend," a 16th Century anti-Spanish myth underpinning the doctrine of "Manifest Destiny." Exploration of the Legend's presence in contemporary American society through interviews and analysis of school textbooks. (Same course as Education 147.) GE credit: ArtHum, Div, Wrt | ACGH, AH, DD, WE.—González

148. Cinema in the Spanish-Speaking World in Translation (4)

Lecture—3 hours; film viewing—3 hours. Prerequisite: course 24 or 24S or 33. Analysis of the culture of the Spanish-speaking world through film in translation. Emphasis on the cultural information illustrated by the films; no prior knowledge of cinematography required. Films with subtitles. Not open for credit to students who have completed Spanish 148S. GE credit: ArtHum, Div | AH, VL, WC.—II. (II.) Martinez-Carazo

1485. Cinema in the Spanish-Speaking World in Translation (4)

Lecture—3 hours; film viewing—3 hours. Prerequisite: course 24 or 33. Analysis of the culture of the Spanish-speaking world through film in translation. Emphasis on the cultural information illustrated by the films; no prior knowledge of cinematography required. Films with subtitles. Offered in a Spanish

speaking country, in Spanish, under the supervision of UC Davis faculty. Not open for credit to students who have completed course 148. GE credit: ArtHum, Div | AH, VL, WC.-III. (III.) Martínez-Car-

149. Latin-American Literature in Translation (4)

Lecture/discussion—3 hours; term paper. Prerequisite: English 3 or the equivalent. Reading, lectures and discussions in English of works by Borges, Cortázar, Fuentes, García Márquez, Paz and others. May not be counted toward the major in Spanish. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC, WE. - (III.) Egan, Newcomb

150N. Survey of Latin American Literature to 1900 (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Latin American literature from preconquest texts and the chronicles of the Conquest to romanticism and modernism. Reading selections include fiction, poetry, drama and essays. GE credit: AH, WC. – I. (I.) Bernucci, Egan

151. Survey of Latin American Literature 1900 to Present (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Latin American literature from 1900 to the present. Reading selections include fiction, poetry, drama, essays, testimonio, etc. GE credit: AH, WC.—II. (II.) Bejel, Irwin, Egan, Lazzara, Peluffo

151N. Survey of Spanish-American Literature 1900 to Present (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 100. Spanish-American literature from Modernism to the present. Reading selections include fiction, poetry, drama, and essays. (Former course 105B.) GE credit: AH, WC.—II. (II.) Egan, Bejel

153. Latin American Short Story (4)

Lecture — 3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. The evolution of the Latin American short story from the 19th century to the present. Emphasis on the contemporary period. Offered in alternate years. GE credit: AH, WC. - (I.) Egan, Peluffo

154. Latin American Novel (4)

Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Evolution of the Latin American novel from the 19th century to the present. Emphasis on significant contemporary works. Offered in alternate years. GE credit: ÁH, WC.-(II.) Bejel, Bernucci, Egan

155. Mexican Novel (4)

Lecture -3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Evolution of the Mexican novel from the 19th century to the present. Emphasis on the narrative of the Revolution and significant contemporary works. GE credit: AH, WC.—II. (II.) Egan

156. Latin American Literature of the Turn of the 20th Century (4)

Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Modernism as an authentic expression of Latin American literature and its influence on 20th-century poetry and prose. In depth analysis of the works of Darío and other major writers of the era. Offered in alternate years. GE credit: AH, WC. - (II.) Egan, Peluffo

157. Great Works of Latin American Literature/Culture (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Study of major works of Latin American literature/culture and their cultural and literary milieus. May include novels, poetry, film, etc. Works may be analyzed in terms of style, influence, cultural significance, political importance, and/or commercial success. Offered in alternate years. GE credit: AH, WC.-III. Bejel, Bernucci, Egan, Irwin, Lazzara, Peluffo

158. Latin American Poetry: From Vanguardism to Surrealism and Beyond (4)

Lecture — 3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Study of vanguardism, surrealism, and more recent movements of Latin American poetry. An in-depth analysis of the works of such major poets as Neruda, Vallejo, and Paz. Offered in alternate years. GE credit: AH, WC.—(II.) Bejel, Bernucci, Egan

159. Special Topics in Latin American Literature and Culture (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Special topics in the study of Latin American literature and culture. May be repeated two times for credit when topic differs. Offered in alternate years. GE credit: AH, WC.-I, II, III, IV. (I, II, III, IV.) Bejel, Bernucci, Egan, Irwin, Lazarra, Peluffo

159S. Special Topics in Latin American Literature and Culture (4)

Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Special topics in the study of Latin American literature and culture. Offered in a Spanish speaking country under the supervision of UC Davis faculty. May be repeated two times for credit when topic differs. GE credit: AH, WC.—III. (III.) Lazzara, Peluffo

160. Latin American Women Writers in Translation (4)

Lecture/discussion-3 hours; term paper. Prerequisite: upper division standing or consent of instructor. Latin American women writers from the 19th and 20th centuries. Recent theoretical approaches to literature by women in Latin America. Discussions in English of works by Matto de Turner, Avellaneda, Storni, Ocampo, Águstini, Mistral, Castellanos, and others. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC.—III. (III.) Peluffo

170. Introduction to Latin American Culture

Lecture-3 hours; term paper. Prerequisite: course 24, 24S or 33. Introduction to history, geography and culture of Latin America. Multiple genres of cultural production and representation, with a focus on cultural diversity and regional difference. Introduction to critical reading and textual analysis. Not open for credit for students who have completed course 170S. GE credit: ArtHum, Div | AH, VL, WC, WE.—III. (III.) Bejel, Irwin, Lazzara, Peluffo

170S. Introduction to Latin American Culture (4)

Lecture - 3 hours; project. Prerequisite: course 24, 24S or 33. Introduction to history, geography and culture of Latin America. Multiple genres of cultural production and representation, with a focus on cultural diversity and regional difference. Introduction to critical reading and textual analysis. Not open for credit for students who have completed course 170. GE credit: ArtHum, Div | AH, VL, WC, WE.—III. (III.) Colombi, Lazzara, Peluffo

171. Music from Latin America (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: consent of instructor. Examination of music from Latin America. Characteristic music (i.e., tango, bossa nova, salsa, música motena, musica andina) as well as its implications in other musical genres. Taught in Spanish. Not open to students who have taken course 171S or Music 127. (Same course as Music 171.) Offered in alternate years. GE credit: AH, WC.-II.

171S. Music from Latin America (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: consent of instructor. Examination of music from Latin America. Characteristic music (i.e., tango, bossa nova, salsa, musica motena, música andina) as well as its implications in other musical genres. Taught in Spanish and in a Spanish speaking country under the supervision of UC Davis faculty. Not open to students who have taken course 171 or Music 127. GE credit: AH, WC.-II. (II.)

172. Mexican Culture (4)

Lecture-3 hours; term paper or discussion-1 hour or term paper. Prerequisite: course 24, 24S or 33. Study of Mexican culture through a diversity of cultural expression, including elite, popular and mass media culture. Focus on national icons and archetypes, multiculturalism, transnationalism. May be repeated once for credit. GE credit: ArtHum, Div | AH, VL, WC.—III. (III.) Egan, Irwin

173. Cinema and Latin American Culture (4)

Lecture/discussion-3 hours; film viewing-3 hours. Prerequisite: course 24, 24S, or 33. Understanding Latin American cultures through cinema. History and critical analysis of Latin American film. Focus on a national cinematic tradition. Comparative experiences in different parts of Latin America and/or a particular era. Conducted entirely in Spanish. May be repeated one time for credit. GE credit: ArtHum, Div | AH, VL, WC.-Irwin

174. Chicano Culture (4)

Lecture—3 hours; term paper/discussion—1 hour. Prerequisite: course 24 or 33. An interdisciplinary survey of Chicano culture. Topics include literature, art, folklore, oral tradition, music, politics, as well as everyday cultural manifestations. Conducted in Spanish. (Former course 124.) GE credit: ArtHum, Div | ACGH, AH, DD.—II. (II.) Alarcón

175. Topics in Spanish American Cultural Studies (4)

Lecture — 3 hours; project — 1 hour. Prerequisite: course 24, 24S, or 33. Specific historical tendencies and issues in Latin American culture(s) from precolombian times to present. Studies of literature, film, art, journalism and performance. Focus on issues of aesthetics, politics, identity, and globalization. May be repeated once for credit if content differs. GE credit: ArtHum, Div | AH, VL, WC, WE.-III. (III.) Bejel, Irwin, Lazzara, Peluffo

176. Literature in Spanish Written in the United States (4)

Lecture—3 hours; term paper. Prerequisite: course 24 or 33. Survey of the literary and cultural contributions of the main Spanish-speaking populations present in the U.S.: Chicanos, Puerto Ricans, Cuban-Americans, Central Americans, and other Latinos. GE credit: ArtHum, Div | ACGH, AH, DD.—III. (III.) Alarcón

177. California and Latin America (4)

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 24, 24S or 33. Interdisciplinary survey on the relationship between California and Latin Ámerica (1500s-present). Latin American representations of California and Californian representations of Latin America, as well as borderlands texts, with a special focus on Mexican-American perspectives. Conducted in Spanish. GE credit: ACGH, DD.-Irwin

180. Senior Seminar in Spanish Linguistics (4)

Seminar-3 hours; term paper. Prerequisite: senior standing; a major in Spanish or consent of instructor. Group study of a special topic drawn from Spanish linguistics. Limited enrollment. May be repeated one time for credit. GE credit: AH or SS, OL, WE.—I. (I.) Blake, Bradley, Colombi

181. Senior Seminar in Spanish Literature/ Culture (4)

Seminar — 3 hours; term paper — 1 hour. Prerequisite: senior standing; a major in Spanish or consent of instructor. Group study of a special topic drawn from Spanish literary or cultural studies. Independent research project. May be repeated one time for credit if content differs. Limited enrollment. GE credit: AH, OL, WE.-II. (II.) Altisent, González, Martin, Martínez-Carazo

182. Senior Seminar in Latin American Literature/Culture (4)

Seminar - 3 hours; term paper - 1 hour. Prerequisite: senior standing; a major in Spanish or consent of instructor. Group study of a special topic drawn from Latin American literary or cultural studies. Independent research project. May be repeated one time for credit if content differs. Limited enrollment. GE credit: AH, OL, WC, WE.-III. (III.) Bejel, Egan, Irwin, Lazzara, Peluffo

1921. Internship in Spanish (1-12)

Independent study—3-36 hours. Prerequisite: course 23; junior standing; major in Spanish, Chicano Studies, or a related field. Internships in fields where Spanish language skills can be used and perfected (teaching, counseling, translating-interpreting). May be repeated for credit for a total of 8 units. Units will not count toward the Spanish major. (P/NP grading only.)

194H. Special Study for Honors Students (1-5)

Independent Study - 3-15 hours. Prerequisite: Senior standing and qualification for the Spanish honors program. Guided research, under the direction of a faculty member, leading to a senior honors thesis on a topic in Spanish literature, civilization, or language studies. May be repeated for up to 8 units of credit. (P/NP grading only.) GE credit: AH, WC,

197T. Tutoring in Spanish (1-4)

Tutorial — 1-4 hours. Prerequisite: upper division standing and permission of the chair. Tutoring in undergraduate courses including leadership in small voluntary discussion groups affiliated with departmental courses. May be repeated for credit for a total of 6 units. (P/NP grading only.)

197TC. Tutoring in the Community (2-4)

Tutorial — 2-4 hours. Prerequisite: upper division standing and permission of the chair. Tutoring in public schools under the guidance of a regular teacher and supervision by a departmental faculty member. May be repeated for credit for a total of 6 units. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor and Department Chairperson. (P/NP grading only.) GE credit: AH,

199. Special Study for Advanced Undergraduates (1-5)

May be repeated for up to 6 units of credit (P/NP grading only.) GE credit: AH, WC, WE.

Graduate Courses

201. Literary Theory I (4)

Seminar — 3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Basic theories and practical approaches to modern and contemporary Hispanic literature. Emphasis on formalism, poststructuralism, socio-cultural discourses, and ideologies. — II. (II.) Bejel

202. Literary Theory II (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Major contemporary critical theories including recent, innovative approaches to Hispanic literature and culture. Readings from Semiotics and Deconstructionism to Psychological and Socio-ideological approaches. Emphasis on Postmodern and Neo-colonial discourse. - III. (III.) Bejel

203. Research Methodologies (1)

Seminar-1 hour. Introduction to the range of scholarly research methodologies currently being realized in Spanish linguistics, literary and cultural studies: archival research, textual analysis, discourse analy sis, statistics for linguistics, etc.; introduction to scholarly writing (MLA style) and scholarly publishing.—II. (II.) Altisent, Bejel, Bernucci, Blake, Colombi, Egan, Irwin, Lazzara, Martin, Martinez-Carazo, New comb, Peluffo

205. Spanish Phonology (4)

Seminar-3 hours; term paper. Prerequisite: some knowledge of phonetics is required and consent of instructor; Linguistics 109 and 139 highly recommended. Analyzes the sound patterns of Spanish from both linear and non-linear perspectives. Students will develop a clear understanding of what phonology is and the nature of Spanish phonology, as defined by modern linguistic analysis.—II. (II.)

206. Spanish Syntax (4)

Seminar — 3 hours; term paper. Prerequisite: Linguistics 140 and 165. An examination of Spanish word order within the framework of general linguistic theory. The student will investigate how to write a grammar of Spanish with particular attention to the structure of noun and verb clauses. — I. (I.) Blake

207. History of the Spanish Language (4)

Seminar — 3 hours; term paper. Prerequisite: Latin 1. (Former course 220A.) — I, III. (I, III.) Blake

208. Old Spanish Texts (4)

Seminar - 3 hours; term paper. Prerequisite: course 207. An in-depth linguistic examination of Old Spanish texts from the 12th to the 15th centuries, with particular attention to the significance of orthographic changes. — II. (II.) Blake

211. Hispanic Dialectology (4)

Seminar—3 hours; term paper. Prerequisite: course 220 or consent of instructor. Descriptive and historical study of the distinctive features of Peninsular and American Spanish dialects. (Former course 221.)-

212. Applied Linguistics (4)

Seminar—3 hours; term paper. Prerequisite: graduate standing and courses 215 and 216 recommended. Focuses on the relevant linguistic aspects of teaching Spanish. Designed for graduate students who have an interest in second-language learning and teaching.—II. (II.) Colombi, Blake

215. Special Topics in Hispanic Linguistics (4)

Seminar — 3 hours; term paper. Prerequisite: consent of instructor; courses 205 and 206 recommended. Specialized topics in Hispanic linguistics (e.g., pragmatics, sociolinguistics, topics in syntax, semantics, or diachronic studies). May be repeated for credit when topic differs.—III. (III.)

222. Critical Approaches to Spanish Literature I: Prose and Essay (4)

Seminar — 3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Critical approaches to Spanish narrative and essay. May be repeated two times for credit when topic differs. Offered in alternate years.—II. Altisent, Martín

223. Critical Approaches to Spanish Literature II: Poetry and Drama (4)

Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Critical approaches to Spanish poetry and drama. May be repeated two times for credit when topic differs. Offered in alternate years.—II. Altisent, Armistead,

224. Studies of a Major Writer, Period, or Genre in Spanish Literature (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Artistic development of a major Spanish writer and his/her intellectual and literary milieu or study of a special topic, period, or genre. May be repeated for credit with consent of instructor. — III. (III.)

230. Topics in Latin American Cultural Studies (4)

Seminar—3 hours; term paper. Discussion of select contemporary theoretical debates in Latin American Cultural Studies. Application of critical questions to the analysis of cultural texts. May be repeated two times for credit when topic differs. Offered in alternate years. - (II.) McKee

231. Interamerican Studies (4)

Seminar—3 hours; term paper. Survey of methodologies of investigation for crosscultural or comparative projects in the geographical context of the Americas. Focus on particular problems of language, discipline, national definitions, and global hierarchies of knowledge that complicate such projects. Readings of interamerican cultural texts. Offered in alternate years. - (II.) Irwin

252. Medieval Spanish Literature: Prose (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. An exploration of the major genres of Medieval Spanish prose from its origins to 1450.—I. (I.)

253. Medieval Spanish Literature: Epic (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Medieval Spanish epic narratives. Major theoretical perspectives on the genesis, diffusion, and character of the Medieval epic. Relationship of epic to ballad literature.—II. (IÌ.)

254. Medieval Hispanic Lyric (4)

Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Analysis of the most representative lyric poetry in the various Peninsular languages and in provencal, troubadour poetry, kharjas, villancicos, cantigas de amigo, and courtly lyric. — II. (II.)

255. Spanish Literature of the Early Renaissance (4)

Seminar-3 hours; term paper. Spanish Literature, 1450-1550, with emphasis on La Celestina. (Former course 229.)-I. (I.) Martín

256. Spanish Literature of the Renaissance and Golden Age: Poetry (4)

Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Extensive critical study of the main currents of Renaissance and Baroque Spanish poetry through its language structures, styles ("Culteranismo-Conceptismo"), rhetorical devices, myths, and themes (love, death, time). -1. (I.) Martín

257. Spanish Literature of the Renaissance and Golden Age: Drama (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. An exploration of major 16th and 17th century literary and cultural developments through the study of selected dramas. - I. (I.) Martín

258. Spanish Literature of the Renaissance and Golden Age: Prose (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. The origins and development of the Spanish novel during the Renaissance and the Spanish Golden Age.—I. (I.) Martín

259. Cervantes and the Novel (4)

Seminar - 3 hours; term paper. Prerequisite: graduate standing or consent of instructor. The narrative works of Miguel de Cervantes with special emphasis on Don Quijote. - I. (I.) Martín

260. Modern Spanish Literature (4)

Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Topics of Spanish literature, from 1700-1920. - I. (I.)

261. Contemporary Spanish Literature: Poetry (4)

Seminar - 3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Critical analysis of modern Spanish poetry from a wide spectrum of poetic currents. - I. (I.) Altisent

262. Contemporary Spanish Literature: Narrative (4)

Seminar — 3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of the 20th-century novel and short story with emphasis on the avant-garde, existentialism, social realism, and postmodern trends. May be repeated two times for credit when topic differs and with consent of instructor. - III. Altisent

263. Contemporary Spanish Literature: Drama (4)

Seminar - 3 hours; term paper. Prerequisite: graduate standing or consent of instructor. The Spanish theatrical production of the last 70 years. - I. (I.)

264. Contemporary Spanish Literature: Essay (4)

Seminar - 3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Major thinkers from Ganivet to Unamuno and Ortega y Gassett. Emphasis will be placed on the relationships between Spanish thought and European philosophical currents. Offered in alternate years. — (III.)

265. Women Writers of Spain (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Introduction to the development of a feminine consciousness in the Spanish contemporary literary scene. Selected texts represent particularly innovative typologies of feminine discourse in the realm of the historical, psychoanalytical, and metafictional, erotic, and allegorical fiction. — I. (I.) Altisent

272. Critical Approaches to Latin American Literature: Narrative (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Development of Latin American literary periods and currents in narrative (novel, short story, and essay), from early colonial times to the present. May be repeated two times for credit. if material changes. Offered in alternate years.—I. Bejel, Bernucci, Egan, Lazzara, Peluffo

273. Critical Approaches to Latin American Literature: Poetry and Drama (4)

Seminar - 3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Development of Latin American literary periods and currents in poetry and drama, from early Colonial times to the present. May be repeated two times for credit when topic differs. Offered in alternate years. - I. Bejel, Bernucci, Egan

274. Studies of a Major Writer, Period, or Genre in Latin American Literature (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Artistic development of a major Latin American writer and his/her intellectual and literary milieu or study of a special topic, period, or genre. May be repeated for credit.—I. (I.) Bejel, Bernucci, Egan, Irwin, Lazzara,

275. Colonial Literature (4)

Seminar—3 hours; term paper. Prerequisite: graduate standing and consent of instructor. An examination of pre-Hispanic and Colonial narrative, poetry and theatre. Emphasis on historical, anthropological, and ethnographic approaches to Colonial discourse. — I. (I.) Egan

276. Twentieth-Century Latin American

Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. Major Latin American dramatists from Florencio Sánchez to the present. Offered in alternate years. (Former course 240.)-

277. Latin American Novel, 1900-1950 (4)

Seminar — 3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of main trends and key authors in Latin America in the first half of the 20th century. Offered in alternate years. (Former course 241A.)—(I.) Bernucci, Egan

278. New Trends in Latin American Fiction (4)

Seminar — 3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Recent developments in Latin American narrative. Emphasis on innovative language and structure. Offered in alternate years. (Former course 241B.)—(II.) Egan, Lazzara

279. Mexican Narrative (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of the evolution of Mexican narrative. Emphasis on the narrative of the Revolution and significant contemporary works. Offered in alternate years. — (III.) Egan

280. Latin American Short Story (4)

Seminar—3 hours; term paper. Works by major writers with emphasis on 20th-century authors such as Quiroga, Borges, García Márquez, Cortázar, and Rulfo. (Former course 243.)—III. (III.) Bernucci, Egan

281. Latin American Women Writers (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of feminist critical theories, gender construction, and selfrepresentation within the history of socio-cultural changes in Latin America. - I. (I.) Peluffo

282. Darío and Modernism (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of poetry and prose of Spanish-American Modernism (1880-1916). Offered in alternate years. (Former course 245.)—(I.) Egan

283. New Directions in Latin American Poetry (4)

Seminar-3 hours; term paper. New trends in Latin American poetry. Offered in alternate years. — (III.)

284. The Latin American Essay (4)

Seminar-3 hours; term paper. Major Latin American essayists from Sarmiento to contemporary essayists. Offered in alternate years. - (II.) Irwin

285. Multicultural Approaches to Cuban Literature and Culture (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of main trends in Cuban literature. Emphasis on historical, geographic, social and cultural context (including music and film). Course taught in English with some readings in Spanish.—III. (III.) Bejel

291. Foreign Language Learning in the Classroom (4)

Seminar—3 hours; project. Overview of approaches to university-level foreign language instruction and the theoretical notions underlying current trends in classroom practices across commonly taught foreign languages. (Same course as French 291 and German 291.)—I, II. (I, II.) Arnett, Blake, Bradley

298. Group Study (1-5)

Prerequisite: graduate standing and consent of instructor. May be repeated for credit. (S/U grading only.)

299. Research (1-12)

(S/U grading only.)

Professional Courses

390. The Teaching of Spanish in College (4)

Lecture - 2 hours; discussion - 2 hours. Prerequisite: graduate standing. Theoretical instruction in modern teaching methods and demonstration of their practical application. Required of graduate teaching assistants. - I. (I.) López-Burton

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Statistics

(College of Letters and Science)

Wolfgang Polonik, Ph.D., Chairperson of the Depart-

Department Office. 4118 Mathematical Sciences Building (530) 752-2361; http://www.stat.ucdavis.edu

Faculty

Ethan Anderes, Ph.D., Assistant Professor Alexander Aue, Ph.D., Assistant Professor Paul Baines, Ph.D., Assistant Professor Prabir Burman, Ph.D., Professor Christiana Drake, Ph.D., Professor Peter Hall, Ph.D., Professor Fushing Hsieh, Ph.D., Professor Jiming Jiang, Ph.D., Professor Thomas Lee, Ph.D., Professor Hans-Georg Müller, M.D., Ph.D., Professor Debashis Paul, Ph.D., Assistant Professor Jie Peng, Ph.D., Associate Professor Wolfgang Polonik, Ph.D., Professor George G. Roussas, Ph.D., Professor Francisco J. Samaniego, Ph.D., Professor Academic Senate Distinguished Teaching Award

Duncan Temple Lang, Ph.D., Associate Professor Jane-Ling Wang, Ph.D., Professor

Emeriti Faculty

Rudolph Beran, Ph.D., Professor Emeritus P.K. Bhattacharya, Ph.D., Professor Emeritus Alan P. Fenech, Ph.D., Professor Emeritus Yue-Pok (Ed) Mack, Ph.D., Professor Emeritus Robert H. Shumway, Ph.D., Professor Emeritus Alvin D. Wiggins, Ph.D., Professor Emeritus

Affiliated Faculty

Rahman Azari, Ph.D., Lecturer

The Major Program

Statistics enables us to make inferences about entire populations, based on samples extracted from those populations. Statistical methods can be applied to problems from almost every discipline and they are vitally important to researchers in agricultural, biological, environmental, social, engineering, and medical sciences.

The Program. Statistics majors may receive either a Bachelor of Arts or a Bachelor of Science degree. The B.S. degree program has three options: General Option, Applied Statistics Option, and Computational Statistics Option. Both the A.B. and the B.S. programs require theoretical and applied course work and underscore the strong interdependence of statistical theory and the applications of statistics.

B.S. in Statistics-General Option emphasizes statistical theory and is especially recommended as preparation for graduate study in statistics.

B.S. in Statistics-Applied Statistics Option emphasizes statistical applications. This major is recommended for students who do not plan to pursue graduate studies in statistics and those who are interested in combining the statistics study with a second major or minor program in the social and life sci-

B.S. in Statistic-Computational Statistics Option emphasizes computing. This major is recommended for students interested in the computational and data management aspects of statistical

A.B. in Statistics-Applied Statistics Option emphasizes statistical applications. This major is recommended for students who do not plan to pursue graduate studies in statistics and those who are interested in combining the statistics study with a second major or minor program in the social sciences or who wish to pursue a Bachelor of Arts degree

Career Alternatives. Probability models and statistical methods are used in a great many fields, including the biological and social sciences, business and engineering. The wide applicability of statistics has created in both the public and private sectors a strong demand for graduates with statistical training. Employment opportunities include careers in data and policy analysis in government, financial management, quality control, insurance and health care industry, actuarial work, engineering, public health, biological and pharmaceutical research, law, and education. Some students have entered advanced studies in statistics, economics, psychology, medicine and other professional school programs.

A.B. Major Requirements:

3 1	UNITS
Preparatory Subject Matter	19-23
Mathematics 16A, 16B, 16C; or 17A, 17 17C; or 21A, 21B, 21C	12 .3 .4
Depth Subject Matter	45-48
Statistics 106, 108, 138 or the equivalent	. 8 . 4

Related elective courses	9-12
Three upper division courses approve	d by
major adviser; they should follow a	
coherent sequence in a single discipli	ne in
the social sciences where statistical me	thods
and models are applied and should c	over
the quantitative aspects of the discipli	ne.
Total Units for the Major	41-

1

Total Units for the Major64-71	
B.S. Major Requirements:	
General Statistics option	
UNITS	
Preparatory Subject Matter 30-32	
Mathematics 21A, 21B, 21C, 21D 16 Mathematics 22A or 67 3-4 Mathematics 25 4 Computer Science Engineering 30 or 6 Computer Science Engineering 40 (or the equivalent) 4 Any one introductory statistics course except Statistics 10 3-4	
Depth Subject Matter 51-52	
Statistics 106, 108, 138	
One upper division course approved by major adviser; it should be in mathematics, computer science or in quantitative aspects of a substantive discipline.	

Total Units for the Major.....81-84

UNITS

UNITS

Applied Statistics option

Preparatory Subject Matter26-31
Mathematics 16A, 16B, 16C; or
17A, 17B, 17C; or 21A, 21B, 21C
(21 series recommended) 9-12
Mathematics 22A 3
Computer science Engineering 30 or
Computer Science Engineering 40 (or the
equivalent)4
Two introductory courses serving as the
prerequisites to upper division courses in a
chosen discipline to which statistics is
applied
Any one introductory statistics course
except Statistics 10
Depth Subject Matter 51-56
Statistics 106, 108, 138, 141

Statistics 106, 108, 138, 141
Statistics 130A, 130B8
Three courses selected from Statistics 104,
135, 137, 142, 144, 145
Five upper division elective courses
outside of Statistics
The electives are chosen with and must be
approved by the major adviser. The
electives should follow a coherent sequence
in one single disciple where statistical
methods and models are applied: at least

three of them should cover the quantitative aspects of the discipline. Total Units for the Major......77-87 **Computational Statistics option**

Preparatory Subject Matter	30-3
Mathematics 21A, 21B, 21C, 21D	16
Mathematics 22A	3
Computer Science Engineering 30 and 40	. 8
Any one introductory statistics course except Statistics 10	3-4
Depth Subject Matter	5

except Statistics 10	
Depth Subject Matter	52
Statistics 106, 108, 14112	
Statistics 131A, 131B 8	
Two courses from Statistics 104, 135, 137,	
138, 142, 144, 1458	

Programming, Data Management & Data Technologies: Computer Science Engineering
110 or 145; and 165A or 166 8
Two courses on Scientific Computational
Algorithm and Visualization from: Computer
Science Engineering 122A, 129, 140A,
158, 163 8
Two courses from Mathematics 124, 128A,
128B, 129, 145, 148, 160, 165, 167,
168 8

Total Units for the Major 82-83 Major Adviser. A. Aue

Students are encouraged to meet with an adviser to plan a program as early as possible. Sometime before or during the first quarter of the junior year, students planning to major in Statistics should consult with a faculty adviser to plan the remainder of their undergraduate programs.

Minor Program Requirements:

The Department offers a minor program in Statistics that consists of five upper division level courses focusing on the fundamentals of mathematical statistics and of the most widely used applied statistical methods.

UNITS

Statistics
Statistics 106, 108, and 130A-130B or
131A-131B16
One course from Statistics 104, 135, 137,
138, 141, 142, 144, 145 4
Preparation. Statistics 13 or 32 or 100 or
102.

Graduate Study. The Graduate Program in Statistics offers study and research leading to the M.S. and Ph.D. degrees in Statistics, including a Ph.D. in Statistics with an emphasis in Biostatistics. Detailed information concerning these degree programs, as well as information on admissions and on financial support, is available from the Department of Statistics.

Graduate Adviser. F. Hsieh

Statistical Consulting. The Department provides a consulting service for researchers on campus. For more information, call the Statistical Laboratory office (530) 752-6096.

Integrated B.S./M.S. Degree Program

The Department offers undergraduate majors a path into the Statistics M.S. program through the Integrated Degree Program (I.D.P.). This program is intended for students who seek to be employed as statisticians in government or industry. The minimum major GPA requirement is 3.200 at the end of the junior year, although students with demonstrated excellence in academic work (with a major GPA of 3.500 or above) are most likely to be admitted. Students with a major GPA of 3.500 or above may waive the GRE requirement in the M.S. application. Before moving into the graduate phase, I.D.P. students must satisfy all requirements of the B.S. dearee.

To apply for the I.D.P., undergraduate students must submit the Statistics I.D.P. form along with supporting documents during the last quarter of their junior year, to enter the I.D.P. in the first quarter of their senior year. In addition, applicants must submit an application to the M.S. program during the senior year, prior to the deadline of May 31st. Before applying to the I.D.P., students are strongly advised to consult with both the undergraduate and graduate

Once a student enters the graduate phase of the I.D.P., they follow the course requirements for the Master's degree (36 units, 18 of which are graduate level). A maximum of 12 units taken in the undergraduate phase can be transferred to the M.S. provided they have not been used to satisfy any requirements of the B.S. degree.

Courses in Statistics (STA) Lower Division Courses

10. Statistical Thinking (4)

Lecture - 3 hours; discussion/laboratory - 1 hour. Prerequisite: two years of high school algebra. Statistics and probability in daily life. Examines principles of collecting, presenting and interpreting data in order to critically assess results reported in the media; emphasis is on understanding polls, unemployment rates, health studies; understanding probability, risk and odds. GE credit: SciEng or SocSci, Wrf | QL, SE.-III. (III.)

12. Introduction to Discrete Probability (4)

Lecture—3 hours; laboratory—1 hour. Prerequisite: two years of high school algebra. Random experiments; countable sample spaces; elementary probability axioms; counting formulas; conditional probability; independence; Bayes theorem; expectation; gambling problems; binomial, hypergeometric, Poisson, geometric, negative binomial and multinomial models; limiting distributions; Markov chains. Applications in the social, biological, and engineering sciences. Offered in alternate years. GE credit: SciEng | QL, SE.

13. Elementary Statistics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: two years of high school algebra or the equivalent in college. Descriptive statistics; basic probability concepts; binomial, normal, Student's t, and chi-square distributions. Hypothesis testing and confidence intervals for one and two means and proportions. Regression. Not open for credit to students who have completed course 13V or higher. GE credit: SciEng | QL, SE. - I, II, III. (I, II, III.)

13V. Elementary Statistics (4)

Lecture - 1.5 hours; web virtual lecture - 5 hours. Prerequisite: two years of high school algebra or the equivalent in college. Descriptive statistics; basic probability concepts; binomial, normal, Student's t, and chi-square distributions. Hypothesis testing and confidence intervals for one and two means and proportions. Regression. Not open for credit to students who have completed course 13 or higher. GE credit: SciEng | QL, SE.-I. (I.)

32. Basic Statistical Analysis Through Computers (3)

Lecture - 3 hours. Prerequisite: Mathematics 16B or 17B or 21B; ability to program in a high-level computer language such as Pascal. Overview of probability modeling and statistical inference. Problem solution through mathematical analysis and computer simulation. Recommended as alternative to course 13 for students with some knowledge of calculus and computer programming. Only two units of credit allowed to students who have taken course 13, or 102; not open for credit to students who have taken course 100. GE credit: SciEng | SE, QL.—II, III. (II. III.)

90X. Seminar (1-2)

Seminar — 1-2 hours. Prerequisite: high school algebra and consent of instructor. Examination of a special topic in a small group setting.

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading

99. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses 100. Applied Statistics for Biological Sciences (4)

Lecture—3 hours; laboratory—1 hour. Prerequisite: Mathematics 16B or the equivalent. Descriptive statistics, probability, sampling distributions, estimation, hypothesis testing, contingency tables, ANOVA, regression; implementation of statistical methods using computer package. Only two units credit allowed to students who have taken course 13, 32

or 103. Not open for credit to students who have taken course 102. GE credit: SciEng | QL, SE.-I, II, III. (I, II, III.)

102. Introduction to Probability Modeling and Statistical Inference (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: two years of high school algebra; upper division standing. Introductory probability and statistics at a rigorous yet precalculus level. Rigorous precalculus introduction to probability and parametric/nonparametric statistical inference with computing; binomial, Poisson, geometric, normal, and sampling distributions; exploratory data analysis; regression analysis; ANOVA. Not open for credit to students who have taken course 100. GE credit: SciEng | QL, SE, SL.— I, III. (I, III.)

103. Applied Statistics for Business and Economics (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 13, 32, or 102; and Mathematics 16A, 16B; course 100 may replace courses 13, 32, or 102. Descriptive statistics; probability; random variables; expectation; binomial, normal, Poisson, other univariate distributions; joint distributions; sampling distributions, central limit theorem; properties of estimators; linear combinations of random variables; testing and estimation; Minitab computing package. Two units credit given to students who have completed course 100. GE credit: SciEng | QL, SE.-I, İI, III. (I, II, III.)

104. Applied Statistical Methods: Nonparametric Statistics (4)

Lecture—3 hours; laboratory—1 hour. Prerequisite: course 13, 32, or 102; course 100 may replace courses 13, 32, or 102. Sign and Wilcoxon tests, Walsh averages. Two-sample procedures. Inferences concerning scale. Kruskal-Wallis test. Measures of association. Chi square and Kolmogorov-Smirnov tests. Offered in alternate years. GE credit: SciEng | QL, SE. — (II.)

106. Applied Statistical Methods: Analysis of Variance (4)

Lecture-4 hours. Prerequisite: course 13, 32, or 102; course 100 may replace courses 13, 32, or 102. One-way and two-way fixed effects analysis of variance models. Randomized complete and incomplete block design, Latin squares. Multiple comparisons procedures. One-way random effects model. GE credit: SciEng | QL, SE, SL.-I, II. (I, II.)

108. Applied Statistical Methods: Regression Analysis (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 13, 32, or 102; course 100 may replace courses 13, 32, or 102. Simple linear regression, variable selection techniques, stepwise regression, analysis of covariance, influence measures, computing packages. GE credit: SciEng | QL, SE, SL.—I, II, III. (I, II, III.)

120. Probability and Random Variables for Engineers (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 21A, B, C, and D. Basic concepts of probability theory with applications to electrical engineering, discrete and continuous random variables, conditional probability, combinatorics, bivariate distributions, transformation or random variables, law of large numbers, central limit theorem, and approximations. No credit for students who have completed course 131A or Civil and Environmental Engineering 114. GE credit: SciEng | QL, SE.—I, III. (I, III.) Mueller

130A. Mathematical Statistics: Brief Course

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Mathematics 16B. Basic probability, densities and distributions, mean, variance, covariance, Chebyshev's inequality, some special distributions, sampling distributions, central limit theorem and law of large numbers, point estimation, some methods of estimation, interval estimation, confidence intervals for certain quantities, computing sample sizes. Only 2 units of credit allowed to students who have taken course 131A. GE credit: QL, SE.-I. (I.)

130B. Mathematical Statistics: Brief Course

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 130A. Transformed random variables, large sample properties of estimates. Basic ideas of hypotheses testing, likelihood ratio tests, goodnessof-fit tests. General linear model, least squares estimates, Gauss-Markov theorem. Analysis of variance, F-test. Regression and correlation, multiple regression. Selected topics. GE credit: QL, SE.—II. (II.)

131A. Introduction to Probability Theory (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 21A, 21B, 21C, and 22A. Fundamental concepts of probability theory, discrete and continuous random variables, standard distributions, moments and moment-generating functions, laws of large numbers and the central limit theorem. Not open for credit to students who have completed Mathematics 135A. GE credit: QL, SE.—İ, II, III. (I,

131B. Introduction to Mathematical Statistics (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 131A or consent of the instructor. Sampling, methods of estimation, sampling distributions, confi dence intervals, testing hypotheses, linear regression, analysis of variance, elements of large sample theory and nonparametric inference. GE credit: QL, SE.—II, III. (II, III.)

131C. Introduction to Mathematical Statistics (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 131B, or consent of the instructor. Sampling, methods of estimation, sampling distributions, confidence intervals, testing hypotheses, linear regression, analysis of variance, elements of large sample theory and nonparametric inference. GE credit: SE, QL. – III. (III.)

133. Mathematical Statistics for Economists

Lecture—3 hours; discussion—1 hour. Prerequisite: course 103 and Mathematics 16B, or the equivalents; no credit will be given to students majoring in Statistics. Probability, basic properties; discrete and continuous random variables (binomial, normal, t, chi-square); expectation and variance of a random variable; bivariate random variables (bivariate normal); sampling distributions; central limit theorem; estimation, maximum likelihood principle; basics of hypotheses testing (one-sample). GE credit: QL, SE. — I. (I.)

135. Multivariate Data Analysis (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 130B, and preferably course 131B. Multivariate normal distribution; Mahalanobis distance; sampling distributions of the mean vector and covariance matrix; Hotelling's T²; simultaneous inference; one-way MANOVA; discriminant analysis; principal components; canonical correlation; factor analysis. Intensive use of computer analyses and real data sets. GE credit: QL, SE.—III. (III.)

137. Applied Time Series Analysis (4)

Lecture—3 hours; term paper. Prerequisite: course 108 or the equivalent. Time series relationships, cyclical behavior, periodicity, spectral analysis, coherence, filtering, regression, ARIMA and statespace models; Applications to data from economics, engineering, medicine environment using time series software. ĞE credit: QL, SE.—III. (III.)

138. Analysis of Categorical Data (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 130B or 131B, or courses 106 and 108. Varieties of categorical data, cross-classifications, contingency tables, tests for independence. Multidimensional tables and log-linear models, maximum likelihood estimation; tests of goodness-of-fit. Logit models, linear logistic models. Analysis of incomplete tables. Packaged computer programs, analysis of real data. GE credit: SciEng | QL, SE. — I. (I.)

141. Statistical Computing (4)

Lecture - 3 hours; laboratory - 1 hour. Prerequisite: one introductory class in Statistics (such as 13, 32, 100, or 102), or the equivalent. Organization of computations to access, transform, explore, analyze data and produce results. Concepts and vocabulary of statistical/scientific computing. GE credit: QL,

142. Reliability (4)

Lecture - 3 hours; discussion/laboratory - 1 hour. Prerequisite: course 130B or 131B or consent of instructor. Stochastic modeling and inference for reliability systems. Topics include coherent systems, statistical failure models, notions of aging, maintenance policies and their optimization. Offered in alternate years. GE credit: QL, SE.

144. Sampling Theory of Surveys (4)

Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 130B or 131B. Simple random, stratified random, cluster, and systematic sampling plans; mean, proportion, total, ratio, and regression estimators for these plans; sample survey design, absolute and relative error, sample size selection, strata construction; sampling and nonsampling sources of error. Offered in alternate years. GE credit: SciEng | QL, SE.—(I.)

145. Bayesian Statistical Inference (4)

Lecture—3 hours; laboratory—1 hour. Prerequisite: courses 130A and 130B, or 131A and 131B, or the equivalent. Subjective probability, Bayes Theorem, conjugate priors, non-informative priors, estimation, testing, prediction, empirical Bayes methods, properties of Bayesian procedures, comparisons with classical procedures, approximation techniques, Gibbs sampling, hierarchical Bayesian analysis, applications, computer implemented data analysis. Offered in alternate years. GE credit: QL, SE. - (II.)

190X. Seminar (1-2)

Seminar - 1-2 hours. Prerequisite: one of courses 13, 32, 100, 102, or 103. In-depth examination of a special topic in a small group setting.

192. Internship in Statistics (1-12)

Internship - 3-36 hours; term paper. Prerequisite: upper division standing and consent of instructor. Work experience in statistics. (P/NP grading only.)

194HA-194HB. Special Studies for Honors Students (4-4)

Independent study-12 hours. Prerequisite: senior qualifying for honors. Directed reading, research and writing, culminating in the completion of a senior honors thesis or project under direction of a faculty adviser. (Deferred grading only, pending completion of sequence.) GE credit: SE

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

205. Statistical Methods for Research with **SAS (4)**

Lecture—3 hours; laboratory—1 hour. Prerequisite: An introductory upper division statistics course and some knowledge of vectors and matrices; suggested courses are 100, or 102, or 103, or the equivalent. Focus on linear statistical models widely used in scientific research. Emphasis on concepts, methods and data analysis using SAS. Topics include simple and multiple linear regression, polynomial regression, diagnostics, model selection, variable transformation, factorial designs and ANCOVA.—III. (III.)

222. Biostatistics: Survival Analysis (4)

Lecture - 3 hours; discussion/laboratory - 1 hour. Prerequisite: course 131C. Incomplete data; life tables; nonparametric methods; parametric methods; accelerated failure time models; proportional hazards models; partial likelihood; advanced topics. (Same course as Biostatistics 222.)—I. (I.)

223. Biostatistics: Generalized Linear Models (4)

Lecture - 3 hours; discussion/laboratory - 1 hour. Prerequisite: course 131C. Likelihood and linear regression; generalized linear model; Binomial regression; case-control studies; dose-response and bioassay; Poisson regression; Gamma regression; quasi-likelihood models; estimating equations; multivariate GLMs. (Same course as Biostatistics 223.)-

224. Analysis of Longitudinal Data (4)

Lecture - 3 hours; discussion/laboratory - 1 hour. Prerequisite: course/Biostatistics 222, 223 and course 232B or consent of instructor. Standard and advanced methodology, theory, algorithms, and applications relevant for analysis of repeated mea surements and longitudinal data in biostatistical and statistical settings. (Same course as Biostatistics 224.) - III. (III.)

225. Clinical Trials (4)

Lecture — 3 hours; discussion/laboratory — 1 hour. Prerequisite: course/Biosatistics 223 or consent of instructor. Basic statistical principles of clinical designs, including bias, randomization, blocking, and masking. Practical applications of widely-used designs, including dose-finding, comparative and cluster randomization designs. Advanced statistical procedures for analysis of data collected in clinical trials. (Same course as Biostatistics 225.) Offered in alternate years.—III.

226. Statistical Methods for Bioinformatics (4)

Lecture—3 hours; discussion/laboratory—1 hour.
Prerequisite: course 131C or consent of instructor; data analysis experience recommended. Standard and advanced statistical methodology, theory, algorithms, and applications relevant to the analysis of omics data. (Same course as Biostatistics 226.) Offered in alternate years. — (II.)

231A. Mathematical Statistics I (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 131A-C, Mathematics 25 and Mathematics 125 A or equivalent. First part of three-quarter sequence on mathematical statistics. Emphasizes foundations. Topics include basic concepts in asymptotic theory, decision theory, and an overview of methods of point estimation. - I. (I.)

231B. Mathematical Statistics II (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 231A. Second part of a three-quarter sequence on mathematical statistics. Emphasizes: hyposthesis testing (including multiple testing) as well as theory for linear models.—II. (II.)

231C. Mathematical Statistics III (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 231A, 231B. Third part of three-quarter sequence on mathematical statistics. Emphasizes large sample theory and their applications. Topics include statistical functionals, smoothing methods and optimization techniques relevant for statistics. —

232A. Applied Statistics I (4)

Lecture — 3 hours; laboratory — 1 hour. Prerequisite: courses 106, 108, 131A, 131B, 131C, and Mathematics 167. Estimation and testing for the general linear model, regression, analysis of designed experiments, and missing data techniques.—I. (I.)

232B. Applied Statistics II (4)

Lecture — 3 hours; laboratory — 1 hour. Prerequisite: courses 106, 108, 131A, 131B, 131C, 232A and Mathematics 167. Alternative approaches to regression, model selection, nonparametric methods amenable to linear model framework and their applicationss. - II. (II.)

232C. Applied Statistics III (4)

Lecture—3 hours; laboratory—1 hour. Prerequisite: courses 106, 108, 131C, 232B and Mathematics 167. Multivariate analysis: multivariate distributions, multivariate linear models, data analytic methods including principal component, factor, discriminant, canonical correlation and cluster analysis. - II. (II.)

233. Design of Experiments (3)

Lecture - 3 hours. Prerequisite: course 131C. Topics from balanced and partially balanced incomplete block designs, fractional factorials, and response surfaces. Offered in alternate years. - (III.)

235A-235B-235C. Probability Theory (4-4-

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: 235A—Mathematics 125B and 135A or course 131A or consent of instructor; 235B-Mathematics 235A/course 235A or consent of instructor; 235C-Mathematics 235B/course 235B or consent of instructor. Measure-theoretic foundations, abstract integration, independence, laws of large numbers, characteristic functions, central limit theorems. Weak convergence in metric spaces, Brownian motion, invariance principle. Conditional expectation. Topics selected from martingales, Markov chains, ergodic theory. (Same course as Mathematics 235A-235B-235C.)—I-II-III. (I-II-III.)

237A-237B. Time Series Analysis (4-4)

Lecture - 3 hours; term paper. Prerequisite: course 131B or the equivalent; course 237A is a prerequisite for course 237B. Advanced topics in time series analysis and applications. Models for experimental data, measures of dependence, large-sample theory, statistical estimation and inference. Univariate and multivariate spectral analysis, regression, ARIMA models, state-space models, Kalman filtering. Offered in alternate years. — (I-II.)

238. Theory of Multivariate Analysis (4)

Lecture—3 hours; term paper. Prerequisite: courses 131B and 135. Multivariate normal and Wishart distributions, Hotelling's T-Squared, simultaneous inference, likelihood ratio and union intersection tests, Bayesian methods, discriminant analysis, principal component and factor analysis, multivariate clustering, multivariate regression and analysis of variance, application to data. Offered in alternate

240A-240B. Nonparametric Inference (4-4)

Lecture—3 hours; term paper. Prerequisite: course 231C; courses 235A-235B-235C recommended. Comprehensive treatment of nonparametric statistical inference, including the most basic materials from classical nonparametrics, robustness, nonparametric estimation of a distribution function from incomplete data, curve estimation, and theory of resampling methodology. Offered in alternate years. (11-111.)

241. Asymptotic Theory of Statistics (4)

Lecture—3 hours; term paper. Prerequisite: course 231C; courses 235A-235B-235C desirable. Topics in asymptotic theory of statistics chosen from weak convergence, contiguity, empirical processes, Edgeworth expansion, and semiparametric inference. Offered in alternate years. (III.)

242. Introduction to Statistical Programming (4)

Lecture - 3 hours; laboratory - 1 hour. Prerequisite: courses 130A and 130B or equivalent. Essentials of statistical computing using a general-purpose statistical language. Topics include algorithms; design; debugging and efficiency; object-oriented concepts; model specification and fitting; statistical visualization; data and text processing; databases; computer systems and platforms; comparison of scientific programming languages. Offered in alternate years.

243. Computational Statistics (4)

Lecture — 3 hours; laboratory — 1 hour. Prerequisite: courses 130A and 130B or equivalent, and Mathematics 167 or Mathematics 67 or equivalent. Numerical analysis; random number generation; computer experiments and resampling techniques (bootstrap, cross validation); numerical optimization; matrix decompositions and linear algebra computations; algorithms (markov chain monte carlo, expectation-maximization); algorithm design and efficiency; parallel and distributed computing. Offered in alternate years. - II.

250. Topics in Applied and Computational Statistics (4)

Lecture—3 hours; lecture/discussion—1 hour. Pre-requisite: course 131A; course 232A recommended, not required. Resampling, nonparametric and semiparametric methods, incomplete data analysis, diagnostics, multivariate and time series analysis, applied Bayesian methods, sequential analysis and quality control, categorical data analysis, spatial and image analysis, computational biology, functional data analysis, models for correlated data, learning theory. May be repeated for credit with consent of graduate advisor. Not offered every year.-I, II, III.

251. Topics in Statistical Methods and Models (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 231B or the equivalent. Topics may include Bayesian analysis, nonparametric and semiparametric regression, sequential analysis, bootstrap, statistical methods in high dimensions, reliability, spatial processes, inference for stochastic process, stochastic methods in finance, empirical processes, changepoint problems, asymptotics for parametric, nonparametric and semiparametric models, nonlinear time series, robustness. May be repeated for credit with consent of instructor. Not offered every year.—

252. Advanced Topics in Biostatistics (4)

Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 222, 223. Biostatistical methods and models selected from the following: genetics, bioinformatics and genomics; longitudinal or functional data; clinical trials and experimental design; analysis of environmental data; dose-response, nutrition and toxicology; survival analysis; observational studies and epidemiology; computer-intensive or Bayesian methods in biostatistics. May be repeated for credit with consent of adviser when topic differs. (Same course as Biostatistics 252.) Offered in alter-

280. Orientation to Statistical Research (2)

Seminar - 2 hours. Prerequisite: consent of instructor. Guided orientation to original statistical research papers, and oral presentations in class of such papers by students under the supervision of a faculty member. May be repeated one time for credit. (S/Ú grading only.)—III. (III.)

290. Seminar in Statistics (1-6)

Prerequisite: consent of instructor. Seminar on advanced topics in probability and statistics. (S/U grading only.)—I, II, III. (I, II, III.)

292. Graduate Group in Statistics Seminar (1-2)

Seminar - 1-2 hours. Prerequisite: graduate standing. Advanced study in various fields of statistics with emphasis in applied topics, presented by members of the Graduate Group in Statistics and other guest speakers. (S/U grading only.)-III. (III.)

298. Directed Group Study (1-5)

Prerequisite: graduate standing, consent of instruc-

299. Individual Study (1-12)

Prerequisite: consent of instructor. (S/U grading only.)

299D. Dissertation Research (1-12)

Prerequisite: advancement to candidacy for Ph.D., consent of instructor. (S/U grading only.)

Professional Courses

390. Methods of Teaching Statistics (2)

Lecture/discussion-1 hour; laboratory-1 hour. Prerequisite: graduate standing. Practical experience in methods/problems of teaching statistics at university undergraduate level. Lecturing techniques, analysis of tests and supporting material, preparation and grading of examinations, and use of statistical software. Emphasis on practical training. May be repeated for credit. (S/U grading only.)—I. (I.)

396. Teaching Assistant Training Practicum

Prerequisite: consent of instructor; graduate standing. (\dot{S}/U grading only.)—I, II, III. (\ddot{I} , II, III.)

Professional Course

401. Methods in Statistical Consulting (3)

Lecture - 3 hours; discussion - 1 hour. Introduction to consulting, in-class consulting as a group, statistical consulting with clients, and in-class discussion of consulting problems. Clients are drawn from a pool of University clients. Students must be enrolled in the graduate program in Statistics or Biostatistics. May be repeated for credit with consent of graduate adviser. Not offered every year. (S/U grading only.)—I, II, III. (I, II, III.)

Statistics (A Graduate Program)

Wolfgang Polonik, Ph.D., Chairperson of the Pro-

Program Office. 4118 Mathematical Sciences Building (530) 692-5194; http://www.stat.ucdavis.edu

Faculty

Ethan Anderes, Ph.D., Assistant Professor (Statistics) Alexander Aue, Ph.D., Assistant Professor (Statistics) Laurel Beckett, Ph.D., Professor (Public Health Sciences)

Paul Baines, Ph.D., Assistant Professor (Statistics) Prabir Burman, Ph.D., Professor (Statistics) Colin Cameron, Ph.D., Professor (Economics) Christiana Drake, Ph.D., Professor (Statistics) Thomas B. Farver, Ph.D., Professor

(Population Health and Reproduction) Peter Hall, Ph.D., Professor (Statistics) Fushing Hsieh, Ph.D., Professor (Statistics) Jiming Jiang, Ph.D., Professor (Statistics)
Oscar Jorda, Ph.D., Associate Professor (Economics) Thomas Lee, Ph.D., Professor (Statistics) Hans-Georg Müller, M.D., Ph.D., Professor

Debashis Paul, Ph.D. Assistant Professor (Statistics) Jie Peng, Ph.D., Associate Professor (Statistics) Wolfgang Polonik, Ph.D., Professor (Statistics) David Rocke, Ph.D., Professor

(Public Health Sciences) George G. Roussas, Ph.D., Professor (Statistics) Naoki Saito, Ph.D., Professor (Mathematics) Francisco J. Samaniego, Ph.D., Professor (Statistics) Duncan Temple Lang, Ph.D., Associate Professor (Statistics)

Chih-Ling Tsai, Ph.D., Professor (Graduate School of Management) Jane-Ling Wang, Ph.D., Professor (Statistics)

Emeriti Faculty

Rudolph Beran, Ph.D., Professor Emeritus P.K. Bhattacharya, Ph.D., Professor Emeritus Alan P. Fenech, Ph.D., Professor Emeritus Yue-Pok (Ed) Mack, Ph.D., Professor Emeritus Robert H. Shumway, Ph.D., Professor Emeritus Alvin D. Wiggins, Ph.D., Professor Emeritus

Affiliated Faculty

Rahman Azari, Ph.D., Lecturer (Statistics)

Graduate Study. The Graduate Program in Statistics offers programs of study and research leading to the M.S. and Ph.D. degrees. The M.S. gives students a strong foundation in the theory of statistics as well as substantial familiarity with the most widely used statistical methods. Facility in computer programming is essential for some of the course work. The supervised statistical consulting required of all M.S. students has proven to be a valuable educational experience. The Ph.D. program combines advanced course work in statistics and probability with the opportunity for in-depth concurrent study in an applied field. For detailed information contact the

Chairperson of the Program or the Graduate

Preparation. Preparation for the graduate program requires a year of calculus, a course in linear algebra, facility with a programming language and upper division coursework in mathematics and/or statistics. For admission to the Ph.D. program, course work requirements for the master's degree, and at least one semester/two quarters of advanced calculus must be completed.

Graduate Adviser. Fushing Hsieh (Statistics)

Study of Religion (A Graduate Group

Flagg Miller, Ph.D., Chairperson of the Group

Program Office. 216 Sproul Hall (530) 752-5799; Fax (530) 752-8630 http://religiongradgroup.ucdavis.edu/

Faculty

David Biale, Ph.D., Professor (History) Catherine Chin, Ph.D., Professor (Religious Studies) Allison Coudert, Ph.D., Professor (Religious Studies) Mark K. Elmore, Ph.D., Professor (Religious Studies) John R. Hall, Ph.D., Professor (Sociology) Mark Halperin, Ph.D., Professor (East Àsian Languages)

Milmon F. Harrison, Ph.D., Professor (African American & African Studies)

Naomi Janowitz, Ph.D., Professor (Religious Studies) Suad Joseph, Ph.D., Professor

(Anthropology and Women & Gender Studies) Flagg Miller, Ph.D., Professor (Religious Studies) Lynn Roller, Ph.D., Professor (Art History) Brenda Schildgen, Ph.D., Professor

(Comparative Literature) Jocelyn Sharlet, Ph.D., Professor (Comparative Literature)

John Smolenski, Ph.D., Professor (History) Smriti Srinivas, Ph.D., Professor (Anthropology)
Blake Stimson, Ph.D., Professor (Art History) Daniel Stolzenberg, Ph.D., Professor (History)
Baki Tezcan, Ph.D., Professor

(History & Religious Studies)
Archana Venkatesan, Ph.D., Professor

(Comparative Literature & Religious Studies)
Moulie Vidas, Ph.D., Professor (Religious Studies) Heghnar Watenpaugh, Ph.D., Professor (Art History) Keith Watenpaugh, Ph.D., Professor (Religious Studies)

Diane Wolf, Ph.D., Professor (Sociology) Aram Yengoyan, Ph.D., Professor (Anthropology) Michael Ziser, Ph.D., Professor (English)

Graduate Study. The Graduate Group in the Study of Religion offers students classical training in the literatures of particular religious traditions, and they are encouraged to understand these traditions at the intersection of contemporary thematic and regional phenomena.

Students have the opportunity to concentrate primarily on one of three regional specializations: American religious cultures, Mediterranean religions, and Asian religions. An additional regional specialization typically serves as a secondary area of competence. Students further shape their scholarship through intensive engagement in one of the following thematic specializations: Values, Ethics, and Human Rights; Modernity, Science, and Secularism: Visual Culture, Media, and Technology; Language, Rhetoric, and Performance; Body and Praxis; Theory and Method.

This curriculum guides students through a rigorous course of study, providing the breadth and depth necessary to produce exciting, rigorous scholarship at forefront of the field of Religious Studies. Graduate Group training prepares students for careers in academia as well as in the government and the pri**Preparation.** Admission to the Graduate Group requires a Bachelor's or Master's degree in a discipline relevant to the study of religion, as well as preparation in at least one language relevant to the intended area of primary research. The group requires three letters of recommendation and a sample of recent written work. The general GRE is also required.

Graduate Adviser. Contact the Group office.

Courses in Study of Religion (REL)

Courses pending approval at the time of publication; see http://religiongradgroup.ucdavis.edu/.

Surgery

See Surgery (SUR), on page 414; and Surgical and Radiological Sciences (VSR), on page 526.

Surgical and **Radiological Sciences**

See Veterinary Medicine, School of, on page 523.

Sustainable **Agriculture and Food Systems**

(College of Agriculture and Environmental Sciences) Sustainable Agriculture and Food Systems is an interdisciplinary major hosted by Human and Community **Development**

Thomas Tomich, Ph.D., Master Adviser

Program Office. 143 Robbins Hall (530) 752-3915; http://asi.ucdavis.edu

Committee in Charge

Richard Howitt, Ph.D. (Agricultural & Resource Economics) Anita Oberbauer, Ph.D. (Animal Science) Michael Parrella, Ph.D. (Entomology) Howard Cornell, Ph.D. (Environmental Science & Policy) Luis Guarnizo, Ph.D. (Human & Community Development) Ryan Galt, Ph.D. (Human & Community Development) Randy Dahlgren, Ph.D. (Land, Air & Water Resources)

William Horwath, Ph.D. (Land, Air & Water Resources) Steve Nadler, Ph.D. (Nematology)
Tom Gordon, Ph.D. (Plant Pathology) Chris van Kessel, Ph.D. (Plant Sciences) Thomas Tomich, Ph.D. (Human & Community Devel-

opment, Environmental Science & Policy)

The Major Program

The Sustainable Agriculture and Food Systems (SA&FS) major serves those interested in improving the sustainability of agriculture and food systems. This major prepares graduates to understand the interdisciplinary and systems-based aspects of sustainability and provides them with the knowledge, leadership skills and experiences required to excel in agricultural and food systems professions.

The Program

This program is designed to develop students' competencies for addressing the environmental, social, and economic challenges and opportunities associ ated with agricultural and food systems sustainability. The program emphasizes an experiential learning approach to sustainability education, allowing students to choose between three tracks within the major. Students in the Agriculture and Ecology track will focus on crop and animal production systems, ecology, and practices that mitigate negative impacts while producing environmental and social benefits. Students in the Food and Society track will focus on issues related to the social, cultural, political and community development aspects of agriculture and food systems. Students in the Economics and Policy track will focus on issues related to agricultural and resource economics, policy and management. The program provides students with practical experiences through courses with on- and off-campus fieldwork and through internship placements at sites related to students' interests and focus of study.

Internships and Career Alternatives

Sustainable Agriculture and Food Systems students are required to complete an internship in the field before graduation. Internships have been arranged with local, county, and state agricultural agencies, production farms and commercial processors and retailers, domestic and international non-governmental organizations, and rural and urban community development programs. Graduates are prepared to pursue a broad range of careers related to agricultural production and food system management, rural and urban community services, education and development, and agricultural and environmental sciences, as well as careers in agricultural, environmental, and economic policy and analysis. Positions may be in private industry, government and public service agencies and in the non-profit sector, nationally and internationally. The major also prepares students for graduate studies in a wide range of fields related to agriculture and food systems.

B.S. Major Requirements:

English Composition Requirement 4-8 See College requirement, must include Communications 1. Core Courses 24-26 Plant Sciences 15......4 Community and Regional Development Agricultural and Resource Economics Environmental Science and Policy 191A, 191B6 Internship Requirement 12 Students must complete at least 12 units of internship, 8 of which must be completed off-Applied Production 69 Plant Sciences 49 or Plant Pathology 40 or Viticulture and Enology 101A or 101B or 101C or Environmental Horticulture 120 or Plant Science 131 2-3 Animal Science 49A-J, Animal Science Applied Biological Systems Technology 49 or

Track I: Agriculture and Ecology

Focuses on crop and animal production systems, ecology, and practices that mitigate negative impacts while producing environmental and social

Preparatory Subject Matter 59-60 Plant Sciences 120 or Statistics 100 4 Chemistry 2A, 2B 10

Physics 1A 3
Biólogical Sciences 2A, 2B9
Plant Sciences 2 4
Animal Sciences 1 or 2 4
Food Science 1
Economics 1A 4
Community and Regional Development 1 4
Philosophy 14 or 15 or 24 4
Anthropology 2 or Political Science 4 or
Sociology 1 or Sociology 34-5
Pepth Subject Matter34-38
cpin sobject maner
Agricultural and Resource Economics 120 or 147 and Environmental Science and Policy 161 or 169

Track II: Food and Society

Focuses on issues related to the social, cultural, political and community development aspects of agriculture and food systems.

UNITS

Additional restricted electives chosen in

consultation with an advisor 20

Preparatory Subject Matter	. 57-63
Philosophy 5 or 31	4
Philosophy 14 or 15 or 24	4
Sociology 46B or Statistics 13	
Community and Regional Development 1	
or Applied Biological Systems Technology	/
180 or Landscape Architecture 150 or	2./
Statistics 103 or Sociology 106	
Chemistry 2A Biological Sciences 2A or 10	5
Plant Sciences 2	4
Evolution and Ecology 2 or Biological	4
Sciences 2B or Environmental Science an	Ч
Policy 1 or 30 or Wildlife, Fish, and	u
Conservation Biology 10 or 11	3-5
Food Science 1	
Soil Science 10	
Economics 1A	4
Political Science 4	4
Anthropology 2 or Sociology 1 or	
Sociology 3	4-5
Community and Regional Development	
1, 2	
Depth Subject Matter	43-44

epth Subject Matter43-4
Agricultural and Resource Economics 112 or
150 4
Agricultural and Resource Economics 147 or
176 or Environmental Science and Policy
160 or 161 or 169 or 172 or 1793-4
Anthropology 101 or 102 or Community
and Regional Development 142 or 152
or Sociology 139 or 144 or 145A or
145B
American Studies 101C or 155 or History
172 or Philosophy 109 4
Additional restricted electives chosen in
consultation with an advisor 20

Track III: Economics and Policy

Focuses on issues related to agricultural and resource economics, policy and management.

UNITS Preparatory Subject Matter......60-63 Mathematics 16A, 16B 6 Sociology 46B or Statistics 13..... Agricultural and Resource Economics 106 or Statistics 103 or Sociology 106...... 4 Sciences 2B or Environmental Science and Policy 1 or 30 or Wildlife, Fish, and Conservation Biology 10 or 113-5

LINITS

Soil Science 10	
Philosophy 14 or 15 or 24	
Depth Subject Matter43-4	4
Agricultural and Resource Economics 112 or 150 or 157	

and Policy 160 or 161 or 169 or 172 or 179......11-12 Anthropology 101 or 102 or Community and Regional Development 142 or 152 or Sociology 139 or 144 or 145A or 145B...... 8 Additional restricted electives chosen in consultation with an advisor20

Total units for the major 139-162

Major Adviser. Thomas P. Tomich (Human & Community Development, Environmental Science & Pol-

Advising Center for the major is located in 1303 Hart Hall, Human and Community Development (530) 752-2244

Technocultural Studies

See Cinema and Technocultural Studies, on page 192.

Textile Arts and Costume Design

See Design, on page 215.

Textile Science

See Fiber and Polymer Science, on page 309.

Textiles (A Graduate Group)

Gang Sun, Ph.D., Chairperson of the Group

Group Office. 129 Everson Hall (530) 752-8035; jlblevins@ucdavis.edu http://textiles.ucdavis.edu

Faculty

Colin A. Carter, Ph.D., Professor (Agricultural and Resource Economics) Hidergarde Heymann. Professor (Viticulture and Enology) You-Lo Hsieh, Ph.D., Professor (Textiles and Clothing)
Joel T. Johnson, Professor (Psychology) Susan B. Kaiser, Ph.D., Professor (Textiles and Clothing, Women and Gender Studies)
Ning Pan, Ph.D., Professor (Textiles and Clothing, Biological and Agricultural Engineering)
Magagrath H. Rucker, Ph.D. Professor Margaret H. Rucker, Ph.D., Professor (Textiles and Clothing) James F. Shackelford, Ph.D., Professor (Chemical Engineering and Materials Science)

Charles F. Shoemaker, Ph.D., Professor (Food Science and Technology) Gang Sun, Ph.D., Professor (Textiles and Clothing) Susan Verba, M.F.A., Assistant Professor (Design Program)

Emeriti Faculty

Stephen Jett, Ph.D., Professor Emeritus (Textiles and Clothing, Geography) Gyongy Laky, M.A., Professor Emeritus (Textiles and Clothing) Dean MacCannell, Ph.D., Professor Emeritus (Landscape Architecture) Howard G. Schutz, Ph.D., Professor Emeritus (Consumer Science) Jo Ann C. Stabb, M.A., Senior Lecturer Emeritus (Design) S. Haig Zeronian, Ph.D., Professor Emeritus (Textiles and Clothing)

Graduate Study. The Graduate Group in Textiles offers a program of study and research leading to the M.S. degree. Students in the program use an interdisciplinary approach emphasizing the physical and behavioral science aspects of textiles. Research areas include chemical, physical, biochemical, and mechanical properties of fibers and polymers as well as fibrous assemblies, including composites, paper, and nonwovens; and psychological and sociological factors relating to perception and consumption of textiles and apparel. Extensive specialized fiber, polymer, and textiles research facilities and a behavioral research laboratory are available. For detailed information regarding the program, address the Chairperson of the Group.

Graduate Advisers. Y.L. Hsieh, G. Sun

Textiles and Clothing

(College of Agricultural and Environmental Sciences) Margaret H. Rucker, Ph.D., Chairperson of the Division

Division Office. 129 Everson Hall (530) 752-6650; http://textiles.ucdavis.edu

You-Lo Hsieh, Ph.D., Professor Susan B. Kaiser, Ph.D., Professor Ning Pan, Ph.D., Professor Margaret H. Rucker, Ph.D., Professor Gang Sun, Ph.D., Professor

Emeriti Faculty

Stephen C. Jett, Ph.D., Professor Emeritus Mary Ann Morris, Ph.D., Professor Emeritus S. Haig Zeronian, Ph.D., D.Sc., Professor Emeritus

The Major Program

The textiles and clothing major emphasizes the connections among (a) the physical characteristics of textile products, (b) human perceptions of and behavior toward these products, and (c) global economic trends affecting the textile/apparel marketplace. An integrative knowledge base links textile products with people and processes, to focus on the production, distribution, and consumer use of textiles and apparel; see also Fiber and Polymer Science, on page 309.

The Program. The textiles and clothing major offers two options: textile science and marketing/ economics. The Textile Science option provides students with a broad knowledge base in both the social and physical sciences. This base includes production, end-use applications and care of textiles and apparel, physical and chemical properties of textiles, and social-psychological and economic aspects of textiles and clothing. The Marketing/Economics option emphasizes social science and business course work, while also providing students with an awareness of the physical nature of textile products.

Internships and Career Alternatives. Textiles and clothing majors can pursue internships and careers in apparel production and merchandising, retail management, international marketing, textile testing and conservation, and textiles journalism. The majority of textiles and clothing graduates accept entry-level management and technical positions within the textile and apparel industry or in related fields, (e.g., merchandising and marketing, production, research and development, technical service and design). Students may also pursue graduate studies in textiles, business, and other areas depending on their specific selections of restricted elective course work.

B.S. Major Requirements:

	OLALIO
Preparatory Subject Matter	42-44
Plant Sciences 21 or Computer Science	
Engineering 15 or 30	. 3-4
Economics 1A-1B	8
Anthropology 2, Science and Society 1,	
Art History 1A, 1B, 1C, or 1D	
Physics 1A or 10	. 3-4
Psychology 1	4
Sociology 2	
Statistics 13	4
Textiles and Clothing 6, 7, 8	12
Select one of the following two opt	ions:

Marketing/Economics option Additional Preparatory Subject Matter for the option.....18-19

Agricultural and Resource Economics	1004
Depth Subject Matter	56-57
Mathematics 16A-16B	6
Chemistry 10 or 2A	
Management IIA-IIB	8

100B, 106, 13616 Statistics 1034 Psychology 151 or Consumer Science 1003-4

Restricted Electives12

Courses selected from the following: Agricultural and Resource Economics 18, 112, 142, 155, 157, 171A, 171B, Anthropology 122A, 126A, Consumer Science 100, Design 77, 107, 143, Economics 101, 121A, 121B, 134, 162, and other relevant course work, Foreign language units may be used to satisfy any or all of the required 12 units, Mathematics 16C, Psychology 151, Sociology 123, 126, 140, 141, 145, Textiles and Clothing 180A, 180B, 230, 293, with consent of instructor, and a maximum of 5 units in either Textiles and Clothing 192 or 199

Textile Science option **Additional Preparatory Subject Matter for** the option......19

Chemistry 2A, 2B, 8A, 8B......16 Mathematics 16A3 Depth Subject Matter51-52 Agricultural and Resource Economics 112, 1138 Design 143......4 Psychology 151 or Consumer Science 1003-4 Fiber and Polymer Science 100, 161, 161L,

Textiles and Clothing 107, 162, 162L, 163, 163L, 164, 165, 171, 173, 174...........36 Restricted Electives16

Courses selected from the following: Agricultural and Resource Economics 18, 141, 142, 155, 171A, 171B, Plant Sciences 120, Chemistry 2C, 128A, 128B, 128C, Communication 42, 130, 136, 140, Community and Regional Development 162, Consumer Science 100, Design 77, 107,

514 Theatre and Dance

142A, 142B, 160A, 160B, 160C, 170A, 170B, 170C, Economics 100, 101, 121A, 121B, 134, Fiber and Polymer Science 110, Foreign Language units may be used to satisfy any or all of the required 16 units, Management 11A, 11B, Mathematics 16B, 16C, Psychology 151, Sociology 25, 123, 126, 140, 148, 159, 175, Statistics 106, 108; Textiles and Clothing 180A, 180B, 230, 293, with consent of instructor, and a maximum of 5 units in either Textiles and Clothing 192 or 199.

Total Units for the Major...... 128-132

Major Adviser. S. Kaiser

Advising Center for the major is located in 129B Everson Hall (530) 754-8368.

Minor Program Requirements:

The Division of Textiles and Clothing offers a minor program for non-majors interested in satisfying secondary career objectives. For acceptance into the program see the staff adviser in 129B Everson Hall.

Textiles and Clothing 18 Textiles and Clothing 6, 7, or 8......4 Courses selected from Fiber and Polymer

Science 100, 110, 161, 161L, Textiles and Clothing 107, 162-162L, 163-163L, 164, 165, 171, 173, 174...... 14

Minor Adviser, G. Sun

Courses in Textiles and Clothing (TXC)

Questions pertaining to the following courses should be directed to the instructor or to the Division of Textiles and Clothing. See also courses in Fiber and Polymer Science, on page 309.

Lower Division Courses 6. Introduction to Textiles (4)

Lecture—3 hours; laboratory—3 hours. Introduction to the structure and properties of textiles. Consumer use and fabric characteristics are emphasized. GE credit: SciEng | SE, SL, VL.-I. (I.) Sun

7. Style and Cultural Studies (4)

Lecture/discussion-3 hours; discussion/laboratory-1 hour. The multiple and overlapping influences of gender, sexuality, ethnicity, and class on constructions of identity and community are explored through the study of style in popular culture and everyday life. Continuity and change in clothing and appearance styles are interpreted. GE credit: Soc-Sci, Div, Wrt | SS, VL, WC, WE.—III. (III.) Kaiser

8. The Textile and Apparel Industries (4)

Lecture — 4 hours. Textile and apparel industries including fashion theory, production, distribution, and consumption of textile goods. GE credit: SocSci, Div | SS.

92. Internship in Textiles and Clothing (1-12)

Internship - 3-36 hours. Prerequisite: consent of instructor. Work experience off campus in a textiles or clothing-related area. Supervision by a member of the Textiles and Clothing faculty. (P/NP grading only.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Lower Division Students (1-5)

(P/NP grading only.)

Upper Division Courses 107. Social and Psychological Aspects of Clothing (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Sociology 2. Social and cognitive factors influencing management and perception of personal appearance in everyday life. Concepts and methods appropriate to the study of meaning of clothes in social and cultural contexts. GE credit: SocSci, Div, Wrt | SS, VL, WE.-I. (I.)

162. Textile Fabrics (3)

Lecture - 3 hours. Prerequisite: course 6. Properties of fabrics as related to serviceability, comfort, and appearance. GE credit: SciEng | SE, VL.—III. (III.)

162L. Textile Fabrics Laboratory (1)

Laboratory-3 hours. Prerequisite: course 162 (may be taken concurrently). Laboratory methods and procedures employed in studying properties of textile fabrics as related to serviceability, comfort, and appearance. GE credit: QL, SE, VL, WE.—III. (III.) Pan

163. Textile Coloration and Finishing (3)

Lecture - 3 hours. Prerequisite: course 6, Fiber and Polymer Science 110, or Chemistry 8B. Basic principles of textile dyeing, printing, and finishing; color theory; structure, properties, and application of dyes and finishes; factors affecting application and fastness; maintenance of dyed and finished textiles. GE credit: SE, VL.-III. (III.) Sun

163L. Textile Coloration and Finishing Laboratory (1)

Laboratory—3 hours. Prerequisite: course 163 (may be taken concurrently). Demonstrates various aspects of dyeing, printing, and finishing of textile substrates including the effect of fiber and finish type, and physical and chemical variables on dyeing and finishing processes and on the properties of the resultant textile. GE credit: QL, SE, SL, WE.-III. (III.) Sun

164. Principles of Apparel Production (3)

Lecture - 3 hours. Prerequisite: course 6 or 8. Overview of characteristics, technology, processes, and research in apparel manufacturing industries including study of government statistics, material utilization and fabrication, mechanization, management, and production engineering. GE credit: OL, SS, VL.

165. Textile Processes (3)

Lecture/discussion-3 hours. Prerequisite: course 6. Physical processes involved in the production of textiles from the individual fiber to the finished fabric. Includes spinning, texturing, yarn formation, weaving preparation, weaving and knitting, tufting and fabric finishing. GE credit: SE.

171. Clothing Materials Science (4)

Lecture - 3 hours; laboratory/discussion - 3 hours. Prerequisite: course 6, 8, and senior standing. The properties, characterization, and performance evaluation of clothing materials and structures for specific functional applications. Principles and methods related to wetting and transport properties, fabric hand and aesthetic properties, clothing comfort, and material and assembly technology. GE credit: SE, VL. — II. (II.) Hsieh

173. Principles of Fashion Marketing (3)

Lecture - 3 hours. Prerequisite: course 8, Economics 1A, Agricultural and Resource Economics 113 or 136. Study of basic elements of fashion marketing including philosophy and objectives, organization, merchandising, pricing, promotion and personnel. Offered in alternate years. GE credit: SS, VL.—III.

174. Introduction to World Trade in Textiles and Clothing (4)

Lecture - 3 hours; discussion - 1 hour. Prerequisite: course 8. Structure of the global fiber/textile/ apparel complex and its distribution patterns with an overview of political, economic and technological factors that are changing these industries and their markets. GE credit: SocSci, Div | SS, WC.—II. (II.) Rucker

180A-180B. Introduction to Research in Textiles (2-2)

Laboratory-6 hours. Prerequisite: senior standing with textile-related major, and consent of instructor. Senior thesis on independent problems. Research begun in course 180A will be continued and completed in course 180B. (Deferred grading only, pending completion of sequence.) GE credit: SS, WE.—I, II, III. (I, II, III.)

192. Internship in Textiles and Clothing

laboratory-3-36 hours. Prerequisite: consent of instructor. Work-learn experience off campus in a textiles or clothing-related area. Supervision by a member of the Textiles and Clothing faculty. (P/NP grading only.)

197T. Tutoring in Textiles and Clothing (1-5)

Discussion/laboratory-3-15 hours. Prerequisite: upper division textiles-related major and consent of instructor. Tutoring of students in Textiles and Clothing courses. Assistance with discussion groups and laboratory sections under supervision of instructor. May be repeated for credit if tutoring another textiles course. (P/NP grading only.)

198. Directed Group Study (1-5)

(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

230. Behavioral Science Concepts in Textiles (3)

Lecture - 3 hours. Prerequisite: course 107, upper division or graduate course in statistics (e.g., Agricultural Management and Rangeland Resources 120) and one in a behavioral science (e.g., Psychology 145). Examination of theories and research concerning relationships between clothing and human behavior with emphasis on research techniques, including methods of measuring clothing variables. Offered in alternate years.—I. Kaiser

290. Seminar (1)

Seminar — 1 hour. Critical review of selected topics of current interest in textiles. (S/U grading only.)-I, II. (L. II.)

290C. Research Conference (1)

Discussion — 1 hour. Prerequisite: graduate standing; consent of instructor. Individual faculty members meet with their graduate students. Critical presentations of original research are made by graduate stu-dents. Research activities are planned. Discussions are led by major professors for their research groups. (S/U grading only.)—I, II, III. (I, II, III.)

293. Recent Advances in Textiles (3)

Lecture - 3 hours. Prerequisite: two upper division courses in Textiles and Clothing or consent of instructor. Critical reading and evaluation on selected topics of current interest in textiles. Multidisciplinary aspects of the topics selected will be stressed. May be repeated for credit. - (III.)

298. Group Study (1-5)

299. Research (1-12)

(S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Theatre and Dance

(College of Letters and Science)

David Grenke, Chairperson of the Department

Department Office. 101 Art Building (530) 752-0888; Fax (530) 752-8818 http://theatredance.ucdavis.edu

Faculty

Larry Bogad, Ph.D., Associate Professor Della Davidson, M.A., Professor David Grenke, Professor Lynette Hunter, Ph.D., Professor John Iacovelli, M.F.A., Professor Peter Lichtenfels, Professor Bella Merlin, Ph.D., Professor Maggie Morgan, M.F.A., Associate Professor Thomas J. Munn, Professor Jon Rossini, Ph.D., Associate Professor Peggy Shannon, Professor

Emeriti Faculty

Bobbie J. Bolden, M.A., Senior Lecturer Emerita Harry C. Johnson, M.A., Professor Emeritus William E. Kleb, D.F.A., Professor Emeritus Barbara Sellers-Young, Ph.D., Professor Emerita Peggy Shannon, Professor Emerita

The Dramatic Art Major Program

The A.B. degree in Dramatic Art provides students with an appreciation for and understanding of performance and its role in culture and society. The program offers a strong foundation in all aspects of drama, theatre, dance performance, and production. Students build significant skills in specific areas (including acting, directing, choreography, design, playwriting and devising, production skills and management) as well as achieving a broad knowledge of theatre, dance and film.

Productions and Facilities. Each year's schedule includes the undergraduate EDGE festival in theatre and dance, and the UC Davis Film Festival; opportunities to work with professional directors and choreographers in two main stage productions; practice-as-research projects established through the Institute of Exploration in Theatre, Dance and Performance, and workshops, performance projects and established scripts developed by M.F.A and Ph.D. established scripts developed by M.T.A din Tri.D. students. These productions are staged in our proscenium (Main), thrust (Wyatt), black box (Arena), performance studio (University Club) and intimate laboratory theatre (Lab A), as well as in the Mondavi Center's Vanderhoef Studio Theatre and Jackson Hall. These productions are part of the academic program of the department and serve an important purpose in the study of theatre and dance. Participation is open to all students.

A.B. Major Requirements: **Theatre Emphasis**

Theatre Emphasis
UNITS
Preparatory Subject Matter33
Dramatic Art 20, 24, 25, 26
Dramatic Art 21A or 144
Choose 4 units from Dramatic Art 21B, 40A,
40B, 41A, 41B, 98, 99, African American
and African Studies 51 or courses in other
departments with departmental
approval 4
Dramatic Art 3011
Participation in at least two of the following
areas: acting/dance; directing/
choreography/playwriting/stage
management/dramaturgy; design/studio/
technical production; and crew assignments for a minimum of two productions which
may include stage management, fly crew,
stage running crew, props, running crew,
lighting board operator, follow spot
operator, sound board operator, costume
running crew, dresser, make-up
Depth Subject Matter45-47
PCP::: 900 CC: :::G::C: :

running crew, dresser, make-up
Pepth Subject Matter45-
Dramatic Art 156A, 156B, 156C

playwriting/stage management/ dramaturgy; design/studio/technical production; and crew assignments for a minimum of two productions which may include stage management, fly crew, stage running crew, props, running crew, lighting board operator, follow spot operator, sound board operator, costume running crew, dresser, make-up

Total Units for the Major78 **Dance Emphasis UNITS**

Preparatory Subject Matter	. 28
Dramatic Art 14, 24, 26	
Choose 10 units from Dramatic Art 21A,	
40A, 40B, 41A, 41B, 42A, 42B, 44A, 44B,	
African American and African Studies	
51 10	
Dramatic Art 30; crew	
Dramatic Art 30; performance	
Depth Subject Matter	45
Dramatic Art 140A, 140B, 140C, 141,	
145 19	
Choose 19 units from African American and	
African Studies 155, Dramatic Art 142, 143,	
154, 155, 156C, 159, Music 107A, Native	
American Studies 125	
Dramatic Art 124C, 1267	
Total Units for the Major	.73

Major Adviser. Consult Department office. **Minor Program Requirements:**

UNITS Dramatic Art......22

One course from Dramatic Art 20, 21A, 24, two of the following areas: acting/dance; directing/choreography/ playwriting/stage management/

dramaturgy; design/studio/technical production; and crew assignments for a minimum of one production which may include stage management, fly crew, stage running crew, props, running crew, lighting board operator, follow spot operator, sound board operator, costume running crew, dresser, make-up

Transfer Students. As described above, all students completing a major in Dramatic Art must participate in dramatic productions, including work in at least two of the following three areas: acting/dance; design (scenic, costume, lighting, painting, props, sound); directing/playwriting/stage management and crew assignments for a minimum of two produc-tions while in residence at UC Davis. Transfer students should see the major adviser for an evaluation of your previous experience.

Guest Artists. The Granada Visiting Artists Program brings distinguished professional artists to the campus each year, to be in residence for a quarter. These working professional artists interact closely with students in the classroom and rehearsal halfs and provide them excellent pre-professional experiences of theater practice.

Graduate Study. The Department of Dramatic Art offers programs of study and research leading to the M.F.A. in Dramatic Art (the interdisciplinary weaving of acting, directing, design, choreography and practice and research) and contributing to the Graduate Group Ph.D. in Performance Studies. Detailed information may be obtained by contacting the Graduate Adviser.

Graduate Advisers. Ph.D. Performance Studies and Graduate Group: L. Hunter; M.F.A. Dramatic Art Program: P. Lichtenfels

Courses in Dramatic Art (DRA)

Lower Division Courses

1. Theatre, Performance and Culture (4)

Lecture — 3 hours; discussion — 1 hour. Introductory Introductory investigation of the nature of performance, moving from performance theory to consideration of various manifestations of performance including theatre, film and media, performance art, dance, sports, rituals, political and religious events, and other "occasions." Not open to students who have completed course 1S. GE credit: ArtHum, Div, Wrt | ACGH, AH, DD, Wrt. - I, II, III, IV. (I, II, III, IV.) Bogad, Hunter, Rossini

1S. Theatre, Performance and Culture (4)

Lecture - 3 hours; discussion - 1 hour. Introductory investigation of the nature of performance, moving from performance theory to consideration of various manifestations of performance including theatre, film and media, performance art, dance, sports, rituals, political and religious events, and other "occasions." For Short Term Programs Abroad. Not open to students who have completed course 1. Not offered every year. GE credit: ArtHum, Div, Wrt.

5. Understanding Performance: Appreciation of Modern Theatre, Dance, Film and Performance Art (4)

Lecture/discussion-2 hours; laboratory/discussion - 5 hours; tutorial - 1 hour. Relevance of theatre and performance to modern culture and society. Approaches to theatre/dance/media/performance art, integrated into Mondavi Centre for the Arts and Theatre and Dance Department programs. GE credit: ArtHum, Div. - I, III. (I, III.)

10. Introduction to Acting (3)

Laboratory/discussion-4 hours; term paper. Fundamentals of movement, speech, theatre games, and improvisation. Selected reading and viewing of theatre productions. Intended for students not specializing in Dramatic Art. - I, II, III. (I, II, III.)

14. Introduction to Contemporary Dance (4)

Lecture — 3 hours; laboratory — 3 hours. Introduction to basic issues and methods in contemporary dance. Focus on preparing the student for dancing and dance-making through basic techniques of improvisation and composition. Consideration of dance as a cultural practice. GE credit: VL.-I, II, III. (I, II, III.)

20. Introduction to Dramatic Art (4)

Lecture - 3 hours; discussion - 1 hour. Understanding and appreciation of both the distinctive and collaborative contributions of playwright, actor, director, and designer to the total work of dramatic art. Study of plays from the major periods of dramatic art in their cultural contexts. GE credit: ArtHum | AH. -I, III. (I, III.)

21A. Fundamentals of Acting (4)

Lecture — 2 hours; laboratory — 4 hours. Prerequisite: course 20. Open to students planning to major in Dramatic Art. Physical and psychological resources of the actor. Experience in individual and group contact and communication, theatre games, advanced improvisation, sound and movement dynamics. Viewing of theatre productions. GE credit: OL, VL. — I. (I.)

21B. Fundamentals of Acting (4)

Lecture – 2 hours; laboratory – 4 hours. Prerequisite: course 21A and consent of instructor. Open to students planning to major in Dramatic Art. Theory and practice of acting with emphasis on character analysis, interpretation, and development. Acting in a student-directed project. Viewing of theatre productions. GE credit: OL, VL.—III. (III.)

24. Visual Aspects of Dramatic Art (4)

Lecture - 3 hours; laboratory - 2 hours. Understanding and appreciation of the visual aspects of dramatic art: theatre architecture, scenery, lighting, costume, and makeup.

25. Technical Aspects of Dramatic Production (3)

Lecture-3 hours. Technical principles of dramatic production emphasizing the three areas of scenic, costume and lighting studios. Subjects covered include basic tools, materials and equipment, production practices; and the interdisciplinary and collaborative nature of dramatic production.

26. Performing Arts Production Management (3)

Lecture—3 hours. Theoretical study of performing arts administration and backstage operations from audition through performance. Techniques of scheduling, production management, stage management, technical direction, audience control, box office, promotion, safety, accommodations for persons with disabilities and emergency procedures.

30. Theatre Laboratory (1-5)

Prerequisite: course 25 or consent of instructor. Projects in acting, production, scene design, costuming, lighting, directing, and playwriting. Participation in departmental productions. May be repeated for credit up to 11 units.—I, II, III. (I, II, III.)

40A. Beginning Modern Dance (2)

Laboratory/discussion-4 hours. Prerequisite: course 14 or consent of instructor. Fundamentals of modern dance focusing primarily on the development of techniques and creative problem solving. Basic anatomy, dance terminology, and a general overview of modern dance history. May be repeated one time for credit with consent of instructor.—I, II, III. (I, II, III.)

40B. Intermediate Modern Dance (2)

Laboratory/discussion-4 hours. Prerequisite: course 40A. Modern dance techniques. Basic anatomy, dance terminology and a general overview of modern dance history. May be repeated one time for credit with consent of instructor. - I, II, III. (I, II, III.)

41A. Beginning Jazz Dance (2)

Laboratory/discussion-4 hours. Prerequisite: course 14 or consent of instructor. Fundamentals of jazz dance; includes warm-ups, dance techniques and combinations. Basic anatomy, dance terminology and general overview of jazz dance history. May be repeated one time for credit with consent of instructor.

41B. Intermediate Jazz Dance (2)

Laboratory/discussion-4 hours. Prerequisite: course 41A. Warm-ups, dance techniques and combinations at the intermediate level. Basic anatomy, dance terminology and a general overview of jazz styles of historically significant jazz choreographers and leading contemporary jazz choreographers.

May be repeated one time for credit with consent of

42A. Beginning Ballet (2)

Laboratory/discussion-4 hours. Prerequisite: course 14 or consent of instructor. Fundamentals of ballet, focusing on the development of technique through proper alignment, quality, and rhythm. Basic anatomy, ballet terminology, and dance history. May be repeated one time for credit with consent of instructor. - I, II, III. (I, II, III.)

42B. Intermediate Ballet (2)

Laboratory/discussion-4 hours. Prerequisite: course 42A or consent of instructor. Barre and center work at the intermediate level. Development and refinement of technique through proper alignment, rhythmic, and qualitative understanding. Anatomy, ballet terminology, and dance history. May be repeated one time for credit with consent of instructor. — I, II, III. (I, II, III.)

43A. Contact Improvisation Dance (2)

Lecture/laboratory-4 hours. Fundamentals of contact improvisation and its applications to all forms of dance, performance, sports, physical safety and health. Solo improvisation, safety, communication, alignment, basic lifting and weight-sharing, intuition, developing relaxed readiness and personal expression. May be repeated two times for credit. Not offered every year.

43B. Intermediate Contact Improvisation (2)

Lecture/laboratory-4 hours. Prerequisite: course 43A. Building on the fundamentals. Reviewing basics, extended improvising, skillfully working with partners of different sizes and abilities, advanced lifting, advanced safety practices, embracing risk and disorientation, subtle nuances of communication. May be repeated two times for credit.

44A. Beginning Hip Hop Dance (2)

Laboratory/discussion-4 hours. Fundamentals of Hip Hop dance focusing on developing a fluid movement vocabulary, facility in body isolations, intricate rhythmic patterning, quick shifts of weight and mastering dance combinations. Discussions on Hip Hop dance history, styles and terminology. May be repeated one time for credit.

44B. Intermediate Hip Hop Dance (2)

Laboratory/discussion-4 hours. Prerequisite: course 44A or consent of instructor. Expansion of Hip Hop dance vocabulary by focusing on mastering body isolations and intricate rhythmic techniques, complex dance combinations, advanced across the floor sequences. May be repeated one time for credit.

92. Internship in Dramatic Art (1-12)

Prerequisite: consent of instructor and department chairperson; lower division students (less than 84 units completed). Internship outside the Department of Theatre and Dance enabling students to practice their skills. May be repeated for credit up to 12 units. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.)

98. Directed Group Study (1-5)

Primarily for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) (P/NP grading only.)

Upper Division Courses

111S. Representation and Identity in Culture and Cinema (4)

Lecture/discussion-2 hours; film viewing-4 hours. Issues of personal and collective identity via study of film narratives from different cultures. Reflection of dominant cultural identities in film. Taught in Australia. GE credit: ArtHum, Div, Wrt.

114. Theatre on Film (4)

Lecture/discussion-3 hours; film viewing-2 hours; term paper. Prerequisite: consent of instructor; graduate standing; course 1, 14, 15. Study of six/eight plays on film, using mixed casts and raising issues of diversity. Focus: sociohistorical context for production and reception, interpretation and analysis of topics (gender, ethnicity, age, politics, philosophy), and filming, screenwriting, design, and acting/ directing for film. GE credit: ArtHum or SocSci, Div, Wrt | V

115. Advanced Study of Major Film Makers (4)

Lecture/discussion-3 hours; film viewing-2 hours. Prerequisite: course 15. Analysis of the contribution of some outstanding film creators. Study of diverse aesthetic theories of the cinema and their application to selected films. May be repeated for credit when different film creator studied.

121A. Advanced Acting: Mask, Myth, and Tragedy (4)

Lecture/laboratory-6 hours. Prerequisite: course 21B and consent of instructor. Theory and practice of acting focused on the performance skills necessary to enact verse plays. Specific concentration on language as vocal and physical metaphor.

121B. Advanced Acting: Comedy from Farce to Manners (4)

Lecture/laboratory-6 hours. Prerequisite: courses 21B, 121A and consent of instructor. Theory and practice of acting in comic plays. Specific issues addressed will be comic characterization, physical mask, and timing.

122A. Advanced Acting: Realism (4)

Lecture/laboratory-6 hours. Prerequisite: course 21B and consent of instructor. The issues of Stanislavski realism are explored through selected plays. Script analysis using improvisation and emotional scoring

122B. Advanced Acting: Non-Realism (4)

Lecture/laboratory-6 hours. Prerequisite: courses 21B, 122A and consent of instructor. Exploration of the acting techniques needed to perform a non-realistic script. Different avant-garde movements will be examined through performance of the scripts.

124A. Principles of Theatrical Design: Scenery (4)

Lecture-seminar - 4 hours. Prerequisite: course 24 or consent of instructor. Scene design processes, working drawings, sketching techniques, scale models, methods and materials of scenery construction.

124B. Principles of Theatrical Design: Scenery (4)

Lecture-seminar - 4 hours. Prerequisite: course 24 or consent of instructor. Analysis of plays in terms of scene design, elements of design, execution of designs for modern and period plays.

124C. Principles of Theatrical Design: Lighting (4)

Lecture-seminar — 4 hours. Prerequisite: course 24 or consent of instructor. Theories of lighting the stage, equipment and control systems, execution of lighting plots. - Munn

124D. Principles of Theatrical Design: Costume (4)

Lecture-seminar - 4 hours. Prerequisite: course 24 or consent of instructor. Source materials for theatrical costuming, selecting fabrics, elements of design, analysis of plays in terms of costume design, execution of designs for modern and period plays. - I. (I.)

124E. Costume Design for Film (4)

Lecture/discussion-4 hours. Prerequisite: 24 or 124D or consent of instructor. Theory and practice of the art and business of film costume design. Script analysis, costume research, developing design concepts, budgeting, and current production practices and methods. Execution of designs for period and contemporary films. Viewing of current films. GE credit: OL, VL.—II. (II.) Morgan

125. Scenic Painting: Studio (4)

Lecture -2 hours; studio -3 hours; laboratory -3hours. Prerequisite: upper division standing in Dramatic Art, Art Studio, or Design; or course 24 or 25, or consent of instructor. Scene painting techniques, practices and materials. Course satisfies production requirement in studio category. May be repeated one time with consent of instructor. Offered in alternate years.

126. Principles of Performing Arts Stage Management (3)

Lecture/discussion - 2 hours; laboratory - 3 hours. Prerequisite: course 20, 24, 25, 26 or the equivalent or consent of instructor. Stage management principles for theatre, dance, musical theatre, music, and concerts. The dynamical role of the stage manager in the performing arts, upper-management team.

127A. Principles of Directing (4)

Lecture — 2 hours; laboratory — 4 hours. Prerequisite: courses 21A, 26; two of 156AN, 156BN, 156CN; or consent of instructor. Director's creative approach to the play and to its staging. GE credit: VL

127B. Principles of Directing (4)

Lecture — 2 hours; laboratory — 4 hours; rehearsal. Prerequisite: course 127A and consent of instructor for non-majors. Director's creative approach to the actor. GE credit: VL

128. Principles of Theatre Sound (3)

Lecture/discussion-2 hours; laboratory-3 hours. Fundamentals of sound, sound equipment, and sound design as used in modern theatre and other performance venues. Assembly, set-up, and operation of basic theatre sound reinforcement system, recording system, and theatrical playback system. -Jacobson

130. Approaches to Theatrical Design: Practice and Theory (4)

Seminar - 2 hours; studio - 4 hours. Prerequisite: upper division standing in Dramatic Art, Art Studio or Design. Advanced scenic design study in specific areas including but not limited to: research, design styles and concepts, new materials and techniques, photography, projections, computer technology, spectacle and special effects, and alternative theatre forms and genres. Course satisfies Dramatic Art production requirement in Design. Offered in alternate

135. Voice in Performance (2)

Performance instruction—4 hours. Prerequisite: course 21B or consent of instructor. Progression of exercises to free, develop and strengthen the voice, as a human and then as an actor's instrument with emphasis on how the voice works, to freeing the channel for sound, to interpersonal communication. May be repeated two times for credit. - I. (I.)

140A. Dance Composition (4)

Lecture — 3 hours; laboratory — 3 hours. Prerequisite: courses 40A, 41A, and 42A, or consent of instructor. Introduction to the craft of choreography. Students will compose phrases and present movement studies based on the elements of choreography: motivation, space, time, force/energy.-II. (II.)

140B. Dance Composition (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 140A. Continuation of the study of choreography, focusing on the development of group choreography: duets, trios, quartets and group work, form, and accompaniment.—III. (III.)

140C. Dance Composition (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 140A, 140B. Continuation of study of choreography focusing on sequencing movements for groups. The relation between dance and allied mediums of music, sets, costumes and lighting. Students conceptualize a choreographic issue and explore it through creation of short dance studies.—I. (I.)

141. Introduction to the Fundamentals of Movement (3)

Lecture/discussion-3 hours. Introduction to fundamentals of movement that combines intellectual and kinesthetic understanding of the body's skeletal and muscular systems. Explorations based on theories of body mind specialists Feldenkrais, Bartenieff and Sweigard as well as the eastern discipline of Yoga. GE credit: VL.-I. (I.)

142. History of Modern Dance (5)

Lecture—3 hours; laboratory—3 hours; extensive writing. The Modern Dance tradition in the U.S., focusing on its theorizations of individual and social identity. Students will write and choreograph analyses of principle dances in this tradition. Offered in alternate years.

143. Dance and Movement Studio (1-4)

Laboratory/discussion-2-8 hours. Prerequisite: course 14 or consent of instructor. Special studies in dance and movement such as African, Balinese, Baroque, Chinese, European, and stage combat. Offered as needed for stage productions. May be repeated for credit for a total of 8 units.

144. Introduction to Traditional Chinese Physical Culture (4)

Lecture/discussion-4 hours. Traditional Chinese Wushu practices, explored through practical work in dance laboratory conditions. Integration of practice with conceptual analysis; contemporary social, educational and artistic applications. GE credit: ArtHum or SocSci, DIV | AH, SS.—II. (II.) Hunter

144B. Introduction to Traditional Chinese Physical Culture (4)

Lecture/discussion-4 hours. Prerequisite: course 144A. Traditional Chinese Wushu practices, explored through practical work in dance laboratory conditions. Integration of practice with conceptual analysis; contemporary social, educational and artistic applications. May be repeated two times for credit when content and instructor varies and if student progression is required. GE credit: ArtHum or SocSci, Div | AH, SS. - I, II, III, IV. (I, II, III, IV.)

144C. Daoist Philosophy in Traditional Chinese Movement Culture (4)

Lecture/discussion-4 hours. Prerequisite: course course 144B. Daoist practices of movement and their relation to daoist philosophy, explored through work in dance laboratory conditions. Integration of practice with conceptual analysis, and critical philosophy around values and ethical action. May be repeated two times for credit when content or instructor varies and if student progression is required. GE credit: AH, WC.—I, II, III, IV. (I, II, III, IV.) Hunter

145. Directed Choreography Projects (4)

Lecture/laboratory—6 hours. Prerequisite: courses 140A, 140B, 140C or consent of instructor. Conceptualization, creation, casting, rehearsing, and concert presentation of complete dances, with students integrating elements of stagecraft and directing the on-stage rehearsals. - Grenke

146A. Professional Track Modern Dance I

Laboratory/discussion-6 hours. Prerequisite: course 40B; consent of instructor. Professionally oriented performance training. Rigorous, consistent training regimen based on traditional modern dance technique. Breath and voice, skeletal and muscular placement, moving from the spine, contraction technique, movement intention. May be repeated two times for credit. - II. (II.)

146B. Professional Track Modern Dance II (3)

Laboratory/discussion-6 hours. Prerequisite: courses 40B and 146A; consent of instructor. Continuous of course 146A. Body and space relationships in solos, duets and group work; stylitic variations of Graham technique; works of Paul Taylor. May be repeated two times for credit. — (III.) (III.)

146C. Professional Track Modern Dance III (3)

Lecture/discussion-6 hours. Prerequisite: courses 40B, 146A, and 146B; consent of instructor. Continuation of course 146B. Time as a theatrical device, sustaining movement and non-movement, phrasing, musicality. May be repeated two times for credit. -Grenke

150. American Theatre and Drama (4)

Lecture — 4 hours. The history of the theatre from Colonial times to the present. Readings of selected plays. Offered in alternate years. GE credit: ArtHum, Div, Wrt.

151S. Australian Performance and Culture (4)

Lecture/discussion-2 hours: seminar-2 hours. Australian performance and theatre practices as a product of its culture of origin. Relationships between art and society. Taught in Australia. GE credit: ArtHum.

154. Asian Theatre and Drama: Contexts and Forms (4)

Lecture/discussion-4 hours. Prerequisite: upper division standing. Selected Asian plays and performance forms in their cultural and artistic contexts; myth, ritual and the theatre; performance training, visual presentation of the text; political theatre; intercultural performance—the fusion of Asian and Western traditions. Offered in alternate years. GE credit: ArtHum, Div, Wrt.

155. Representing Race in Performance (4)

Lecture - 4 hours. Representation and performance of "race" in American culture featuring different subheadings such as "African American Theatre" or "Asian-Americans on Stage." Offered in alternate years. May be repeated one time for credit when topic differs. GE credit: ArtHum, Div, Wrt | AH, DD, WE.—III. (III.)

155A. African American Dance and Culture in the United States, Brazil and the Caribbean (4)

Lecture/discussion-4 hours. A comparative study of the African American dance forms in the U.S.A. Brazil, Haiti, Cuba, Jamaica, Barbados, and Trinidad. Examination of ritual, folk, and popular dance forms and the socio/historical factors that have influenced these forms. (Same course as African American and African Studies 155A.) Offered in alternate years.

155B. Ancient and Contemporary Greek Theatre and Dance (6)

Discussion/laboratory-10 hours; performance instruction - 10 hours; seminar - 13 hours. Origins of early theatres and the first actors, playwrights and dancers and their powerful influence on western performance and thought up to present day. Offered in Greece. GE credit: ArtHum | AH.—IV. (IV.)

156D. Theatre History through Shakespeare (4)

Lecture-4 hours; writing. Shakespeare's plays, theatre history, and theatre today. European contexts from 1590-2004 and international theatre from 20th century. Stagecraft, different media (print, stage, film), social/political environments, design, and cultural change (gender, sexuality and ethnicity). May be repeated one time for four units of credit. GE credit: ArtHum, Div., Wrt.

156AN. Performance Analysis (4)

Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 1, 20, or consent of instructor. Performance on the stage, in the street, in everyday life, ritual, and in politics. Satire, irony, creative protest and performance. Social movements, the state, and performance as tactical intervention. GE credit: ArtHum, Div, Wrt | AH, DD, WE

156BN. Theatre in History and Place: Local, National and Global Conditions for Production (4)

Laboratory-3 hours; discussion-1 hour. Prerequisite: course 1, course 20 or consent of instructor. Exploration of local, national and global issues in theatre production, with special attention to historical changes in social and political contexts for performance. GE credit: ArtHum, Div, Wrt | AH, WC,

156CN. Modern Aesthetic Movements in Performance (4)

Laboratory/discussion-3 hours; discussion-1 hour. Prerequisite: course 1, course 20 or consent of instructor. Important movements in performance, especially theatre and dance, from realism to the present. Primary emphasis on Western traditions though others may be studied. GE credit: ArtHum, Div, Wrt | AH, WE.

156D. Theatre History through Shakespeare (4)

Laboratory-4 hours; extensive writing. Shakespeare's plays, theatre history, and theatre today. European contexts from 1590-2004 and international theatre from 20th century. Stagecraft, different media (print, stage, film), social/political environments, design, and cultural change (gender, sexuality and ethnicity). May be repeated one time for credit. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—II, IV. (II, IV.) Hunter

158. Performance Studies Undergraduate Seminar (4)

Seminar-4 hours. Prerequisite: course 156A, B, or C, or consent of instructor. Focused inquiry into a particular genre, period, movement, artist, or theme in performance. Philosophical and aesthetic issues as well as historical and cultural performance contexts. In-depth research projects in relationship to the subject of inquiry. May be repeated for credit. GE credit: Wrt.

159. Contemporary Experimental Performance, Theatre and Drama (4)

Lecture/discussion—4 hours. Evaluation and examination of the "New Theatre"—its experimental and innovative nature since the 1960s. Dance, film,

stage, performance art and public acts of a performative nature. Not open for credit to students who have completed course 159S

159S. Contemporary Experimental Performance, Theatre and Drama (4)

Lecture/discussion-4 hours. Evaluation and examination of the "New Theatre"—its experimental and innovative nature since the 1960s. Dance, film, stage, performance art and public acts of a performative nature. This course is offered in Sydney, Australia. Not open for credit to students who have completed course 159. Not offered every year.

160A-160B. Principles of Playwriting (4-4)

Lecture/seminar—4 hours. Prerequisite: two courses in Dramatic Art or related courses in other departments; course 160A prerequisite for 160B or consent of instructor. Analysis of dramatic structure; preparation of scenarios; the composition of plays. GE credit: WE

170. Media Theatre (3)

Lecture - 1 hour; rehearsal - 2 hours; performance -1 hour. Prerequisite: upper division standing in Dramatic Art, Music, Art Studio, Design, Computer Science, or Engineering: Computer Science, or consent of instructor. New media and application of theatre design and performance. Emphasis on collaborative process in relationship to integration of emerging technologies and formation of new theatrical works. Development of collaborative performance through lecture, demonstration, improvisation and experimentation. May be repeated one time for credit.

180. Theatre Laboratory (1-5)

Prerequisite: upper division standing and course 25, or consent of instructor. Projects in acting, production, scene design, costuming, lighting, directing, and playwriting. Participation in departmental productions. May be repeated for credit.—I, II, III. (I, II,

192. Internships in Theatre and Dance (1-12)

Internship - 3-36 hours. Theatre production experience in creative, technical or management areas. Experience in galleries, performance sites, or theatre/dance/physical theatre companies. May be repeated for credit for a total of 12 units. Not open to students who have completed course 1925. (P/NP grading only.)

1925. Internships in Theatre and Dance (1-12)

Internship – 3-36 hours. Theatre production experience in creative, technical or management areas. Experience in galleries, performance sites, or the-atre/dance/physical theatre companies. This course is offered in Sydney, Australia. May be repeated for credit for a total of 12 units. Not open to students who have completed course 192. Not offered every year. (P/NP grading only.)—McCutcheon

194HA-194HB. Special Study for Honors Students (3-3)

Independent study-9 hours. Prerequisite: qualification for Letters and Science Honors Program and admission to Dramatic Art Senior Honors Program. Preparation and presentation of a culminating project, under the supervision of an instructor, in one of the creative or scholarly areas of Dramatic Art. (Deferred grading only, pending completion of sequence)

197T. Tutoring in Dramatic Art (1-5)

Tutoring - 1-5 hours. Prerequisite: upper division or graduate standing with major in dramatic art; consent of department chairperson. Leading of small voluntary groups affiliated with one of the department's regular courses. May be repeated for credit. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

200. Methods and Materials in Theatre Research (4)

Seminar-3 hours; term paper. Essential research tools in theatre and related fields; bibliographies. primary sources; methods of evaluating and presenting evidence; delineating research areas in the field.

211. Advanced Voice and Speech (3)

Lecture—2 hours; laboratory—2 hours. Prerequisite: advanced senior undergraduate Acting major or graduate student. Open only to Dramatic Arts Students and Ph.D. students with an emphasis in Performance and Theatre. Review a progression of exercises to free, develop and strengthen the voice, first as a human instrument, and then as an actor's instrument using various texts such as Shakespeare, Ibsen and contemporary plays. Required for the M.F.A. degree in Acting. May be repeated two times for credit. - I, IV. (I, IV.)

212. Advanced Stage Movement (3)

Laboratory-6 hours. Prerequisite: graduate standing in the MFA Program. The application of modes of exploration, breath placement, and the use of imagery as well as Laban's effort/shape system as a method of analysis in classic and modern plays Open to advanced undergraduates by consent of instructor. May be repeated for credit.

221. Special Problems in Advanced Acting

Seminar-2 hours; laboratory-4 hours. Prerequisite: consent of instructor. Advanced acting problems arising from differences in the type and style of plays selected from Greece to the present. May be repeated for credit.

224A. Seminar in Theatrical Design: Ancient Worlds—Early 17th Century (4)

Seminar - 2 hours; project - 2 hours. Prerequisite: graduate standing. Group study while focusing primarily on one discipline: scenic, costume or lighting design. Periods covered: Greek, Medieval, Renaissance, Shakespearean, Jacobean, early 17th century. Design projects include script analysis, research of period style, fashion, character development, developing design concepts, presentation skills.—I. (I.) lacovelli, Morgan, Munn

224B. Seminar in Theatrical Design: Mid 17th Century to 1900 (4)

Seminar—2 hours; project—2 hours. Prerequisite: graduate standing; course 224A or consent of instructor. Group study focusing primarily on one discipline: scenic, costume or lighting design. Periods covered: Cavalier, Restoration 18th century opera and ballet, 19th century drama. Design projects include script analysis, research of period style, fashion, character development, developing design concepts, presentation skills.—II. (II.) lacovelli, Morgan, Munn

224C. Seminar in Theatrical Design: the 20th Century (4)

Seminar—2 hours; project—2 hours. Prerequisite: graduate standing; course 224A and 224B or consent of instructor. Group study focusing primarily on one discipline-scenic, costume or lighting design. 20th century genres covered: Realism, Brecht, Musicals, Contemporary Dance, short narrative film. Design projects include script analysis, research of period style, fashion, character development, developing design concepts, presentation skills.—III. (III.) lacovelli, Munn

224D. Seminar in Theatrical Design: **Contemporary Concepts (4)**

Seminar — 2 hours; project — 2 hours. Prerequisite: graduate standing; course 224A, 224B, and 224C or consent of instructor. Group study focusing primarily on one discipline: scenic, costume or lighting design. Emphasis on contemporary design concepts for new works and classics: Shakespeare, modern dance, concept plays and musicals. Script and character analysis for design in performance, research, design projects.—I. (I.) lacovelli, Morgan, Munn

224E. Seminar in Theatrical Design: **Advanced Concepts (4)**

Seminar – 2 hours; project – 2 hours. Prerequisite: graduate standing; courses 224A, 224B, 224C, and 224D or consent of instructor. Group study focusing primarily on one discipline: scenic, costume or lighting design. Emphasis on special issues in contemporary design concepts for new works and classics. Script and character analysis for design in performance, research, design projects.—III. (III.) Iacovelli, Morgan, Munn

225. Performance Design Studio: Techniques and Media (2)

Studio - 2 hours. Prerequisite: graduate standing; must be taken concurrently with course 224 series. Exploration and development of techniques and skills in the performance design process. Drafting, model building, drawing, painting and rendering, costume drawing, color theory, lighting techniques, design portfolio preparation and presentation. May be repeated up to five times for credit. -1, II, III. (I, II, III.) Iacovelli, Morgan, Munn

228. Seminar in Directing Theory: Non-Realism (4)

Seminar-3 hours; term paper. Modern directing theory as it applies to non-realistic theatre; development of directorial concepts for production of selected non-realistic plays—Greek to the present; emphasis on textual analysis.

229. Special Problems in Directing (5)

Seminar-2 hours; laboratory-2 hours; rehearsal-4 hours. Prerequisite: consent of instructor. Projects in directing scenes selected from plays from ancient Greece to the present. May be repeated for credit.

230. Advanced Problems in Choreography and Performance (2)

Laboratory/discussion - 2 hours. Prerequisite: consent of instructor. Explores contemporary issues of choreography and performance in depth and how those issues pertain to performance work. Focus will include contemporary thought on representation, legibility, new forms, and cultural attitudes. May be repeated six times for credit. - I, II, III. (I, II, III.) Davidson

244. Critical Approaches to Traditional Systems of Body Movement (4)

Discussion/laboratory-6 hours; project; term paper. Introduction to traditional systems for body movement, development of critical approaches to them, and experiments in how they inform training and practice in theatre, dance, and performance. May be repeated five times for credit. Not offered

250. Modern Theatre (4)

Seminar-3 hours; term paper. The theatre of Europe and America, 1860-1940, with emphasis on the relationship of the dramas of the period to the physical circumstances under which they were produced. Offered in alternate years.

251. Scoring and Scripting in Performance (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: graduate standing. The process of weaving together various performance elements brought into play by the artists in their respective disciplines. The "script" is the thread from which the artists' "scores" will layer and transform the "script" into performance for specific time, place, spectators.

252. Performance: Concepts of Space, Place, and Time (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: graduate standing. Innovative theories of creating performance spaces, establishing a sense of place, and communicating the concept of time explored through collaborative interaction. Research includes traditional principles, site-specific spaces and consideration of various tempi from music and move-

253. Approaches to Collaboration (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: graduate standing. Exploration of different approaches to collaboration among artists in different media and their influence on the creative pro-

254. Performing Identities/Personae (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: graduate standing. Historical and contemporary theories of constructing stage identities. Discussion and project collaborations based on theories. Questions of identity related to ethnicity, gender or sexual ori-

255. Composition in the Arts (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: graduate standing. Examine manner in which specific elements utilized by actors, dancers, directors, choreographers, and designers are combined or related to form a whole in space and time, as well as methods of sequencing used by each discipline to produce artistic products. May be repeated one time for credit.

257. Interdisciplinary Seminar in Theatre, Dance and Performance (4)

Seminar - 3 hours; project. Prerequisite: consent of instructor. Interdisciplinary seminar for first and second year MFA students in Dramatic Art. Topics will range from current practice in dance, theatre, film and performance, to leading edge developments by outstanding practitioners in the field. Students must be enrolled on the MFA in Dramatic Art. Students taking the Ph.D. in Performance Studies or the DE in Studies in Performance and Practice may apply to join the class. May be repeated two times for credit.

259. Topics in Contemporary Theatre and Performance (4)

Seminar—3 hours; term paper. Special topics designed to study in depth aspects of contemporary performance including performance analysis, cultural and historical context, modes of production, theoretical and political entailments, and issues of spectatorship (e.g., "Brecht and After," "British Theater," "Race and Gender in Performance." May be repeated five times for credit.

260. Topics in Contemporary Theatre and Performance (4)

Seminar—3 hours; term paper; project. Prerequisite: admission to any graduate program in the University. Preference will be given to students enrolled in the Designated Emphasis in Studies in Performance and Practice. Instruction is offered a variety of disciplinary approaches and methodologies in Performance and Practice, with a focus is on crossdisciplinary learning and research. Usually offered each quarter. Maybe repeated for credit with different topical matter/instructor. Offered irregularly.

265A. Performance Studies: Modes of Production (4)

Seminar—3 hours; term paper; project. Introduces students to the literature of performance production in a variety of media: theatre, dance, film, video, computer-based, looking at cultural, aesthetic, rhetorical and political theory. Offered in alternate years. May be repeated three times for credit when topic

265B. Performance Studies: Signification and the Body (4)

Seminar—3 hours; term paper; project. Introduces students to analysis of the body in performance, drawing on theoretical models from several fields. Offered in alternate years. May be repeated three times for credit when topic differs.

265C. Performance Studies: Performance and Society (4)

Seminar—3 hours; term paper; project. Introduces students to the role of performance (broadly defined), in everyday life, sociopolitical negotiation, identity, social movements, the media, and the state. Offered in alternate years. May be repeated three times for credit when topic differs.

265D. Performance Studies: Theory, History, Criticism (4)

 $\begin{array}{l} {\sf Seminar-3\ hours;\ term\ paper;\ project.\ Introduction}\\ {\sf to\ the\ theory,\ history\ and\ criticism,\ informing\ perfor} \end{array}$ mance studies. Offered in alternate years. May be repeated three times for credit when topic differs.

280. Theatre Laboratory (1-12)

Advanced practice in acting, designing, directing, playwriting, and technical theatre. May be repeated for credit.—I, II, III. (I, II, III.)

298. Group Study (1-5)

Prerequisite: consent of instructor.

299. Individual Study (1-12) (S/U grading only.)

299D. Dissertation Research (1-12) (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)-I, II, III. (I, II, III.)

Professional Courses

413. Stage Make-up (1)

Lecture/laboratory-2 hours. Prerequisite: consent of instructor. Approved for graduate degree credit. Lectures, demonstrations, and practical work in aspects of theatrical make-up.

Transportation **Technology and Policy** (A Graduate Group)

Patricia L. Mokhtarian, Ph.D., Chairperson of the

Group Office. 2028 Academic Surge (530) 752-0247; http://www.its.ucdavis.edu

Faculty

Ralph C. Aldredge, III, Ph.D., Professor (Mechanical and Aerospace Engineering) Alison Berry, Ph.D., Professor (Environmental Horticulture) Hemant Bhargava, Ph.D., Professor (Graduate School of Management) David Bunch, Ph.D., Professor (Graduate School of Management) Harry Dwyer, Ph.D., Professor (Mechanical and Aerospace Engineering) Paul Erickson, Ph.D., Associate Professor (Mechanical and Aerospace Engineering) Yueyue Fan, Ph.D., Associate Professor (Civil and Environmental Engineering) Y. Hossein Farzin, Ph.D., Professor (Agricultural and Resource Economics) Robert Feenstra, Ph.D., Professor (Economics) Andrew A. Frank, Ph.D., Professor (Mechanical and Aerospace Engineering) Joanna R. Groza, Ph.D., Professor (Chemical Engineering and Materials Science) Susan Handy, Ph.D., Professor (Environmental Science and Policy) John T. Harvey, Ph.D., Professor (Civil and Environmental Engineering) Bryan Jenkins, Ph.D., Professor (Biological and Agricultural Engineering) Alissa Kendall, Ph.D., Assistant Professor (Civil and Environmental Engineering) lan Kennedy, Ph.D., Professor (Mechanical and Aerospace Engineering) Michael Kleeman, Ph.D., Associate Professor (Civil and Environmental Engineering) Cynthia Lin, Ph.D., Assistant Professor (Agricultural and Resources Economics) Mark Lubell, Ph.D., Associate Professor (Environmental Science and Policy)

Debbie A. Niemeier, Ph.D., Professor (Civil and Environmental Engineering) Joan Ogden, Ph.D., Professor (Environmental Science and Policy) Ahmet Palazoglu, Ph.D., Professor (Chemical and Materials Science Engineering) David Rapson, Ph.D., Assistant Professor (Economics) Paul Sabatier, Ph.D., Professor (Environmental Science and Policy) Nesrin Sarigul-Klijn, Ph.D., Professor (Mechanical and Aerospace Engineering) Daniel Sperling, Ph.D., Professor (Civil and Environmental Engineering, Environmental Science and Policy Pieter Stroeve, Sc.D., Professor (Chemical Engineering and Materials Science) Steven Velinsky, Ph.D., Professor (Mechanical and Aerospace Engineering)
Stephen M. Wheeler, Ph.D., Assistant Professor (Landscape Architecture) James Wilen, Ph.D., Professor (Agricultural and Resource Economics) Distinguished Graduate Mentoring Award Michael Zhang, Ph.D., Professor

Emeriti Faculty

Thomas Cahill, Ph.D., Professor Emeritus (Atmospheric Science and Physics) Dan Chang, Ph.D., Professor Emeritus (Civil and Environmental Engineering) Mark Francis, M.L.A., Professor (Landscape Architecture) Myron "Mike" Hoffman, Professor Emeritus (Mechanical and Aerospace Engineering) Robert Johnston, Ph.D., Professor Emeritus (Environmental Science and Policy)

(Civil and Environmental Engineering)

Affiliated Faculty

Rahman Azari, Ph.D., Lecturer (Statistics) Andrew F. Burke, Ph.D., Research Engineer (Institute of Transportation Studies) Steven S. Cliff, Ph.D., Research Engineer (Applied Science)
Mark A. Delucchi, Ph.D., Research Ecologist (Institute of Transportation Studies) Kenneth S. Kurani, Ph.D., Research Éngineer (Institute of Transportation Studies)
Alan Meier, Ph.D., Professional Researcher (Institute of Transportation Studies) Marshall Miller, Ph.D., Associate Engineer (Institute of Transportation Studies) Thomas Turrentine, Ph.D., Research Anthropologist (Institute of Transportation Studies) Sonia Yeh, Ph.D., Research Scientist (Institute of Transportation Studies)

Graduate Study. The Graduate Group in Transportation Technology and Policy offers the M.S. (Plan I—thesis; and Plan II—exam), and Ph.D. degrees in two areas of specialization: Transportation Technology; and Transportation Planning and Policy. The technology track is for students trained in engineering and the physical sciences and interested in systems-level planning, analysis, management and design of advanced technologies (emphasizing vehicle propulsion and "intelligent transportation system" technologies) focusing on energy and environmental issues. The planning and policy track is aimed at students from a wider range of disciplines interested in the broader public policy issues concerning transportation systems. The curriculum for both tracks includes courses in civil, mechanical, and environmental engineering, economics, policy sciences, statistics, travel behavior, management, technology assessment and environmental studies.

Preparation. Applicants will normally be expected to have completed two courses in calculus, one course in linear algebra, and one course each in calculus level statistics and microeconomics. Additionally, students entering the technology track will need either to have an appropriate technical background or make up a relatively large number of prerequisite courses in order to be able to take the approved courses in that track.

Patricia L. Mokhtarian, Ph.D., Professor

Program of Study. Students will have the option of following either a technology or policy/management track. M.S. students complete 6 core courses plus electives. Ph.D. students take 7 courses from the same core, 3 additional courses from their chosen track, one more in the alternate track, plus electives. Master's degrees require a minimum of 36 quarter units and doctoral degrees require a minimum of 54 units. M.S. Plan I students may replace up to 6 units of regular course work with research (course 299) units. At least two thirds of all credits must be at the araduate level.

Graduate Adviser. P.L. Mokhtarian

Curriculum

Core Courses. Students in each track are required to take courses in a common set of core competencies, as well as (for Ph.D. students) some courses in the other track.

Knowledge areas core courses: M.S. and Ph.D. students take Transportation Technology (TTP 210), Transportation Policy (ECI 252 or TTP 220), and Transportation Systems (ECI 251)

Skill areas core courses: M.S. and Ph.D. students take one in the area of Research Design from the following: Transportation Survey Methods (TTP 200), Research Methods in Environmental Policy (ESP 278), Survey and Questionnaire Research Methods (PSY 207), Design and Analysis of Engineering Experiments (EBS 265), Experimental Design and Analysis (PLS 205), Engineering Experimentation and Uncertainty Analysis (MAE 207), or Statistical Methods for Research (STA 205);

M.S. and Ph.D. students take one in the area of Economics from the following:
Microeconomic Analysis (ARE 204),
Economic Analysis of Resource and
Environmental Policies (ARE 275),
Environmental Economics (ARE 276), or
Infrastructure Economics (ECI 268);

M.S. students take one and Ph.D. students take two in the area of Transportation Models and Quantitative Methods from the following: Applied Linear Programing (ARE 252), Optimization Techniques with Economic Applications (ARE 253), Dynamic Optimization Techniques with Economic Applications (ARE 254), Applied Econometrics (ARE 256), Probabilistic Design and Optimization (ECI 249), Dynamic Programming and Multistage Decision
Processes (ECI 253), Discrete Choice Analysis of Travel Demand (ECI 254), Urban Traffic Management and Control (ECI 256), Transportation-Air Quality: Theory and Practice (ECI 269), Applied Statistical Methods: Regression Analysis (STA 108), Applied Statistical Methods: Analysis of Variance (STA 106), Analysis of Ćategorical Data (STA 138), Design and Analysis of Engineering Experiments (EBS 265), Multivariate Systems and Modeling (PLS 206), or Psychological Data (PSC 204A, B, C. or DI:

Integration and Breadth core courses: M.S. and Ph.D. students take ITS Seminars (TTP 281), Transportation Orientation Seminar (TTP 282), and Research (TTP 299).

Planning and Policy Courses. Approved courses in this area include the following; additional courses may be added upon approval by the Chairperson:

Agricultural and Resource Economics, 100B, 130, 136, 144, 175, 176, 204, 275, 276 Anthropology 104N, 127, 211, 222 Civil and Environmental Engineering, 165, 252, 258, 268, 269

Civil and Environmental Engineering/
Environmental Science and Policy 163, 289A
Communication 170
Community and Regional Development 162, 171, 240, 245
Ecology 213
Economics 101, 200D
Education 222
Engineering 250
Environmental Horticulture 110
Environmental Science and Policy 163, 167, 168A, 171, 179 212A
Geography 155
History 172
Landscape Architecture 180G, 180L, 180M, 181M, 201, 205, 220
Management 240, 244, 251, 252, 293
Political Science 175, 187, 208, 279
Psychology 155
Sociology 141, 143A, 143B, 160
Transportation Technology and Policy 200, 210, 220, 281, 282, 292, 289A, 298

Technology Courses. Approved courses in this area include the following; additional courses may be added upon approval by the Chairperson:

Applied Biological Systems Technology 180, 181N, 182
Applied Science Engineering-Livermore 220A, 220B
Biological Systems Engineering 216
Civil and Environmental Engineering 143, 149, 161, 162, 179, 242, 244, 250, 253, 256, 257, 269, 282
Computer Science Engineering 168
Environmental and Resource Sciences 131, 186
Electrical and Computer Engineering 207
Landscape Architecture 150
Mechanical Engineering 134, 161, 163, 188, 216, 217, 218, 226, 234, 236, 258, 269
Plant Science 180

Other Courses. Approved courses in this area include the following; additional courses may be added upon approval by the Chairperson:

Agricultural and Resource Economics 106,

155, 252, 253, 254, 255, 256 Agronomy 205, 206 Anthropology 138 Biological Systems Engineering 265 Civil and Environmental Engineering 153, Community and Regional Development 151, Economics 140, 240A, 240B, 240, 256 Engineering, Applied Science 115 Engineering, Biological Sciences 265 Environmental Science and Policy 278 Graduate School of Management 249 Mathematics 108, 227, 258A, 258B Mechanical and Aeronautical Engineering Nutrition 492A Psychology 204A, 204B, 204C, 204D, 205A, 205B, 205C Sociology 298 Statistics 106, 108, 130, 131A, 131B, 131C, 135, 137, 138, 140, 142, 144, 205, 222, 223 Transportation Technology and Policy 200, 292, 396

Courses in Transportation Technology and Policy (TTP) Graduate Courses

200. Transportation Survey Methods (4)

Lecture—4 hours. Prerequisite: Statistics 13; Civil and Environmental Engineering 251 recommended. Description of types of surveys commonly used in transportation demand modeling, including travel and activity diaries, attitudinal, panel, computer, and stated-response surveys. Discussion of sampling, experimental design, and survey design issues.

Analysis methods, including factor, discriminant and cluster analysis. Not open for credit to students who have completed Civil and Environmental Engineering 255.—II. (II.) Mokhtarian

210. Fundamentals of Transportation Technology (4)

Lecture—2 hours; discussion—2 hours. Prerequisite: consent of instructor; Mathematics 21A, 21B, 22A; graduate or junior/senior undergraduate as a technical elective. Limited enrollment. Not open for credit to students who have completed Transportation Technology and Policy; Fundamentals of Transportation Technology 289. [Former course Transportation Technology 289].—II. (II.) Erickson

220. Transportation Planning and Policy (4)

Lecture/discussion—4 hours. Transportation planning process at the regional level, including the role of federal policy in shaping regional transportation planning, tools and techniques used in regional transportation planning, issues facing regional transportation planning agencies, pros and cons of potential solutions and strategies. Students having taken this course previously as course 289 cannot repeat for credit; having taken other course 289 offerings does not preclude taking this course for credit. Limited enrollment. Offered in alternate years.—III. Handy

281. ITS Transportation Seminar Series (1)

Seminar—1.5 hours. Transportation seminars by guest speakers, on varied topics. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.) Mokhtarian, Sperling

282. Transportation Orientation Seminar (1)

Seminar—1 hour. Ten weeks of seminars, introducing various topics in transportation research and education, focusing on topics of particular interest at UC Davis. May be repeated for credit. (S/U grading only.)—1. (I.) Handy

283. Professionalism, Leadership, and Ethics (1)

Seminar—2 hours. Speakers from industry, government, academia, and NGOs will lead discussions about succeeding and performing in the professional world. They will address leadership, ethics, and other workplace issues. May be repeated for credit. (S/U grading only.)—III. (III.) Sperling

289A. Selected Topics in Transportation Technology and Policy (1-5)

Lecture and/or laboratory. Prerequisite: consent of instructor. Directed group study of special topics with instruction carried out through lecture or laboratory, or a combination of both. May be repeated for credit.—I, II, III. (I, II, III.)

289B. Selected Topics in Transportation Technology and Policy (1-5)

Lecture and/or laboratory. Prerequisite: consent of instructor. Directed group study of special topics with instruction carried out lecture or laboratory, or a combination of both. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

290C. Graduate Research Group Conference (1)

Discussion—1 hour. Prerequisite: consent of instructor. Research problems, progress, and techniques in transportation. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

292. Internship in Transportation Technology and Policy (1-5)

Prerequisite: second year standing; approval of project prior to period of internship. Supervised work experience in transportation studies. May be repeated for credit if topic differs. (S/U grading only.)—I, II, III. (I, II, III.)

298. Group Study (1-5)

Discussion — 1-5 hours. Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12)

Discussion—1-12 hours. Prerequisite: consent of instructor. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

University Writing Program

(College of Letters & Science) Carl Whithaus, Ph.D., Program Director

Program Office. 109 Voorhies Hall (530) 752-6283; http://program.ucdavis.edu

Committee in Charge

Rebekka Andersen, Ph.D. (University Writing Program) Marlene Clarke, Ph.D. (University Writing Program) Dana R. Ferris, Ph.D. (University WritingProgram) Jesse Drew, Ph.D.

(Cinema and Technocultural Studies) Gary Goodman, Ph.D. (University Writing Program) Sarah Perrault, Ph.D. (University Writing Program) Daniel Potter, Ph.D. (Plant Sciences) James Shackelford, Ph.D.

(Chemical Engineering and Materials Science) Christopher J. Thaiss, Ph.D. (University Writing Program) Carl W. Whithaus, Ph.D. (University Writing Program)

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Affiliated Faculty

Sasha Abramsky, M.S., Lecturer Cynthia J. Bates, M.A., Lecturer Mary E. Bly, M.A., Lecturer Amy Clarke, Ph.D., Lecturer Marlene B. Clarke, Ph.D., Lecturer Academic Federation Excellence in Teaching Award

Pamela Demory, Ph.D., Lecturer Aliki Dragona, Ph.D., Lecturer Academic Federation Excellence in Teaching

Dale B. Flynn, Ph.D., Lecturer Laurie Glover, Ph.D., Lecturer Gary S. Goodman, Ph.D., Lecturer Jared Haynes, M.A., Lecturer

Academic Federation Excellence in Teaching Award

Scott R. Herring, Ph.D., Lecturer Brad J. Henderson, Ph.D., Lecturer Andy Jones, Ph.D., Lecturer Stephen Magagnini, B.A., Lecturer Pamela J. Major, Ph.D., Lecturer James McElroy, Ph.D., Lecturer Don Meisenheimer, Ph.D., Lecturer Raquel Scherr, Ph.D., Lecturer

Academic Federation Excellence in Teaching Award c

Academic Federation Excellence in Teaching Award

Wrye Sententia, Ph.D., Lecturer Victor Squitieri, Ph.D., Lecturer

Academic Federation Excellence in Teaching Award

John Stenzel, Ph.D., Lecturer

Academic Federation Excellence in Teaching Award

The Program

The University Writing Program (UWP) offers writing courses and seeks to improve writing instruction across campus through a variety of programs. The

UWP coordinates first year, intermediate, and advanced writing courses that satisfy college composition requirements and offers courses in writing across the curriculum, writing in specific disciplines, and writing in the professions. The Professional Writing Minor serves students from all majors who are planning careers as professional writers or editors, as well as those whose academic and professional careers demand advanced writing skills. The Program offers graduate courses in the teaching of writing and in composition theory, history, and research. The Designated Emphasis in Writing, Rhetoric, and Composition Studies offers Ph.D. students in affiliated programs the opportunity to prepare for leadership roles in writing research, teaching, and program administration. The UWP also administers the English Composition Examination, an alternative way to satisfy the advanced writing requirement. The UWP publishes an annual anthology of exemplary student writing, Prized Writing, and a journal for writing instructors, Writing on the Edge. The Writing in the Disciplines Workshop Program presents workshops on teaching writing for faculty and TAs and workshops on writing for students. The Writing Ambassadors Program trains advanced undergraduates and places them as interns in K-12 classrooms to improve writing instruction.

Minor Program Requirements:

UNITS

Professional Writing20 One course from each of the following four

Group A: University Writing Program 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 102H, 102I, 102J, 102K, 102L Group B: Sociology 189, University Writing Program 104A, 104B, 104C, 104D, 104E, 104F, 104I, 110, 111A, 111B, 111C Group C: Anthropology 110, 120, Classics 110, Communication 101, 105, 152, Design 145, English 105, 106, 164, History 101, Linguistics 106, Philosophy 137A, 137B, 137C, Science and Technology Studies 164, Technocultural Studies 191, University Writing Program 112A

Group D: University Writing Program 192 (or equivalent)

Additional units to achieve a total of 20 upper division units

One additional course from Groups A, B, or C above

Note: At least twelve units must be from University Writing Program courses

Courses in University Writing Program (UWP)

Lower Division Courses

1. Expository Writing (4)

Lecture/discussion-4 hours. Prerequisite: completion of Entry-Level Writing Requirement. Composi-tion, the essay, paragraph structure, diction, and related topics. Frequent writing assignments. GE credit: Wrt | AH, WE.—I, II, III, IV. (I, II, III, IV.)

11. Popular Science and Technology Writing (4)

Lecture/discussion - 3 hours; discussion - 1 hour. Positioning of science and technology in society as reflected and constructed in popular texts. Topics include genre theory, demarcation, rhetorical figures, forms of qualitative and quantitative reasoning, and the epistemic role of popularization in science. Offered irregularly. GE credit: AH, WE.-II. (II.)

18. Style in the Essay (4)

Lecture/discussion-4 hours. Prerequisite: course 1 or English 3 or the equivalent. Style, language, and structure in the essay. Analyzing style, developing a voice in writing, revising sentences, developing effective paragraphs and arguments, and writing with force and clarity. GE credit: Wrt | AH, WE.—I, II, III. (I, II, III.)

19. Writing Research Papers (4)

Lecture/discussion-4 hours. Prerequisite: course 1 or English 3 or the equivalent. Critical reading, analysis, documentation, and writing research-based assignments. Formulation of research topics and development of effective arguments. Reading and writing assignments may focus on a single theme. GE credit: Wrt | AH, WE.-I, II. (I, II.)

92. Internship in Writing (1-12)

Internship - 3-36 hours. Prerequisite: course 1 or English 3. Internships in fields where students can practice their skills. May be repeated for credit for a total of 12 units. (P/NP grading only.)

98. Directed Group Study (1-5)

Prerequisite: course 1 or English 3 or the equivalent; consent of instructor. May be repeated two times for credit. (P/NP grading only.) GE credit: AH, WE.

99. Special Study for Undergraduates (1-5) Prerequisite: course 1 or English 3 or the equivalent; consent of instructor. (P/NP grading only.) GE credit: AH, WE.

Upper Division Courses

101. Advanced Composition (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Instruction in advanced principles of expository writing. Writing tasks within and beyond the University. Different writing modes, including narrative, analysis, explanation, argument, critique. GE credit: Wrt | AH, WE.-I, II, III, IV. (I, II,

102A. Writing in the Disciplines: Special Topics (4)

Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to majors or to stu-dents concurrently enrolled in an upper division course in a specific academic discipline or interdisci-plinary field. Advanced instruction in writing in that discipline and practice in effective styles of communication. May be repeated one time for credit if taken in conjunction with a different subject-matter course. GE credit: Wrt | AH, WE.-I, II, III. (I, II, III.)

102B. Writing in the Disciplines: Biology (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to majors in a biological science or to students concurrently enrolled in an upper division biological science course. Advanced instruction in writing in biology. Not open for credit to students who have completed English 102B. GE credit: Wrt | AH, WE.—I, II, III. (I, II, III.)

102C. Writing in the Disciplines: History (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to majors in history or to students concurrently enrolled in an upper division course accepted for the history major. Advanced instruction in writing in history. GE credit: Wrt | AH, WE.—II. (II.)

102D. Writing in the Disciplines: International Relations (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to majors in international relations or to students concurrently enrolled in an upper division course accepted for the majo Advanced instruction in writing in international relations. GE credit: Wrt | AH, WE.-II. (II.)

102E. Writing in the Disciplines: Engineering (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to upper division stu-dents in the College of Engineering and to students enrolled in an upper division engineering or computer science course for the major. Advanced instruction in writing in engineering. GE credit: Wrt | AH, WE.-I, II, III. (I, II, III.)

102F. Writing in the Disciplines: Food Science and Technology (4)

Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to majors in food science and technology and to students concurrently enrolled in an upper division course in food science and technology. Advanced instruction in writing in food science and technology. GE credit: Wrt | AH, WE.-III. (III.)

102G. Writing in the Disciplines: Environmental Writing (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to students with upper division coursework with an environmental focus. Advanced instruction in writing and practice in effective styles of communication in the fields of environmental study, policy, or advocacy. Not open for credit to students who have completed course 102A in the same academic field. GE credit: Wrt | AH, WE.-III. (III.)

102H. Writing in the Disciplines: Human Development and Psychology (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to majors and minors or to students concurrently enrolled in an upper division course in Human Development or Psychology. Advanced instruction in writing and practice in effective styles of communication in Human Development and Psychology. Not open for credit to students who have completed course 102A in the same academic field. GE credit: Wrt | AH, WE.—I. (I.)

1021. Writing in the Disciplines: Ethnic Studies (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to majors and minors in ethnic studies, or students with upper division coursework focusing on race and ethnicity. Advanced instruction in cross-disciplinary writing about race and ethnicity and practice in effective styles of communication. Not open for credit to students who have completed Wrt | AH, WE.-I. (I.)

102J. Writing in the Disciplines: Fine Arts (4)

Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to majors and minors or to students concurrently enrolled in an upper divi-sion course in Art History, Art Studio, Design, Music, or Theater and Dance. Advanced instruction in writing about the arts and practice in effective styles of communication. Not open for credit to students who have completed course 102A in the same academic field. GE credit: Wrt | AH, WE.—I, III. (I, III.)

102K. Writing in the Disciplines: Sociology

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to majors and minors in Sociology or to students concurrently enrolled in an upper division Sociology course. Advanced instruction in writing and practice in effective styles of communication in Sociology and related academic and professional fields. Not open for credit to students who have completed course 102A in the same academic field. GE credit: Wrt | AH, WE.-

102L. Writing in the Disciplines: Film Studies (4)

Lecture/discussion - 3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to majors and minors or to students concurrently enrolled in an upper division course in Film Studies, Technocultural Studies, English, American Studies, or any other upper division course that includes the analysis and understanding of film as a medium. Advanced instruction in writing about film and practice in effective styles

of communication. Not open for credit to students who have completed course 102A in the same academic field. GÉ credit: Wrt | AH, WE.-II. (II.)

104A. Writing in the Professions: Business Writing (4)

Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Effective communication in and for organizations, including businesses (corporations), government agencies, and non-profit organizations. Suitable for students entering careers that require substantial communications, such as management, public relations, and grant writing. GE credit: AH, WE.—I, II, III. (I, II, III.)

104B. Writing in the Professions: Law (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Advanced principles of critical thinking, argumentation, and style, with special emphasis on their application in the legal profession. Suitable for students planning careers in law, business, administration, or management. GE credit: Wrt | AH, WE.—I, II, III. (I, II, III.)

104C. Writing in the Professions: Journalism (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Non-fiction for magazines and newspapers, with attention to style and language. Emphasis on research, interviewing, market analysis, and query letters. GE credit: Wrt | AH, WE. –I, II, III. (I, II, III.)

104D. Writing in the Professions: Elementary and Secondary Education (4)

Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Advanced expository writing in the contemporary American classroom. Strongly recommended for teaching credential candidates. GE credit: Wrt | AH, WE.-I, II, III. (I, II,

104E. Writing in the Professions: Science (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing or enrollment in a graduate science curriculum. Writing abstracts, research proposals, scientific papers, other forms of scientific communication. Presenting data graphically. Primarily for students engaged in or planning careers in basic or applied research. GE credit: Wrt | AH, WE.—I, II, III. (I, II, III.)

104F. Writing in the Professions: Health (4)

Lecture/discussion — 3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Advanced expository writing common in the health professions, emphasizing effective communication between the writer and different audiences. Topics relate to health, disability, and disease. Suitable for students planning careers in professions such as medicine, dentistry, physical therapy, optometry. GE credit: Wrt | AH, WE. –I, II, III. (I, II, III.)

1041. Writing in the Professions: Internships

Lecture/discussion-3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to students concurrently enrolled in an internship and to Contemporary Leadership minors. Advanced instruction in writing in the workplace, including public and private sectors, government agencies, profit and non-profit organizations. Collaborative work and practice in effective styles of communication. Not open for credit to students who have completed course 102A. GE credit: Wrt | AH, WE.-III. (III.)

104T. Writing in the Professions: Technical Writing (4)

Lecture/discussion-3 hours; extensive writing. Communicating effectively about technology and other technical subjects to varied audiences for varied purposes. Suitable for students entering professions that require communicating technical information to subject matter experts, managers,

technicians, and non-specialists. Not open for credit to students who have taken course 104A prior to Fall 2012. GE credit: AH, WE.-I, II, III. (I, II, III.)

110. Specialized Genres in Professional Writing (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: satisfaction of the upper-division writing requirement. Restricted to upper-division students who have satisfied the upper-division writing requirement. Counts toward the writing minor. Instruction in the elements and practices of professional writing in specialized genres. Offered irregularly. GE credit:

111A. Specialized Topics in Journalism (4)

Lecture/discussion—3 hours; extensive writing. Prerequisite: satisfaction of the upper-division writing requirement. Restricted to upper-division students with a strong interest in journalism. Counts toward the writing minor. Instruction in the elements and practices of advanced journalism. May be repeated one time for credit if specialized journalism topic for each course differs. Offered irregularly. GE credit: Wrt | AH, WE.

111B. Specialized Topics in Journalism: Investigative Journalism (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: satisfaction of the upper-division writing requirement. Restricted to upper-division students with a strong interest in journalism; counts toward the writing minor. Instruction in the elements and practices of in-depth investigative journalism.

Offered in alternate years. GE credit: Wrt | AH,

111C. Specialized Topics in Journalism: Science Journalism (4)

Lecture/discussion—3 hours; extensive writing. Prerequisite: satisfaction of the upper-division writing requirement. Restricted to upper-division students with a strong interest in journalism. Counts toward the writing minor. Instruction in the elements and practices of science journalism. Offered in alternate years. GE credit: Wrt | AH, WE.-II.

112A. Introduction to Professional Editing (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: satisfaction of the upper-division writing requirement. Restricted to upper-division students who have satisfied the upper-division writing requirement; counts toward the writing minor, Group C: Theory, History, and Design. Introduction to general editing practices and principles, with an emphasis on professional editing in organizational contexts, including academia and the workplace. Extensive practice in copy, comprehensive, and collaborative editing. Offered irregularly. GE credit: ArtHum, Wrt | AH, VL, WE.

192. Internship in Writing (1-12)

Internship - 3-36 hours. Prerequisite: course 1 or English 3 or the equivalent. Internships in fields where students can practice their skills. May be repeated up to 12 units for credit. (P/NP grading only.) GE credit: AH.

197T. Tutoring in Writing (1-5)

Tutoring — 1-5 hours. Prerequisite: upper division standing; consent of instructor. Tutoring one-on-one or leading small voluntary discussion groups affiliated with a writing course. May be repeated up to 10 units for credit. (P/NP grading only.) GE credit:

197TC. Community Tutoring in Writing (1-4)

Tutoring – 1-4 hours. Prerequisite: upper division standing; consent of instructor. Field experience, with individuals or in K-12 classroom instruction, focusing on reading- and writing-to-learn strategies in any subject area. May be repeated up to 10 units for credit. (P/NP grading only.) GE credit: AH.

198. Directed Group Study (1-5)

Prerequisite: course 1 or English 3 or the equivalent; consent of instructor. May be repeated up to 10 units for credit. (P/NP grading only.) GE credit: AH, WE.

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) GE credit: AH, WE.

Graduate Courses

250. Writing Assessment (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: graduate standing or consent of instructor. Examines key testing and measurement concepts; the history of writing assessment; and relationships among writing tests and methods of teaching writing; the impacts of Information and Communication Technology (ICT), and how educational policies both drive and respond to writing assessments. Offered in alternate years. — (II.) Whithaus

270. Literacy and Technology (4)

Lecture/discussion-3 hours; extensive writing. Prerequisite: graduate standing or consent of instructor. Examines how the physical qualities of texts offer different affordances during production and reception; grounds these discussions in the development of literacy practices and writing technologies from ancient to contemporary; creates frameworks for research into literacy, teaching, and textual technologies. Offered in alternate years. — (II.) Andersen, Whithaus

298. Directed Group Study (1-5)

Prerequisite: graduate standing; consent of instructor. (S/U grading only.)

299. Individual Study (1-12)

Prerequisite: consent of instructor; graduate standing. (S/U grading only.)

Professional Courses

390. Theory and Practice of University-Level Composition Instruction (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing; appointment as Teaching Assistant in the Composition Program. Examination of current theories about the teaching of writing and their practical application to undergraduate writing courses at UC Davis. Not open for credit to students who have completed English 390. (S/U grading only.)—III.

392. Teaching Expository Writing (2)

Discussion - 2 hours. Prerequisite: graduate standing, appointment as Teaching Assistant in the Composition Program; completion of course 390 or the equivalent. Discussion of problems related to teaching expository writing at the university level, with special emphasis on teaching reading and writing skills and responding to student papers. (S/U grading only.)—I. (I.)

396. Teaching Assistant Training Practicum

Prerequisite: graduate standing; consent of instructor. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Urban Planning

See Environmental Science and Policy, on page 297.

Urology

See Medicine, School of, on page

Vegetable Crops

See Plant Sciences, on page 467.

Veterinary Medicine, School of

Michel D. Lairmore, D.V.M., Ph.D., Dean of the

Bruno B. Chomel, D.V.M., Ph.D., Director, Master of Preventive Veterinary Medicine Program

Terry W. Lehenbauer, D.V.M., M.P.V.M., Ph.D., Director, Veterinary Medicine Teaching and Research Center, Tulare

Jan E. Ilkiw, B.V.Sc., Ph.D., Associate Dean-Academic Programs

Rance B. LeFebvre, Ph.D., Associate Dean-Student

K. C. Kent Lloyd, D.V.M., Ph.D., Associate Dean-Research and Graduate Education Programs

John R. Pascoe, B.V.Sc., Ph.D., Executive Associate

W. David Wilson, B.V.M.S., Director, Veterinary Medical Teaching Hospital

School Office. (530) 752-1360; http://www.vetmed.ucdavis.edu

Departmental Courses

Anatomy, Physiology and Cell Biology (APC)

Lower Division Courses

92. Internship (1-12)

Internship—3-36 hours. Prerequisite: lower division standing; consent of instructor. Internship experience off and on campus in all subject areas offered in the Department of Anatomy, Physiology & Cell Biology. Internships are supervised by a member of the faculty. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading

Upper Division Courses 100. Comparative Vertebrate Organology

Lecture—3 hours; laboratory—3 hours. Prerequisite: Biological Science 1A and 1B or 2A and 2B. Functional anatomy of major organ systems in vertebrates. Each system examined from cellular to gross level in fish, birds, and mammals. Emphasis on how differentiated cell types are integrated into tissues and organs to perform diverse physiological functions. (Same course as Neurobiology, Physiology, and Behavior 123.)—II. (II.) Meyers

192. Internship (1-15)

Internship - 3-45 hours. Prerequisite: upper division standing, approval of internship. Internship experience off and on campus in all subject areas offered in the Department of Anatomy, Physiology and Cell Biology. Internships are supervised by a member of the faculty. May be repeated for credit if topic differs. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading

Graduate Courses

285. Morphometry of Cells, Tissues and Organs (2)

Lecture - 1 hour; laboratory - 3 hours. Prerequisite: course 100 or the equivalent; Statistics 13. Stereological estimation of volumes, surfaces and lengths of organs/components; estimation of number of cells in an organ or tissue, their volumes, products and gene expression. Practical application of stereology

and avoidance of most common biases of histological measurements. Offered in alternate years. - II.

286. Basics of Microscopy and Cellular Imaging (2)

Lecture—1 hour; laboratory—2 hours. Prerequisite: graduate standing. Practical applications of basic microscope techniques used to image cells and tissues with the goal of using these techniques to generate publication quality images. Principles of light, epifluorescent, confocal and electron microscopy, their applications and limitations. Restricted enrollment. Öffered in alternate years. - III. Van Winkle

290. Seminar (1)

Seminar — 1 hour. Discussion and critical evaluation of advanced topics and current trends in research. (P/NP grading only.)—I, II, III. (I, II, III.)

291. Topics in Biology of Respiratory System (1)

Seminar — 1 hour. Prerequisite: graduate standing and consent of instructor. Topics concerning structure and function of respiratory system. Possible topics include: lung growth, pulmonary reaction to toxicants, pulmonary inflammation, lung metabolism, biology of lung cells, tracheobronchial epithelium, nasal cavity structure and function. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, İII.) Hyde, Wu, Pinkerton

298. Group Study (1-5)

Laboratory-6-15 hours. Prerequisite: consent of instructor.

299. Research (1-12)

Laboratory-6-36 hours. Prerequisite: consent of instructor. (S/U grading only.)

Medicine and Epidemiology (VME) **Upper Division Courses**

158. Infectious Disease in Ecology and Conservation (3)

Lecture — 3 hours. Prerequisite: Evolution and Ecology 101 or Environmental Science and Policy 100 or Veterinary Medicine 409 or equivalent. Introduction to the dynamics and control of infectious disease in wildlife, including zoonotic diseases and those threatening endangered species. Basic epidemiological models and application to field data. Scientists role in developing disease control policies. Offered in alternate years. — (II.) Foley

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

201. Emerging Issues at the Interface of Ecosystem, Animal and Human Health (3)

Lecture — 1 hour; discussion — 2 hours. Prerequisite: Active student status in MPVM, Master of Public Health programs or graduate groups in Epidemiology, Ecology, Public Health, Comparative Pathology, or consent of instructor. Restricted to 20 students. Principles of one health with emphasis on the relationships and interdependence of environmental, animal and human health. Exploration of critical data gaps needed to achieve sustainability in ecosystems and disease prevention.—II. (II.) Johnson

217. Evaluation and Application of Diagnostic Tests (2)

Lecture/discussion-17 sessions; laboratory-3 sessions. Prerequisite: introductory courses in probability (e.g., Preventive Veterinary Medicine 402 or Statistics 102) and epidemiology (e.g., Preventive Veterinary Medicine 405 or Epidemiology 205); a working knowledge of immunological principles beneficial but not essential to understanding technical material associated with diagnostic tests. Topics include sensitivity, specificity, predictive values, Bayes' Theorem, ROC analysis, measuring agree ment between tests, series and parallel testing strategies. Emphasis on rational evaluation, interpretation and presentation of test results for individuals and aggregates. Offered in alternate years.-III

219. Clinical Experimental Design (3)

Lecture - 15 sessions. Prerequisite: biostatistics, ecology, epidemiology, experience in clinical medicine or microbiology recommended. Design and construction of experiments, hypothesis testing, exploratory data analysis, controls, inferring causation, and the performance of scientific research. Offered in alternate years.—II. Foley

225. Retroviral Pathogenesis Seminar/ Journal Club (1)

Discussion - 1 hour. Prerequisite: graduate student status in the Comparative Pathology, Microbiology or Immunology graduate groups. Participatory seminar addressing the mechanisms of retroviral pathogenesis in a journal club format. Focus on the review of current scientific journal papers concerning viral pathogenesis, immunology and virology with a special focus on retroviruses. May be repeated 12 times for credit. (S/U grading only.)-I, II, III. (I, II, III.) George, Sparger

258. Infectious Disease in Ecology and Conservation (1)

Discussion-2 hours. Prerequisite: course 158 (must be taken concurrently). Presentation, analysis and discussion of primary literature on the dynamics and control of infectious disease in wildlife, including zoonotic diseases and those threatening endangered species. Multidisciplinary approach combines perspectives of ecology and veterinary medicine. Offered in alternate years. (S/U grading only.)—II. Foley

290C. Research Group Conference (1)

Conference — 10 sessions. Prerequisite: first-, secondor third-year standing in the School of Veterinary Medicine. Current research topics relevant to veterinary clinical pharmacology. May be repeated two times for credit. (S/U grading only.)—I, II, III. (I, II, III.) Tell

298. Group Study (1-5)

Prerequisite: student in School of Veterinary Medicine or consent of instructor. Group study in selected areas of the clinical sciences. (S/U grading only.)

299. Research (1-12)

(S/U grading only.)

Molecular Biosciences (VMB) **Lower Division Course**

92. Internship (1-12)

Internship - 3-36 hours. Prerequisite: lower division standing and consent of instructor. Work experience off and on campus in all subject areas offered in the Department of Molecular Biosciences. Internships supervised by a member of the faculty. (P/NP grading only.)

Upper Division Courses 192. Internship (1-12)

Internship - 3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience off and on campus in all subject areas offered in the Department of Molecular Biosciences. Internships supervised by a member of the faculty. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

234. Current Topics in Neurotoxicology (3)

Lecture - 3 hours. Prerequisite: core courses in one of the following graduate programs: Pharmacology and Toxicology, Agricultural and Environmental Chemistry, Biochemistry and Molecular Biology, Cell and Developmental Biology, Immunology, Molecular Cellular and Integrative Physiology or Neuroscience. Restricted to upper level undergraduate students must obtain permission from the course coordinator. General principles of neurotoxicology, the cell and molecular mechanisms and health

impacts of specific neurotoxicants and the contribution of neurotoxic compounds to complex neurodevelopmental disorders and neurodegenerative diseases. (Same course as Environmental Toxicology 234 and Molecular, Cellular, and Integrative Physiology 234.) Offered in alternate years. - II. P. Lein

253. Metabolism of Toxicants and Drugs (2)

Lecture - 2 hours. Prerequisite: Pharmacology and Toxicology 201, 202, 203, general biochemistry or consent of instructor. Significance/chemical pathways of toxicants and drug metabolism, enzymology and molecular aspects of P450 and flavin monooxygenases, hydrolases and phase 2 transferases and experimental approaches for metabolism studies.

Offered in alternate years.—II. Buckpitt

254. Toxicology of the Respiratory System

Lecture — 3 hours; discussion. Prerequisite: Pharmacology and Toxicology 201, 202, 203, or consent of instructor. Survey of structure and function of the respiratory system, the pathophysiology of major lung diseases, the interactions of toxicants with the lung and response of this organ to injury. Offered in alternate years. - (II.) Pinkerton

255. Pharmacokinetics and Biopharmaceuticals (2)

Lecture - 16 sessions; discussion - 4 sessions. Indepth study of pharmacokinetics, including the fundamentals of pharmacokinetics, how to design a pharmacokinetic study and how to use both compartmental and non-compartmental analysis to interpret the data. Offered in alternate years. – III. Knych, Stanlev

290. Seminar (1)

Seminar — 1 hour. Prerequisite: graduate standing and consent of instructor Topics in nutrition, pharmacology/toxicology, and biochemistry. May be repeated for credit. (S/U grading only.) -1, II, III. (I,

297T. Tutoring in Graduate Molecular Biosciences (1-5)

Prerequisite: graduate or professional student standing and consent of instructor. Assist in preparation and teaching of courses in Nutrition, Pharmacology and Toxicology, or other courses offered by the department under direct supervision of the instructor. Designed for graduate or professional students who desire teaching experience in graduate courses. May be repeated up to 5 units of credit. (S/U grading only.)—I, II, III. (I, II, III.)

298. Group Study (1-5)

(S/U grading only.)

299. Research (1-12)

(S/U grading only.)

Professional Course

397T. Tutoring in Molecular Biosciences (1-5)

Discussion - 1-5 hours. Prerequisite: graduate or professional standing and consent of instructor. Experience in professional curriculum for graduate or professional students, not teaching assistants, under direct supervision of instructor. May be repeated up to 5 units of credit (S/U grading only.) -1, II, III. (I, II,

Pathology, Microbiology, and Immunology (PMI)

Lower Division Course

99. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading

Upper Division Courses

126. Fundamentals of Immunology (3)

Lecture — 3 hours. Prerequisite: Biological Sciences 102 or the equivalent or consent of instructor. Overview of immunology including components of the immune system, initiation and regulation of the immune response, infection and immunity, hypersensitivity and immune dysfunction. Clinical immunologic techniques, immunodeficiency and vaccinology. — II. (II.) Stott

126L. Immunology Laboratory (2)

Laboratory-6 hours. Prerequisite: course 126 or the equivalent (may be taken concurrently). Laboratory procedures in clinical immunology. Laboratory animal immunization/bleeding. Quantitative and qualitative characterization of the immune response. Cells of the immune system. - II. (II.) Stott

127. Medical Bacteria and Fungi (5)

Lecture—3 hours; laboratory—5 hours. Prerequisite: general microbiology (Microbiology 102 and 102L), basic immunology (course 126 or Medical Microbiology 188). An introduction to the bacterial and mycotic pathogens of man and animals, with emphasis on pathogenic mechanisms and ecologic aspects of infectious disease. — III. (III.) LeFebvre

128. Biology of Animal Viruses (3)

Lecture — 3 hours. Prerequisite: Biological Sciences 102. Fundamental physical and chemical properties of animal viruses; methods of propagation, purification and assay. Mechanisms of viral replication and pathogenesis of viral infections in man and animals. Immunity to virus diseases and oncogenic properties of animal viruses. Two units of credit to students who have completed Microbiology 162.—III. (III.) Miller

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

214. Vector-borne Infectious Diseases: Changing Patterns (2)

Lecture/discussion-2 hours. Prerequisite: graduate student standing (PhD or MS). Restricted to 10 students. Vector-borne infectious diseases especially as they relate to changing patterns associated with climatic changes, trade and population movement. Prerequisite: consent of instructor. (S/U grading only).—I. (I.) Lanzaro, Reisen

221. Topics in Virus Research (1)

standing (PhD or MS). Restricted to 10 students. Discussion-based seminar covering graduate student virology research. Informal presentations and discussion of technical problems in research design and experimentation are encouraged. Current stage of the research project is not important. (S/U grading only.)-I. (I.) Murphy

250. Philosophy and Ethics of Biomedical Science (1)

Seminar - 1 hour. Prerequisite: graduate-level standing. Presentations by faculty and guest speakers followed by discussions of relevant current events by graduate students. (S/U grading only.)-III. (III.) Gal-

270. Advanced Immunology (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: Introductory course in immunology. Graduate student status in the Comparative Pathology Graduate Group. All other students will require consent of instructor. Current concepts of immunology with an emphasis on interactions between the host, the environment and the pathogen. These interactions will include those that are protective and successful for the host as well as those that are deleterious—II. (II.) Stott

275. Comparative Pathology of Organ Systems (4)

Lecture - 3 hours; laboratory/discussion - 2 hours. Prerequisite: graduate level standing. Correlative alterations in structure and function of organ response to injury presented in context of major disease syndromes. Emphasis on general responses to disease in both humans and animals. Introductory material on the mechanisms of viral, bacterial and parasite pathogenesis.—I. (I.) Affolter

283. Comparative Avian Anatomy and Pathology (1-3)

Lecture—3 hours. Prerequisite: Anatomy section (1 unit): upper division undergraduate standing, veterinary students, or graduate standing, and consent of instructor; Pathology section: third- or fourth-year standing in the School of Veterinary Medicine or graduate standing and consent of instructor. Ten lectures outline gross/microscopic functional anatomy of a wide range of avian species as appropriate for students interested in avian biology. The remaining 20 lectures encompass comparative aspects of avian pathobiology and disease manifestations for students interested in avian diseases.—I. (I.) Lowenstine

285. Cellular Basis of Disease (3)

Lecture—3 hours. Prerequisite: Biological Sciences 104, Veterinary Medicine 452, course 275, or Medical Pathology 210. Application of cell biology, biochemistry and molecular biology to the understanding of the basic nature of disease. Cellular injury and mechanisms of adaptation, host-defense and vascular responses, and cellular transformation.—II. (II.) Mohr, Wu

287. Comparative Pathology of Laboratory Animals (3)

Lecture—3 hours. Prerequisite: general and systemic pathology; second-, third-, or fourth-year standing in the School of Veterinary Medicine or graduate student standing, or consent of instructor. Recognition of lesions and understanding of pathogenesis of diseases of animals commonly kept in laboratory settings. Species covered include rodents, lagomorphs, amphibians, nonhuman primates, genetically manipulated animals and novel animal models. Offered in alternate years.—(III.)

290. Seminar (1)

Seminar — 1 hour. Prerequisite: graduate level standing. Topics in pathology, microbiology or immunology. May be repeated for credit. (S/U grading only.) I, II, III, IV. (I, II, III, IV.)

291A. Seminar in Immunology (1)

Seminar—1 hour. Prerequisite: course 126 or the equivalent. Students choose topic for each quarter. Individual or pairs of students choose a paper for all to read and present a seminar based on the subject of the paper. All students participate in discussion. May be repeated for credit. (S/U grading only.)—I, III. (I, III.) Gershwin

293A. Seminar in Infectious Diseases (1)

Seminar—1 hour. Prerequisite: current enrollment in health science professional school or graduate standing in biological sciences. Discussion of current topics and cases of infectious diseases. May be repeated one time for credit if topic differs. (S/U grading only.)—I, II, III. (I, III.) Byrne

293B. Necropsy and Surgical Pathology (2-4)

Laboratory—6-12 hours. Prerequisite: graduate student standing and consent of instructor. Responsible diagnostic casework. Performance of necropsies, slide reading, and case reporting. May be repeated for credit. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.)

296. Microbiological Diagnosis (2-5)

Laboratory—5-14 hours; discussion—1 hour. Prerequisite: laboratory course in veterinary or medical microbiology or equivalent or consent of Chief of Microbiology, VM Teaching Hospital. Laboratory diagnosis of infectious diseases involving case work at the VM Teaching Hospital. (S/U grading only.) I, II, III. (I, II, III.) Byrne

298. Group Study (1-5)

Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12)

Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

Population Health and Reproduction (PHR)

Lower Division Course

92. Internship in Veterinary Science (1-4)

Discussion/laboratory—1-4 hours; clinic—3-36 hours; final report. Prerequisite: approval of project prior to period of internship by faculty sponsor. Supervised work experience in reproduction. (P/NP grading only.)

Upper Division Courses

106. Human-Animal Interactions: Benefits and Issues (2)

Lecture—18 sessions; fieldwork—1 session. Prerequisite: upper division standing or consent of instructor. The contributions of animals to human society, including historic, anthropologic, developmental, human health and therapeutic perspectives, as well as effects of humans on animals. One field trip required.—II. (II.) Hart

192. Internship in Veterinary Science (1-12)

Discussion/laboratory—1-12 hours; clinic—3-36 hours; final report. Prerequisite: upper division standing; approval of project prior to period of internship. Supervised work experience in Reproduction. May be repeated for credit. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

202. Sampling in Health-Related Research (3)

Lecture—3 hours. Prerequisite: Preventive Veterinary Medicine 403 or the equivalent; consent of instructor. A very thorough coverage of simple random sampling, stratified sampling, cluster sampling, systematic sampling and other sampling methods applied extensively in epidemiology and other health-related disciplines. Emphasis on application of the sampling methods. Offered in alternate years.—II. Farver

203. Multivariate Biostatistics (3)

Lecture—3 hours. Prerequisite: Preventive Veterinary Medicine 403 and 404, or the equivalent; consent of instructor. Multivariate procedures covered are principal component analysis, factor analysis, Twogroup and k-group multivariate ANOVA, multivariate regression, Two-group and k-group discriminant analysis and repeated measures analysis, cluster analysis, and canonical analysis. Emphasis is on application of procedures. Offered in alternate years.—(II.) Farver

210. Epidemiological Approaches to Waterborne Zoonotic Pathogens (1)

Lecture—1 hour. Waterborne zoonotic diseases remain a significant cause of human illness. Review key waterborne pathogens; their biology, fate and transport in aquatic systems; on-farm management practices for reducing microbial contamination of California's fresh and marine aquatic resources from livestock production systems. [S/U grading only.]—II. (II.) Atwill

212. Epidemiology of the Zoonoses (4)

Lecture — 35 sessions; discussion — 5 sessions. Prerequisite: graduate standing or third-year standing in the School of Veterinary Medicine or consent of instructor. Epidemiological, biological and ecological features of some major infections shared by humans and other animals. Wildlife and domestic animals zoonoses of major health and economic significance are presented to illustrate how knowledge of zoonoses epidemiology is essential for implementing control measures. — II. (II.) Chomel

241. Advanced Topics in Canine Genetics and Genomics (2)

Discussion—2 hours. Prerequisite: Genetics 201A, 201C (or equivalents, with consent of instructor). Indepth study of topics in canine genomics and genetics. Topics will vary annually, but can include positional cloning, whole genome association, complex traits and linkage disequilibrium. Students will lead discussions on assigned readings. May be repeated for credit when topic differs. Limited enrollment. Offered in alternate years.—III. Bannasch

242. Ecological Genetics: Applied Genetics for Ecology, Health, and Conservation of Natural Populations (3)

Lecture—2 hours; discussion—0.5 hours; laboratory—0.5 hours. Prerequisite: undergraduate genetics and ecology/conservation biology courses recommended. Introduction to the field of applied ecological genetics to include applications in conservation ecology, population genetics, population biology, wildlife health and disease ecology. Limited enrollment. (Same course as Ecology 242.)—1. (I.) Ernest

243. Advanced Topics in Conservation Genetics (2)

Discussion—18 sessions; lecture—2 sessions. Prerequisite: undergraduate genetics and ecology or consent of instructor. Restricted to 16 students. Indepth study of topics related to the application of genetic tools to wildlife conservation. Topics will vary annually, but may include use of non-invasive methods of genetic assessment and monitoring of wildlife populations. Students will lead discussions on assigned readings. (S/U grading only.)—II. (II.)

266. Applied Analytic Epidemiology (3)

Lecture—2 hours; laboratory—2 hours. Prerequisite: Preventive Veterinary Medicine 404 or consent of instructor. Principles and applications in analysis of epidemiologic data. Methods of analyzing stratified and matched data, logistic regression for cohort and case-control studies, Poisson regression, survival-time methods. (Same course as Master of Public Health 266.)—III. (III.) Kass

290A. Seminar (1)

Seminar—1 hour. Discussion of current topics in animal reproduction and medicine, as well as presentation of research findings by graduate students and faculty. May be repeated for credit. (S/U grading only.)—1, II, III. (I, II, III.)

292. Current Topics in Reproduction (1)

Seminar—1 hour. Prerequisite: consent of instructor. Discussion of current scientific literature in reproduction, as well as presentation of research findings by graduate students and faculty. (S/U grading only.)—1, II, III. (J, II, III.)

298. Group Study (1-5)

Prerequisite: consent of instructor.

299. Research (1-12)

Prerequisite: consent of instructor. (S/U grading only.)

Preventive Veterinary Medicine (MPM)

Professional Courses 402. Medical Statistics I (5)

Lecture—37 sessions; laboratory—13 sessions. Prerequisite: MPVM standing in the School of Veterinary Medicine or consent of instructor. Statistics in clinical, laboratory and population medicine: graphical and tabular presentation of data; probability; binomial; Poisson, normal, t., F-, and Chi-square distributions; elementary nonparametric methods; simple linear regression and correlation; life tables. Microcomputer applications of statistical procedures in population medicine.—1. (1.) Farver

403. Medical Statistics II (3)

Lecture — 20 sessions; laboratory — 10 sessions. Prerequisite: Prerequisite: MPVM standing in the School of Veterinary Medicine and/or successful completion of course 402 (or equivalent) or consent of instructor. Analysis of variance in biomedical sciences; nonparametric methods; multiple regression; biomedical applications of statistical methods. Microcomputer applications to reinforce principles that are taught in lecture. Continuation of course 402.—II. (II.) Farver

404. Medical Statistics III (4)

Lecture—3 hours; laboratory—2 hours. Prerequisite: MPVM standing in the School of Veterinary Medicine and/or successful completion of course 403 (or equivalent) or consent of instructor. Continuation of course 403. Analysis of time dependent variation and trends, analysis of multiway frequency tables; logistic regression; survival analysis selecting the best regression equation; biomedical applications.— III. (III.) Farver

405. Principles of Epidemiology (4)

Lecture - 4 hours. Prerequisite: MPVM standing in the School of Veterinarian Medicine or consent of instructor. Basic epidemiologic concepts and approaches to epidemiologic research, with examples from veterinary and human medicine, including outbreak investigation, infectious disease epidemiol ogy, properties of tests, and an introduction to epidemiologic study design and surveillance. (Same course as Epidemiology 205A.)—I. (I.) Gold, Miller

405L. Epidemiology Laboratory (1)

Lecture—1 session; lecture/discussion—1 session; laboratory-1 session. Prerequisite: MPVM standing in the School of Veterinary Medicine or consent of instructor. Practical application of epidemiological methods using the microcomputer as a tool to solve problems. Utilizes spreadsheets and databases as tools to organize and analyze data. Emphasize epidemiological methods introduced in course 405. Data sets provided.—I. (I.) Lehenbauer

406A. Epidemiologic Study Design (3)

Lecture-20 sessions; discussion-6 sessions; laboratory-4 sessions. Prerequisite: MPVM standing in the School of Veterinary Medicine or consent of instructor. Builds on concepts presented in course 405. Concepts of epidemiologic study design-clinical trials, observational cohort studies, case control studies-introduced in course 405 and covered in more depth, using a problem-based format. Discussion of published epidemiologic studies. (Same course as Epidemiology 206.)—II. (II.) Miller

408A. Veterinary Research: Planning and Reporting (2)

Lecture - 20 sessions. Prerequisite: MPVM standing in the School of Veterinary Medicine or consent of instructor. Planning, critical analysis, ethics, and written and oral communication of veterinary research.—Foley

408B. Veterinary Research: Planning and Reporting (1)

Lecture - 10 sessions. Prerequisite: MPVM standing in the School of Veterinary Medicine or consent of instructor. Planning, critical analysis, ethics, and written and oral communication of veterinary research. - I. (I.) Foley

408C. Veterinary Research: Planning and Reporting (1)

Discussion - 10 sessions. Prerequisite: Master of Preventive Veterinary Medicine standing in the School of Veterinary Medicine or consent of instructor; completion of course 408A and course 408B. Planning, critical analysis, ethics, and written and oral communication of veterinary research. - II. (II.) Chomel

410. Animal Health Policy and Risk Communication (1)

Discussion - 10 sessions. Prerequisite: MPVM standing in the School of Veterinary Medicine or consent of instructor. International, national and state policy issues affecting veterinary medicine, how policy is made, organizational cultures, the role of science in policy-making, ten best practices in risk/crisis communication, message-mapping for the public and policy-makers, and effective meeting management. - I. (I.) Mazet

426. Applied Epidemiologic Problem Solving (1)

Laboratory—10 sessions. Prerequisite: MPVM standing in the School of Veterinary Medicine or consent of instructor. Integration of epidemiologic and statistical methodology in a problem-solving approach to contemporary animal population health issues. Data validation and manipulation; descriptive statistical analysis using spreadsheets, database management, and Epi Info software. Builds on skills learned in courses 405L and 406.—II. (II.)

Surgical and Radiological Sciences (VSR)

Lower Division Course

99. Special Study for Undergraduates (1-5) (P/NP grading only.)

Upper Division Course 199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

250. Anesthesia in Animal Research (2)

Lecture - 2 hours. Prerequisite: graduate student standing and consent of instructor. Pharmacodynamic and pharmacokinetic effects of common anesthetics used in several common laboratory species. Explore how anesthetic protocols may impact the measurement and interpretation of results in physiology and pharmacology research studies.—II. (II.)

298. Group Study (1-5)

Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12)

Prerequisite: consent of instructor. (S/U grading

Viticulture and Enology

(College of Agricultural and Environmental Sciences) David E. Block, Ph.D., Chairperson of the Depart-

Department Office. 1162 RMI North Building (530) 752-0380; http://wineserver.ucdavis.edu

Douglas O. Adams, Ph.D., Professor Linda F. Bisson, Ph.D., Professor David E. Block, Ph.D., Professor

(Viticulture and Enology, Chemical Engineering) Academic Senate Distinguished Teaching Award Roger B. Boulton, Ph.D., Professor

(Viticulture and Enology, Chemical Engineering) Susan E. Ebeler, Ph.D., Professor Hildegarde Heymann, Ph.D., Professor Mark A. Matthews, Ph.D., Professor David A. Mills, Ph.D., Professor David R. Smart, Ph.D., Associate Professor M. Andrew Walker, Ph.D., Professor Andrew L. Waterhouse, Ph.D., Professor Larry E. Williams, Ph.D., Professor

Emeriti Faculty

L. Peter Christensen, Specialist in Cooperative Extension, Emeritus W. Mark Kliewer, Ph.D., Professor Emeritus Lloyd A. Lider, Ph.D., Professor Emeritus Carole P. Meredith, Ph.D., Professor Emerita Ann C. Noble, Ph.D., Professor Emerita Cornelius S. Ough, D.Sc., Professor Emeritus Vernon L. Singleton, Ph.D., Professor Emeritus Academic Senate Distinguished Teaching Award

Affiliated Faculty

Matthew W. Fidelibus, Ph.D., Associate Specialist in Cooperative Extension

James T. Lapsley, Ph.D., Associate Adjunct Professor Andrew J. McElrone, Ph.D., Assistant Adjunct

Anita Oberholster, Ph.D., Specialist in Cooperative

Kerri L. Steenwerth, Ph.D., Assistant Adjunct Professor

James A. Wolpert, Ph.D., Specialist in Cooperative Extension

The Major Program

The Viticulture and Enology major provides an inter-disciplinary education in the biological and physical principles underlying grape and wine production as well as practical knowledge of grape growing (viticulture) and wine making (enology). This program provides the knowledge base for problem-solving and decision-making in commercial grape and wine

Preparatory Requirements. Before transferring into the Viticulture and Enology major, students must complete the following courses with a grade of C- or better and with a combined grade point average of at least 2.500 at the University of California (at least 3.000 for similar courses taken at community college) for these and all other preparatory courses. In addition, students' overall UC GPA must be 2.250 or higher. All courses must be taken for a letter grade.

Biological Sciences 1A or 2A 4-5	units
Chemistry 2A, 2B, 2C, 8A	units
Mathematics 16A	units
Physics 1A, 1B or 7A 4-6	units

Recommendations. Completion of UC Davis equivalents of the following preparatory courses for the major are not required for entry but are highly recommended. Failure to complete these will delay entry into required upper division courses and may thus delay graduation. Some courses may be available at UC Davis during Summer Session:

Chemistry 8B	
Mathematics 16B	3 units
Biological Sciences 1C or Plant	
Sciences 2 4-	5 units
Biological Sciences 102	3 units

The Program. The curriculum builds upon a foundation of biology, chemistry, biochemistry and mathematics with specialized courses related to grape and wine production. To complete the program, students may choose to place particular emphasis on viticulture, enology or economics. Credit may also be earned for foreign language study and intern-

Career Alternatives. Graduates are qualified for a variety of vineyard and winery positions, including production management, quality control and research. Additionally they may work in related fields such as pest management, nursery production and analytical services.

R S Major Requirements:

b.5. Major Requirements:	
3	UNITS
Preparatory Subject Matter	. 44-51
Biological Sciences 1A or 2A and 1C	
or Plant Sciences 28	3-10
Chemistry 2A-2B-2C	. 15
Chemistry 8A, 8B	
Plant Sciences 21 or equivalent and advi	
approval	
Mathematics 16A-16B	
Physics 1A, 1B or 7A	4-0
Viticulture and Enology 2, 3	
Depth Subject Matter	. 48-54
Biological Sciences 102, 103 or 105	.3-6
Microbiology 102, 102L or 101	
Plant Sciences 120 or Statistics 106	4
Viticulture and Enology 101A, 101B,	
101C, 110, 118	
Viticulture and Enology 123, 124, 125, 1	126,
128, 135 and in consultation with the	

adviser, choose 3 of the following courses: 123L, 124L, 125L, 126L, 128L. If more than 3 are taken, the extra courses will count as restricted electives in Area B............. 21-22

Restricted Electives......28

In consultation with adviser, choose 28 units from three of the following five areas. At least 12 units must be from one of the following areas: (A) Plant Science, (B) Food Science and Microbiology, or (C) Economics and

(A) Plant Science area: Applied Biological Systems Technology 142, 145, 147, 175, 180, Atmospheric Science 133, Biological Sciences 101, Biotechnology 160, Entomology 110, Hydrologic Science 110, 124, Molecular and Cellular Biology 126, Nematology 100, Plant Biology 111, 112, 123, 143, 172, 172L, Plant Pathology 120, Plant Sciences 142, 146, 154, 157, 158, 171, 176, Soil Science 100, 102, 109, 118, Viticulture and Enology 111. (B) Food Science and Microbiology area: Biological Sciences 101, Food Science and Technology 102A, 102B, 104, 104L, 108, 109, 110A, 110B, 127, Microbiology 140, 150, 155L, Viticulture and Enology

(C) Economics and Business area: Agricultural and Resource Economics 100A, 112, 113, 118, 130, 140, 150, Economics 1A, 1B, Management 11A, 11B, Viticulture and Enology 111, 130 (D) Language area: Maximum 12 units, not counting course 1, of one of the following languages: French, German, Italian, Portuguese or Spanish. At least one course must be Intermediate or Conversational; qualifying Intermediate or Conversational courses are listed below:

French 8, 21, 22, 23, 38, German 6, 11, 20, 21, 22, Italian 4, 5, Spanish 8, 21, 22, 28, 31, 32, 33.

Courses taught in English will not count as restricted electives in this major. (E) Internship area: A maximum of 8 units of Viticulture and Enology 190X, 192, 198, 199, 290 or 298 may be counted as restricted electives by prior arrangement with adviser. May be increased to 12 units in exceptional circumstances.

Total Units for the Major 120-133 Major Adviser. M. Matthews

Related Major Programs. Food Science and Technology, and Plant Sciences.

Graduate Study. Several graduate groups offer programs of study leading to advanced degrees in the fields of viticulture and enology. For the M.S. or Ph.D. degree, see Agricultural and Environmental Chemistry (A Graduate Group), on page 139, Engineering: Chemical Engineering and Materials Science, on page 252, Ecology (A Graduate Group), on page 224, Food Science (A Graduate Group), on page 311, Genetics (A Graduate Group), on page 318, Horticulture and Agronomy (A Graduate Group), on page 340, Microbiology (A Graduate Group), on page 419, Plant Biology (A Graduate Group), on page 464, Plant Pathology, on page 465, Soils and Biogeochemistr (A Graduate Group), on page 501, and Viticulture and Enology (A Graduate Group), on page 529

Courses in Viticulture and Enology (VEN)

Lower Division Courses

2. Introduction to Viticulture (2)

Lecture - 2 hours. Fundamental principles of biology and culture of the grapevine including taxonomy, morphology, physiology, distribution, domestication, utilization, propagation, production systems, harvesting, and storage and processing of grapes.

Successful completion of the course should prepare students for upper division courses in viticulture. GE credit: SE. — I. (I.) Williams

3. Introduction to Winemaking (3)

Lecture - 3 hours. Overview of the history of wine, viticulture, fermentation, winery operations, the physiology of wine consumption, wines produced in California and other major wine-producing regions and the sensory evaluation of wine. GE credit: SE, SS.-I, II, III. (I, $\dot{\text{II}}$, III.) Heymann, Waterhouse, Adams

90X. Lower Division Seminar (2)

Seminar-1 hour; term paper (required)/discussion. Prerequisite: lower division standing and consent of instructor. Introduction to current issues surrounding wine and health as they relate to diet, nutrition, and toxicology. May not be repeated for credit. GE credit: Wrt.

99. Special Study for Undergraduates (1-5) (P/NP grading only.)

Upper Division Courses 101A. Viticultural Practices (3)

Lecture - 1.5 hours; discussion/laboratory - 3.5 hours. Prerequisite: course 2. Identification, cultivation, and use of the major wine, table, raisin, and rootstock cultivars. Includes practices specific to the fall such as fruit contracts, maturity sampling, harvesting, cover crops, and soil-pests. One field trip required. GE credit: SE.-I. (I.) Walker

101B. Viticultural Practices (3)

Lecture – 1.5 hours; discussion/laboratory – 3.5 hours. Prerequisite: course 2. Theory, principles, and practices of pruning and grapevine propagation. Plant materials and the certification process, weed control and weed identification, wood diseases, and frost protection. One field trip required. GE credit: SE. - II. (II.) Walker

101C. Viticultural Practices (3)

Lecture - 1.5 hours; discussion/laboratory - 3.5 hours. Prerequisite: course 2. Field oriented experience in the principles and practices of grapevine production, including vineyard establishment, vine training, trellising, canopy management practices, irrigation and water management, and methods of crop adjustment for improvement of fruit quality. One field trip required. GE credit: SE.-III. (III.) Smart

110. Grapevine Growth and Physiology (3)

Lecture - 3 hours. Prerequisite: course 2. Botanical aspects including morphology and domestication will precede lectures covering flower development and energy budget concepts. Impact of physiological variables such as photosynthesis translocation, mineral nutrition, and water relations on fruit ripening and composition will be covered. GE credit: SE.—II. (II.) Matthews

111. World Viticulture (3)

Lecture - 3 hours. Prerequisite: upper division standing. Study of the diversity of viticulture, both geographical and historical. History of grape growing and its spread throughout the world will be covered, along with discussions of current viticultural practices in different parts of the world, including California. GE credit: OL, SE, WE.

111L. Critical Evaluation of Wines of the World (1)

 ${\it Laboratory/discussion-3\ hours.\ Prerequisite:}$ course 111 (must be taken concurrently), course 125 with a grade of C or better. Critical analysis of wines produced in different parts of the world with emphasis on the relationship between sensory properties of the wines and factors associated with their place of origin. (P/NP grading only.) GE credit: SE

115. Raisin and Table Grape Production (2)

Lecture - 2 hours. Prerequisite: course 2. Overview of the raisin and table grape industries in California and other production areas of the world. Cultural practices associated with raisin and table grape production will also be discussed. GE credit: ŠE. – I. (I.)

118. Grapevine Pests, Diseases and Disorders (3)

Lecture - 3 hours. Prerequisite: course 2. Various pests and diseases of vineyards throughout California. Pest/disease identification and control methods (to include sampling techniques) also will be discussed. Integrated management approach to pest control methods will be emphasized. GE credit: SE.—I. (I.) Williams

123. Analysis of Musts and Wines (2)

Lecture — 2 hours. Prerequisite: Chemistry 2C and 8B or equivalent; Agricultural Management and Range-land Resources 21 or equivalent. Students enrolled in the lecture only portion of the course will be required to enroll in 1 unit of course 199/299. Fundamental principles of analytical chemistry as they relate to specific methods used in winemaking. GE credit: SE. -I. (I.) Ebeler

123L. Analysis of Musts & Wines Laboratory (2)

Lab-3 hours; independent study-3 hours. Prerequisite: Chemistry 2C and 8B, or equivalent, Agricultural Management and Rangeland Resources 21, and course 123 (course 123 may be taken concur-rently). Fundamental principles of analytical chemistry as they relate to specific methods used in winemaking. Laboratory exercises demonstrating various chemical, physical and biochemical meth ods. Data will be analyzed and results interpreted in weekly lab reports; includes student-designed independent project and written report. Enrollment restricted to upper division and graduate students in Viticulture & Enology; others by approval of instructor. GE credit: Wrt | QL, SE, VL, WE.—I. (I.) Ebeler

124. Wine Production (2)

Lecture - 2 hours. Prerequisite: course 3, 123 (may be taken concurrently), Biological Sciences 102. Principles and practices of making standard types of wines, with special reference to grape varieties used and methods of vinification. GE credit: SE, WE.—I.

124L. Wine Production Laboratory (3)

Laboratory-3 hours; independent study-3 hours; term paper. Prerequisite: course 124 (may be taken concurrently). Restricted to undergraduate students in fermentation science, viticulture and enology, biotechnology, microbiology, food science and applied plant biology or graduate students in food science, agricultural and environmental chemistry and horticulture. Current technologies used in production of California table wines; analysis and monitoring of impact of fermentation variables on microbial performance and product quality; student-designed independent research project. GE credit: OL, SE, WE.— I. (I.) Bisson

125. Wine Types and Sensory Evaluation (2)

Lecture — 2 hours. Prerequisite: course 124; Plant Sciences 120 or Statistics 106. Open to upper division and graduate students in Viticulture & Enology; others by approval of instructor. Principles of sensory evaluation and application to wines. Factors influencing wine flavor, data from sensory analysis of model solutions. GE credit: QL, SE.—III. (III.) Hey-

125L. Sensory Evaluation of Wine Laboratory (2)

Laboratory—3 hours; term paper. Prerequisite: course 125 (may be taken concurrently). Restricted to upper division majors in fermentation science or viticulture and enology or graduate students in food science. Sensory evaluation of wines and model systems using discrimination tests, ranking, descriptive analysis and time-intensity analysis. Data analyzed by appropriate statistical tests and results interpreted in extensive weekly lab reports. GE credit: QL, SE, VL, WE.—III. (III.) Heymann

126. Wine Stability (3)

Lecture - 2 hours; discussion - 1 hour. Prerequisite: course 124. Restricted to students in viticulture and enology, fermentation science, applied plant biology majors, or graduate students in food science, micro biology, horticulture, and horticulture and agronomy.

528 Viticulture and Enology

Principles of equilibria and rates of physical and chemical reactions in wines; treatment of unstable components in wines by absorption, ion exchange, refrigeration, filtration, and membrane processes; and protein, polysaccharide, tartrate, oxidative, and color stabilities. GE credit: SE.-II. (II.) Boulton

126L. Wine Stability Laboratory (2)

Laboratory—3 hours; independent study—3 hours. Prerequisite: course 126 (may be taken concurrently). Restricted to upper division fermentation science, viticulture and enology majors, or graduate students in food science, agricultural and environmental chemistry, microbiology or by consent of instructor. Practical application of principles of equilibria and rates of physical and chemical reactions to wine stability. GE credit: SE, WE.-II. (II.) Boulton

128. Wine Microbiology (2)

Lecture - 2 hours. Prerequisite: courses 123 and 124; Microbiology 102 and 102L, or Food Science and Technology 104 and 104L; courses 125 and 126 recommended. Nature, development, physiology, biochemistry, and control of yeasts and bacteria involved in the making, aging and spoilage of wine. GE credit: SE.—II. (II.) Mills

128L. Wine Microbiology Laboratory (2)

Laboratory-6 hours. Prerequisite: course 123, 124, and 128 (may be taken concurrently), Microbiology 102L or Food Science and Technology 104 and 104L; course 125 and 126 recommended. Restricted to upper division students in fermentation science, viticulture and enology or graduate students in food science. Nature, development, physiology, biochemistry and control of yeasts and bacteria involved in the making, aging and spoilage of wine. GE credit: SE, VL, WE.—II. (II.) Mills

135. Wine Technology and Winery Systems

Lecture - 3 hours; discussion/laboratory - 2 hours. Prerequisite: course 124. Process technologies and process systems that are used in modern commercial wineries. Lectures, demonstrations, problem solving sessions, and possible field trips. Includes grape preparation and fermentation equipment; post-fermentation processing equipment; winery utilities, cleaning systems, and waste treatment. GE credit: SE.—III. (III.) Block

140. Distilled Beverage Technology (3)

Lecture—3 hours. Prerequisite: Chemistry 8B; Food Science and Technology 110A. Distillation principles and practices; production technology of brandy, whiskey, rum, vodka, gin, and other distilled beverages; characteristics of raw materials, fermentation, distillation, and aging. Offered in alternate years. GE credit: QL, SE.—(III.) Boulton

181. Readings in Enology (1)

Discussion—1 hour. Prerequisite: course 3. Critical evaluation of selected monographs in enology. Discussion leadership rotates among the students. May be repeated three times for credit. (P/NP grading only.) GE credit: SE.-III. (III.) Matthews

190X. Winemaking Seminar (1)

Seminar - 1 hour; discussion - 1 hour. Prerequisite: course 3. Open to Viticulture and Enology majors and graduate students. Outside speakers on a specific winemaking topic chosen for the quarter. Discussion with the speaker hosted by the faculty member(s) in charge. May be repeated for credit up to 3 times. (P/NP grading only.) GE credit: SE.—III. (III.)

192. Internship (1-12)

Internship - 3-36 hours. Prerequisite: completion of 84 units. Work experience related to Fermentation Science (Enology) or Plant Science (Viticulture) majors. Internships must be approved and supervised by a member of the department or major faculty, but are arranged by the student. (P/NP grading only.) GE credit: SE.

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.) GE credit: SE.

Graduate Courses

200. Introduction to Scientific Methods (2)

Lecture/discussion-1 hour; term paper. Prerequi site: graduate standing or consent of instructor. Processes involved in conducting scientific research Topics include conducing literature review, formulating hypotheses, and analyzing and reporting results. Annotated bibliography and written and oral research proposal.

210. Grape Development and Composition

Lecture - 3 hours; discussion - 1 hour. Prerequisite: Biological Sciences 102 and 103, or 105. Anatomy, physiology and biochemistry of grape berry development, with emphasis on the development of grape composition relevant to winemaking. Offered in alternate years.—III. Adams, Polito

213. Flavor Chemistry of Foods and Beverages (3)

Lecture/discussion - 3 hours. Prerequisite: Chemistry 8B, course 123, course 123L or Food Science and Technology 103 or consent of instructors. Students will become familiar with basic principles of flavor chemistry, analysis, and formation in fresh and processed foods. Students will be required to read and critically evaluate flavor chemistry literature. (Same course as Food Science and Technology 213). - III. (III.) Ebeler, Heymann

215. Sensometrics (3)

Lecture-3 hours. Prerequisite: Food Science and Technology 117 or the equivalent, course 125 and 125L or Food Science and Technology 107A or 107B. Experimental design and statistical analysis, including multivariate analysis, for both sensory and instrumental data in enology and food-related studies. — I. (I.) Heymann

216. Vineyard Establishment and Development (4)

Lecture/discussion—3 hours; fieldwork—3 hours; term paper. Prerequisite: courses 101A, 101B, 101C, and one of courses 115 or 116, and course 118 or consent of instructor; course 110, Soil Science 100, Atmospheric Science 133 and Agricultural and Resource Economics 140 recommended. Application of plant, meteorological, soil, water, and economic sciences to vineyard establishment and development. Preparation of a comprehensive study to determine the viticultural and economic feasibility of a given site for raisin, table, or wine grape production. — I. (I.) Smart

217. Field and GIS Evaluation of Soils (3)

Lecture/laboratory-4 hours; fieldwork-3 hours. Prerequisite: Plant Sciences 120, 205 or 206; Soil Science 100, 105, or 107; course 101C; Applied Biotechnology 180 are recommended; consent of Instructor. Principles and practices used to evaluate agricultural soils in the field, including soil pits, soil cores, electrical conductivity meters, ground penetrating radar, geomorphology and surface terrain analysis. Use of geographic information sciences, soil databases, digital elevation models and geostatics. tistics. Offered in alternate years. — (II.) Smart

219. Natural Products of Wine (3)

Lecture—3 hours. Prerequisite: courses 123 and 124, or natural products background and consent of instructor. Structure, occurrence, and changes due to wine production to the natural products found in wine. Chemicals with a sensory impact will be emphasized, including flavonoids and other phenolics, terpenes and norisoprenoids, pyrazines, oak volatiles and other wine constituents. - I. (I.) Water-

223. Instrumental Analysis of Must and Wine (4)

Lecture - 2 hours; laboratory - 3 hours; discussion -1 hour. Prerequisite: course 123 or Food Science and Technology 103 required. Biological Sciences 102 and 103 or Biological Sciences 105, Chemistry

107B or Chemistry 115 recommended. Open to upper division students in Viticulture & Enology, Food Science and Technology; students in Food Science, Ag & Environmental Chemistry and Viticulture & Enology graduate groups. Theory and practice of instrumental analysis of wines and musts. Emphasis on the principles of analytical techniques (e.g., CE, GC, HPLC, Mass Spectrometry) and factors determining correct choice of instrumental method.—III. (III.) Ebeler

224. Advances in the Science of Winemaking (3)

Lecture - 3 hours. Prerequisite: course 125, 126 and graduate standing or consent of instructor. Selected topics in the science and technology of winemaking. Topics drawn from current research of participating faculty. Critical analysis of the technical content of published material.—III. (III.)

225. Advanced Sensory Analysis of Wines

Lecture/discussion-2 hours; laboratory-4 hours. Prerequisite: courses 124 and 125 (or Food Science and Technology 107) and Agricultural Management and Rangeland Resources 120 or the equivalent. Sensory descriptive analysis experiments will be designed and conducted using standard sensory science methods. Data will be analyzed by analyses of variance, principal component analyses and generalized Procrustes analysis to evaluate the judge's performance and interpret the significance of the results.—III. Heymann

235. Winery Design (4)

Lecture - 2 hours; discussion - 1 hour; independent study. Prerequisite: course 124, 135 or consent of instructor. Design of wineries, Includes process calculations, equipment selection, process layout and building choice and siting. Project scheduling, capital costs, and ten-year cash flow analysis for the winery. One field trip required. Offered in alternate years. - II. Boulton

270. Critical Evaluation of Scientific Literature (2)

Discussion-2 hours. Prerequisite: consent of instructor. Contemporary research topics in biological sciences. Discussion of recent research articles in a special topic area. Intended to develop skills in critical evaluation of scientific publications. May be repeated for credit. (S/U grading only.)-II, III. (II,

290. Seminar (1)

Seminar - 1 hour. Prerequisite: consent of instructor. (S/U grading only.)—I, İİI. (I, III.)

290C. Advanced Research Conference (1)

Discussion - 1 hour. Prerequisite: graduate standing and consent of instructor. Planning and results of research programs, proposals, and experiments. Discussion and critical evaluation of original research being conducted by the group. Discussion led by individual research instructors for research group May be repeated for credit. (S/U grading only.)-I, II, III. (I, II, III.)

291. Advanced Viticulture (2)

Lecture/discussion-2 hours. Prerequisite: course 110, 116, 124, 125; course 210 recommended. Critical evaluation of scientific and popular literature on selected topics of current interest that relate viticulture to fruit or wine sensory attributes or quality. May be repeated one time for credit. Offered in alternate years. — (II.) Matthews

292. Advanced Internship (1-15)

Internship — 3-45 hours. Prerequisite: courses 123, 123L, 124, 124L, 125, 125L, 126, 126L, 128, 128L; consent of instructor. Restricted to Viticulture & Enology Graduate Group graduate students. Work experience related to Fermentation Science (Enology) or Plant Science (Viticulture) majors. Internships must be approved and supervised by a graduate group faculty member or students major professor, but are arranged by the student. May be repeated 12 units for credit. (S/U grading only.)—I, II, III. (I, II,

297T. Tutoring in Viticulture and Enology

Prerequisite: graduate standing and consent of instructor. Designed for graduate students who desire teaching experience, but are not teaching assistants. Student contact primarily in laboratory or discussion sections, and under direction of a faculty member. (S/U grading only.)

298. Group Study (1-5)

(S/U grading only.)

299. Research (1-12)

(S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.) I, II, III. (I, II, III.)

Viticulture and **Enology** (A Graduate Group)

David A. Mills, Ph.D., Chairperson of the Group

Group Office. 1204 RMI South (530) 752-8035; Fax (530) 752-0382; http://wineserver.ucdavis.edu

Faculty

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(Viticulture and Enology)
Jean-Xavier Guinard, Ph.D., Professor (Food Science and Technology)

Hildegarde Heymann, Ph.D., Professor (Viticulture and Enology)

Maria Marco, Ph.D., Assistant Professor (Food Science and Technology

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M. Andrew Walker, Ph.D., Professor

(Viticulture and Enology)
Andrew L. Waterhouse, Ph.D., Professor (Viticulture and Enology) Larry E. Williams, Ph.D., Professor

(Viticulture and Enology)

Affiliated Faculty

Matthew W. Fidelibus, Ph.D., Associate Specialist in Cooperative Extension (Viticulture and Enology) W. Douglas, Gubler, Ph.D., Specialist in Cooperative Extension (*Plant Pathology*) Andrew J. McElrone, Ph.D. Assistant Adjunct Professor (Viticulture and Enology) Anita Oberholster, Ph.D., Assistant Specialist in Cooperative Extension (Viticulture and Enology)
Kerri L. Steenwerth, Ph.D., Assistant Adjunct Professor (Viticulture and Enology) James A. Wolpert, Ph.D., Specialist in Cooperative Extension (Viticulture and Enology)

Graduate Study. The M.S. program offers advanced studies in viticulture and enology, ranging from the genetics, physiology and biochemistry of grapevines to the chemistry, microbiology and sensory science of wines and the chemical engineering of winemaking. Graduate students will usually work on a project that requires at least two of these fields of science and may involve grapevines, grapes, and wine or wine distillates. Topics can vary; examples include the molecular biology of grapevines, bacteria or yeast, the grape and wine chemistry associated with fermentation and aging and the correlation of analytical and sensory analyses. All application material must be received in the Group office by January 15.

Ph.D. studies are offered through one of the following Graduate Groups: Agricultural and Environmental Chemistry, Chemical Engineering, Food Science, Horticulture and Agronomy, Genetics, Microbiology, and Plant Biology.

Preparation. Applicants to the program are required to have a level of competence equivalent to that of a strong science undergraduate program. This includes coursework in biology, general chemistry, organic chemistry, calculus, statistics (analysis of variance), biochemistry, and microbiology. Specific requirements are outlined in detail and may be obtained from the Group office or see http://wineserver.ucdavis.edu.

Graduate Advisers. H. Heymann, D.A. Mills

War–Peace Studies

(College of Letters and Science)

The interdisciplinary minor in War-Peace Studies examines the causes and dynamics of intra- and international wars and efforts to prevent and settle such conflicts

Students in the minor are encouraged to participate in the educational activities of the Davis Program of the UC Institute on Global Conflict and Cooperation

The minor is sponsored by the International Relations

Minor Program Requirements:

UNITS

War-Peace Studies......19-20

One or two courses from each of the following areas:

Approaches: Anthropology 123AN, 126B, Comparative Literature 157, Philosophy 115, 118, Political Science 121, 123, 124, 132, 176, Sociology 157, Women's Studies 102

Northern and Western Regions: History 134A, 138C, 142A, 143, 144A, 144B, 145, 170B, 171B, 174B, Native American Studies 130B, Political Science 130, 131 Southern and Eastern Regions: Anthropology 142, 143A, 143B, 144, History 165, 191F, 194C, Native

American Studies 120, Political Science

Restriction. No more than two courses from a single department may be offered in satisfaction of the minor requirements

Advising. International Relations Program (530) 754-8098

Washington, D.C. Program

Program Location. 1608 Rhode Island Avenue, NW, Washington, D.C. 20036

Campus Program Office. 105 and 108 South Hall (530) 752-6652;

http://washingtonprogram.ucdavis.edu

The University of California hosts a system-wide academic and residential program for undergraduate students attending from each of the UC campuses. Housed within the UC Washington Center (UCDC), an 11-story, state of the art facility, convenient to public transportation and located in downtown D.C., the programs provide undergraduates opportunity to enrich their education while in residence for one quarter in the nation's capital. The program's principal activities include enrollment in credit-bearing courses, participation in academic internships, and opportunity to explore the many educational, cultural and historical activities in the Washington

Program of Study

UCDC is open to undergraduates from all majors who will have upper-division standing by the start of the quarter in which they plan to participate. A GPA of at least 3.000 is recommended for admission although not required. Applicants are also evaluated based on overall relevant experience, a written statement, and letters of recommendation

Academic Year Component (11 weeks). Students earn academic credit and continue to be registered as full-time UC Davis students during the quarter in which they participate.

- Internship. Students work three to four days per week as interns in Congress, federal agencies, interest groups, trade associations, research institutions, media corporations, museums, or in other organizations related to the interests and objectives of individual students.
- Research Seminar. Each student writes a research paper in consultation with Washington Program faculty and graduate fellows. To complete the assignment, students take advantage of the many unique research resources in Washington, DC.
- Elective Seminar Course. Each student enrolls in one upper division seminar course taught at UCDC. These courses vary each quarter from among offerings that typically include international relations, history, political science, public policy and other social sciences; the arts and humanities; and science policy. In addition to regular instruction, seminars often include guest speakers, observations of congressional committees and federal agencies, and other relevant

Courses are taught by UCDC faculty appointed by the various UC campuses, or visiting faculty from the Washington area.

Financial aid eligibility and awards as determined by the home campus is maintained while enrolled in the program, and the aid package can be adjusted to reflect the additional costs of the program.

Summer Component (10 weeks). UCDC also offers a 10-week Summer Program with a credit or non-credit option. The credit option allows students to enroll in courses in addition to working at an internship. Students pay the summer sessions rate per credit hour plus an application fee. The noncredit option (internship only) has no enrollment fee. Both options allow students to participate in many educational, cultural, historical and social activities.

University Graduation Requirements

• All prospective applicants should carefully plan their course programs in order to satisfy university, college, and major/minor requirements for their degree.

530 Water Science

- Although units and grade points earned at UCDC are incorporated into the University transcript and GPA calculation, departments and programs retain the right to determine which UCDC courses will be accepted in satisfaction of major and minor requirements.
- All degree candidates must meet the University residence requirement. Students should consult with their college Dean's office early during the UCDC planning process for information on the university residence requirement, particularly students who intend to study abroad or participate in UCDC during their senior year.

Recognizing the special value of UCDC, the faculty has approved two exceptions to the usual residence requirement for students participating in the Washington Program:

- Students planning to graduate immediately upon completion of participation in UCDC may satisfy the University residence requirement by completing at least 35 of their final 45 units on the Davis campus immediately preceding entry into UCDC
- Students who have not finished all of their degree requirements following completion of their participation in the UCDC program may satisfy the University residence requirement by completing at least 35 units, including at least 12 units after returning from UCDC, on the Davis campus within the final 90 units earned toward the degree.

Students who will not meet the residency requirements outlined may petition their Dean's office requesting an exception to policy.

- Students may satisfy GE requirements while at UCDC but should consult with their college Dean's office prior to departure for information on the certification process.
- Students with a large number of units may participate in the UCDC program provided that (1) they will not exceed 225 units prior to their departure and (2) that all their degree requirements have been fulfilled either before they leave campus or during their time at UCDC. Participants may only return to campus from UCDC to complete any outstanding degree requirements provided that they can do so within the 225 unit restriction.

Courses in UC Davis Washington Center (WAS)

Upper Division Courses 175. Health Policy and Health Politics (4)

Seminar — 3 hours; extensive writing or discussion – 1 hour. Restricted to students attending UC Washington Center program. Following the model of a Congressional subcommittee, identification of four salient health policy issues for study, research, and development of model policies to address them. (Same course as Public Health Sciences 175W.) GE credit: SocSci, Wrt | ACGH, OL, SS, WE.

187. Gun Violence (4)

Lecture/discussion-4 hours. Gun violence, viewed from the perspectives of criminology and public health. Topics include personal and societal contributing factors and critical assessment of potential solutions. Offered in alternate years.

192. Internship in the UC Davis Washington Center Program (7)

Internship—28 hours. Prerequisite: junior or senior standing, admission in the UC Davis Washington Center undergraduate program, course 193 concurrently. Internship in Washington, DC with associated, supervised research project. (Same course as Political Science 192W.) (P/NP grading only.)

193. Washington Center Research Seminar

Lecture/discussion-1 hour; independent study-3 hours; tutorial-0.5 hour. Prerequisite: course 192 concurrently. Core academic component of Washington Program. Topics coordinated with internships. Research draws on resources uniquely available in Washington, DC. Supervised preparation of extensive paper. (Same course as Political Science 193W.) GE credit: Wrt | OL, SS, WE.

Water Science

See Hydrologic Sciences (A Graduate Group), on page 346; Hydrology, on page 347; and Soil and Water Science, on page 501.

Wildlife, Fish, and **Conservation Biology**

(College of Agricultural and Environmental Sciences) Douglas A. Kelt, Ph.D., Chairperson of the Depart-

Department Office. 1088 Academic Surge (530) 752-6586; http://wfcb.ucdavis.edu

Louis W. Botsford, Ph.D., Professor Tim Caro, Ph.D., Professor John M. Eadie, Ph.D., Professor Deborah L. Elliott-Fisk, Ph.D., Senior Lecturer Nann A. Fangue, Ph.D., Assistant Professor Douglas A. Kelt, Ph.D., Professor Douglas A. Nett, Ph.D., Professor
A. Peter Klimley, Ph.D., Adjunct Professor
Peter B. Moyle, Ph.D., Professor
Brian D. Todd, Ph.D., Assistant Professor
Andrea K. Townsend, Ph.D., Assistant Professor Dirk H. Van Vuren, Ph.D., Professor

Emeriti Faculty

Daniel W. Anderson, Ph.D., Professor Emeritus Joseph J. Cech, Jr., Ph.D., Professor Emeritus Ronald E. Cole, B.S., Lecturer Emeritus Christopher M. Dewees, Ph.D., Specialist in Cooperative Extension Emeritus, Lecturer Emeritus Don C. Erman, Ph.D., Professor Emeritus Nancy A. Erman, M.S., Lecturer Emerita E. Lee Fitzhugh, Ph.D., Specialist in Cooperative Extension Emeritus Walter E. Howard, Ph.D., Professor Emeritus Rex E. Marsh, A.B., Lecturer Emeritus Terrell P. Salmon, Ph.D., Specialist in Cooperative Extension Emeritus

Affiliated Faculty

Lisa C. Thompson, Ph.D., Associate Specialist in Cooperative Extension

The Major Program

The Wildlife, Fish, and Conservation Biology major deals with the relationships between the requirements of wildlife and the needs of people. Understanding these relationships is vital for the maintenance of ecological diversity, recreational resources, and food supplies. Students completing the major possess a broad knowledge of ecology and natural history, but with the quantitative skills to use this knowledge in critical thinking and decision-

The Program. The major emphasizes broad training in biological and physical sciences, with specialization in one of five areas. The major is primarily for students interested in becoming professionals in the diverse and cutting-edge fields of wildlife, fish, and conservation biology including veterinary and wildlife health sciences. The breadth of course requirements, when combined with electives also make this an excellent preparatory major for secondary school teaching. Certification by professional societies such as The Wildlife Society, American Fisheries Society, or the Ecological Society of Amer-

ica, or preparation for specialized resource-related graduate studies may also be achieved by careful planning of electives with a faculty adviser.

Career Alternatives. The major prepares students to excel in the dynamic fields of environmental and conservation biology emphasizing vertebrate animals in their natural environments, as well as resolution of conflicts between humans and wild animals. Positions now held by graduates in this major include wildlife biology, fisheries biology, wildlife damage management, and resource biologists and managers with local, state, and federal agencies. Many graduates are biologists or consultants with private industries such as environmental consulting firms, commercial fishing businesses, electrical utilities, sporting clubs or businesses, and aquaculture operations, while others are veterinarians, medical physicians, and professors/researchers who teach and/or conduct research in academic institutions.

UNITS

B.S. Major Requirements:

Written/Oral Expression	8
University Writing Program 1	
Communication 1	. 4
Communication 1	fy
the College requirements.	,
Preparatory Subject Matter	49-50
Biological Sciences 2A, 2B, 2C	
Chemistry 2A, 2B, 8A, 8B	16
Mathematics 16A, 16B	. 6
Physics 1A, 1B	. 6
Statistics 100, 102, or Plant Sciences	
120	. 4
Wildlife, Fish, and Conservation	2.4
Biology 10, 11, or 50	
Depth Subject Matter	4/-54
Students graduating with this major are	
required to attain at least a C average (2.000) in all courses taken at the univer	aib.
in depth subject matter.	Sily
Environmental Science and Policy 100 or	
Evolution and Ecology 101	. 4
Evolution and Ecology 100	
Biological Sciences 101	. 4
Wildlife, Fish, and Conservation	
Biology 121 or 130	. 4
Neurobiology, Physiology, and Behavior 102 or Wildlife, Fish, and Conservation	
Biology 141	1
Wildlife, Fish, and Conservation	. 4
Biology 122	4
Wildlife, Fish, and Conservation Biology	
154	. 4
Choose three lecture courses and two	
(laboratory) courses from Wildlife, Fish, a	nd
Conservation Biology 110, (110L), 111,	
(111L), 120, (120L), or Evolution and	1.5
Ecology 134, (134L)12- Choose one course (two recommended)	13
	. 4
Wildlife, Fish, and Conservation Biology	
100, or 101 & 101L, or 102 & 102L	4-7
Landscape Architecture 150	. 3
Strongly recommended, but not required	
Anatomy, Physiology and Cell Biology	,
100	
Restricted Electives	15-24

Restricted Electives...... 15-24

Choose one from the five Areas of Specialization shown below. Students must maintain a C average (2.000 GPA) and pass all course work in their chosen specialization

Areas of Specialization

(1) Conservation Biology: Complete Wildlife, Fish, and Conservation Biology 155 & 155L. Choose one course from Environmental Science and Policy 161, 170, or 171. Choose two courses from Environmental Horticulture 160, Environmental Science and Policy 127, Evolution and Ecology

115, 117, 138, 147, Wildlife, Fish, and Conservation Biology 152, 156, or 157. Choose one course from Animal Science 103, Nature and Culture 120, 140, or Veterinary Medicine 170.

(2) Fish Biology: Complete Wildlife, Fish, and

Conservation Biology 120 & 120L.

Choose one course from Entomology 116 or Evolution and Ecology 112 & 112L. Choose three courses from Animal Science 118, Environmental Science and Policy 116N, 150C, 151, 151L, Evolution and Ecology 115, Environmental Science and Management 100, Hydrology 143, Wildlife, Fish, and Conservation Biology 155 & 155L, or 157.

Choose one course from Hydrology 150, Environmental Science and Policy 161, 169, or Landscape Architecture 150

(3) Wildlife Biology: Complete Wildlife, Fish,

and Conservation Biology 151.
Choose one course from Plant Biology 102, 147, Plant Sciences 144 or 178. Choose one course from Environmental Horticulture 160, Environmental Science and Policy 155, Plant Sciences 130, Wildlife, Fish, and Conservation Biology 155 & 155L, 156, or 157.

Choose two courses from Animal Science 104, Environmental Science and Policy 121, Environmental Toxicology 101, Evolution and Ecology 107, Landscape Architecture 150, Medical Microbiology 116, Wildlife, Fish, and Conservation Biology 136, 141 (cannot be used to simultaneously satisfy the Depth Subject Matter requirement), or 152.

Note: Students interested in certification as a Wildlife Biologist from The Wildlife Society should consider additional courses in plant sciences. Recommended courses include Plant Biology 108, 117, 118, 119, 148, Plant Sciences 131, 144, 145, or 178.

(4) Wildlife Health: Complete either Biological Sciences 102 and 103 or Animal Biology 102 and 103.

Choose one course from Wildlife, Fish, and Conservation Biology 136, 151, 152, or 155 &155L.

Choose one course from Animal Science 103 or 170.

Choose one course from Anatomy, Physiology, and Cell Biology 100, Animal Science 104, Medical Microbiology 115, 116, Microbiology 102, Molecular and Cell Biology 150, Neurobiology, Physiology, and Behavior 101, 126, 127, 128, 129, 140, or Veterinary Medicine 158. Note that this AOS recommends additional preparatory courses; prerequisites for admission to Veterinary Medicine vary among schools and students should confirm the specific requirements of the school(s) to which they wish to apply. Additional Preparatory (recommended, not required): Chemistry 2C, 118A, 118B, 118C, Physics 7A, 7B, 7C.

(5) Individualized: Students may, with prior approval of their adviser and the curriculum committee, design their own individualized specialization within the major. The specialization will consist of five upper division courses with a common theme.

Total Units for the Degree 119-136 Major Adviser. N. A. Fangue

Students transferring to UC Davis from another institution or new students declaring the major of Wild-life, Fish, and Conservation Biology must consult the Master Adviser so that their program can be evaluated and a faculty adviser assigned. Contact the Department in 1088 Academic Surge Building or telephone (530) 752-6586.

Minor Program Requirements:

The minor in Wildlife, Fish, and Conservation Biology is for students interested in basic training and understanding of the ecology and conservation of wild terrestrial and aquatic vertebrates, emphasizing birds, mammals, and fish, but with relevance and application to all life forms.

Wildlife, Fish, and Conservation Biology......20-32

Wildlife, Fish, and Conservation Biology 100, 151, either 154 or 155 & 155L, and choose one course from 110, 111, or Two to four upper division elective courses chosen from the Wildlife, Fish, and Conservation Biology curriculum, excluding WFC 190, 191, 192, 195, 197T, 198, and 199.....5-16

Minor Adviser. N. A. Fangue

Graduate Study. Faculty in Wildlife, Fish, and Conservation Biology are active members of several graduate programs, including the Ecology, Population Biology, Genetics, Animal Behavior, and Avian Science graduate groups. Students interested in graduate studies should see Graduate Studies, on

Courses in Wildlife, Fish, and **Conservation Biology (WFC)**

Lower Division Courses

10. Wildlife Ecology and Conservation (4)

Lecture - 3 hours; discussion - 1 hour. Introduction to the ecology and conservation of vertebrates. Complexity and severity of world problems in conserving biological diversity. GE credit: SciEng, Div, Wrt | SE, SL, WE.—I, III. (I, III.) Elliott-Fisk, Moyle, Kelt

11. Introduction to Conservation Biology (3)

Lecture — 3 hours. Introduction to conservation biology and background to the biological issues and controversies surrounding loss of species and habitats for students with no background in biological sciences. GE credit: SciEng, Wrt | SE, SL.—III. Caro

50. Natural History of California's Wild Vertebrates (3)

Lecture - 2 hours; discussion - 1 hour. Examination of the natural history of California's wild vertebrates (fish, amphibians, reptiles, birds, and mammals), including their biogeography, systematics, ecology and conservation status. GE credit: SciEng, Wrt | SE, SL, WE.-II. (II.) Elliott-Fisk

92. Internship (1-6)

Internship - 3-18 hours. Prerequisite: lower division standing and consent of instructor. Work experience off and on campus in all subject areas offered in the department. Internships supervised by a member of the faculty. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor. Special study for undergraduates. (P/NP grading only.)—I, II, III. (I, II,

Upper Division Courses 100. Field Methods in Wildlife, Fish, and Conservation Biology (4)

Lecture - 2 hours; laboratory - 3 hours; fieldwork - 3 hours. Prerequisite: Evolution and Ecology 101 or Environmental Science and Policy 100 and consent of instructor. Introduction to field methods for monitoring and studying wild vertebrates and their habitats, with an emphasis on ecology and conservation.
Required weekend field trips. GE credit: SE.—III. (III.) Eadie, Kelt, Todd, Van Vuren

101. Field Research in Wildlife Ecology (2)

Lecture/discussion-2 hours. Prerequisite: Consent of instructor and one upper division course in each of ecology, statistics, and ornithology, mammalogy, or herpetology. Field research in ecology of wild ver-

tebrates in terrestrial environments; formulation of testable hypotheses, study design, introduction to research methodology, oral and written presentation of results. Limited enrollment. Offered in alternate years. GE credit: Wrt | SE, VL, WE.—I. Eadie, Kelt, Todd, Van Vuren

101L. Field Research in Wildlife Ecology: Laboratory (4)

Lecture/discussion-2 hours; field work-15 hours. Prerequisite: consent of instructor, course 101 (may be taken concurrently), and one upper division course in each of ecology, statistics, and ornithology, mammalogy, or herpetology. Field research in ecology of wild vertebrates in terrestrial environments; testing ecological hypotheses through field research, application of research methodology, supervised independent research projects. Held between Labor Day and fall quarter. Limited enrollment. Offered in alternate years.—I. Eadie, Kelt, Todd, Van Vuren

102. Field Studies in Fish Biology (1)

Lecture/discussion-1 hour. Prerequisite: upper division course in each of ecology, aquatic biology, fish biology, and statistics, and consent of instructor. Emphasis on theory of quantitative fish capture methods and design of individual research projects on ecology, behavior, physiology or population biology of fishes. Not offered every year. - III. Moyle

102L. Field Studies in Fish Biology: Laboratory (6)

Fieldwork-15 hours; laboratory-12 hours; discussion/laboratory-3 hours. Prerequisite: course 102, upper division course in each of ecology, aquatic biology, fish biology, and statistics, and consent of instructor. Field investigations of fish biology are emphasized including quantitative capture methods and individual research projects on ecology, behavior, physiology or population biology of fishes at the field site in relation to their habitats. Not offered every year. (Deferred grading only, pending completion of projects.) GE credit: SciEng, Wrt | SE, WE.—III. Moyle

110. Biology and Conservation of Wild Mammals (3)

Lecture — 3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, or Biological Sciences 2A, 2B, 2C; Evolution and Ecology 101 or Environmental Science and Policy 100 or equivalent course. Origins, evolution, diversification, and geographical and ecological distributions of mammals. Morphological, physiological, reproductive, and behavioral adaptations of mammals to their environment.—III. (III.) Kelt

110L. Laboratory in Biology and Conservation of Wild Mammals (3)

Laboratory -- 6 hours. Prerequisite: course 110 (may be taken concurrently); consent of instructor. Laboratory exercises in the morphology, systematics, species identification, anatomy, and adaptations of wild mammals to different habitats. Limited enrollment.— III. (III.) Kelt

111. Biology and Conservation of Wild Birds (3)

Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, or Biological Sciences 2A, 2B, 2C; Evolution and Ecology 101 or Environmental Science and Policy 100 or equivalent course. Phylogeny, distribution, migration, reproduction, population dynamics, behavior and physiological ecology of wild birds. Emphasis on adaptations to environ ments, species interactions, management, and conservation. GE credit: SE. - I. (I.) Eadie

111L. Laboratory in Biology and Conservation of Wild Birds (3)

Laboratory-6 hours; fieldwork-3 hours. Prerequisite: course 111 (may be taken concurrently); consent of instructor. Laboratory exercises in bird species identification, anatomy, molts, age and sex, specialized adaptations, behavior, research, with emphasis on conservation of wild birds. Several weekend field trips, after class bird walks, and independent bird study are required. Limited enrollment.—I. (I.) Eadie

120. Biology and Conservation of Fishes (3)

Lecture—3 hours. Prerequisite: Biological Sciences 2A, 2B, 2C. Evolution, ecology, and conservation of marine and freshwater fishes.—I. (I.) Moyle

120L. Laboratory in Biology and Conservation of Fishes (1)

Laboratory—3 hours. Prerequisite: course 120 (may be taken concurrently). Morphology, taxonomy, conservation, and identification of marine and freshwater fishes with emphasis on California species. Limited enrollment.—I. (I.) Moyle

121. Physiology of Fishes (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: upper division courses in nutrition and physiology or consent of instructor. Comparative physiology, growth, reproduction, behavior, and energy relations of fishes. Not offered every year. GE credit: SciEng, Wrt | SE, WE.—II. (II.)

122. Population Dynamics and Estimation (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 16A-16B; Statistics 13 or the equivalent; an upper division course in ecology. Description of bird, mammal and fish population dynamics, modeling philosophy, techniques for estimation of animal abundance (e.g., mark-recapture, change-inratio, etc.), mathematical models of populations (e.g., Leslie matrix, logistic, dynamic pool, stock-recruitment); case histories.—III. (III.) Botsford

130. Physiological Ecology of Wildlife (4)

Lecture—4 hours. Prerequisite: Evolution and Ecology 101 or Environmental Science and Policy 100 or equivalent course. Principles of physiological ecology, emphasizing vertebrates. Ecological, evolutionary, and behavioral perspectives on physiological mechanisms used by animals to adapt to their environment, in the context of climate-change and other threats to biodiversity. Tropical, temperate, and polar ecosystems are highlighted. GE credit: SciEng | SE.—II. (II.) Fangue

136. Ecology of Waterfowl and Game Birds(3)

Lecture—3 hours; laboratory—3 hours; fieldwork—1 hour. Prerequisite: course 111, 111L or the equivalent, or consent of instructor. Detailed examination of distribution, behavior, population dynamics, and management of waterfowl and upland game birds. Offered in alternate years.—(II.) Eadie

141. Behavioral Ecology (4)

Lecture—3 hours; film viewing—1 hour. Prerequisite: Evolution and Ecology 101 or Environmental Science and Policy 100 or equivalent course. Basic theories underlying the functional and evolutionary significance of behavior, and the role of ecological constraints. Supporting empirical evidence taken mainly from studies of wild vertebrates. Offered in alternate years. GE credit: SE.—[II.] Caro

151. Wildlife Ecology (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 2A, 2B, 2C or equivalent. Ecology of wild vertebrates, including habitat selection, spatial organization, demography, population dynamics, competition, predation, herbivory, energetics, and community dynamics, set in the context of human-caused degradation of environments in North America.—1. (I.) Van Vuren

152. Ecology of Human—Wildlife Conflicts (3)

Lecture—3 hours. Prerequisite: Biological Sciences 2A, 2B, 2C, or the equivalent. Ecological approaches to managing wild vertebrates that come into conflict with agriculture, public health, or the conservation of biodiversity. Offered in alternate years.—II. Van Vuren

153. Wildlife Ecotoxicology (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: introductory courses in organic chemistry, ecology, and physiology, or consent of instructor; Environmental Toxicology 101 recommended. Various forms of environmental pollution in relation to fish and wildlife, the effects and mechanisms of pollutants, effects on individuals and systems, laboratory and field eco-

toxicology, examples/case histories, philosophical/management considerations. Not offered every year. GE credit: SciEng, Wrt | SE, WE.

154. Conservation Biology (4)

Lecture—3 hours; term paper (will be one or more book reviews). Prerequisite: Evolution and Ecology 101 or Environmental Science and Policy 100 or the equivalent. An introduction to conservation biology and background to the biological issues and controversies surrounding loss of species and habitats. GE credit: SE, WE.—I. (I.) Todd

155. Habitat Conservation and Restoration (3)

Lecture—3 hours. Prerequisite: Evolution and Ecology 101 or Environmental Science and Policy 100 or equivalent course; course 154 and Environmental Horticulture 160 recommended. Analysis of the characteristics of wildlife and fish habitats, the conservation of habitats, and restoration. GE credit: SciEng, Wrt | SE, VL, WE.—II. (II.) Elliott-Fisk

155L. Habitat Conservation and Restoration Laboratory (2)

Fieldwork—3 hours; laboratory—3 hours. Prerequisite: Evolution and Ecology 101 or Environmental Science and Policy 100 or equivalent course; course 155 (may be taken concurrently). Analysis of the characteristics of wildlife and fish habitats, application of restoration methods, and evaluation of conservation and restoration projects in the field. Students will also participate during the term in a restoration project.—II. (II.) Elliott-Fisk

156. Plant Geography (4)

Lecture—3 hours; laboratory—3 hours; term paper. Field trips will be substituted for some in-lab activities. Prerequisite: Environmental Science and Policy 100 or Evolution and Ecology 101; Plant Biology 102 or 108 strongly recommended. Survey of the geographical distribution of vegetation types and habitats, with consideration of the environmental and historical factors that determine these patterns. Conservation and management approaches. Analytical field and lab techniques introduced. Offered in alternate years. GE credit: SciEng, Wrt | SE, VL, WE.—III. Elliott-Fisk

157. Coastal Ecosystems (4)

Lecture—3 hours; laboratory/fieldwork—3 hours. Prerequisite: Environmental Studies 100 or Evolution and Ecology 101; course work in organismal biology, physical geography, and geology recommended. Overview of coastal ecosystems, physical and biological elements and processes, and coastal zone dynamics, including sandy, rocky and muddy shorelines, estuaries, dunes and coastal watersheds. Discussion of the role of historical factors and conservation, restoration, and management approaches. Offered in alternate years. GE credit: SE, VL.—(III.) Elliott-Fisk

158. Infectious Disease in Ecology and Conservation (3)

Lecture—3 hours. Prerequisite: Evolution and Ecology 101 or Environmental Science and Policy 100 or Veterinary Medicine 409 or the equivalent. Introduction to the dynamics and control of infectious disease in wildlife, including zoonotic diseases and those threatening endangered species. Basic epidemiological models and their applications. Role of scientists in developing disease control policies. Not offered every year.

190. Departmental Research Seminar (1)

Seminar—1 hour. Prerequisite: upper division standing in the biological sciences. Reports and discussions of recent advances related to wildlife and fisheries biology. May be repeated for credit up to 3 times. (P/NP grading only.)—I, II, III.

191. Museum Science (2)

Lecture—1 hour; laboratory—3 hours. Prerequisite: upper division standing and consent of instructor. Principles and methods required to preserve and present biological specimens for research, teaching collections, and museums. Not offered every year. (P/NP grading only.)—II. Engilis

192. Internship (1-12)

Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience off and on campus in all subject areas offered in the department. Internships supervised by a member of the faculty. (P/NP grading only.)

195. Field and Laboratory Research (3)

Laboratory—6 hours; discussion—1 hour. Prerequisite: course 110L, 111L, or 120L; 121 or 130; Evolution and Ecology 101 or the equivalent; and consent of instructor. Critique and practice of research methods applied to field and/or laboratory environments of wild vertebrates. Students work independently or in small groups to design experimental protocol, analyze data, and report their findings. May be repeated two times for credit. GE credit: SE.—I, II, III. (I, II, III.)

197T. Tutoring in Wildlife and Fisheries (1-5)

Prerequisite: major in Wildlife, Fish, and Conservation Biology and consent of instructor. Experience in teaching under guidance of faculty member. (P/NP grading only.)

198. Directed Group Study (1-5)

(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

222. Advanced Population Dynamics (3)

Lecture—3 hours. Prerequisite: graduate standing; advanced course in ecology (e.g., Evolution and Ecology 101), population dynamics (e.g., course 122), and one year of calculus; familiarity with matrix algebra and partial differential equations recommended. Logical basis for population models, evaluation of simple ecological models, current population models with age, size, and stage structure, theoretical basis for management and exemplary case histories. Emphasis on development and use of realistic population models in ecological research. Not offered every year.—II. (II.) Botsford

223. Conservation Biology and Animal Behavior (3)

Lecture—1.5 hours; discussion—1.5 hours. Prerequisite: Ecology 208 or Animal Behavior 221. Influences of concepts of animal behavior (functional, evolutionary, developmental, mechanistic, and methodological issues) on conservation biology theory and practice. Offered in alternate years. (III.)—Caro

290. Seminar (1-3)

Seminar — 1-3 hours. Prerequisite: consent of instructor. Seminar devoted to a highly specific research topic in any area of wildlife or fisheries biology. Special topic selected for a quarter will vary depending on interests of instructor and students. (S/U grading only.) — I, II, III. (I, II, III.)

290C. Research Group Conference (1)

Discussion—1 hour. Prerequisite: consent of instructor. Weekly conference on research problems, progress and techniques in wildlife and fishery sciences. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

291. Seminar in Aquatic Ecology (2)

Seminar—2 hours. Prerequisite: graduate standing in biology. Presentation and analysis of assigned topics in aquatic ecology emphasizing fish, fisheries and aquatic conservation. Offered in alternate years. (S/U grading only.)—III. (III.) Moyle

292. Physiology of Fishes Seminar (1)

Seminar—1 hour. Prerequisite: graduate standing and at least two courses in physiology; consent of instructor. Seminar devoted to current topics concerning the physiological functioning of fishes. May be repeated two times for credit. Not offered every year. (S/U grading only.)—1. (I.)

294. Behavioral Ecology of Predators and Prey (3)

Seminar—2 hours. Prerequisite: graduate standing. Presentation and analysis of research papers on social and foraging behavior of predatory animals,

antipredator strategies of prey species, co-evolution of predators and prey, and ecology of predator prey interactions. May be repeated two times for credit. (Same course as Animal Behavior 294.) Offered in alternate years.—II. Caro

295. Seminar in Wildlife Ecotoxicology (3)

Seminar — 2 hours; term paper. Prerequisite: graduate standing in biology. Presentation and analysis of assigned and searched research papers on transport, exposure, and effects of environmental contam-inants on wildlife-associated ecosystem components, especially at individual/population levels. Specific subjects vary each offering. Offered in alternate years. (S/U grading only.)

297T. Supervised Teaching in Wildlife and Fisheries Biology (1-3)

Tutorial — 3–9 hours. Prerequisite: meet qualifications for teaching assistant; graduate standing; and consent of instructor. Tutoring and teaching students in undergraduate courses in Wildlife, Fish, and Conservation Biology. Weekly conferences with instructor; evaluations of teaching; preparing for and conducting demonstrations, laboratories, and discussions; preparing and grading examinations. May be repeated for a total of 6 units when a different course is tutored. (S/U grading only.)

298. Group Study (1-5) 299. Research (1-12)

(S/U grading only.)

Students transferring to UC Davis from another institution or new students declaring the major of Wild-life, Fish, and Conservation Biology must consult the Master Adviser so that their program can be evaluated and a faculty adviser assigned. Contact the Department in 1088 Academic Surge Building or telephone (530) 752-6586.

Wine Production

Food Science and Technology, on page 311; Microbiology, on page 417; and Viticulture and Enology, on page 526.

Women and Gender Studies

(College of Letters and Science) Amina Mama, Ph.D., Program Director Program Office, 2222 Hart Hall (530) 752-4686; http://wms.ucdavis.edu/wgssite/

Committee in Charge

Elizabeth Constable, Ph.D. (Women and Gender Studies)
Maxine Craig, Ph.D. (Women and Gender Studies)
Wendy Ho, Ph.D. (Asian American Studies, Women and Gender Studies)

Suad Joseph, Ph.D. (Anthropology, Women and Gender Studies) Susan Kaiser, Ph.D. (Textiles and Clothing, Women and Gender Studies)

Anna K. Kuhn, Ph.D. (Women and Gender Studies) Amina Mama, Ph.D (Women and Gender Studies) Luz Mena, Ph.D. (Women and Gender Studies) Kimberly D. Nettles-Barcelón, Ph.D.

(Women and Gender Studies) Margaret Swain, Ph.D. (Center for Gender and Global Issues, Women and Gender Studies)

Faculty

Elizabeth Constable, Ph.D., Associate Professor (Women and Gender Studies)

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Emeriti Faculty

Judith Newton, Ph.D., Professor Emerita Leslie Rabine, Ph.D., Professor Emerita

The Major Program

Women's Studies is an interdisciplinary major founded on the feminist theoretical premise that gender is a historically variable construction that centrally shapes the historical experience and everyday lives of women as well as men. Women's Studies also assumes that gender, race, class, sexual and national identities are constructed in relation to one another. The intersections of these categories of experience as well as the history of debate over what these categories mean is an important strand of the Women's Studies curriculum. Women's Studies at UC Davis is particularly rich in faculty doing comparative, cross-cultural work on women and gender. Among the faculty offering courses for the major are scholars working on women and gender in various countries across Africa, the Americas, Asia, the Caribbean, Europe, and the Middle East,

The Program. Perhaps the most exciting aspect of the Women's Studies major is that students can pursue their particular academic interests and design their course of study accordingly. In devising their program of study, students will draw on courses offered in African American and African Studies, American Studies, Anthropology, Asian American Studies, Chicana/o Studies, Comparative Literature, English, French, German and Italian Studies History, Linguistics, Native American Studies, Political Science, Psychology, Sociology, Spanish, Textiles and Clothing, and other related disciplines.

In addition to offering a broad array of courses that deal with gender, class, race, ethnicity, and sexuality, the Women and Gender Studies Program affords interested students the opportunity to earn internship credit and conduct independent research as well as take advantage of the Honors Thesis option.

Students design a program of study in consultation with an adviser that is in accordance with their individual career goals. Many Women's Studies majors find it advantageous to pursue a double major, or to minor in another field of study.

Career Alternatives. A degree in Women's Studies opens many possibilities for future employment. The major introduces students to relevant social issues, fosters critical thinking, and encourages social advocacy; it also hones their verbal and writing skills. It prepares students for entrance into graduate programs in the Humanities or Social Sciences.

Pre-professional students will discover that a major in Women's Studies offers useful preparatory training for medical or law school. It is particularly suitable for those interested in specializing in social or family-related issues. Students who plan to do practical work in counseling, clinical psychology, social services, or political science will also find Women's Studies to be a helpful undergraduate major. Those who wish to do graduate level research in such fields as anthropology, comparative literature, cultural studies, education, ethnic studies, film studies, history, languages and literatures, performance studies, philosophy, political science, and sociology will also benefit from a strong undergraduate background in women's history, feminist social theory,

and a feminist understanding of narrative and cultural representation.

Increasingly, corporations, colleges and universities, insurance companies, and personnel firms are hiring specialists in women and gender studies as consul-tants. Current state and federal agencies need people who have special understanding for the problems that women face in society, industry, and the professions. Educational institutions need specialists to develop and administer women and gender studies programs, women's centers, and other organizations designed specifically to study and assist women.

Women's Studies

A.B. Major Requirements:

UNITS

Two courses from Women's Studies 20, 50, Three courses selected from the following: African American and African Studies 10, 15, American Studies 1E, 1F, Anthropology 2, 20, 21, Art History 15, Asian American Studies 1, 2, Chicana/o Studies 10, 50, Classics 15, Comparative Literature 12, Dramatic Art 1, English 30A or 30B, 45, 46A or 46B or 46C, History 72A, 72B, Humanities 10, Native American Studies 1, 10, Nature and Culture 1, Political Science 7, Psychology 1, Science and Society 1, 15, Sociology 1, 2, 3, Textiles and Clothing 7, Women's Studies 8012

Preparatory Subject Matter.....20

Depth Subject Matter44

Women's Studies 103, 104, 190 and one additional upper division Women's Studies Cross-Cultural Requirement...... Choose four courses (at least one from each category). Courses used to meet this requirement may not duplicate those used to meet other Women's Studies major requirements. The list that follows represents a partial list of options; other courses may be included with the consent of the Women's Studies Adviser.

Ethnic Studies: Women of Color in the United States: African American and African Studies 123, 133, Anthropology 139, Asian American Studies 112 Chicana/o Studies 111, 122, 131, Native American Studies 134, 180, Sociolog 134, 172, Women's Studies 160, 180. Cultures Outside the United States: Anthropology 130A, Comparative Literature 135, 138, 159, English 185A, 185B, German 129, History 102G, 102H, 148A, 148B, Women's Studies 102, 182, 184

Historical Material Prior to 1900: African American and African Studies 123, Asian American Studies 112, English 185A, History 148A, 148B, Italian 141, Native American Studies 180.

Thematic. Courses used to meet this requirement may not duplicate those used to meet other Women's Studies major requirements.

Disciplinary track

Choose three courses from one of the following focus groups:

Anthropology focus: Anthropology 129, 130, 131, 134, 139, 148B, 158, Women's Studies 102, 182, 184. History focus: African American and African Studies 123, Asian American Studies 112, English 185A, History 102H, 102G, 110C, 116, 132, 148A, 148B, 159, 173, 176B, 177B, 184, 193A, Italian 141, Native American Studies 180. Literature and Language focus: Comparative Literature 135, 138, 159,

English 185A, 185B, French 133, German 129, Italian 141, Linguistics 163, Russian 142, Women's Studies 129. Sociology and Psychology focus: Anthropology 129, Chicana/o Studies 122, Psychology 149, Sociology 131, 132, 134, 145B, 172, Women's Studies

Thematic track

In consultation with a Women's Studies adviser, choose three courses that form a thematic cluster (for example, Gender and Race in the United States; The Cultural Representations of Gender; Gender and Public Policy; Gender and Global Issues; Gender and Autobiography; The Body, Theory and Representation; Sexualities; Gender and Science). Other clusters may be developed in consultation with a Women's Studies adviser.

Total units for the major64

Major Adviser. All Women's Studies majors and minors must consult with a faculty adviser, individually, at least once each academic year.

Minor Program Requirements:

UNITS

Women's Studies 24

Women's Studies 20, 50, 60, 70 or 80 4 Choose one from African American and African Studies 123, 133, Anthropology 139, Asian American Studies 112 Chicana/o Studies, 111, 122, 131, Native American Studies 134, 180, Sociology 134, 172, Women's Studies 160, 180.... Choose one from Anthropology 148B, Comparative Literature 135, 138, 159 English 185A, 185B, 129, History 102G, 102H, 148A, 148B, Women's Studies 102, 182, 184.. Additional Electives from approved list of upper division cross-listed and Women's Studies courses Note: With prior consultation with an adviser, other upper division courses may be accepted toward the minor program. Under no circumstances may more than one lower division course be offered in

satisfaction of requirements for the minor. Minor Adviser. All Women's Studies majors and minors must consult with a faculty adviser, individually, at least once each academic year.

Graduate Study. The Women and Gender Studies Program offers a designated emphasis in Feminist Theory and Research for students enrolled in the Ph.D. programs of twelve other affiliated depart-

Courses in Women's Studies (WMS) **Lower Division Courses**

20. Cultural Representations of Gender (4)

Lecture/discussion-4 hours. Prerequisite: one course specified for the Women's Studies major Interdisciplinary investigation of how specific cultures represent gender difference. Examine a variety of cultural forms and phenomena including film, television, literature, music, popular movements, and institutions. GE credit: ArtHum, Div, Wrt | ACGH, AH or SS, DD, VL, WC, WE.—III. (III.) Craig

25. Gender and Global Cinema (4)

Lecture - 3 hours; film viewing - 3 hours. The role gender plays in film history/culture in various geographical contexts and in aspects of contemporary globalization. Films from nations such as China, Colombia, Cuba, Ethiopia, India, Iran, Korea, New Zealand, and the U.S. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.—II. (II.) Constable, Kuhn

50. Introduction to Women and Gender Studies (4)

Lecture - 3 hours; discussion - 1 hour. Interdisciplinary introduction surveys and integrates anthropological, artistic, cultural studies, historical, legal, literary,

philosophical, psychological, scientific, and sociological perspectives on the study of gender and its relationship to race, sexuality, class, and other aspects of social experience. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, VL, WC, WE.-I, II, III. Ho, Kaplan, Kuhn, Mena, Nettles-Barcelón

60. Introduction to Feminist Interpretations of Western Thought (4)

Lecture/discussion—4 hours. A critical introduction to major traditions of social thinking in the West from a feminist perspective. Not offered every year. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.-Craig

70. Theory and History of Sexualities (4)

Lecture/discussion-4 hours. Key issues in the social construction, organization, and reproduction of sexualities such as the intersection of sexual identity with gender, race, ethnicity, and class, and the relation between movements for sexual liberation and the regulation of the body. GE credit: ArtHum or SocSci, Div | ACGH, AH or SS, DD, WE.—(I.)

80. Special Topics in Women's Studies (4)

Lecture/discussion-4 hours. In-depth examination of a women's studies topic related to the research interest of the instructor. May be repeated for credit when topic differs. Limited enrollment.—Constable, Ho, Joseph, Kaiser, Kuhn, Mena, Nettles-Barcelón, Swain

90X. Lower Division Seminar (2)

Seminar - 2 hours. Examination of a special topic in Women's Studies through shared readings, discussions, and written assignments. Offered in alternate years.—Constable, Joseph, Kaiser, Kaplan, Kuhn, Mena, Nettles-Barcelón, Swain

91. Research Seminar in the Transnational **Production and Consumption of Fashion**

Seminar—1-2 hours. Preparation for a research conference. May be repeated for credit when topic varies. - II. (II.) Kaiser

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)—Constable Ho, Joseph, Kaiser, Kaplan, Kuhn, Mena, Nettles-Barcelón, Swain

99. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)—Constable, Craig, Ho, Joseph, Kaiser, Kaplan, Kuhn, Mena, Nettles-Barcelón, Swain

Upper Division Courses 102. Colonialism, Nationalism, and Women (4)

Lecture/discussion-4 hours. Prerequisite: one course specified for Women's Studies major. Explores key dimensions of women's relationship to colonialism and nationalism in one or more societies. GE credit: SocSci, Div | AH or SS, WC, WE.-I. Mena, Swain

103. Introduction to Feminist Theory (4)

Lecture/discussion-4 hours. Prerequisite: one course specified for the Women's Studies major. Introduction to the emergence of feminist theory and to key concepts in feminist theorizing. Examination of past and current debates over sexuality, race, identity politics, and the social construction of women's experience. GE credit: ACGH, AH or SS, DD, WE.-I. (I.) Constable, Craig, Kuhn, Mena, Nettles-Barcelón

104. Feminist Approaches to Inquiry (4)

Lecture/discussion-4 hours. Prerequisite: one course specified for the Women's Studies major. Feminist applications and transformations of traditional disciplinary practices; current issues and methodologies in feminist interdisciplinary work. GE credit: ACGH, AH or SS, DD, WE.—II. (II.) Constable, Mena, Nettles-Barcelón

130. Feminism and the Politics of Family Change (4)

Lecture/discussion-4 hours. Prerequisite: any Women's Studies course or Sociology 131 or 132. An examination of contemporary conflicts over fam-

ily values and the changing family from a feminist perspective. Offered in alternate years. GE credit: . ArtHum or SocSci, Div | ACGH, AH or SS, DD, WE. - (II.) Joseph

136. Topics in Gender, Production, Consumption and Meaning (4)

Lecture/discussion-3 hours; term paper Construction of gender through production and consumption of goods and services. Transnational movement of peoples and products. Topics may include fashion, film, food, and technology. May be repeated for credit. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WC, WE.—Constable, Ho, Kaiser, Nettles-Barcelón

137. Feminist Interpretations of Contemporary Western Thought (4)

Lecture/discussion-4 hours. Prerequisite: one course in Women's Studies, or consent of instructor. Introduction to deciphering, demystifying, and interpreting poststructuralist, postmodern, and postcolonial thought from a feminist perspective: applications to gender, race, sexuality, and class. Not offered every year. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE

138. Transnational Studies of Dress, Fashion, and Gender (4)

Lecture/discussion-4 hours. Prerequisite: one course in Women's Studies or Textiles and Clothing 7, 107, or 174. Dress and fashion as cultural communication, aesthetic expression, capitalist commodity. History, sociology, semiotics of fashion. Fashion as means of gender oppression and liberation. Use of dress in identity construction across cultures. Clothing workers on the global assembly line. Not offered every year. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, VL, WC, WE.—Kaiser

139. Feminist Cultural Studies (4)

Lecture/discussion-4 hours. Prerequisite: one course in Women's Studies or American Studies. The histories, theories, and practices of feminist traditions within Cultural Studies. (Same as course American Studies 139.) GE credit: SocSci, Div, Wrt | ACGH, AH or SS, DD, VL, WE. - (II.) Kaiser

140. Gender and Law (4)

Lecture/discussion-4 hours. Prerequisite: one course in Women's Studies. Exploration of women's legal rights in historical and contemporary context, discussing a variety of legal issues and applicable feminist theories. Topics include constitutional equal protection, discrimination in employment and education, sexual orientation discrimination, and the regulation of abortion. GE credit: SocSci, Div | ACGH, DD, SS.-(III.) West

158. Contemporary Masculinities (4)

Lecture/discussion-4 hours. Prerequisite: one course specified for the Women's Studies major. A multicultural study of contemporary trends in masculinity and the economic, social and political forces that have shaped them. Topics may include men's movements, ethnic nationalist masculinities, and images of masculinity in popular culture. GE credit: ArtHum or SocSci, Div | ACGH, AH or SS, DD, WE.—III. Craig, Ho

160. Representations of Women of Color in Cinema (4)

Lecture/discussion-3 hours; film viewing-3 hours. Prerequisite: course 20 or another film course. The representations of women of color in commercial and independent films from a feminist perspective. GE credit: ArtHum, Div | ACGH, AH, DD, VL. - (III.)

162. Feminist Film Theory and Criticism (4)

Lecture/discussion-3 hours; film-viewing-3 hours. Prerequisite: one course from the Women's Studies major and Humanities 10 or consent of instructor. Historical overview of and contemporary issues in feminist film theory, including representation, spectatorship, and cultural production. Film stars, women filmmakers, and the intersections of gender, race, sexuality, and class in films and their audiences. Offered in alternate years. GE credit: ArtHum, Div | ACGH, AH, DD, VL, WC, WE.—III. Constable

164. Topics in Gender and Cinematic Representation (4)

Lecture/discussion - 3 hours; film-viewing - 3 hours. Prerequisite: one course from the Women's Studies major and Humanities 10 or consent of instructor. Examination of a specific topic within the broad rubric of gender and cinema. Possible topics include Latinas in Hollywood; gender, nation, cinema; and gender and film genre. Topics vary. May be repeated two times for credit when topic differs. Offered in alternate years. GE credit: ArtHum, Div | AH, VL, WC, WE.—Constable, Kuhn

165. Feminist Media Production (6)

Lecture/discussion-3 hours; laboratory-3 hours; fieldwork-6 hours. Prerequisite: one course in Women and Gender Studies or consent of instructor. Basic media production and community service. Video, audio and photography instruction; feminist community documentary; video ethnography; video journals; alternative representations of fashion and women's bodies. Fundamentals of camera and microphone operation, interviewing techniques, and editing. May be repeated two times for credit if topic differs. Not offered every year. GE credit: ArtHum or SocSci, Div | ACGH, AH, DD, VL.

170. Queer Studies (4)

Lecture/discussion-4 hours. Prerequisite: course 20, or 50, or 70, or consent of instructor. Study of queer sexualities, identities, theories, practices Alternative sexualities as historical, social, and cultural constructions in intersections with race, gender, class, nationality. Interdisciplinary exploration of sexual liberation and the regulation of sexuality through history, theory and expressive cultural forms. Not offered every year. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.

178A-F. Transnationalism and Writing by Women of Color (4)

Lecture/discussion-4 hours. Prerequisite: one course in Women's Studies, or consent of instructor. Writings by women of color in a transnational framework, understood in their cultural, socio-economic, and historical contexts. The interrelation among gender, writing, nationalism, and transnationalism, with focus on women's writing in specific geographic/ national locations and their diasporas: (A) The Arab World; (B) Asia; (C) The Caribbean; (D) Africa; (E) Diasporic Women Writers in Europe; (F) Topics on Women Writers of Color. Not offered every year. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—Constable, Ho, Joseph, Kuhn, Mena, Nettles-Barcelón

179. Gender and Literature (4)

Lecture/discussion-4 hours. Prerequisite: one course in Women's Studies, or consent of instructor. Role of literature, especially novels, in constructing, challenging, and transforming normative genders in society. Transhistorical and transnational focus on gender in its intersections with race, class, sexuality, and politics. Not offered every year. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—Constable, Ho,

180. Women of Color Writing in the United States (4)

Lecture/discussion—4 hours. Prerequisite: course 20 or 50. Literature, especially novels, written by contemporary women of color in the United States, understood in their socio-economic, cultural and historical contexts. GE credit: ArtHum, Div | ACGH, AH, DD, WE.-II. Ho, Nettles-Barcelón, Kuhn

182. Globalization, Gender and Identity (4)

Lecture/discussion-4 hours. Prerequisite: course 50. Feminist theories on affects of gender on self and identity and cross cultural study as it intersects gender with race, class, ethnicity. Impact of globalization processes on gender and identity. Offered in alternate years. GE credit: SocSci, Div, Wrt | AH or SS, WC, WE.—III. Mama, Mena, Swain

184. Gender in the Arab World (4)

Lecture/discussion-4 hours. Prerequisite: course 50. Examination of the history, culture, and social/ political/economic dynamics of gender relations and gendering in the Arab world. GE credit: SocSci, Div, Wrt | SS, WC, WE.-II. Joseph

185. Women and Islamic Discourses (4)

Lecture/discussion-4 hours. Prerequisite: course 50 or comparable course. Introduction to the debates discourses about women and Islam. Transformations in debates/discourses in colonial and postcolonial periods in the Middle East & South Asia. Comparative study of debates/discourses on family, work law, sexuality, religion, comportment, human rights, feminist and religious movements. Not offered every year. (Same course as Middle East/South Asia Studies 150.) GE credit: AH or SS, WC.-Joseph

187. Gender and Social Policy (4)

Lecture/discussion-3 hours; term paper. Prerequisite: upper division standing and a course in Women's Studies. The role of gender in the creation of social policies, especially with respect to issues brought into the policy arena by contemporary feminism. Offered in alternate years. GE credit: SocSci, Div | ACGH, DD, SS, WE. - (III.) Craig, Nettles-Barcelón

189. Special Topics in Women and Gender

Lecture/discussion-4 hours. Prerequisite: one course from the Women's Studies major. In-depth examination of a women's studies topic related to the research interests of the instructor. May be repeated one time for credit when topic differs. Not offered every year. GE credit: ACGH, AH or SS, DD, WE.—I. Constable, Craig, Ho, Joseph, Kaiser, Kuhn, Mama, Mena, Nettles-Barcelón, Swain

190. Senior Seminar (4)

Seminar-4 hours. Prerequisite: senior standing in Women's Studies. Capstone course for senior Women's Studies majors, which focuses on current issues on feminism as they impact theory, public policy, and practice. GE credit: ACGH, AH or SS, DD.-III. (III.) Constable, Craig, Ho, Joseph, Kaiser, Kuhn, Mama, Mena, Nettles-Barcelón, Swain

191. Capstone Seminar (4)

Seminar-4 hours. Prerequisite: course 104 or Textiles and clothing 107, and course 194HA, course 199, or Textiles and Clothing 199, or consent of instructor. Revision, completion, and presentation of senior research or creative project. Creating a multimedia Web site for publishing research and creative projects. GE credit: Wrt | ACGH, AH or SS, DD, WE.—III. (III.) Kaiser

192. Internship in Women's Studies (1-12)

Internship—3-36 hours; written report. Prerequisite: completion of a minimum of 84 units and consent of instructor; enrollment dependent on availability of intern positions with priority to Women's Studies majors. Supervised internship and study in positions/institutional settings dealing with genderrelated problems or issues, as for example, a women's center, affirmative action office, advertising agency, or social welfare agency. Final written report on internship experience. (P/NP grading only.)—Constable, Craig, Ho, Joseph, Kaiser, Kaplan, Kuhn, Mena, Nettles-Barcelón, Swain

193. Gender and Global Issues Internship Seminar (2)

Seminar-2 hours. Prerequisite: course 192 concurrently. The ethics of working in communities and community projects, emphasizing feminist understandings of activism, communities, globalization, multiculturalism, and the politics of institutions, agencies, and organizations. May be repeated for credit. (P/NP grading only.) GE credit: ACGH, AH or SS, DD, WC, WE.—I, II, III. (I, II, III.) Swain

194HA-194HB. Senior Honors Project in Women's Studies (4-6)

Independent study—12 hours. Prerequisite: senior standing, Women's Studies major, and adviser's approval. In consultation with an adviser, students complete a substantial research paper or significant creative project on a Women's Studies topic. (Deferred grading only, pending completion of sequence.) GE credit: AH or SS, WE.-Constable, Craig, Ho, Joseph, Kaiser, Kaplan, Kuhn, Mama, Mena, Nettles-Barcelón, Swain

195. Thematic Seminar in Women's Studies (4)

Seminar-4 hours. Prerequisite: two courses specified for women's studies major. Group study of a topic, issue or area in feminist theory and research involving intensive reading and writing. May be repeated for credit when topic differs. Limited enrollment. GE credit: ArtHum or SocSci, Div | ACGH AH or SS, DD, WE.—III. Constable, Ho, Joseph, Kaiser, Kuhn, Mama, Mena, Nettles-Barcelón, Swain

197T. Tutoring in Women's Studies (1-4)

Tutoring - 3-12 hours. Prerequisite: upper division standing and consent of director. Leading small, voluntary discussion groups affiliated with a Women's Studies course. May be repeated for credit for a total of 8 units. (P/NP grading only.)

198. Directed Group Study (1-5)

Prerequisite: upper division standing; consent of instructor. (P/NP grading only.)—Constable, Joseph, Kaiser, Kaplan, Kuhn, Mena, Nettles-Barcelón,

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: upper division standing; consent of instructor. (P/NP grading only.)—Constable, Joseph, Kaiser, Kaplan, Kuhn, Mena, Nettles-Barcelón,

Graduate Courses

200A. Current Issues in Feminist Theory (4)

Seminar-4 hours. Current issues in feminist theory; techniques employed to build feminist theory in various fields. — I. (I.) Constable, Craig, Ho, Joseph, Kaiser, Kuhn, Mama, Mena, Nettles-Barcelón, Swain

200B. Problems in Feminist Research (4)

Seminar-4 hours. Prerequisite: course 200A with a grade of B+ or better. Application of feminist theoretical perspectives to the interdisciplinary investigation of a problem or question chosen by the instructor(s). May be repeated for credit when subject area differs.—II. (II.) Constable, Craig, Mama, Mena, Nettles-Barcelón

201. Special Topics in Feminist Theory and Research (4)

Lecture/discussion-4 hours. Explores in depth a topic in feminist theory and research related to the research interests of the instructor. May be repeated for credit when topic differs. Limited enrollment.-(III.) Constable, Craig, Ho, Joseph, Kaiser, Kuhn, Mama, Mena, Nettles-Barcelón, Swain

250. Cultural Study of Masculinities (4)

Seminar-3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Interdisciplinary approaches to understanding the social and cultural construction of masculinities; attention to the effects of biology, gender, race, class, sexual and national identities; criticism of oral, printed, visual, and mass mediated texts, and of social relations and structures. (Same course as American Studies 250.) -Craig, Ho

299. Special Study for Graduate Students (1-12)

(S/U grading only.)—Constable, Craig, Ho, Joseph, Kaiser, Kaplan, Kuhn, Mena, Nettles-Barcelón,

299D. Dissertation Research and Writing

Prerequisite: courses 200A and 200B; fulfillment of course requirements for the DE in Feminist Theory and Research, advancement to candidacy. (S/U grading only.)—Constable, Ho, Joseph, Kaiser, Kaplan, Kuhn, Mena, Nettles-Barcelón, Swain

Professional Course

396. Teaching Assistant Training Practicum (1-4)

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.) Constable, Craig, Ho, Joseph, Kaiser, Kuhn, Mama, Mena, Nettles-Barcelón, Swain

536 Zoology

Zoology

See Evolution and Ecology, on page 305.



GENERAL EDUCATION OPTIONS/COURSES

NEW GENERAL EDUCATION COURSES; FALL 2011 AND ON

The following section pertains to students who matriculated to UC Davis for the first time in Fall 2011 or later. Students who matriculated prior to Fall 2011 should refer to the Former General Education Courses; Pre-Fall 2011, on page 560.

For the most up-to-date General Education courses, use the GE search tool at http://registrar4.ucdavis.edu/courses/GE_courses/.

TOPICAL BREADTH

These courses satisfy the GE requirement for Topical Breadth.

Arts & Humanities	Art History 153	Art Studio 152E	Classics 3
(AH)	Art History 156	Art Studio 152F	Classics 10
(An)	Art History 163A	Art Studio 152G	Classics 15
Afr Am & Afr Std 12 †	Art History 163B	Art Studio 171	Classics 20
Afr Am & Afr Std 15	Art History 163C Art History 163D	Art Studio 190 Asian American Studies 1 †	Classics 25 Classics 30
Afr Am & Afr Std 16	Art History 164	Asian American Studies 1 † Asian American Studies 2 †	Classics 30 Classics 31
Afr Am & Afr Std 18 †	Art History 168	Asian American Studies 4	Classics 50
Afr Am & Afr Std 50 Afr Am & Afr Std 51	Art History 172A	Asian American Studies 100 †	Classics 101A
Afr Am & Afr Std 51 Afr Am & Afr Std 52	Art History 172B	Asian American Studies 112 †	Classics 101B
Afr Am & Afr Std 100	Art History 173	Asian American Studies 113 †	Classics 101C
Afr Am & Afr Std 107C †	Art History 175	Asian American Studies 116 †	Classics 101D
Afr Am & Afr Std 111 †	Art History 176A Art History 176B	Asian American Studies 121	Classics 102 Classics 110
Afr Am & Afr Std 152	Art History 1766 Art History 176C	Asian American Studies 130 Asian American Studies 141 †	Classics 110 Classics 120
Afr Am & Afr Std 153	Art History 177A	Asian American Studies 150B †	Classics 125
Afr Am & Afr Std 156 Afr Am & Afr Std 157	Art History 177B	Asian American Studies 150C †	Classics 140
Afr Am & Afr Std 157 Afr Am & Afr Std 162	Art History 178A	Asian American Studies 150D †	Classics 141
Afr Am & Afr Std 163	Art History 178B	Asian American Studies 150E †	Classics 142
Afr Am & Afr Std 168	Art History 178C	Asian American Studies 150F †	Classics 143
Afr Am & Afr Std 169	Art History 179B	Asian American Studies 189B †	Classics 150 Classics 171
Afr Am & Afr Std 170	Art History 182 Art History 183A	Asian American Studies 189E † Asian American Studies 189H †	Classics 171 Classics 172A
Afr Am & Afr Std 171	Art History 183B	Asian American Studies 1891 †	Classics 172A Classics 172B
Afr Am & Afr Std 175A	Art History 183C	Chicano Studies 10 †	Classics 173
Afr Am & Afr Std 175B Afr Am & Afr Std 177 †	Art History 183D	Chicano Studies 23 †	Classics 174
Afr Am & Afr Std 177	Art History 184	Chicano Studies 50	Classics 175
Afr Am & Afr Std 185	Art History 185	Chicano Studies 60	Classics 190
American Studies 1B †	Art History 186	Chicano Studies 65	Classics 194HA
American Studies 1C †	Art History 187	Chicano Studies 70 Chicano Studies 73	Classics 194HB Communication 5 †
American Studies 1E †	Art History 188A Art History 188B	Chicano Studies 75 Chicano Studies 150 †	Comparative Literature 1
American Studies 5 † American Studies 10 †	Art History 188D	Chicano Studies 154	Comparative Literature 2
American Studies 10 American Studies 21	Art History 189	Chicano Studies 155	Comparative Literature 3
American Studies 25 †	Art History 190F	Chicano Studies 156	Comparative Literature 4
American Studies 30 †	Art History 190H	Chicano Studies 160	Comparative Literature 5
American Studies 55 †	Art Studio 10	Chicano Studies 165	Comparative Literature 6
American Studies 59 †	Art Studio 24 Art Studio 30	Chicano Studies 170 Chicano Studies 171	Comparative Literature 7
American Studies 110 †	Art Studio 30 Art Studio 101	Chicano Studies 171 Chicano Studies 172	Comparative Literature 8 Comparative Literature 9
American Studies 120 †	Art Studio 101 Art Studio 102A	Chicano Studies 181 †	Comparative Literature 12
American Studies 130 † American Studies 151 †	Art Studio 102B	Chinese 10	Comparative Literature 13
American Studies 151 †	Art Studio 102C	Chinese 11	Comparative Literature 14
American Studies 153 †	Art Studio 103A	Chinese 50	Comparative Literature 20
American Studies 154 †	Art Studio 103B	Chinese 100A	Comparative Literature 24
American Studies 155 †	Art Studio 105A Art Studio 105B	Chinese 101 Chinese 102	Comparative Literature 25 Comparative Literature 53A
American Studies 156 †	Art Studio 103B	Chinese 102 Chinese 103	Comparative Literature 53A Comparative Literature 53B
American Studies 157 †	Art Studio 110B	Chinese 104	Comparative Literature 53C
American Studies 158 Anthropology 20 †	Art Studio 111A	Chinese 105	Comparative Literature 100
Anthropology 30 †	Art Studio 111B	Chinese 106	Comparative Literature 110
Anthropology 124	Art Studio 112	Chinese 107	Comparative Literature 120
Anthropology 134 †	Art Studio 113	Chinese 108	Comparative Literature 135
Anthropology 145 †	Art Studio 114A Art Studio 114B	Chinese 109A Chinese 109C	Comparative Literature 138 Comparative Literature 139
Arabic 1	Art Studio 1146 Art Studio 114C	Chinese 109D	Comparative Literature 139 Comparative Literature 140
Arabic 1A Arabic 2	Art Studio 117	Chinese 109E	Comparative Literature 141
Arabic 2 Arabic 3	Art Studio 121	Chinese 109G	Comparative Literature 142
Arabic 3	Art Studio 125A	Chinese 109H	Comparative Literature 144
Arabic 22	Art Studio 125B	Chinese 109I	Comparative Literature 145
Arabic 23	Art Studio 125C	Chinese 110	Comparative Literature 146
Arabic 121	Art Studio 125D Art Studio 129	Chinese 111 Chinese 111A	Comparative Literature 147 Comparative Literature 148
Arabic 122	Art Studio 129 Art Studio 138	Chinese 111A Chinese 112	Comparative Literature 170 Comparative Literature 151
Arabic 123 Art History 1A	Art Studio 142A	Chinese 113	Comparative Literature 152
Art History 1A Art History 1B	Art Studio 142B	Chinese 114	Comparative Literature 152S
Art History 1C	Art Studio 143A	Chinese 115	Comparative Literature 153
Art History 1D	Art Studio 143B	Chinese 116	Comparative Literature 154
Art History 1DV	Art Studio 147	Chinese 120	Comparative Literature 155
Art History 1E	Art Studio 148	Chinese 130 Chinese 131	Comparative Literature 156
Art History 10	Art Studio 149 Art Studio 150	Chinese 131 Chinese 132	Comparative Literature 157 Comparative Literature 158
Art History 25	Art Studio 150 Art Studio 151	Chinese 140	Comparative Literature 159
Art History 110 Art History 150	Art Studio 152A	Chinese 150	Comparative Literature 160A
Art History 150 Art History 151	Art Studio 152B	Chinese 160	Comparative Literature 160B
Art History 152	Art Studio 152C	Classics 1	Comparative Literature 161A
,	Art Studio 152D	Classics 2	Comparative Literature 161B
* This course may not be used to satisfy	 a college or university composition 	n requirement and GE writing experience simultar	neously.

[#] Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

Comparative Literature 163	English 122	French 125	History 4C †
Comparative Literature 164A	English 123	French 127	History 6 †
Comparative Literature 164B	English 125	French 130	History 7A †
Comparative Literature 164C	English 130	French 133	History 7B †
Comparative Literature 164D	English 133	French 140	History 7C †
Comparative Literature 165	English 137N	French 141	History 8 †
Comparative Literature 165S	English 138	French 160 †	History 9A †
Comparative Literature 166	English 139	French 161 †	History 9B †
Comparative Literature 166A	English 142	French 162 †	History 10A †
Comparative Literature 166B	English 143	French 194H	History 10B †
Comparative Literature 167	English 144	French 195H	History 10C †
Comparative Literature 168A	English 146N	German 1	History 11
Comparative Literature 168B	English 147	German 2	History 15 †
Comparative Literature 169	English 149	German 3	History 17A †
Comparative Literature 170	English 150A	German 6	History 17B †
Comparative Literature 180	English 150B	German 10	History 72A †
Comparative Literature 180S	English 153	German 20	History 72B †
Comparative Literature 194H	English 155A	German 21	History 85 †
Design 1	English 155B English 155C	German 22 German 40	History 102S †
Design 13 Design 14	English 156	German 45	History 109A † History 110 †
Design 15	English 158A	German 48	History 110A
Design 16	English 158B	German 101A	History 111A †
Design 21	English 159	German 101B	History 111B †
Design 40A	English 160	German 103	History 111C †
Design 40B	English 161A	German 104	History 112A †
Design 50	English 161B	German 105	History 112B †
Design 77	English 162	German 112	History 113 †
Design 107	English 164	German 113	History 115A †
Design 113	English 165	German 114	History 115B †
Design 115	English 166	German 115	History 115C †
Design 116	English 167	German 116	History 115D †
Design 117	English 168	German 117	History 115E †
Design 131	English 171A	German 118A	History 115F †
Design 132A	English 171B	German 118B	History 116 †
Design 134B	English 173	German 118E	History 121A †
Design 135A	English 175	German 119	History 121B †
Design 135B	English 177	German 120	History 121C †
Design 144	English 178	German 121	History 122 †
Design 150A	English 179	German 122	History 125 †
Design 150B	English 180	German 123	History 130A †
Design 151	English 181A	German 124	History 130B †
Design 154	English 181B	German 125	History 130C †
Design 150	English 182 English 183	German 126 German 127	History 131A †
Design 159 Design 160	English 184	German 129	History 131B † History 131C †
Design 177	English 185A	German 131	History 132 †
Design 180A	English 185B	German 132	History 133 †
Design 180B	English 186	German 133	History 134A †
Design 185	English 189	German 134	History 135A †
Design 186	English 194H	German 141	History 135B †
Design 187	English 195H	German 142	History 136 †
Dramatic Art 1	Entomology 1 †	German 143	History 138A †
Dramatic Art 20	Film Studies 1	German 168	History 138B †
Dramatic Art 144 †	Film Studies 45	German 176A	History 138C †
Dramatic Art 144B †	Film Studies 120	German 185	History 139A †
Dramatic Art 144C	Film Studies 121	Greek 1	History 139B †
Dramatic Art 155	Film Studies 121S	Greek 2	History 140 †
Dramatic Art 155B	Film Studies 124	Greek 2NT	History 141 †
Dramatic Art 156AN	Film Studies 125	Greek 3	History 142A †
Dramatic Art 156CN	Film Studies 127 Film Studies 142	Greek 3NT Greek 100	History 142B †
Dramatic Art 156CN	Film Studies 176A		History 1444 †
Dramatic Art 156D Education 147	Film Studies 176A Film Studies 176B	Greek 101 Greek 102	History 144A † History 144B †
Education 152 †	Film Studies 170B	Greek 102 Greek 103A	History 145 †
English 3	Film Studies 195H	Greek 103B	History 146A †
English 4	Film Studies 196H	Greek 104	History 146B †
English 5F	French 21	Greek 105	History 147A †
English 5P	French 22	Greek 111	History 147B †
English 10A	French 23	Greek 112	History 147C †
English 10B	French 50	Greek 113	History 148A †
English 10C	French 51	Greek 114	History 148B †
English 30A	French 52	Greek 115	History 148C †
English 30B	French 53	Greek 116	History 149 †
English 40	French 100	Greek 121	History 151A †
English 42	French 101	Greek 130	History 151B †
English 43	French 102	Hebrew 1	History 151C †
English 44	French 107A	Hebrew 1A	History 151D †
English 45	French 107B	Hebrew 2	History 159 †
English 46A	French 115	Hebrew 3	History 160 †
English 46B	French 116	Hebrew 100AN	History 162 †
English 46C English 105	French 117A French 117B	Hebrew 100BN Hebrew 100CN	History 163A †
English 105 English 106	French 118A	Hindi/Urdu 1	History 163B † History 164 †
English 100 English 107	French 118B	Hindi/Urdu 2	History 165 †
English 110A	French 119A	Hindi/Urdu 3	History 166A †
English 110A	French 119B	Hindi/Urdu 21	History 166B †
English 111	French 119C	Hindi/Urdu 22	History 167 †
English 113A	French 120	Hindi/Urdu 23	History 168 †
English 113B	French 121	History 3 †	History 169A †
English 115	French 122	History 4A †	History 169B †
English 117	French 124	History 4B †	History 170A †
* This source may not be used to estich a	H	at and CE visiting avancianas simultanas val	

^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth. # Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

History 170B †	Italian 150	Music 17C	Philosophy 117
History 170C †	Italian 190X	Music 24A	Philosophy 118
History 171A †	Italian 194H	Music 24B	Philosophy 119
History 171B †	Italian 195H	Music 24C	Philosophy 120
History 171BF †	Japanese 10	Music 28	Philosophy 123
History 171D †	Japanese 15S	Music 98	Philosophy 125
History 172 †	Japanese 50	Music 99	Philosophy 128
History 173 †	Japanese 98	Music 101A	Philosophy 131
History 174A †	Japanese 101	Music 101B	Philosophy 134
History 174B †	Japanese 102	Music 102	Philosophy 135
History 174C †	Japanese 103	Music 103	Philosophy 137A
History 174D †	Japanese 104	Music 105	Philosophy 137B
History 175 †	Japanese 105	Music 106	Philosophy 137C
History 176A †	Japanese 106	Music 107A	Philosophy 141
History 176B †	Japanese 107	Music 107B	Philosophy 143
History 177A †	Japanese 108	Music 108A	Philosophy 145
History 177B †	Japanese 109	Music 108B	Philosophy 151
History 178A †			
	Japanese 131	Music 110A	Philosophy 156
History 178B †	Japanese 132	Music 110B	Philosophy 157
History 179 †	Japanese 133	Music 110C	Philosophy 160
History 180AN †	Japanese 134	Music 110D	Philosophy 161
History 180BN †	Japanese 135	Music 110E	Philosophy 162
History 181 †	Japanese 136	Music 110F	Philosophy 168
History 182 †	Japanese 152	Music 110G	Philosophy 170
History 183A †	Japanese 156	Music 113	Philosophy 172
History 183B †	Japanese 198	Music 114	Philosophy 174
History 184 †	Japanese 199	Music 115	Philosophy 175
History 185A †	Jewish Studies 101	Music 121	Philosophy 178
History 185B †	Jewish Studies 110	Music 122	Philosophy 189A
History 189 †	Jewish Studies 111	Music 124A	Philosophy 189B
History 190A †	Jewish Studies 112	Music 124B	Philosophy 189D
History 190B †	Jewish Studies 120	Music 126	Philosophy 189E
History 190C †	Landscape Architecture 1 †	Music 127	Philosophy 189F
History 190D †	Landscape Architecture 30	Music 129A	Philosophy 189G
History 191A †	Latin 1	Music 129B	Philosophy 189H
History 191B †	Latin 2	Music 129C	Philosophy 189I †
History 191C †	Latin 3	Music 129D	Philosophy 189J
History 191D †	Latin 101	Music 132	Philosophy 189K
History 191E †	Latin 102	Music 141	Political Science 4 †
History 191F †	Latin 103	Music 142	Political Science 51 †
History 193A †	Latin 104	Music 143	Political Science 112 †
History 193B †	Latin 105	Music 144	Political Science 113 †
History 193D †	Latin 106	Music 145	Political Science 114 †
History 194A †	Latin 108	Music 146	Political Science 115 †
History 194B †	Latin 109	Music 147	Political Science 116 †
History 194C †	Latin 110	Music 148	Political Science 118A †
History 194D †	Latin 112	Music 149	Political Science 118B †
History 194E †	Latin 115	Music 192	Political Science 118C †
History 195B †	Latin 116	Music 194HA	Political Science 119 †
History 196A †	Latin 118	Music 194HB	Portuguese 100
History 196B †	Latin 119	Music 195	Portuguese 159
Humanities 1	Latin 120	Music 198	Portuguese 161
Humanities 1D	Latin 121	Music 199	Portuguese 162
Humanities 2A	Latin 125	Native American Studies 5	Portuguese 163
Humanities 3 †	Latin 130	Native American Studies 10 †	Portuguese 198
Humanities 4	Linguistics 1 †	Native American Studies 12 †	Religious Studies 1
Humanities 4D	Linguistics 5 †	Native American Studies 34	Religious Studies 1A
Humanities 7	Linguistics 103A	Native American Studies 108 †	Religious Studies 1B
Humanities 8	Linguistics 103B	Native American Studies 133B †	Religious Studies 1C
Humanities 9	Linguistics 106	Native American Studies 135 †	Religious Studies 1D
Humanities 9D	Linguistics 100 Linguistics 111	Native American Studies 157	Religious Studies 1E †
Humanities 13	Linguistics 121	Native American Studies 180 †	Religious Studies 1F
Humanities 15 †	Linguistics 131	Native American Studies 181A	Religious Studies 1G
Humanities 18	Linguistics 141	Native American Studies 181B	Religious Studies 1H
Humanities 60	Linguistics 150 †	Native American Studies 184 †	Religious Studies 10A
Humanities 144	Linguistics 151	Native American Studies 185	Religious Studies 11
Humanities 180	Linguistics 152	Native American Studies 188	Religious Studies 12
Integrated Studies 8B	Medieval Studies 20A	Native American Studies 192	Religious Studies 21
Italian 50	Medieval Studies 20B	Philosophy 1	Religious Studies 23
Italian 101	Medieval Studies 130A	Philosophy 11	Religious Studies 30
Italian 101S	Medieval Studies 130B	Philosophy 12	Religious Studies 40
Italian 104	Middle East/S. Asian Std 100 †	Philosophy 14	Religious Studies 60
Italian 104S	Middle East/S. Asian Std 180 †	Philosophy 15	Religious Studies 65C
Italian 105	Middle East/S. Asian Std 181A †	Philosophy 16	Religious Studies 67 †
Italian 105S	Music 2A	Philosophy 21	Religious Studies 68
Italian 107 †	Music 2B	Philosophy 24	Religious Studies 69
Italian 1075 †	Music 2C	Philosophy 30 †	Religious Studies 80
Italian 108 †	Music 3A	Philosophy 31 †	Religious Studies 90 †
Italian 108S †	Music 3B	Philosophy 32 †	Religious Studies 100 †
Italian 112	Music 6A	Philosophy 38 †	Religious Studies 102
	Music 6B	Philosophy 101	Religious Studies 102 Religious Studies 103
Italian 113			
Italian 114	Music 6C	Philosophy 102	Religious Studies 105
Italian 119	Music 7A	Philosophy 103	Religious Studies 106
Italian 120B	Music 7B	Philosophy 105	Religious Studies 110
Italian 121	Music 7C	Philosophy 107 †	Religious Studies 115
Italian 121S	Music 10	Philosophy 108 †	Religious Studies 120
Italian 131	Music 11	Philosophy 109 †	Religious Studies 122
Italian 139B	Music 16 Music 16A	Philosophy 111	Religious Studies 125
Italian 140	Music 16B	Philosophy 112	Religious Studies 131 †
Italian 142	Music 16C	Philosophy 113	Religious Studies 132
Italian 145	Music 17A	Philosophy 115	Religious Studies 134 †
		Philosophy 116	Religious Studies 140
	Music L/R		
Italian 145S	Music 17B college or university composition requireme	1 ,	U

^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth. # Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

Religious Studies 141A	Spanish 182	Animal Science 1	Atmospheric Science 5
Religious Studies 141B	Spanish 194H	Animal Science 2	Atmospheric Science 6
Religious Studies 141C	Spanish 198	Animal Science 15	Atmospheric Science 10
Religious Studies 145	Spanish 199	Animal Science 18	Atmospheric Science 30
Religious Studies 150	Technocultural Studies 1	Animal Science 21	Atmospheric Science 60
Religious Studies 156	Technocultural Studies 2	Animal Science 22A	Atmospheric Science 110
Religious Studies 157	Technocultural Studies 4	Animal Science 22B	Atmospheric Science 111
Religious Studies 160	Technocultural Studies 5 †	Animal Science 41	Atmospheric Science 111L
Religious Studies 161	Technocultural Studies 6	Animal Science 41L	Atmospheric Science 115
Religious Studies 162	Technocultural Studies 155	Animal Science 42	Atmospheric Science 116
Religious Studies 170	Technocultural Studies 158	Animal Science 103	Atmospheric Science 120
Religious Studies 175A	Textiles & Clothing 7 †	Animal Science 104	Atmospheric Science 121A
Russian 1	University Writing Program 1	Animal Science 106	Atmospheric Science 121B
Russian 2	University Writing Program 11	Animal Science 112 †	Atmospheric Science 124
Russian 3	University Writing Program 18	Animal Science 115	Atmospheric Science 128
Russian 4	University Writing Program 19	Animal Science 118	Atmospheric Science 133
Russian 5	University Writing Program 98	Animal Science 119	Atmospheric Science 149
Russian 6	University Writing Program 99	Animal Science 120	Atmospheric Science 150
Russian 45	University Writing Program 101	Animal Science 120L	Atmospheric Science 158
Russian 101A	University Writing Program 102A	Animal Science 123	Atmospheric Science 160
Russian 101B	University Writing Program 102B	Animal Science 124	Avian Sciences 11
Russian 101C	University Writing Program 102C	Animal Science 125	Avian Sciences 13
Russian 102	University Writing Program 102D	Animal Science 126	Avian Sciences 14L
Russian 105	University Writing Program 102E	Animal Science 127	Avian Sciences 15L
Russian 122	University Writing Program 102F	Animal Science 128	Avian Sciences 16LA
Russian 123	University Writing Program 102G	Animal Science 129	Avian Sciences 16LB
Russian 124	University Writing Program 102H	Animal Science 131	Avian Sciences 16LC
Russian 126	University Writing Program 102I	Animal Science 136A	Avian Sciences 100
Russian 128	University Writing Program 102J	Animal Science 136B	Avian Sciences 103
Russian 129	University Writing Program 102K	Animal Science 137	Avian Sciences 115
Russian 130	University Writing Program 102L	Animal Science 140	Avian Sciences 121
Russian 139	University Writing Program 104A	Animal Science 142	Avian Sciences 123
Russian 140	University Writing Program 104B	Animal Science 143	Avian Sciences 149
Russian 141	University Writing Program 104C	Animal Science 144	Avian Sciences 150
Russian 142	University Writing Program 104D	Animal Science 145	Avian Sciences 160
Russian 150	University Writing Program 104E	Animal Science 146	Avian Sciences 170
Russian 192	University Writing Program 104F	Animal Science 147	Biological Sciences 2A
Science & Tech Studies 130A †	University Writing Program 104I	Animal Science 149	Biological Sciences 2B
Science & Tech Studies 130B †	University Writing Program 104T	Animal Science 194HA	Biological Sciences 2C
Science & Tech Studies 131 †	University Writing Program 111A	Animal Science 194HB	Biological Sciences 10V
Science & Tech Studies 164	University Writing Program 111B	Animal Science 194HC	Biological Sciences 101
Science & Tech Studies 173	University Writing Program 111C	Anthropology 1	Biological Sciences 102
Science and Society 40 †	University Writing Program 112A	Anthropology 3	Biological Sciences 102Q
Science and Society 42 †	University Writing Program 192	Anthropology 5	Biological Sciences 103
Spanish 100	University Writing Program 197T	Anthropology 13	Biological Sciences 104
Spanish 100S	University Writing Program 197TC	Anthropology 15	Biological Sciences 105
Spanish 115 †	University Writing Program 198	Anthropology 50 Anthropology 54	Biological Sciences 122
Spanish 115S † Spanish 130	University Writing Program 199 Women's Studies 20 †	Anthropology 132	Biological Sciences 122P Biological Sciences 124
Spanish 131N	Women's Studies 25	Anthropology 152 Anthropology 151	Biological Sciences 132
Spanish 132	Women's Studies 50 †	Anthropology 152	Biological Sciences 133
Spanish 133N	Women's Studies 60 †	Anthropology 153	Biological Sciences 134
Spanish 134A	Women's Studies 70 †	Anthropology 154A	Biological Sciences 181
Spanish 134B	Women's Studies 102 †	Anthropology 154BN	Biological Sciences 183
Spanish 135N	Women's Studies 103 †	Anthropology 154C	Biological Sciences 194H
Spanish 136N	Women's Studies 104 †	Anthropology 154CL	Biotechnology 1
Spanish 137N	Women's Studies 130 †	Anthropology 156A	Biotechnology 150
Spanish 138N	Women's Studies 136 †	Anthropology 156B	Biotechnology 160
Spanish 139	Women's Studies 137 †	Anthropology 157	Biotechnology 161A
Spanish 140N	Women's Studies 138 †	Anthropology 157L	Biotechnology 161B
Spanish 141	Women's Studies 139 †	Anthropology 159	Biotechnology 171
Spanish 141S	Women's Studies 158 †	Anthropology 160	Biotechnology 188
Spanish 142	Women's Studies 160	Anthropology 180	Biotechnology 194H
Spanish 143	Women's Studies 162	Anthropology 181	Chemistry 2A
Spanish 144	Women's Studies 164	Anthropology 182	Chemistry 2B
Spanish 147	Women's Studies 165	Anthropology 183	Chemistry 2C
Spanish 148	Women's Studies 170 †	Applied Biological System Tech 15	Chemistry 10
Spanish 148S	Women's Studies 178A	Applied Biological System Tech 16	Chemistry 105
Spanish 149	Women's Studies 178B	Applied Biological System Tech 17	Chemistry 110A
Spanish 150N Spanish 151	Women's Studies 178C Women's Studies 178D	Applied Biological System Tech 49 Applied Biological System Tech 52	Chemistry 115 Chemistry 125
Spanish 151N	Women's Studies 178E	Applied Biological System Tech 98	Chemistry 150
Spanish 153	Women's Studies 178F	Applied Biological System Tech 99	Chicano Studies 40
Spanish 154	Women's Studies 178F Women's Studies 179	Applied Biological System Tech 101	Chicano Studies 40S
Spanish 155	Women's Studies 180	Applied Biological System Tech 110L	Chicano Studies 140A
Spanish 156	Women's Studies 182 †	Applied Biological System Tech 121	Ecology 201
Spanish 157	Women's Studies 185 †	Applied Biological System Tech 142	Engineering 1
Spanish 158	Women's Studies 189 †	Applied Biological System Tech 150	Engineering 4
Spanish 159	Women's Studies 190 †	Applied Biological System Tech 150	Engineering 6
Spanish 159S	Women's Studies 191 †	Applied Biological System Tech 163	Engineering 7
Spanish 160	Women's Studies 193 †	Applied Biological System Tech 165	Engineering 10 †
Spanish 170	Women's Studies 194HA †	Applied Biological System Tech 181N	Engineering 17
Spanish 170S	Women's Studies 194HB †	Applied Biological System Tech 182	Engineering 35
Spanish 171	Women's Studies 195 †	Applied Biological System Tech 190C	Engineering 45
Spanish 171S		Applied Biological System Tech 192	Engineering 100
Spanish 172	Science & Engineering	Applied Biological System Tech 197T	Engineering 102
Spanish 173	(SE)	Applied Biological System Tech 198	Engineering 103
Spanish 174	/1	Applied Biological System Tech 199	Engineering 104
Spanish 175	Animal Genetics 101	Astronomy 10G	Engineering 104L
Spanish 176	Animal Genetics 105	Astronomy 10L	Engineering 105
Spanish 180 †	Animal Genetics 107	Astronomy 10S	Engineering 106 †
Spanish 181	Animal Genetics 111	Astronomy 25	Engineering 111
* This source many not be used to estick, a	and the contract of the contra	ant and CE visiting avantianan simultananus	

^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth.

Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

Explanation 123				
Engineering 180	Engineering 121	Engineering Biomedical 161L	Engr: Civil & Environ 189B	Engineering Electrical & Compu 132A
Engineering 180	Engineering 122	Engineering Biomedical 161S	Engr: Civil & Environ 189C	Engineering Electrical & Compu 132B
Engineering 1889				
Engenemy decognes Sci 130 Enginemy decognes Sci				
Engineering Averages 5-1125				
Engineering Accorption Sci 126 Engineering Remembed 1896 Engineering Remembed 18				
Engineering Averages Sci 130. Fingeneering Memode Sci 130. Fingeneering Memode Sci 130. Fingeneering Memode 180. Finge				
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Engineering Autonome Sci 13 Engineering Binnendeck 100A Prige Cell de Francis 1950 Engineering Autonome Sci 13 Engineering Autonome Sci 13 Engineering Autonome Sci 13 Engineering Autonome Sci 13 Engineering Autonome Sci 13 Engineering Autonome Sci 13 Engineering Autonome Sci 13 Engineering Autonome Sci 13 Engineering Autonome Sci 13 Engineering Autonome Sci 13 Engineering Autonome Sci 14 Engin	Engineering Aerospace Sci 130A	Engineering Biomedical 189B	Engr: Civil & Environ 189I	Engineering Electrical & Compu 140A
Engineering Autonome Sci 13 Engineering Binnendeck 100A Prige Cell de Francis 1950 Engineering Autonome Sci 13 Engineering Autonome Sci 13 Engineering Autonome Sci 13 Engineering Autonome Sci 13 Engineering Autonome Sci 13 Engineering Autonome Sci 13 Engineering Autonome Sci 13 Engineering Autonome Sci 13 Engineering Autonome Sci 13 Engineering Autonome Sci 13 Engineering Autonome Sci 14 Engin	Engineering Aerospace Sci 130B	Engineering Biomedical 189C	Engr: Civil & Environ 189]	Engineering Electrical & Compu 140B
Figurering Armopace Sci 155 Figurering Bomochical 1022 Figurering Armopace Sci 156 Figurering Armopace Sci 156 Figurering Armopace Sci 157 Fig				
Figurency Security Acceptance Sci 188 Figurency Employed Sci 2008 Figurency Employed S				
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* This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously.		6		0 0

^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth. # Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

Microbiology 162

Microbiology 170

Microbiology 191

Hydrologic Science 143

Hydrologic Science 144

Food Science & Technology 128

Food Science & Technology 131

Engineering Mechanical 185A Engineering Mechanical 185B Engineering Mechanical 189B

Entomology 1 †

Entomology 2

Entomology 10

Entomology 102 Entomology 105

Entomology 107

Entomology 109

Entomology 110

Entomology 116

Entomology 117 Entomology 153

Entomology 156

Entomology 156L

Environmental Horticulture 1

Environmental Horticulture 6

Environmental Horticulture 100 Environmental Horticulture 101

Environmental Horticulture 102

Environmental Horticulture 105

Environmental Horticulture 120

Environmental Horticulture 125

Environmental Horticulture 129

Environmental Horticulture 130 Environmental Horticulture 133

Environmental Horticulture 150

Environmental Horticulture 160

Environmental Horticulture 160L

Environ Science & Policy 30

Environ Science & Policy 100

Environ Science & Policy 110

Environ Science & Policy 111

Environ Science & Policy 121

Environ Science & Policy 123

Environ Science & Policy 124

Environ Science & Policy 127

Environ Science & Policy 150A

Environ Science & Policy 150B Environ Science & Policy 150C

Environ Science & Policy 151 Environ Science & Policy 151L

Environ Science & Policy 152

Environ Science & Policy 155

Environ Science & Policy 155L

Environ Science & Policy 163 † Environ Science & Policy 170 †

Environ Science & Policy 179L

Environ Science & Policy 190

Environ Science & Policy 191A

Environ Science & Policy 191B Environmental Toxicology 10 Environmental Toxicology 20

Environmental Toxicology 30

Environmental Toxicology 92

Environmental Toxicology 99

Environmental Toxicology 101

Environmental Toxicology 102A Environmental Toxicology 102B

Environmental Toxicology 103A

Environmental Toxicology 103B

Environmental Toxicology 104

Environmental Toxicology 110

Environmental Toxicology 111 Environmental Toxicology 120

Environmental Toxicology 127

Environmental Toxicology 128

Environmental Toxicology 130

Environmental Toxicology 131

Environmental Toxicology 135 Environmental Toxicology 138

Environmental Toxicology 146

Environmental Toxicology 190

Environmental Toxicology 190C

Environ Science & Policy 116N

^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously.

[†] Also assigned to another area of topical breadth.

Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

Molecular and Cellular Biology 10	Physics 98	Plant Science 180	Viticulture & Enology 125
Molecular and Cellular Biology 99	Physics 99	Plant Science 188	Viticulture & Enology 125L
Molecular and Cellular Biology 120L	Physics 102	Plant Science 190	Viticulture & Enology 126
Molecular and Cellular Biology 121	Physics 104B	Plant Science 194H	Viticulture & Enology 126L
Molecular and Cellular Biology 123 Molecular and Cellular Biology 124	Physics 105A Physics 105B	Plant Science 196 Political Science 51 †	Viticulture & Enology 128 Viticulture & Enology 128L
Molecular and Cellular Biology 126	Physics 105C	Political Science 114 †	Viticulture & Enology 125E Viticulture & Enology 135
Molecular and Cellular Biology 138	Physics 108	Science & Tech Studies 130A †	Viticulture & Enology 140
Molecular and Cellular Biology 140L	Physics 108L	Science & Tech Studies 130B †	Viticulture & Enology 181
Molecular and Cellular Biology 142	Physics 110A	Science & Tech Studies 131 †	Viticulture & Enology 190X
Molecular and Cellular Biology 143	Physics 110B	Science and Society 1 †	Viticulture & Enology 192
Molecular and Cellular Biology 144	Physics 110C	Science and Society 2 †	Viticulture & Enology 199
Molecular and Cellular Biology 145	Physics 112	Science and Society 3 †	Wild, Fish & Conserv Biol 10
Molecular and Cellular Biology 148	Physics 115A	Science and Society 4 †	Wild, Fish & Conserv Biol 11
Molecular and Cellular Biology 150	Physics 115B	Science and Society 5 †	Wild, Fish & Conserv Biol 50
Molecular and Cellular Biology 158	Physics 116A	Science and Society 7 †	Wild, Fish & Conserv Biol 100
Molecular and Cellular Biology 160L	Physics 116B Physics 116C	Science and Society 8 †	Wild, Fish & Conserv Biol 101 Wild, Fish & Conserv Biol 102L
Molecular and Cellular Biology 162 Molecular and Cellular Biology 163	Physics 122A	Science and Society 9 † Science and Society 10 †	Wild, Fish & Conserv Biol 102L Wild, Fish & Conserv Biol 111
Molecular and Cellular Biology 165 Molecular and Cellular Biology 164	Physics 122B	Science and Society 11 †	Wild, Fish & Conserv Biol 121
Molecular and Cellular Biology 178	Physics 122 Physics 123	Science and Society 12 †	Wild, Fish & Conserv Biol 130
Molecular and Cellular Biology 182	Physics 129A	Science and Society 13 †	Wild, Fish & Conserv Biol 141
Molecular and Cellular Biology 190C	Physics 129B	Science and Society 15 †	Wild, Fish & Conserv Biol 153
Molecular and Cellular Biology 191	Physics 130A	Science and Society 18 †	Wild, Fish & Conserv Biol 154
Molecular and Cellular Biology 192	Physics 130B	Science and Society 20 †	Wild, Fish & Conserv Biol 155
Molecular and Cellular Biology 193	Physics 140A	Science and Society 25 †	Wild, Fish & Conserv Biol 156
Molecular and Cellular Biology 194H	Physics 140B	Science and Society 25V	Wild, Fish & Conserv Biol 157
Molecular and Cellular Biology 197T	Physics 150	Science and Society 30 †	Wild, Fish & Conserv Biol 195
Molecular and Cellular Biology 198	Physics 151 Physics 152	Science and Society 40 † Science and Society 42 †	Social Sciences (SS)
Molecular and Cellular Biology 199 Native American Studies 108 †	Physics 152 Physics 153	Science and Society 70A †	
Native American Studies 110B	Physics 154	Science and Society 120 †	Afr Am & Afr Std 10
Nematology 10V	Physics 155	Science and Society 135S †	Afr Am & Afr Std 12 †
Nematology 100	Physics 156	Soil Science 10	Afr Am & Afr Std 17
Nematology 110	Physics 157	Soil Science 100	Afr Am & Afr Std 18†
Neuro, Physio & Behavior 14	Physics 160	Soil Science 102	Afr Am & Afr Std 107C † Afr Am & Afr Std 110
Neuro, Physio & Behavior 101	Physics 190	Soil Science 105	Afr Am & Afr Std 110
Neuro, Physio & Behavior 139	Physics 194HA	Soil Science 107	Afr Am & Afr Std 123
Neuro, Physio & Behavior 159	Physics 194HB	Soil Science 109	Afr Am & Afr Std 130
Neuro, Physio & Behavior 161	Physics 195	Soil Science 111	Afr Am & Afr Std 133
Nutrition 10 Nutrition 11	Physics 197T Physics 198	Soil Science 112 Soil Science 118	Afr Am & Afr Std 145A
Nutrition 99	Physics 199	Soil Science 120	Afr Am & Afr Std 145B
Nutrition 104	Plant Biology 102	Statistics 10	Afr Am & Afr Std 165
Nutrition 105	Plant Biology 105	Statistics 12	Afr Am & Afr Std 172
Nutrition 111AV	Plant Biology 112	Statistics 13	Afr Am & Afr Std 176
Nutrition 112	Plant Biology 119	Statistics 13V	Afr Am & Afr Std 177 † Afr Am & Afr Std 180
Nutrition 114	Plant Biology 143 †	Statistics 32	Agricult & Res Econ 1
Nutrition 116A	Plant Pathology 148	Statistics 100	Agricult & Res Econ 1S
Nutrition 116AL	Plant Science 1	Statistics 102	Agricult & Res Econ 15
Nutrition 116B	Plant Science 2	Statistics 103	Agricult & Res Econ 18
Nutrition 116BL Nutrition 117	Plant Science 5 Plant Science 12 †	Statistics 104 Statistics 106	Agricult & Res Econ 98
Nutrition 118	Plant Science 14	Statistics 100	Agricult & Res Econ 99
Nutrition 120AN †	Plant Science 15	Statistics 120	Agricult & Res Econ 100A
Nutrition 120BN †	Plant Science 21	Statistics 130A	Agricult & Res Econ 100B
Nutrition 122	Plant Science 49	Statistics 130B	Agricult & Res Econ 106
Nutrition 123	Plant Science 100A	Statistics 131A	Agricult & Res Econ 112 Agricult & Res Econ 113
Nutrition 124	Plant Science 100AL	Statistics 131B	Agricult & Res Econ 115 Agricult & Res Econ 115A
Nutrition 127	Plant Science 100B	Statistics 131C	Agricult & Res Econ 115B
Nutrition 129	Plant Science 100BL	Statistics 133	Agricult & Res Econ 120
Nutrition 130	Plant Science 100C Plant Science 100CL	Statistics 135	Agricult & Res Econ 120S
Nutrition 190 Nutrition 190C	Plant Science 100CL Plant Science 101	Statistics 137 Statistics 138	Agricult & Res Econ 121
Nutrition 199	Plant Science 102	Statistics 136 Statistics 141	Agricult & Res Econ 130
Philosophy 13 †	Plant Science 105	Statistics 142	Agricult & Res Econ 132
Philosophy 30 †	Plant Science 112	Statistics 144	Agricult & Res Econ 135
Philosophy 31 †	Plant Science 113	Statistics 145	Agricult & Res Econ 136
Philosophy 32 †	Plant Science 114	Statistics 194HA	Agricult & Res Econ 138 Agricult & Res Econ 139
Philosophy 38 †	Plant Science 130	Statistics 194HB	Agricult & Res Econ 159 Agricult & Res Econ 140
Philosophy 107 †	Plant Science 131	Technocultural Studies 5 †	Agricult & Res Econ 142
Philosophy 108 †	Plant Science 140	Textiles & Clothing 6	Agricult & Res Econ 143
Philosophy 1891 † Physics 1A	Plant Science 141 † Plant Science 144	Textiles & Clothing 162 Textiles & Clothing 162L	Agricult & Res Econ 144
Physics 1B	Plant Science 147	Textiles & Clothing 162L	Agricult & Res Econ 145
Physics 7A	Plant Science 147L	Textiles & Clothing 163L	Agricult & Res Econ 146
Physics 7B	Plant Science 150	Textiles & Clothing 165	Agricult & Res Econ 147
Physics 7C	Plant Science 152	Textiles & Clothing 171	Agricult & Res Econ 147M Agricult & Res Econ 150
Physics 9A	Plant Science 153	Viticulture & Enology 2	Agricult & Res Econ 150 Agricult & Res Econ 155
Physics 9B	Plant Science 154	Viticulture & Enology 3 †	Agricult & Res Econ 156
Physics 9C	Plant Science 157	Viticulture & Enology 101A	Agricult & Res Econ 150 Agricult & Res Econ 157
Physics 9D	Plant Science 158	Viticulture & Enology 101B	Agricult & Res Econ 171A
Physics 9HA Physics 9HB	Plant Science 160 Plant Science 162	Viticulture & Enology 101C Viticulture & Enology 110	Agricult & Res Econ 171B
Physics 9HC	Plant Science 170A	Viticulture & Enology 110 Viticulture & Enology 111	Agricult & Res Econ 175
Physics 9HD	Plant Science 170B	Viticulture & Enology 111 Viticulture & Enology 111L	Agricult & Res Econ 176
Physics 9HE	Plant Science 171	Viticulture & Enology 115	Agricult & Res Econ 190
Physics 10	Plant Science 172	Viticulture & Enology 118	Agricult & Res Econ 192
Physics 12	Plant Science 173	Viticulture & Enology 123	Agricult & Res Econ 194HA Agricult & Res Econ 194HB
Physics 30	Plant Science 174	Viticulture & Enology 123L	Agricult & Res Econ 19471B
Physics 49	Plant Science 176	Viticulture & Enology 124	Agricult & Res Econ 198
Physics 90X	Plant Science 178	Viticulture & Enology 124L	-

^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth. # Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

Agricult & Res Econ 199	Asian American Studies 141 †	Economics 111A	History 112C
American Studies 1B †	Asian American Studies 150	Economics 111B	History 113 †
American Studies 1C †	Asian American Studies 150B †	Economics 162	History 115A †
American Studies 1E †	Asian American Studies 150C †	Education 81	History 115B †
American Studies 5 †	Asian American Studies 150D †	Education 100	History 115C †
American Studies 10 †	Asian American Studies 150E†	Education 110	History 115D †
American Studies 25 †	Asian American Studies 150F †	Education 115	History 115E †
American Studies 30 †	Asian American Studies 155	Education 119	History 115F †
	Asian American Studies 189A		
American Studies 55 †		Education 120	History 116 †
American Studies 59 †	Asian American Studies 189B †	Education 122	History 120
American Studies 110 †	Asian American Studies 189C	Education 130	History 121A †
American Studies 120 †	Asian American Studies 189D	Education 142	History 121B †
American Studies 130 †	Asian American Studies 189E †	Education 150	History 121C †
American Studies 139	Asian American Studies 189F	Education 152 †	History 122 †
American Studies 151 †	Asian American Studies 189G	Education 173	History 125 †
American Studies 152 †	Asian American Studies 189H †	Education 181	History 130A †
American Studies 153 †	Asian American Studies 189I †	Education 183	History 130B †
American Studies 154 †	Chicano Studies 10 †	Engineering 10 †	History 130C †
American Studies 155 †	Chicano Studies 23 †	Engineering 106 †	History 131A †
American Studies 156 †	Chicano Studies 30	Engineering 188	History 131B †
American Studies 157 †	Chicano Studies 100	Engineering 190	History 131C †
Animal Science 112 †	Chicano Studies 110	Engr: Chemical 80 †	History 132 †
Animal Science 141	Chicano Studies 111	Engr: Chemical 158A †	History 133 †
Animal Science 148	Chicano Studies 112	Engr: Chemical 161C †	History 134A †
Animal Science 170	Chicano Studies 120	Engr: Civil & Environ 123 †	History 135A †
Anthropology 2	Chicano Studies 121	Engr: Civil & Environ 137 †	History 135B †
Anthropology 4	Chicano Studies 122	Engr: Civil & Environ 155 †	History 136 †
Anthropology 20 †	Chicano Studies 122S	Engr: Civil & Environ 163 †	History 138A †
Anthropology 23	Chicano Studies 123	Engr: Civil & Environ 165 †	History 138B †
Anthropology 24	Chicano Studies 125S	Engr: Computer Science 188	History 138C †
Anthropology 30 †	Chicano Studies 130	Entomology 1 †	History 139A †
Anthropology 32	Chicano Studies 131	Environmental Sci & Management 8 †	History 139B †
Anthropology 34	Chicano Studies 131S	Environmental Sci & Management 195 †	History 140 †
Anthropology 100	Chicano Studies 150 †	Environ Science & Policy 1 †	History 141 †
Anthropology 101	Chicano Studies 181 †	Environ Science & Policy 10 †	History 142A †
Anthropology 103	Chicano Studies 182	Environ Science & Policy 101	History 142B †
Anthropology 104N	Communication 3	Environ Science & Policy 105	History 143 †
Anthropology 105	Communication 5 †	Environ Science & Policy 160	History 144A †
Anthropology 109	Communication 101	Environ Science & Policy 161	History 144B †
Anthropology 110	Communication 102	Environ Science & Policy 162	History 145 †
Anthropology 117	Communication 103	Environ Science & Policy 163 †	History 146A †
Anthropology 120	Communication 105	Environ Science & Policy 164	History 146B †
Anthropology 121	Communication 134	Environ Science & Policy 167	History 147A †
Anthropology 122A	Communication 135	Environ Science & Policy 168A	History 147B †
Anthropology 122B	Communication 136	Environ Science & Policy 168B	History 147C †
Anthropology 123AN	Communication 137	Environ Science & Policy 169	History 148A †
Anthropology 125A	Communication 138		
		Environ Science & Policy 170 †	History 148B †
Anthropology 125B	Communication 139	Environ Science & Policy 171	History 148C †
Anthropology 126A	Communication 140	Environ Science & Policy 172	History 149 †
Anthropology 126B	Communication 141	Environ Science & Policy 173	History 151A †
Anthropology 127	Communication 142	Environ Science & Policy 175	History 151B †
Anthropology 128A	Communication 143	Environ Science & Policy 178	History 151C †
Anthropology 128B	Communication 144	Environ Science & Policy 179	History 151D †
Anthropology 129	Communication 146	Exercise Biology 102	History 159 †
Anthropology 130A	Communication 152	Exercise Biology 120	History 160 †
Anthropology 130BN	Communication 161	Fiber And Polymer Science 110 †	History 162 †
Anthropology 134 †	Communication 165	Food Science & Technology 10 †	
			History 163A †
Anthropology 136	Communication 170	French 109	History 163B †
Anthropology 138	Communication 172	French 160 †	History 164 †
Anthropology 139AN	Communication 180	French 161 †	History 165 †
Anthropology 139BN	Communication 189A	French 162 †	History 166A †
Anthropology 140A	Communication 189B	Geology 81	History 166B †
Anthropology 140B	Communication 189C	Geology 181	History 167 †
Anthropology 141B	Communication 189D	Geology 183	History 168 †
Anthropology 142	Communication 194H	History 3 †	History 169A †
Anthropology 143A	Comm & Reg Develpmnt 1	History 4A †	History 169B †
Anthropology 144	Comm & Reg Develpmnt 2	History 4B †	History 170A †
Anthropology 145 †			
	Comm & Reg Develpmnt 20	History 4C †	History 170B †
Anthropology 146N	Comm & Reg Develpmnt 118	History 6 †	History 170C †
Anthropology 148A	Comm & Reg Develpmnt 140	History 7A †	History 171A †
Anthropology 149A	Comm & Reg Develpmnt 141	History 7B †	History 171B †
Anthropology 149B	Comm & Reg Develpmnt 142	History 7C †	History 171BF †
Anthropology 170	Comm & Reg Develpmnt 147	History 8 †	History 171D †
Anthropology 172	Comm & Reg Develpmnt 149	History 9A †	History 172 †
Anthropology 173	Comm & Reg Develpmnt 151	History 9B †	History 173 †
Anthropology 174	Comm & Reg Develpmnt 152	History 10A †	History 174A †
Anthropology 175	Comm & Reg Develpmnt 153A	History 10B †	History 174B †
Anthropology 176	Comm & Reg Develpmnt 153B	History 10C †	History 174C †
Anthropology 177	Comm & Reg Develpmnt 153C	History 15 †	History 174D †
Anthropology 178	Comm & Reg Develpmnt 154	History 17A †	History 175 †
Anthropology 184	Comm & Reg Develpmnt 156	History 17B †	History 176A †
Asian American Studies 1 †	Comm & Reg Develpmnt 157	History 72A †	History 176B †
Asian American Studies 2 †	Comm & Reg Develpmnt 164	History 72B †	History 177A †
Asian American Studies 3	Comm & Reg Develpmnt 176	History 85 †	History 177B †
Asian American Studies 100 †	Comm & Reg Develpmnt 180	History 102S †	History 178A †
Asian American Studies 112 †	Consumer Sciences 100	History 109A †	History 178B †
Asian American Studies 113 †	Dramatic Art 144 †	History 110 †	History 179 †
Asian American Studies 114	Dramatic Art 144B †	History 111A †	History 180AN †
Asian American Studies 115	Economics 1A	History 111B †	History 180BN †
Asian American Studies 116 †	Economics 1B	History 111C †	History 181 †
Asian American Studies 131	Economics 110A	History 112A †	History 182 †
Asian American Studies 132	Economics 110B	History 112B †	History 183A †
* This source may not be used to estich a	college or university composition requireme	nt and CE veriting avanciance simultaneousl	.,

^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth. # Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

II: 102D ÷	DL:1l 17	D-lisi1 C-i 104HD	C:-1120
History 183B †	Philosophy 17	Political Science 194HB	Sociology 138
History 184 †	Philosophy 104 Philosophy 109 †	Political Science 195	Sociology 139 Sociology 140
History 185A †		Political Science 196A Political Science 196B	
History 185B † History 188	Plant Biology 143 † Plant Science 12 †	Political Science 1966 Political Science 196C	Sociology 141 Sociology 143A
History 189 †	Plant Science 141 †	Political Science 196D	Sociology 143B
History 190A †	Political Science 1	Political Science 196E	Sociology 144
History 190A †	Political Science 2	Psychology 1	Sociology 145A
History 190C †	Political Science 3	Psychology 142	Sociology 145B
History 191A †	Political Science 4 †	Psychology 155	Sociology 146
History 1918 †	Political Science 5	Psychology 158	Sociology 147
History 191C †	Political Science 7	Psychology 162	Sociology 148
History 191D †	Political Science 51 †	Psychology 168	Sociology 149
History 191E †	Political Science 100	Psychology 175	Sociology 150
History 191F †	Political Science 102	Psychology 185	Sociology 151
History 193A †	Political Science 104	Religious Studies 1E †	Sociology 152
History 193B †	Political Science 105	Religious Studies 67 †	Sociology 153
History 193D †	Political Science 106	Religious Studies 90 †	Sociology 154
History 194A †	Political Science 107	Religious Studies 100 †	Sociology 155
History 194B †	Political Science 108	Religious Studies 131 †	Sociology 156
History 194C †	Political Science 109	Religious Studies 134 †	Sociology 157
History 194D †	Political Science 110	Science & Tech Studies 1	Sociology 158
History 194E †	Political Science 112 †	Science & Tech Studies 20	Sociology 159
History 195B †	Political Science 113 †	Science & Tech Studies 32	Sociology 160
History 196A †	Political Science 114 †	Science & Tech Studies 98	Sociology 170
History 196B †	Political Science 115 †	Science & Tech Studies 108	Sociology 171
Human Development 12	Political Science 116 †	Science & Tech Studies 109	Sociology 172
Human Development 102	Political Science 117	Science & Tech Studies 121	Sociology 173
Human Development 103	Political Science 118A †	Science & Tech Studies 129	Sociology 174
Human Development 120	Political Science 118B †	Science & Tech Studies 150	Sociology 175
Human Development 161	Political Science 118C †	Science & Tech Studies 161	Sociology 176
Humanities 3 †	Political Science 119 †	Science & Tech Studies 163	Sociology 180A
Humanities 15 †	Political Science 120	Science & Tech Studies 165	Sociology 180B
Hydrologic Science 10 †	Political Science 121	Science & Tech Studies 175	Sociology 181
Hydrologic Science 150	Political Science 122	Science & Tech Studies 176	Sociology 183
Integrated Studies 8C	Political Science 123	Science & Tech Studies 180	Sociology 185
International Agricultural Dev 10	Political Science 124	Science and Society 1 †	Sociology 188
International Agricultural Dev 103	Political Science 126	Science and Society 2 †	Sociology 189
International Relations 1	Political Science 129	Science and Society 3 †	Sociology 190X
International Relations 192	Political Science 130	Science and Society 4 †	Sociology 191
International Relations 194HA	Political Science 131	Science and Society 5 †	Sociology 193
International Relations 194HB	Political Science 132	Science and Society 7 †	Sociology 194HA
Italian 107 †	Political Science 135	Science and Society 8 †	Sociology 194HB
Italian 1075 †	Political Science 136	Science and Society 9 †	Sociology 195
Italian 108 †	Political Science 137	Science and Society 10 †	Spanish 111N
Italian 108S † Japanese 151	Political Science 140A Political Science 140B	Science and Society 11 †	Spanish 112N Spanish 113
Jewish Studies 10	Political Science 140C	Science and Society 12 † Science and Society 13 †	Spanish 114N
Jewish Studies 121	Political Science 142A	Science and Society 15 †	Spanish 115 †
Landscape Architecture 1 †	Political Science 142B	Science and Society 19 †	Spanish 1155 †
Landscape Architecture 2	Political Science 143A	Science and Society 20 †	Spanish 116
Landscape Architecture 3	Political Science 143B	Science and Society 25 †	Spanish 118
Landscape Architecture 180G	Political Science 144A	Science and Society 25V	Spanish 180 †
Landscape Architecture 180J	Political Science 144B	Science and Society 30 †	Textiles & Clothing 7 †
Landscape Architecture 180K	Political Science 146A	Science and Society 70A †	Textiles & Clothing 8
Linguistics 1 †	Political Science 146B	Science and Society 120 †	Textiles & Clothing 107
Linguistics 5 †	Political Science 147A	Science and Society 135S †	Textiles & Clothing 164
Linguistics 6	Political Science 147B	Sociology 1	Textiles & Clothing 173
Linguistics 150 †	Political Science 147C	Sociology 2	Textiles & Clothing 174
Linguistics 160	Political Science 147D	Sociology 3	Textiles & Clothing 180A
Linguistics 163	Political Science 148A	Sociology 4	Textiles & Clothing 180B
Linguistics 165	Political Science 148B	Sociology 5	Viticulture & Enology 3 †
Linguistics 166	Political Science 148C	Sociology 11	Washington Center 175
Linguistics 171	Political Science 150	Sociology 25	Washington Center 193
Linguistics 173	Political Science 151	Sociology 30A	Women's Studies 20 †
Linguistics 180	Political Science 152	Sociology 30B	Women's Studies 50 †
Linguistics 182	Political Science 153	Sociology 46A	Women's Studies 60 †
Med - Public Health Sciences 175W	Political Science 154	Sociology 46B	Women's Studies 70 †
Middle East/S. Asian Std 100 †	Political Science 155	Sociology 90X	Women's Studies 102 †
Middle East/S. Asian Std 180 †	Political Science 162	Sociology 100	Women's Studies 103 †
Middle East/S. Asian Std 181A †	Political Science 163	Sociology 102	Women's Studies 104 †
Native American Studies 1	Political Science 164	Sociology 103	Women's Studies 130 † Women's Studies 136 †
Native American Studies 10 † Native American Studies 12 †	Political Science 165 Political Science 166	Sociology 104 Sociology 106	Women's Studies 130 † Women's Studies 137 †
Native American Studies 12 † Native American Studies 110A	Political Science 168	Sociology 118	Women's Studies 137 †
Native American Studies 110A	Political Science 170	Sociology 120	Women's Studies 139 †
Native American Studies 110D	Political Science 170	Sociology 120	Women's Studies 140
Native American Studies 118	Political Science 172	Sociology 123	Women's Studies 158 †
Native American Studies 119	Political Science 174	Sociology 124	Women's Studies 170 †
Native American Studies 122	Political Science 175	Sociology 125	Women's Studies 182 †
Native American Studies 130A	Political Science 176	Sociology 126	Women's Studies 184
Native American Studies 130B	Political Science 179	Sociology 127	Women's Studies 185 †
Native American Studies 130C	Political Science 180	Sociology 128	Women's Studies 187
Native American Studies 133B †	Political Science 183	Sociology 129	Women's Studies 189 †
Native American Studies 135 †	Political Science 187	Sociology 130	Women's Studies 190 †
Native American Studies 146	Political Science 190	Sociology 131	Women's Studies 191 †
Native American Studies 180 †	Political Science 192A	Sociology 132	Women's Studies 193 †
Native American Studies 184 †	Political Science 192B	Sociology 133	Women's Studies 194HA †
Nutrition 120AN †	Political Science 193	Sociology 134	Women's Studies 194HB †
Nutrition 120BN †	Political Science 193W	Sociology 135	Women's Studies 195 †
Philosophy 13 †	Political Science 194HA	Sociology 137	

^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth. # Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

CORE LITERACIES

These courses satisfy the GE requirement for Core Literacies.

American Cultures,	Chicano Studies 120	History 180AN	Sociology 123
Governance, and	Chicano Studies 121 Chicano Studies 123	History 180BN History 181	Sociology 129 Sociology 130
History (ACGH)	Chicano Studies 123 Chicano Studies 130	History 182	Sociology 131
	Chicano Studies 131	History 183A	Sociology 132
Afr Am & Afr Std 10 Afr Am & Afr Std 15	Chicano Studies 132 Chicano Studies 140A	History 183B History 184	Sociology 134
Afr Am & Afr Std 19 Afr Am & Afr Std 50	Chicano Studies 150	History 188	Sociology 137 Sociology 138
Afr Am & Afr Std 100	Chicano Studies 154	History 189	Sociology 139
Afr Am & Afr Std 123 Afr Am & Afr Std 133	Chicano Studies 155	Human Development 12	Sociology 140
Afr Am & Afr Std 155	Chicano Studies 156 Chicano Studies 170	Human Development 103 Hydrologic Science 150	Sociology 149 Sociology 153
Afr Am & Afr Std 172	Chicano Studies 181	Landscape Architecture 2	Sociology 160
Agricult & Res Econ 120	Chicano Studies 182	Landscape Architecture 3	Sociology 172 Sociology 183
Agricult & Res Econ 146 Agricult & Res Econ 150	Classics 25 Communication 140	Landscape Architecture 30 Landscape Architecture 180G	Spanish 147
American Studies 1A	Communication 142	Landscape Architecture 180J	Spanish 174
American Studies 1B American Studies 1C	Communication 143 Communication 146	Linguistics 6 Linguistics 163	Spanish 176 Spanish 177
American Studies 1E American Studies 1E	Communication 170	Med - Public Health Sciences 175W	Technocultural Studies 155
American Studies 10	Comm & Reg Develpmnt 1	Music 28	Technocultural Studies 158
American Studies 21 American Studies 25	Comm & Reg Develpmnt 2 Comm & Reg Develpmnt 151	Music 105 Music 106	Technocultural Studies 159 Washington Center 175
American Studies 30	Comm & Reg Develpmnt 152	Music 110F	Women's Studies 20
American Studies 55	Comm & Reg Develpmnt 154	Music 126	Women's Studies 50
American Studies 59 American Studies 110	Comm & Reg Develpmnt 157 Comm & Reg Develpmnt 164	Native American Studies 1 Native American Studies 12	Women's Studies 60 Women's Studies 70
American Studies 120	Comm & Reg Develpmnt 176	Native American Studies 34	Women's Studies 103
American Studies 130	Dramatic Art 1	Native American Studies 108	Women's Studies 104
American Studies 139 American Studies 151	Economics 1A Economics 1B	Native American Studies 118 Native American Studies 119	Women's Studies 130 Women's Studies 136
American Studies 152	Economics 121B	Native American Studies 122	Women's Studies 137
American Studies 153	Education 100	Native American Studies 130A	Women's Studies 139
American Studies 154 American Studies 155	Education 120 Education 147	Native American Studies 130B Native American Studies 130C	Women's Studies 140 Women's Studies 158
American Studies 156	Engr: Civil & Environ 123	Native American Studies 146	Women's Studies 160
American Studies 157	Engr: Civil & Environ 137	Native American Studies 181A	Women's Studies 162
Anthropology 2 Anthropology 20	English 30A English 30B	Philosophy 16 Political Science 1	Women's Studies 165 Women's Studies 170
Anthropology 30	English 142	Political Science 5	Women's Studies 180
Anthropology 103 Anthropology 104N	English 143	Political Science 7	Women's Studies 187
Anthropology 120	English 144 English 146N	Political Science 100 Political Science 102	Women's Studies 189 Women's Studies 190
Anthropology 122A	English 147	Political Science 104	Women's Studies 191
Anthropology 139AN Anthropology 139BN	English 158A English 158B	Political Science 105 Political Science 106	Women's Studies 193 Women's Studies 195
Anthropology 141B	English 166	Political Science 107	
Anthropology 176	English 167	Political Science 108	Domestic Diversity
Art History 186 Art History 190H	English 168 English 175	Political Science 109 Political Science 113	(DD)
Asian American Studies 1	English 179	Political Science 130	Afr Am & Afr Std 10
Asian American Studies 2	English 181A	Political Science 150	Afr Am & Afr Std 15
Asian American Studies 3 Asian American Studies 4	English 181B English 182	Political Science 151 Political Science 152	Afr Am & Afr Std 50 Afr Am & Afr Std 51
Asian American Studies 100	Environ Science & Policy 172	Political Science 153	Afr Am & Afr Std 100
Asian American Studies 112 Asian American Studies 113	Film Studies 45 Film Studies 120	Political Science 155 Political Science 160	Afr Am & Afr Std 123
Asian American Studies 114	Film Studies 124	Political Science 162	Afr Am & Afr Std 130 Afr Am & Afr Std 133
Asian American Studies 115	German 45	Political Science 163	Afr Am & Afr Std 145B
Asian American Studies 116 Asian American Studies 121	German 117 History 17A	Political Science 164 Political Science 166	Afr Am & Afr Std 152 Afr Am & Afr Std 156
Asian American Studies 130	History 17B	Political Science 168	Afr Am & Afr Std 196
Asian American Studies 131	History 72A	Political Science 172	Afr Am & Afr Std 168
Asian American Studies 141 Asian American Studies 150	History 72B History 169B	Political Science 176 Political Science 180	Afr Am & Afr Std 169 Afr Am & Afr Std 170
Asian American Studies 150B	History 170A	Political Science 183	Afr Am & Afr Std 172
Asian American Studies 150C Asian American Studies 150D	History 170B History 170C	Political Science 192A Political Science 192B	Afr Am & Afr Std 175A
Asian American Studies 150E	History 171A	Political Science 195	Afr Am & Afr Std 175B Afr Am & Afr Std 181
Asian American Studies 150F	History 171B	Political Science 196A	Afr Am & Afr Std 185
Asian American Studies 155 Asian American Studies 189A	History 171D History 172	Psychology 158 Religious Studies 1	Agricult & Res Econ 150 American Studies 1A
Asian American Studies 189D	History 173	Religious Studies 23	American Studies 1B
Asian American Studies 189E	History 174A	Religious Studies 106	American Studies 1C
Asian American Studies 189I Chicano Studies 10	History 174B History 174C	Religious Studies 145 Science & Tech Studies 108	American Studies 1E American Studies 10
Chicano Studies 30	History 174D	Science & Tech Studies 150	American Studies 21
Chicano Studies 50	History 175	Sociology 1	American Studies 25
Chicano Studies 60 Chicano Studies 70	History 176A History 176B	Sociology 2 Sociology 3	American Studies 30 American Studies 55
Chicano Studies 73	History 177A	Sociology 4	American Studies 59 American Studies 59
Chicano Studies 100 Chicano Studies 110	History 177B History 178A	Sociology 5 Sociology 30A	American Studies 110
Chicano Studies 110 Chicano Studies 111	History 178A History 178B	Sociology 30A Sociology 30B	American Studies 120 American Studies 130
Chicano Studies 112	History 179	Sociology 102	American Studies 139
* This course may not be used to satisfy a † Also assigned to another area of topical		ment and GE writing experience simultaneous	ly.
# Credit for writing experience allowed if	co-course taken concurrently (see writing a	experience list).	

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American Studies 152	German 117	Sociology 160
American Studies 153	History 11	Sociology 172
American Studies 154	History 17A	Spanish 147
American Studies 155	History 17B	Spanish 174
American Studies 156	History 72A	Spanish 176
American Studies 157	History 72B	Spanish 177
Anthropology 2	History 169B	Technocultural Studies 155
Anthropology 20	History 170C	Women's Studies 20
Anthropology 30 Anthropology 103	History 171A History 171B	Women's Studies 50 Women's Studies 60
Anthropology 103 Anthropology 104N	History 173	Women's Studies 70
Anthropology 120	History 174A	Women's Studies 103
Anthropology 122A	History 174B	Women's Studies 104
Anthropology 139AN	History 174C	Women's Studies 130
Anthropology 139BN	History 176B	Women's Studies 136
Anthropology 141B	History 177A	Women's Studies 137
Anthropology 176	History 177B	Women's Studies 139
Art History 190H	History 178A	Women's Studies 140
Asian American Studies 1	History 178B	Women's Studies 158
Asian American Studies 2	History 179	Women's Studies 160
Asian American Studies 3	History 182	Women's Studies 162
Asian American Studies 4	History 184	Women's Studies 165
Asian American Studies 100	History 188	Women's Studies 170
Asian American Studies 112 Asian American Studies 113	History 189	Women's Studies 180 Women's Studies 187
Asian American Studies 113 Asian American Studies 114	Human Development 12 Human Development 103	Women's Studies 189
Asian American Studies 117 Asian American Studies 115	Landscape Architecture 180J	Women's Studies 190
Asian American Studies 116	Landscape Architecture 180K	Women's Studies 191
Asian American Studies 121	Landscape Architecture 181J	Women's Studies 193
Asian American Studies 130	Landscape Architecture 181K	Women's Studies 195
Asian American Studies 131	Linguistics 6	
Asian American Studies 141	Linguistics 163	Oral Skills (OL)
Asian American Studies 150	Music 28	Animal Science 18
Asian American Studies 150B	Music 105	Animal Science 18
Asian American Studies 150C	Music 110F	Animal Science 22A
Asian American Studies 150D	Music 126	Animal Science 22B
Asian American Studies 150E	Native American Studies 1	Animal Science 104
Asian American Studies 150F	Native American Studies 5	Animal Science 112
Asian American Studies 155	Native American Studies 10	Animal Science 123
Asian American Studies 189A Asian American Studies 189D	Native American Studies 12 Native American Studies 34	Animal Science 142
Asian American Studies 189E	Native American Studies 34 Native American Studies 108	Animal Science 144
Asian American Studies 1891	Native American Studies 106 Native American Studies 118	Animal Science 146
Chicano Studies 10	Native American Studies 122	Animal Science 148
Chicano Studies 30	Native American Studies 130A	Animal Science 194HA
Chicano Studies 50	Native American Studies 130B	Anthropology 5
Chicano Studies 60		Anthropology 13
	Native American Studies 130C Native American Studies 135	Anthropology 103
Chicano Studies 60	Native American Studies 130C	Anthropology 103 Anthropology 154CL
Chicano Studies 60 Chicano Studies 70 Chicano Studies 73 Chicano Studies 100	Native American Studies 130C Native American Studies 135	Anthropology 103 Anthropology 154CL Anthropology 158
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Chicano Studies 60 Chicano Studies 73 Chicano Studies 73 Chicano Studies 110 Chicano Studies 111 Chicano Studies 111 Chicano Studies 112 Chicano Studies 122 Chicano Studies 123 Chicano Studies 123 Chicano Studies 123 Chicano Studies 130 Chicano Studies 131 Chicano Studies 131 Chicano Studies 131 Chicano Studies 132 Chicano Studies 150 Chicano Studies 155 Chicano Studies 156 Chicano Studies 155 Chicano Studies 156 Chicano Studies 170 Chicano Studies 181 Commo Studies 182 Communication 103 Comm & Reg Develpmnt 1 Comm & Reg Develpmnt 1 Comm & Reg Develpmnt 147 Comm & Reg Develpmnt 151 Comm & Reg Develpmnt 151 Comm & Reg Develpmnt 154 Comm & Reg Develpmnt 154 Comm & Reg Develpmnt 176 Comm & Reg Develpmnt 176 Dramatic Art 155 Dramatic Art 15 Dramatic Art 15 Dramatic Art 150 Engr: Civil & Environ 123 English 179 English 181A English 181B Film Studies 45	Native American Studies 130C Native American Studies 146 Native American Studies 180 Native American Studies 1810 Native American Studies 1818 Native American Studies 1818 Native American Studies 1818 Native American Studies 188 Political Science 102 Political Science 150 Political Science 151 Political Science 151 Political Science 153 Political Science 160 Political Science 160 Political Science 164 Political Science 166 Political Science 167 Political Science 168 Political Science 176 Political Science 176 Political Science 176 Psychology 158 Religious Studies 1 Religious Studies 1 Religious Studies 17 Religious Studies 12 Religious Studies 145 Science and Society 25V Sociology 1 Sociology 2 Sociology 3 Sociology 3 Sociology 30A Sociology 102 Sociology 123 Sociology 123 Sociology 130 Sociology 131 Sociology 137 Sociology 137 Sociology 137 Sociology 137 Sociology 137 Sociology 137 Sociology 137 Sociology 137 Sociology 137 Sociology 137	Anthropology 103 Anthropology 154CL Anthropology 154CL Anthropology 158 Anthropology 183 Applied Biological System Tech 15 Applied Biological System Tech 163 Art History 190F Art History 190H Asian American Studies 4 Asian American Studies 115 Asian American Studies 116 Asian American Studies 121 Asian American Studies 130 Asian American Studies 130 Asian American Studies 150F Asian American Studies 150F Asian American Studies 150F Asian American Studies 1891 Atmospheric Science 110 Atmospheric Science 111L Biological Sciences 22 Biological Sciences 122 Biological Sciences 124 Biological Sciences 124 Biological Sciences 124 Biological Sciences 124 Biological Sciences 124 Biological Sciences 125 Chicano Studies 21 Chicano Studies 21 Chicano Studies 23 Chicano Studies 23 Chicano Studies 10 Chicano Studies 10 Chicano Studies 11 Chicano Studies 12 Chicano Studies 112 Chicano Studies 112 Chicano Studies 122 Chicano Studies 123 Chicano Studies 123 Chicano Studies 131 Chicano Studies 131 Chicano Studies 131 Chicano Studies 131 Chicano Studies 132 Chicano Studies 135

Chicano Studies 154	German 119	Science and Society 20	Biological Sciences 2C
Chicano Studies 155	German 133	Science and Society 25	Biological Sciences 101
Chicano Studies 156	German 142	Science and Society 25V	Biological Sciences 102
Chicano Studies 172	German 143	Science and Society 42	Biological Sciences 102Q
Chicano Studies 182	German 168	Science and Society 130	Biological Sciences 105
Chicano Studies 192	German 176A	Soil Science 109	Biological Sciences 122
Chicano Studies 194HA	Hydrologic Science 142	Spanish 8	Biological Sciences 124
Chicano Studies 194HB	International Relations 194HA	Spanish 28	Biological Sciences 132
Chicano Studies 194HC	International Relations 194HB	Spanish 31	Biological Sciences 133
Chinese 111A	Italian 101	Spanish 32	Biological Sciences 134
Chinese 150	Italian 101S	Spanish 33	Biological Sciences 181
Communication 1	Italian 105	Spanish 100	Biological Sciences 183
Communication 5	Italian 105S	Spanish 117	Chemistry 2A Chemistry 2B
Comm & Reg Development 1	Italian 107	Spanish 117	
Comm & Reg Develpmnt 20 Comm & Reg Develpmnt 147	Italian 107S Italian 108	Spanish 132 Spanish 133N	Chemistry 2C Chemistry 105
Comm & Reg Develpmin 147 Comm & Reg Develpmin 149	Italian 108S	Spanish 138N	Chemistry 110A
Comm & Reg Develpmnt 151	Italian 112	Spanish 142	Chemistry 115
Comm & Reg Develpmnt 151A	Italian 113	Spanish 180	Chemistry 125
Comm & Reg Develpmnt 154	Italian 114	Spanish 181	Chicano Studies 40
Comm & Reg Develpmnt 164	Italian 115A	Spanish 182	Chicano Studies 40S
Comparative Literature 53B	Italian 115B	Textiles & Clothing 164	Chicano Studies 140A
Dramatic Art 21A	Italian 115C	Viticulture & Enology 111	Comm & Reg Develpmnt 156
Dramatic Art 21B	Italian 118	Viticulture & Enology 124L	Economics 1A
Dramatic Art 124E	Italian 119	Washington Center 175	Economics 1B
Education 100	Italian 121	Washington Center 193	Education 114
Education 142	Italian 121S	9	Education 119
Education 152	Italian 131	Quantitative (QL)	Engineering 6
Education 183	Italian 139B	Agricult & Dec Feen 1004	Engineering 45
Engineering Aerospace Sci 130B	Italian 140	Agricult & Res Econ 100A	Engineering 102
Engr: Biological Systems 1	Italian 145	Agricult & Res Econ 100B	Engineering 104
Engr: Biological Systems 125	Italian 145S	Agricult & Res Econ 106 Agricult & Res Econ 155	Engineering 105
Engr: Biological Systems 170A	Japanese 111	Agricult & Res Econ 156	Engineering 106
Engr: Biological Systems 170B	Japanese 112	Agricult & Res Econ 171A	Engineering 111
Engr: Biological Systems 170BL	Japanese 113	Agricult & Res Econ 171B	Engineering 121
Engr: Biological Systems 170C	Japanese 114A	Agricult & Res Econ 194HA	Engineering 122
Engr: Biological Systems 170CL	Japanese 114B	Agricult & Res Econ 194HB	Engineering Aerospace Sci 127
Engineering Biomedical 110A	Japanese 114C	Animal Science 15	Engineering Aerospace Sci 129
Engineering Biomedical 110B	Landscape Architecture 1	Animal Science 18	Engineering Aerospace Sci 130A
Engineering Biomedical 116	Landscape Architecture 70	Animal Science 41L	Engineering Aerospace Sci 130B
Engineering Biomedical 151	Landscape Architecture 181F	Animal Science 42	Engineering Aerospace Sci 135
Engineering Biomedical 173	Landscape Architecture 181J	Animal Science 106	Engineering Aerospace Sci 138
Engr: Chemical 155A Engr: Chemical 158C	Landscape Architecture 181K	Animal Science 112	Engr: Applied Sci-Davis 108A
Engr: Civil & Environ 137	Linguistics 5 Mathematics 189	Animal Science 115	Engr: Applied Sci-Davis 108B Engr: Applied Sci-Davis 115
Engr: Civil & Environ 157 Engr: Civil & Environ 150	Med - Public Health Sciences 175W	Animal Science 123	Engr: Applied Sci-Davis 115 Engr: Applied Sci-Davis 165
Engr: Materials Science 180	Molecular and Cellular Biology 138	Animal Science 127	Engr: Applied Sci-Davis 166
Engr: Materials Science 181	Molecular and Cellular Biology 140L	Animal Science 128	Engr: Applied Sci-Davis 167
Engr: Materials Science 188A	Molecular and Cellular Biology 148	Animal Science 136A	Engr: Applied Sci-Davis 169
Engr: Materials Science 188B	Molecular and Cellular Biology 158	Animal Science 136B	Engr: Applied Sci-Davis 170
Engineering Mechanical 185A	Molecular and Cellular Biology 178	Animal Science 137	Engr: Applied Sci-Davis 172
Engineering Mechanical 185B	Molecular and Cellular Biology 194H	Animal Science 142	Engr: Biological Systems 1
Entomology 1	Music 121	Animal Science 144	Engr: Biological Systems 75
Entomology 105	Music 122	Animal Science 146	Engr: Biological Systems 103
Entomology 119	Native American Studies 5	Animal Science 148	Engr: Biological Systems 114
Environmental Toxicology 104	Native American Studies 34	Anthropology 105	Engr: Biological Systems 115
Environmental Toxicology 110	Native American Studies 122	Anthropology 153 Anthropology 154BN	Engr: Biological Systems 120
Environmental Toxicology 120	Native American Studies 133B	Anthropology 157	Engr: Biological Systems 125
Environmental Toxicology 127	Native American Studies 135	Anthropology 157 Anthropology 157L	Engr: Biological Systems 127 Engr: Biological Systems 128
Environmental Toxicology 130	Native American Studies 157	Anthropology 159	Engr: Biological Systems 128
Evolution and Ecology 11	Native American Studies 180	Anthropology 182	Engr: Biological Systems 130
Evolution and Ecology 141	Native American Studies 181A	Anthropology 183	Engr: Biological Systems 135
Fiber And Polymer Science 150	Native American Studies 181B	Applied Biological System Tech 15	Engr: Biological Systems 144
Fiber And Polymer Science 161 Fiber And Polymer Science 161L	Native American Studies 184 Native American Studies 185	Applied Biological System Tech 16	Engr: Biological Systems 145 Engr: Biological Systems 147
Film Studies 1	Native American Studies 188	Applied Biological System Tech 17	Engr: Biological Systems 161
Film Studies 45	Neuro, Physio & Behavior 106	Applied Biological System Tech 49	Engr: Biological Systems 165
Film Studies 120	Nutrition 11	Applied Biological System Tech 52	Engr: Biological Systems 170A
Film Studies 121	Nutrition 115	Applied Biological System Tech 101	Engr: Biological Systems 170B
Film Studies 1215	Nutrition 127	Applied Biological System Tech 110L	Engr: Biological Systems 170BL
Film Studies 124	Nutrition 129	Applied Biological System Tech 142	Engr: Biological Systems 170C
Film Studies 125	Nutrition 190	Applied Biological System Tech 161	Engr: Biological Systems 170CL
Film Studies 127	Plant Science 141	Applied Biological System Tech 163	Engr: Biological Systems 175
Film Studies 142	Plant Science 150	Applied Biological System Tech 165	Engineering Biomedical 20
Film Studies 176A	Plant Science 188	Atmospheric Science 5	Engineering Biomedical 102
Film Studies 176B	Political Science 193W	Atmospheric Science 10	Engineering Biomedical 105
Film Studies 189	Political Science 194HA	Atmospheric Science 60	Engineering Biomedical 106
Food Science & Technology 160	Political Science 194HB	Atmospheric Science 110 Atmospheric Science 111	Engineering Biomedical 107
Food Science & Technology 190	Religious Studies 1	Atmospheric Science 111 Atmospheric Science 111L	Engineering Biomedical 108
French 21	Religious Studies 1B	Atmospheric Science 111L Atmospheric Science 116	Engineering Biomedical 111
French 22	Religious Studies 1C	Atmospheric Science 110 Atmospheric Science 120	Engineering Biomedical 117
French 23	Religious Studies 1E	Atmospheric Science 120 Atmospheric Science 121A	Engineering Biomedical 118
French 53	Religious Studies 1G	Atmospheric Science 1218 Atmospheric Science 121B	Engineering Biomedical 126
French 118A	Religious Studies 1H	Atmospheric Science 124	Engineering Biomedical 140
Geology 115	Religious Studies 11	Atmospheric Science 128	Engineering Biomedical 141
Geology 183	Religious Studies 12	Atmospheric Science 133	Engineering Biomedical 142
German 45	Religious Studies 105	Atmospheric Science 149	Engineering Biomedical 151
German 45 German 104	Religious Studies 115 Religious Studies 120	Atmospheric Science 158	Engineering Biomedical 161A Engineering Biomedical 161L
German 104 German 105	Russian 105	Atmospheric Science 160	Engineering Biomedical 161S
German 116	Russian 128	Avian Sciences 150	Engineering Biomedical 162
German 116 German 117	Russian 128 Russian 130	Biological Sciences 2B	Engineering Biomedical 163
Committee	II	. 105	Zigincering Diomedical 103

^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth.

Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

Engineering Biomedical 167	Evolution and Ecology 103	Mathematics 160	Textiles & Clothing 162L
Engr: Chemical 140	Evolution and Ecology 106	Mathematics 165	Textiles & Clothing 163L
Engr: Chemical 141	Evolution and Ecology 107	Mathematics 167	Viticulture & Enology 123L
Engr: Chemical 142	Evolution and Ecology 110	Mathematics 168	Viticulture & Enology 125
Engr: Chemical 155A	Evolution and Ecology 114	Mathematics 189	Viticulture & Enology 125L
Engr: Chemical 155B Engr: Chemical 157	Evolution and Ecology 141 Evolution and Ecology 147	Microbiology 102 Microbiology 104	Viticulture & Enology 140
Engr. Chemical 157 Engr: Chemical 158B	Evolution and Ecology 180A	Molecular and Cellular Biology 10	Scientific (SL)
Engr: Chemical 158C	Evolution and Ecology 180B	Molecular and Cellular Biology 120L	• •
Engr: Chemical 160	Exercise Biology 103	Molecular and Cellular Biology 121	Animal Genetics 105
Engr: Chemical 161A	Exercise Biology 111	Molecular and Cellular Biology 123	Animal Genetics 111
Engr: Chemical 161B	Exercise Biology 115	Molecular and Cellular Biology 140L	Animal Science 2
Engr: Chemical 161C	Exercise Biology 126	Molecular and Cellular Biology 143	Animal Science 18
Engr: Chemical 161L	Exercise Biology 148L	Molecular and Cellular Biology 160L	Animal Science 41L Animal Science 42
Engr: Chemical-Materials 5	Fiber And Polymer Science 100	Molecular and Cellular Biology 162	Animal Science 72 Animal Science 103
Engr: Chemical-Materials 6	Fiber And Polymer Science 150	Neuro, Physio & Behavior 14	Animal Science 105 Animal Science 106
Engr: Chemical-Materials 194HC	Fiber And Polymer Science 161	Neuro, Physio & Behavior 100	Animal Science 115
Engr: Civil & Environ 3	Fiber And Polymer Science 161L	Neuro, Physio & Behavior 100Q	Animal Science 124
Engr: Civil & Environ 16 Engr: Civil & Environ 114	Fiber And Polymer Science 180A Fiber And Polymer Science 180B	Neuro, Physio & Behavior 106 Neuro, Physio & Behavior 111C	Animal Science 128
Engr: Civil & Environ 130	Food Science & Technology 50	Neuro, Physio & Behavior 121	Animal Science 129
Engr: Civil & Environ 135	Food Science & Technology 100B	Neuro, Physio & Behavior 139	Animal Science 136A
Engr: Civil & Environ 137	Food Science & Technology 101A	Neuro, Physio & Behavior 141	Animal Science 136B
Engr: Civil & Environ 139	Food Science & Technology 101B	Neuro, Physio & Behavior 159	Animal Science 137
Engr: Civil & Environ 142	Food Science & Technology 102B	Neuro, Physio & Behavior 166	Animal Science 142
Engr: Civil & Environ 143	Food Science & Technology 103	Neuro, Physio & Behavior 167	Animal Science 143 Animal Science 144
Engr: Civil & Environ 148B	Food Science & Technology 104	Neuro, Physio & Behavior 169	Animal Science 146
Engr: Civil & Environ 150	Food Science & Technology 104L	Nutrition 112	Animal Science 170
Engr: Civil & Environ 153	Food Science & Technology 107	Nutrition 115	Anthropology 1
Engr: Civil & Environ 155 Engr: Civil & Environ 161	Food Science & Technology 109 Food Science & Technology 110A	Nutrition 122 Nutrition 124	Anthropology 3
Engr: Civil & Environ 165	Food Science & Technology 110A	Nutrition 127	Anthropology 15
Engr: Civil & Environ 173	Food Science & Technology 117	Physics 30	Anthropology 50
Engr: Civil & Environ 175	Food Science & Technology 119	Plant Biology 112	Anthropology 54
Engr: Civil & Environ 179	Food Science & Technology 123	Plant Biology 113	Applied Biological System Tech 161
Engr: Computer Science 10	Food Science & Technology 123L	Plant Science 120	Applied Biological System Tech 163
Engr: Computer Science 15	Food Science & Technology 127	Political Science 51	Applied Biological System Tech 181N Applied Biological System Tech 182
Engr: Computer Science 20	Food Science & Technology 151	Political Science 102	Astronomy 10G
Engr: Computer Science 30	Geology 30	Political Science 107	Astronomy 10S
Engr: Computer Science 60	Geology 101	Political Science 108	Astronomy 25
Engr: Computer Science 120	Geology 146 Geology 147	Political Science 109 Political Science 110	Atmospheric Science 5
Engr: Computer Science 122B Engr: Computer Science 132	Geology 148	Political Science 114	Atmospheric Science 6
Engineering Electrical & Compu 100	Geology 150A	Political Science 121	Atmospheric Science 10
Engineering Electrical & Compu 150A	Geology 160	Political Science 140A	Atmospheric Science 30
Engineering Electrical & Compu 150B	Geology 161	Political Science 160	Atmospheric Science 115
Engineering Electrical & Compu 161	Geology 162	Political Science 175	Atmospheric Science 124
Engr: Materials Science 147	Geology 163	Political Science 196E	Atmospheric Science 133 Atmospheric Science 149
Engr: Materials Science 160	Hydrologic Science 47	Psychology 41	Atmospheric Science 160
Engr: Materials Science 162	Hydrologic Science 103N	Psychology 103A	Avian Sciences 13
Engr: Materials Science 162L	Hydrologic Science 124 Hydrologic Science 134	Psychology 103B	Avian Sciences 121
Engr: Materials Science 164 Engr: Materials Science 172	Hydrologic Science 141	Psychology 104 Psychology 107	Avian Sciences 123
Engr: Materials Science 172 Engr: Materials Science 172L	Hydrologic Science 142	Psychology 120	Biological Sciences 2B
Engr: Materials Science 174	Hydrologic Science 143	Science and Society 18	Biological Sciences 2C
Engr: Materials Science 174L	Hydrologic Science 147	Science and Society 25	Biological Sciences 10V
Engr: Materials Science 182	Hydrologic Science 151	Science and Society 25V	Biological Sciences 101
Engineering Mechanical 5	Hydrologic Science 182	Sociology 46B	Biological Sciences 122 Biological Sciences 132
Engineering Mechanical 50	Landscape Architecture 1	Sociology 106	Biological Sciences 133
Engineering Mechanical 107A	Landscape Architecture 70	Sociology 170	Biological Sciences 181
Engineering Mechanical 107B Engineering Mechanical 134	Mathematics 12 Mathematics 16A	Soil Science 10 Soil Science 100	Biotechnology 161B
Engineering Mechanical 150A	Mathematics 16B	Soil Science 100	Biotechnology 171
Engineering Mechanical 150B	Mathematics 16C	Soil Science 105	Chemistry 10
Engineering Mechanical 151	Mathematics 17A	Soil Science 109	Engineering 45
Engineering Mechanical 152	Mathematics 17B	Soil Science 111	Engineering 106 Engr: Biological Systems 1
Engineering Mechanical 154	Mathematics 17C	Soil Science 120	Engr: Biological Systems 75
Engineering Mechanical 161	Mathematics 21A	Statistics 10	Engr: Biological Systems 115
Engineering Mechanical 163	Mathematics 21AH	Statistics 12	Engr: Biological Systems 120
Engineering Mechanical 165	Mathematics 21B	Statistics 13	Engr: Biological Systems 128
Engineering Mechanical 171 Engineering Mechanical 172	Mathematics 21C Mathematics 21D	Statistics 13V Statistics 32	Engr: Biological Systems 130
Engineering Mechanical 172 Engineering Mechanical 185A	Mathematics 22A	Statistics 32 Statistics 100	Engr: Biological Systems 135
Engineering Mechanical 185B	Mathematics 22AL	Statistics 100	Engr: Biological Systems 144
Environmental Horticulture 120	Mathematics 22B	Statistics 103	Engr: Biological Systems 145
Environmental Sci & Management 47	Mathematics 115A	Statistics 104	Engr: Biological Systems 147 Engr: Biological Systems 165
Environmental Sci & Management 100	Mathematics 115B	Statistics 106	Engr: Biological Systems 170A
Environmental Sci & Management 121	Mathematics 118A	Statistics 108	Engr: Biological Systems 1708 Engr: Biological Systems 1708
Environmental Sci & Management 131	Mathematics 118B	Statistics 120	Engr: Biological Systems 170B Engr: Biological Systems 170BL
Environmental Sci & Management 186	Mathematics 118C	Statistics 130A Statistics 130B	Engr: Biological Systems 170C
Environmental Sci & Management 186L	Mathematics 119A Mathematics 119R	Statistics 130B	Engr: Biological Systems 170CL
Environ Science & Policy 110 Environ Science & Policy 121	Mathematics 119B Mathematics 124	Statistics 131A Statistics 131B	Engineering Biomedical 1
Environ Science & Policy 121 Environ Science & Policy 150A	Mathematics 128A	Statistics 1316 Statistics 131C	Engineering Biomedical 106
Environ Science & Policy 178	Mathematics 128B	Statistics 133	Engineering Biomedical 109
Environmental Toxicology 102A	Mathematics 128C	Statistics 135	Engineering Biomedical 110A
Environmental Toxicology 127	Mathematics 129	Statistics 137	Engineering Biomedical 110B Engineering Biomedical 111
Environmental Toxicology 135	Mathematics 133	Statistics 138	Engineering Biomedical 111 Engineering Biomedical 116
Environmental Toxicology 146	Mathematics 135A	Statistics 141	Engineering Biomedical 117
Evolution and Ecology 10	Mathematics 135B	Statistics 142	Engineering Biomedical 126
Evolution and Ecology 100 Evolution and Ecology 101	Mathematics 145 Mathematics 148	Statistics 144 Statistics 145	Engineering Biomedical 140
Evolution and Ecology 101	manematics 1 10	JOE W. J. J. J. J. J. J. J. J. J. J. J. J. J.	

^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth. # Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

Engineering Biomedical 142	Evolution and Ecology 149	Science and Society 8	Art History 172B
Engineering Biomedical 161L	Exercise Biology 10	Science and Society 13	Art History 173
Engineering Biomedical 162	Exercise Biology 101	Science and Society 18	Art History 175
Engineering Biomedical 173	Exercise Biology 112	Science and Society 20	Art History 176A
Engr: Chemical 158A	Fiber And Polymer Science 110	Science and Society 25	Art History 176B
Engr: Chemical 158C	Fiber And Polymer Science 150	Science and Society 25V	Art History 176C
Engr: Chemical 161C	Fiber And Polymer Science 161	Science and Society 40	Art History 177A
Engr: Civil & Environ 123	Fiber And Polymer Science 161L	Science and Society 70A	Art History 177B
Engr: Civil & Environ 143	Food Science & Technology 3	Sociology 103	Art History 178A
Engr: Civil & Environ 149	Food Science & Technology 10	Sociology 106	Art History 178B
Engr: Civil & Environ 150	Food Science & Technology 109	Soil Science 10	Art History 178C
Engr: Civil & Environ 153	Geology 1	Soil Science 100	Art History 179B
Engr: Civil & Environ 155 Engr: Civil & Environ 162	Geology 2	Soil Science 102	Art History 182
Engr. Civil & Environ 162 Engr: Civil & Environ 163	Geology 4 Geology 10	Soil Science 105 Soil Science 109	Art History 183A
Engr: Civil & Environ 179	Geology 16	Soil Science 111	Art History 183B Art History 183C
Engr: Computer Science 10	Geology 17	Soil Science 112	Art History 183D
Engr: Computer Science 155	Geology 20	Soil Science 118	Art History 184
Engr: Computer Science 156	Geology 25	Soil Science 120	Art History 185
Engr: Computer Science 157	Geology 35	Statistics 102	Art History 186
Engr: Computer Science 166	Geology 50	Statistics 106	Art History 187
Engineering Electrical & Compu 140A	Geology 91	Statistics 108	Art History 188A
Engr: Materials Science 160	Geology 108	Textiles & Clothing 6	Art History 188D
Engr: Materials Science 162L	Geology 116N	Textiles & Clothing 163L	Art History 189
Engr: Materials Science 164	Geology 130	Wild, Fish & Conserv Biol 10	Art History 190F
Engr: Materials Science 172	Geology 131	Wild, Fish & Conserv Biol 11	Art History 190H
Engr: Materials Science 172L	Geology 150C	Wild, Fish & Conserv Biol 50	Art Studio 10
Engr: Materials Science 174	Human Development 117		Art Studio 24
Engr: Materials Science 174L	Hydrologic Science 10	Visual (VL)	Art Studio 30
Engr: Materials Science 180	Hydrologic Science 47	Afr. A C- Afr. C+ J 16	Art Studio 101
Engr: Materials Science 182	Hydrologic Science 110	Afr Am & Afr Std 16 Afr Am & Afr Std 50	Art Studio 102A
Engr: Materials Science 188A	Hydrologic Science 124	Afr Am & Afr Std 50	Art Studio 102B
Engr: Materials Science 188B	Hydrologic Science 141		Art Studio 102C
English 164	Hydrologic Science 143	Afr Am & Afr Std 168	Art Studio 103A
Entomology 2	Hydrologic Science 147	Afr Am & Afr Std 169 Afr Am & Afr Std 170	Art Studio 103B
Entomology 10	Hydrologic Science 151	Afr Am & Afr Std 170 Afr Am & Afr Std 171	Art Studio 105A
Entomology 105	Hydrologic Science 182	Afr Am & Afr Std 171 Afr Am & Afr Std 175A	Art Studio 105B
Entomology 116	Integrated Studies 8A	Afr Am & Afr Std 173A Afr Am & Afr Std 181	Art Studio 110A
Entomology 117	Landscape Architecture 1	Afr Am & Afr Std 185	Art Studio 110B
Entomology 153	Landscape Architecture 180I	Animal Genetics 111	Art Studio 111A
Environmental Horticulture 1	Mathematics 12	Animal Science 2	Art Studio 111B
Environmental Horticulture 150	Mathematics 16A	Animal Science 15	Art Studio 113
Environmental Horticulture 160	Mathematics 16B	Animal Science 18	Art Studio 114A
Environmental Horticulture 160L	Mathematics 16C	Animal Science 41L	Art Studio 114B
Environmental Sci & Management 6	Mathematics 17B	Animal Science 106	Art Studio 114C
Environmental Sci & Management 8	Mathematics 21A	Animal Science 123	Art Studio 117
Environmental Sci & Management 30	Mathematics 21B	Animal Science 136A	Art Studio 121
Environmental Sci & Management 47 Environmental Sci & Management 100	Mathematics 133 Molecular and Cellular Biology 10	Animal Science 136B	Art Studio 125A Art Studio 125B
Environmental Sci & Management 108	Molecular and Cellular Biology 120L	Animal Science 142	Art Studio 125C
Environmental Sci & Management 121	Molecular and Cellular Biology 121	Animal Science 144	Art Studio 125D
Environmental Sci & Management 131	Molecular and Cellular Biology 126	Animal Science 146	Art Studio 129
Environmental Sci & Management 186L	Molecular and Cellular Biology 140L	Animal Science 194HB	Art Studio 138
Environ Science & Policy 1	Molecular and Cellular Biology 150	Anthropology 13	Art Studio 142A
Environ Science & Policy 10	Molecular and Cellular Biology 162	Anthropology 32	Art Studio 142B
Environ Science & Policy 30	Molecular and Cellular Biology 163	Anthropology 109	Art Studio 143A
Environ Science & Policy 100	Molecular and Cellular Biology 164	Anthropology 136	Art Studio 143B
Environ Science & Policy 110	Nematology 10V	Anthropology 154A	Art Studio 147
Environ Science & Policy 111	Neuro, Physio & Behavior 12	Anthropology 154BN	Art Studio 148
Environ Science & Policy 116N	Neuro, Physio & Behavior 14	Anthropology 182 Applied Biological System Tech 15	Art Studio 149
Environ Science & Policy 121	Neuro, Physio & Behavior 102		Art Studio 151
Environ Science & Policy 123	Neuro, Physio & Behavior 107	Applied Biological System Tech 16 Applied Biological System Tech 17	Art Studio 152A
Environ Science & Policy 124	Neuro, Physio & Behavior 112	Applied Biological System Tech 49	Art Studio 152B
Environ Science & Policy 127	Neuro, Physio & Behavior 121	Applied Biological System Tech 79 Applied Biological System Tech 52	Art Studio 152C
Environ Science & Policy 150C	Neuro, Physio & Behavior 124	Applied Biological System Tech 101	Art Studio 152D
Environ Science & Policy 152	Neuro, Physio & Behavior 127	Applied Biological System Tech 110L	Art Studio 152E
Environ Science & Policy 155L	Neuro, Physio & Behavior 165	Applied Biological System Tech 142	Art Studio 152F
Environ Science & Policy 163	Neuro, Physio & Behavior 168	Applied Biological System Tech 150	Art Studio 152G
Environmental Toxicology 10	Nutrition 10	Applied Biological System Tech 161	Art Studio 171
Environmental Toxicology 20	Nutrition 115	Applied Biological System Tech 163	Art Studio 190
Environmental Toxicology 101 Environmental Toxicology 102A	Nutrition 118	Applied Biological System Tech 165	Asian American Studies 1
	Nutrition 124 Nutrition 127	Applied Biological System Tech 181N	Asian American Studies 2 Asian American Studies 4
Environmental Toxicology 104 Environmental Toxicology 110	Nutrition 127 Nutrition 129	Applied Biological System Tech 182	Asian American Studies 112
Environmental Toxicology 120	Philosophy 13	Art History 1A	Asian American Studies 141
Environmental Toxicology 127	Philosophy 30	Art History 1B	Asian American Studies 150B
Environmental Toxicology 130	Philosophy 31	Art History 1DV	Asian American Studies 150C
Environmental Toxicology 135	Philosophy 38	Art History 1E	Astronomy 10G
Environmental Toxicology 146	Philosophy 108	Art History 10	Astronomy 10L
Evolution and Ecology 2	Physics 160	Art History 25	Astronomy 10S
Evolution and Ecology 10	Plant Biology 112	Art History 150	Astronomy 25
Evolution and Ecology 11	Plant Biology 113	Art History 151	Atmospheric Science 5
Evolution and Ecology 12	Plant Biology 143	Art History 152	Atmospheric Science 6
Evolution and Ecology 100	Plant Pathology 140	Art History 153	Atmospheric Science 10
Evolution and Ecology 101	Plant Science 2	Art History 156	Atmospheric Science 30
Evolution and Ecology 103	Plant Science 14	Art History 163A Art History 163B	Atmospheric Science 60
Evolution and Ecology 104	Plant Science 101	Art History 163C	Atmospheric Science 110
Evolution and Ecology 111	Plant Science 150	Art History 163D	Atmospheric Science 111
Evolution and Ecology 115	Plant Science 162	Art History 164	Atmospheric Science 111L
Evolution and Ecology 138	Science & Tech Studies 164	Art History 168	Atmospheric Science 120
Evolution and Ecology 141	Science and Society 2	Art History 172A	Atmospheric Science 124
Evolution and Ecology 147	Science and Society 4	•	Atmospheric Science 128
	and the second control of the contro	ent and GE writing experience simultaneousl	

^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth. # Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

Atmospheric Science 133	Engineering 17	English 161A	History 193A
Atmospheric Science 158	Engineering 100	English 161B	History 193B
Atmospheric Science 160	Engineering 102	English 162	History 193D
Biological Sciences 2B	Engineering 105	Entomology 1	Hydrologic Science 141
Biological Sciences 2C	Engineering 106	Entomology 100L	Hydrologic Science 182
Biological Sciences 122	Engineering 111	Entomology 119	Italian 107
Biological Sciences 122P	Engineering 121	Environmental Horticulture 6	Italian 107S
	Engineering Aerospace Sci 130A	Environmental Horticulture 101	
Biological Sciences 124			Italian 108
Biological Sciences 132	Engineering Aerospace Sci 130B	Environmental Horticulture 105	Italian 108S
Biological Sciences 133	Engr: Biological Systems 1	Environmental Sci & Management 144	Italian 121
Biological Sciences 134	Engr: Biological Systems 75	Environmental Sci & Management 186	Italian 121S
Biological Sciences 183	Engr: Biological Systems 103	Environmental Sci & Management 186L	Italian 145
Biotechnology 150	Engr: Biological Systems 114	Environmental Toxicology 20	Italian 145S
Chicano Studies 60	Engr: Biological Systems 115	Environmental Toxicology 102A	Italian 150
Chicano Studies 65	Engr: Biological Systems 120	Environmental Toxicology 102B	Japanese 106
Chicano Studies 70	Engr: Biological Systems 125	Environmental Toxicology 103B	Japanese 109
Chicano Studies 73	Engr: Biological Systems 127	Environmental Toxicology 120	Japanese 152
Chicano Studies 155	Engr: Biological Systems 128	Environmental Toxicology 127	Japanese 156
Chicano Studies 160	Engr: Biological Systems 130	Environmental Toxicology 130	Landscape Architecture 1
Chicano Studies 165	Engr: Biological Systems 135	Environmental Toxicology 131	Landscape Architecture 2
Chicano Studies 170	Engr: Biological Systems 144	Environmental Toxicology 135	Landscape Architecture 3
Chicano Studies 171	Engr: Biological Systems 145	Environmental Toxicology 138	Landscape Architecture 21
Chicano Studies 172	Engr: Biological Systems 161	Environmental Toxicology 146	Landscape Architecture 30
Chinese 101	Engr: Biological Systems 165	Evolution and Ecology 101	Landscape Architecture 50
Chinese 103	Engr: Biological Systems 170A	Evolution and Ecology 104	Landscape Architecture 70
Classics 10	Engr: Biological Systems 170B	Evolution and Ecology 106	Landscape Architecture 150
Classics 15	Engr: Biological Systems 170BL	Evolution and Ecology 107	Landscape Architecture 170
Classics 20	Engr: Biological Systems 170C	Evolution and Ecology 110	Landscape Architecture 181F
Classics 172A	Engr: Biological Systems 170CL	Evolution and Ecology 114	Landscape Architecture 181G
Classics 172B	Engr: Biological Systems 175	Evolution and Ecology 115	Landscape Architecture 1811
Classics 173	Engineering Biomedical 20	Evolution and Ecology 141	Landscape Architecture 181J
Classics 175	Engineering Biomedical 102	Evolution and Ecology 147	Landscape Architecture 181K
Communication 170	Engineering Biomedical 105	Evolution and Ecology 180A	Mathematics 141
Comm & Reg Develpmnt 1	Engineering Biomedical 106	Evolution and Ecology 180B	Molecular and Cellular Biology 120
Comm & Reg Develpmnt 20	Engineering Biomedical 107	Exercise Biology 115	Molecular and Cellular Biology 140
Comm & Reg Develpmnt 147	Engineering Biomedical 109	Fiber And Polymer Science 150	Molecular and Cellular Biology 160
		Fiber And Polymer Science 161	Music 10
Comm & Reg Develpmnt 149	Engineering Biomedical 110A		
Comm & Reg Develpmnt 151	Engineering Biomedical 110B	Fiber And Polymer Science 161L	Music 11
Comm & Reg Develpmnt 153A	Engineering Biomedical 116	Fiber And Polymer Science 180A	Music 24A
Comm & Reg Develpmnt 154	Engineering Biomedical 117	Fiber And Polymer Science 180B	Music 24B
Comm & Reg Develpmnt 164	Engineering Biomedical 140	Film Studies 1	Music 24C
Comparative Literature 4	Engineering Biomedical 141	Film Studies 45	Music 28
Comparative Literature 100	Engineering Biomedical 142	Film Studies 120	Music 106
Comparative Literature 110	Engr: Chemical 155A	Film Studies 121	Music 108A
Comparative Literature 152S	Engr: Chemical 155B	Film Studies 121S	Music 108B
Design 1	Engr: Chemical 158A	Film Studies 124	Music 110A
Design 13	Engr: Chemical 158C	Film Studies 125	Music 110B
Design 14	Engr: Chemical 160	Film Studies 127	Music 110C
Design 15	Engr: Chemical 161A	Film Studies 142	Music 110D
Design 16	Engr: Chemical 161C	Film Studies 176A	Music 110E
Design 21	Engr: Chemical 161L	Film Studies 176B	Music 110F
		Film Studies 189	
Design 40A	Engr: Civil & Environ 132		Music 110G
Design 40B	Engr: Civil & Environ 137	Film Studies 195H	Music 115
Design 50	Engr: Civil & Environ 148B	Film Studies 196H	Music 124A
Design 77	Engr: Civil & Environ 179	Food Science & Technology 1	Music 124B
Design 107	Engr: Computer Science 40	Food Science & Technology 10	Music 129A
Design 113	Engr: Computer Science 163	Food Science & Technology 100A	Music 129B
Design 115	Engr: Computer Science 175	Food Science & Technology 100B	Music 129C
Design 116	Engr: Computer Science 177	Food Science & Technology 101A	Music 129D
Design 117	Engr: Computer Science 178	Food Science & Technology 101B	Native American Studies 12
Design 131	Engineering Electrical & Compu 100	Food Science & Technology 104	Native American Studies 34
Design 132A	Engineering Electrical & Compu 110A	Food Science & Technology 104L	Neuro, Physio & Behavior 100Q
Design 134B	Engineering Electrical & Compu 110B	Food Science & Technology 109	Neuro, Physio & Behavior 106
Design 135A	Engr: Materials Science 160	Food Science & Technology 110A	Neuro, Physio & Behavior 111C
Design 135B	Engr: Materials Science 162L	Food Science & Technology 119	Neuro, Physio & Behavior 127
Design 144	Engr: Materials Science 164	Food Science & Technology 123	Neuro, Physio & Behavior 130
Design 150A	Engr: Materials Science 172	Food Science & Technology 123L	Neuro, Physio & Behavior 141
Design 150R Design 150B	Engr: Materials Science 172 Engr: Materials Science 172L	Food Science & Technology 160	Neuro, Physio & Behavior 141P
Design 150b Design 151	Engr: Materials Science 172L Engr: Materials Science 174	French 50	
			Neuro, Physio & Behavior 160
Design 154	Engr: Materials Science 174L	French 122	Neuro, Physio & Behavior 168
Design 155A	Engr: Materials Science 180	French 125	Nutrition 115
Design 157	Engr: Materials Science 181	Geology 10	Nutrition 127
Design 159	Engr: Materials Science 182	Geology 20	Nutrition 190
		C1 25	
Design 160	Engr: Materials Science 188A	Geology 25	Physics 12
Design 177	Engr: Materials Science 188B	Geology 36	Physics 116A
Design 180A	Engineering Mechanical 5	Geology 62	Plant Biology 102
Design 180B	Engineering Mechanical 50	Geology 81	Plant Biology 113
Design 185	Engineering Mechanical 107A	Geology 101L	Plant Science 21
Design 186	Engineering Mechanical 107A Engineering Mechanical 107B		Plant Science 102
		Geology 103	
Design 187	Engineering Mechanical 150A	Geology 110	Plant Science 131
Dramatic Art 14	Engineering Mechanical 150B	Geology 142	Plant Science 144
Dramatic Art 21A	Engineering Mechanical 151	German 10	Plant Science 147
Dramatic Art 21B	Engineering Mechanical 151 Engineering Mechanical 152	German 45	Plant Science 147L
Dramatic Art 114	Engineering Mechanical 154	German 104	Plant Science 176
Dramatic Art 124E	Engineering Mechanical 161	German 114	Plant Science 180
Dramatic Art 127A	Engineering Mechanical 163	German 117	Political Science 51
Dramatic Art 127B	Engineering Mechanical 165	German 119	Political Science 114
Dramatic Art 141	Engineering Mechanical 171	German 142	Political Science 194HA
Economics 102	Engineering Mechanical 172	German 168	Political Science 194HB
Education 81	Engineering Mechanical 185A	German 176A	Political Science 196E
Education 122	Engineering Mechanical 185B	History 11	Religious Studies 1
Engineering 4	English 160	History 110A	Religious Studies 1B
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mis course may not be used to satisfy a	i college or university composition requireme	ent and GE writing experience simultaneous	y.

^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth. # Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

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Religious Studies 1C	World Cultures (WC)	Art History 156	Classics 50
Religious Studies 1E Religious Studies 1G	Afr Am & Afr Std 12	Art History 163A Art History 163B	Classics 101A Classics 101B
Religious Studies 11	Afr Am & Afr Std 16	Art History 163C	Classics 101C
Religious Studies 30	Afr Am & Afr Std 17	Art History 163D	Classics 101D
Religious Studies 67	Afr Am & Afr Std 18 Afr Am & Afr Std 52	Art History 164	Classics 120
Religious Studies 68 Religious Studies 69	Afr Am & Afr Std 107A	Art History 172A Art History 172B	Classics 125 Classics 140
Religious Studies 105	Afr Am & Afr Std 107C	Art History 173	Classics 142
Religious Studies 115	Afr Am & Afr Std 110	Art History 175	Classics 150
Religious Studies 120	Afr Am & Afr Std 111 Afr Am & Afr Std 152	Art History 176A	Classics 171
Religious Studies 131 Religious Studies 157	Afr Am & Afr Std 152 Afr Am & Afr Std 153	Art History 176B Art History 176C	Classics 174 Classics 175
Religious Studies 170	Afr Am & Afr Std 156	Art History 177A	Communication 5
Russian 129	Afr Am & Afr Std 157	Art History 177B	Comm & Reg Develpmnt 118
Science & Tech Studies 32	Afr Am & Afr Std 162	Art History 178A	Comm & Reg Develpmnt 141
Science & Tech Studies 109	Afr Am & Afr Std 163 Afr Am & Afr Std 168	Art History 178C	Comm & Reg Development 152
Science and Society 18 Science and Society 25	Afr Am & Afr Std 176	Art History 179B Art History 182	Comm & Reg Develpmnt 153A Comm & Reg Develpmnt 153B
Science and Society 25V	Afr Am & Afr Std 177	Art History 183A	Comm & Reg Develpmnt 153C
Science and Society 40	Afr Am & Afr Std 180	Art History 183B	Comm & Reg Develpmnt 154
Sociology 25	Agricult & Res Econ 1S Agricult & Res Econ 15	Art History 183C	Comm & Reg Develpmnt 176
Soil Science 100 Soil Science 105	Agricult & Res Econ 115A	Art History 185 Art History 190F	Comm & Reg Develpmnt 180 Comparative Literature 1
Soil Science 109	Agricult & Res Econ 115B	Art History 190H	Comparative Literature 2
Soil Science 120	Agricult & Res Econ 120S	Asian American Studies 1	Comparative Literature 3
Spanish 132	Anthropology 2 Anthropology 4	Asian American Studies 2	Comparative Literature 4
Spanish 141 Spanish 141S	Anthropology 4 Anthropology 20	Asian American Studies 112	Comparative Literature 5
Spanish 143	Anthropology 23	Asian American Studies 113 Asian American Studies 114	Comparative Literature 6 Comparative Literature 7
Spanish 148	Anthropology 24	Asian American Studies 115	Comparative Literature 8
Spanish 148S	Anthropology 30	Asian American Studies 141	Comparative Literature 9
Spanish 170	Anthropology 34 Anthropology 101	Asian American Studies 150	Comparative Literature 12
Spanish 170S Spanish 172	Anthropology 103	Asian American Studies 150B Asian American Studies 150C	Comparative Literature 13 Comparative Literature 14
Spanish 173	Anthropology 104N	Asian American Studies 150D	Comparative Literature 20
Spanish 175	Anthropology 105	Asian American Studies 150E	Comparative Literature 24
Technocultural Studies 1	Anthropology 110 Anthropology 117	Asian American Studies 189A	Comparative Literature 25
Technocultural Studies 2 Technocultural Studies 4	Anthropology 120	Chicano Studies 215 Chicano Studies 40S	Comparative Literature 53A
Technocultural Studies 5	Anthropology 121	Chicano Studies 50 Chicano Studies 50	Comparative Literature 53B Comparative Literature 53C
Technocultural Studies 6	Anthropology 122A	Chicano Studies 65	Comparative Literature 100
Technocultural Studies 7A	Anthropology 122B	Chicano Studies 70	Comparative Literature 110
Technocultural Studies 7B	Anthropology 123AN Anthropology 124	Chicano Studies 73	Comparative Literature 120
Technocultural Studies 7C Technocultural Studies 7D	Anthropology 125A	Chicano Studies 100 Chicano Studies 122S	Comparative Literature 135 Comparative Literature 138
Technocultural Studies 7E	Anthropology 125B	Chicano Studies 125S	Comparative Literature 139
Technocultural Studies 100	Anthropology 126A	Chicano Studies 1315	Comparative Literature 141
Technocultural Studies 101	Anthropology 126B Anthropology 127	Chicano Studies 135S	Comparative Literature 144
Technocultural Studies 103 Technocultural Studies 104	Anthropology 128A	Chicano Studies 1455 Chicano Studies 147S	Comparative Literature 145 Comparative Literature 146
Technocultural Studies 110	Anthropology 128B	Chicano Studies 150	Comparative Literature 147
Technocultural Studies 111	Anthropology 129	Chicano Studies 154	Comparative Literature 148
Technocultural Studies 150	Anthropology 130A Anthropology 130BN	Chicano Studies 155	Comparative Literature 151
Technocultural Studies 151 Technocultural Studies 152	Anthropology 132	Chicano Studies 156 Chicano Studies 160	Comparative Literature 152 Comparative Literature 152S
Technocultural Studies 154	Anthropology 134	Chicano Studies 165	Comparative Literature 1525
Technocultural Studies 155	Anthropology 136	Chicano Studies 170	Comparative Literature 154
Technocultural Studies 159	Anthropology 138 Anthropology 139AN	Chicano Studies 172	Comparative Literature 155
Technocultural Studies 170A Technocultural Studies 170B	Anthropology 139BN	Chinese 4 Chinese 10	Comparative Literature 156 Comparative Literature 157
Technocultural Studies 170C	Anthropology 140A	Chinese 11	Comparative Literature 157 Comparative Literature 158
Technocultural Studies 170D	Anthropology 140B	Chinese 50	Comparative Literature 159
Technocultural Studies 170E	Anthropology 142 Anthropology 143A	Chinese 100A	Comparative Literature 160A
Technocultural Studies 190 Textiles & Clothing 6	Anthropology 144	Chinese 101 Chinese 102	Comparative Literature 160B Comparative Literature 161A
Textiles & Clothing 7	Anthropology 145	Chinese 102 Chinese 103	Comparative Literature 161B
Textiles & Clothing 107	Anthropology 146N	Chinese 104	Comparative Literature 163
Textiles & Clothing 162	Anthropology 148A Anthropology 149A	Chinese 105	Comparative Literature 164A
Textiles & Clothing 162L Textiles & Clothing 163	Anthropology 149B	Chinese 106 Chinese 107	Comparative Literature 164B Comparative Literature 164C
Textiles & Clothing 165	Anthropology 172	Chinese 107 Chinese 108	Comparative Literature 164D
Textiles & Clothing 171	Anthropology 174	Chinese 109A	Comparative Literature 165
Textiles & Clothing 173	Anthropology 175 Anthropology 177	Chinese 109C	Comparative Literature 165S
University Writing Program 112A	Anthropology 177 Anthropology 178	Chinese 109D	Comparative Literature 166
Viticulture & Enology 123L Viticulture & Enology 125L	Arabic 1A	Chinese 109E Chinese 109G	Comparative Literature 166A Comparative Literature 166B
Viticulture & Enology 128L	Arabic 121	Chinese 109H	Comparative Literature 167
Wild, Fish & Conserv Biol 101	Arabic 122	Chinese 109I	Comparative Literature 168A
Wild, Fish & Conserv Biol 155	Arabic 123 Art History 1A	Chinese 111	Comparative Literature 168B
Wild, Fish & Conserv Biol 156 Wild, Fish & Conserv Biol 157	Art History 1B	Chinese 111 Chinese 111A	Comparative Literature 170 Comparative Literature 180
Women's Studies 20	Art History 1C	Chinese 112	Comparative Literature 180S
Women's Studies 25	Art History 1DV	Chinese 113	Dramatic Art 144C
Women's Studies 50	Art History 1DV Art History 1E	Chinese 150	Dramatic Art 156BN
Women's Studies 138 Women's Studies 139	Art History 10	Chinese 150 Classics 1	Dramatic Art 156D Economics 116
Women's Studies 160	Art History 25	Classics 1 Classics 2	Economics 162
Women's Studies 162	Art History 150	Classics 3	English 46A
Women's Studies 164	Art History 151 Art History 152	Classics 10	English 46B
Women's Studies 165	Art History 152 Art History 153	Classics 15 Classics 20	English 46C English 111
* This course may not be used to satisfy	,	ment and GE writing experience simultaneou	9
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^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth. # Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

E 1:1 1124	C 110F	II 140D	I. 1. 104H
English 113A	German 118E	History 148B	Italian 194H
English 113B	German 119	History 148C	Italian 195H
English 115	German 120	History 149	Japanese 10
English 117	German 122	History 151A	Japanese 15S
English 122	German 123	History 151B	Japanese 50
English 123	German 124	History 151C	Japanese 101
English 125	German 125	History 151D	Japanese 102
English 130	German 126	History 159	Japanese 103
English 133	German 127	History 160	Japanese 104
English 137N	German 129	History 162	Japanese 105
English 138	German 131	History 163A	Japanese 106
English 139	German 132	History 163B	Japanese 107
English 150A	German 133	History 164	Japanese 108
English 150B	German 134	History 165	Japanese 109
English 155A	German 141	History 166A	Japanese 133
English 155B	German 142	History 166B	Japanese 134
English 155C	German 143	History 167	Japanese 135
English 171A	German 160	History 168	Japanese 136
English 171B	German 168	History 169A	Japanese 152
Environmental Sci & Management 30	German 176A	History 190A	Japanese 156
Environ Science & Policy 30	German 185	History 190B	Japanese 198
Environ Science & Policy 101	Greek 100	History 190C	Japanese 199
Environ Science & Policy 105	Greek 105	History 190D	Jewish Studies 10
Film Studies 1	Hebrew 1A	History 191A	Jewish Studies 101
Film Studies 45	History 3	History 191B	Jewish Studies 110
Film Studies 120	History 4A	History 191C	Jewish Studies 111
Film Studies 121	History 4B	History 191D	Jewish Studies 112
Film Studies 121S	History 4C	History 191E	Landscape Architecture 1
Film Studies 127			
Film Studies 127	History 6	History 191F	Landscape Architecture 2
	History 7A	History 193A	Landscape Architecture 30
Film Studies 176A	History 7B	History 193B	Latin 110
Film Studies 176B	History 7C	History 193D	Latin 118
Food Science & Technology 10	History 8	History 194A	Latin 119
French 1	History 9A	History 194B	Latin 120
French 2	History 9B	History 194C	Latin 130
French 3	History 10A	History 194D	Linguistics 5
French 21	History 10B	History 194E	Linguistics 150
French 22	History 10C	History 195B	Linguistics 182
French 23	History 11	History 196A	Medieval Studies 20A
French 50	History 15	History 196B	Medieval Studies 20B
French 51	History 110	Human Development 103	Medieval Studies 130A
French 52	History 110A	Humanities 2A	Medieval Studies 130B
French 53	History 111A	Humanities 7	Medieval Studies 131
French 100	History 111B	Humanities 9	Middle East/S. Asian Std 100
French 101	History 111C	Humanities 9D	Middle East/S. Asian Std 180
French 102	History 112A	Humanities 13	Middle East/S. Asian Std 181A
French 107A	History 112B	Humanities 144	Music 10
French 107B	History 112C	International Agricultural Dev 10	Music 11
French 115	History 113	International Agricultural Dev 162	Music 110A
French 116	History 115A	Italian 1	Music 110B
French 117A	History 115B	Italian 1S	Music 110C
French 117B	History 115C	Italian 2	Music 110D
French 118A	History 115D	Italian 2S	Music 110E
French 118B	History 115E	Italian 3	Music 110G
French 119A	History 115F	Italian 3S	Music 129B
French 119B	History 116	Italian 4	Music 129C
French 119C	History 120	Italian 4S	Music 129D
French 120	History 121A	Italian 5	Native American Studies 1
French 121	History 121B	Italian 5S	Native American Studies 10
French 122	History 121C	Italian 8A	Native American Studies 12
French 124	History 122	Italian 8AS	Native American Studies 34
French 125	History 125	Italian 8B	Native American Studies 118
French 127	History 130A	Italian 8BS	Native American Studies 130A
French 130	History 130B	Italian 9	Native American Studies 184
French 133	History 130C	Italian 9S	Native American Studies 185
French 140	History 131A	Italian 50	Philosophy 145
French 141	History 131B	Italian 101	Political Science 2
French 162	History 131C	Italian 101S	Political Science 3
French 194H	History 132	Italian 104	Political Science 4
French 195H	History 133	Italian 104S	Political Science 116
German 1	History 135A	Italian 105	Political Science 118A
German 2	History 135B	Italian 105S	Political Science 118B
German 3	History 136	Italian 107	Political Science 118C
German 10	History 138A	Italian 107S	Political Science 119
German 20	History 138B	Italian 108	Political Science 124
German 21	History 138C	Italian 108S	Political Science 126
German 22	History 139A	Italian 112	Political Science 137
German 40	History 139B	Italian 113	Political Science 142A
German 45	History 140	Italian 114	Political Science 142B
German 48	History 141	Italian 119	Political Science 143A
German 101A	History 142A	Italian 120B	Political Science 143B
German 103	History 142B	Italian 121	Political Science 144A
German 105	History 143	Italian 1218	Political Science 144B
German 112	History 144A	Italian 131	Political Science 146A
German 113	History 144B	Italian 139B	Political Science 146B
German 114	History 145	Italian 140	Political Science 147A
German 115	History 146A	Italian 141	Political Science 147B
German 116	History 146B	Italian 142	Political Science 147C
German 117	History 147A	Italian 145	Political Science 147D
German 118A	History 147B	Italian 145S	Political Science 148A
German 118B	History 147C	Italian 150	Political Science 148B
German 118C	History 148A	Italian 190X	Political Science 148C
* This course may not be used to satisfy a	college or university composition requireme	nt and GE writing experience simultaneously	V

^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth. # Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

Portugueco 1	Sociology 160	Writing Experience	Anthropology 126A
Portuguese 1 Portuguese 2	Sociology 183	<u> </u>	Anthropology 126B
Portuguese 3	Sociology 188	(WE)	Anthropology 127
Portuguese 21	Spanish 1	Afr Am & Afr Std 10	Anthropology 128A
Portuguese 22	Spanish 1S Spanish 2	Afr Am & Afr Std 12	Anthropology 128B Anthropology 129
Portuguese 23 Portuguese 100	Spanish 2S	Afr Am & Afr Std 17	Anthropology 130A
Portuguese 159	Spanish 2V	Afr Am & Afr Std 50 Afr Am & Afr Std 145B	Anthropology 130BN
Portuguese 161	Spanish 3	Afr Am & Afr Std 152	Anthropology 132
Portuguese 163	Spanish 3S Spanish 3V	Afr Am & Afr Std 153	Anthropology 134 Anthropology 136
Portuguese 198 Religious Studies 1A	Spanish 8	Afr Am & Afr Std 157	Anthropology 138
Religious Studies 1B	Spanish 21	Afr Am & Afr Std 162 Afr Am & Afr Std 163	Anthropology 139AN
Religious Studies 1C	Spanish 21S	Afr Am & Afr Std 169	Anthropology 139BN
Religious Studies 1D Religious Studies 1F	Spanish 21V Spanish 22	Afr Am & Afr Std 170	Anthropology 140A Anthropology 140B
Religious Studies 1G	Spanish 22S	Afr Am & Afr Std 172 Afr Am & Afr Std 175A	Anthropology 141B
Religious Studies 1H	Spanish 23	Afr Am & Afr Std 179A	Anthropology 142
Religious Studies 11 Religious Studies 12	Spanish 23S Spanish 24	Afr Am & Afr Std 185	Anthropology 143A Anthropology 144
Religious Studies 12 Religious Studies 21	Spanish 24S	Agricult & Res Econ 15	Anthropology 145
Religious Studies 23	Spanish 28	Agricult & Res Econ 150 Agricult & Res Econ 194HA	Anthropology 146N
Religious Studies 30	Spanish 31	Agricult & Res Econ 194HB	Anthropology 148A
Religious Studies 40 Religious Studies 60	Spanish 32 Spanish 33	American Studies 1A	Anthropology 149A Anthropology 149B
Religious Studies 65C	Spanish 100	American Studies 1B American Studies 1C	Anthropology 151
Religious Studies 67	Spanish 100S	American Studies 1C American Studies 1E	Anthropology 152
Religious Studies 68	Spanish 130	American Studies 5	Anthropology 153
Religious Studies 69 Religious Studies 90	Spanish 131N Spanish 132	American Studies 10	Anthropology 154A Anthropology 154BN
Religious Studies 100	Spanish 133N	American Studies 21 American Studies 25	Anthropology 154CL
Religious Studies 102	Spanish 134A	American Studies 30	Anthropology 158
Religious Studies 103 Religious Studies 105	Spanish 134B	American Studies 55	Anthropology 170
Religious Studies 105 Religious Studies 106	Spanish 135N Spanish 136N	American Studies 59	Anthropology 172 Anthropology 173
Religious Studies 115	Spanish 137N	American Studies 110 American Studies 120	Anthropology 174
Religious Studies 120	Spanish 138N	American Studies 130	Anthropology 175
Religious Studies 125 Religious Studies 126	Spanish 139 Spanish 140N	American Studies 139	Anthropology 176 Anthropology 177
Religious Studies 130	Spanish 141	American Studies 151 American Studies 152	Anthropology 177 Anthropology 178
Religious Studies 131	Spanish 141S	American Studies 152 American Studies 153	Anthropology 182
Religious Studies 132	Spanish 142	American Studies 154	Anthropology 183
Religious Studies 134 Religious Studies 140	Spanish 143 Spanish 144	American Studies 155	Anthropology 184 Anthropology 194H
Religious Studies 141A	Spanish 148	American Studies 156 American Studies 157	Applied Biological System Tech 110L
Religious Studies 141B	Spanish 148S	Animal Genetics 111	Applied Biological System Tech 163
Religious Studies 141C Religious Studies 156	Spanish 149 Spanish 150N	Animal Science 1	Art History 1D Art History 1DV
Religious Studies 157	Spanish 151	Animal Science 2	Art History 25
Religious Studies 160	Spanish 151N	Animal Science 18 Animal Science 41L	Art History 163A
Religious Studies 161	Spanish 153	Animal Science 42	Art History 163B
Religious Studies 162 Religious Studies 170	Spanish 154 Spanish 155	Animal Science 106	Art History 163C Art History 163D
Religious Studies 175A	Spanish 156	Animal Science 115 Animal Science 123	Art History 164
Russian 1	Spanish 157	Animal Science 127	Art History 168
Russian 2 Russian 3	Spanish 158 Spanish 159	Animal Science 131	Art History 176A Art History 176B
Russian 4	Spanish 159S	Animal Science 136A	Art History 1766 Art History 176C
Russian 5	Spanish 160	Animal Science 136B Animal Science 142	Art History 177A
Russian 6	Spanish 170	Animal Science 144	Art History 177B
Russian 45 Russian 101A	Spanish 170S Spanish 171	Animal Science 146	Art History 178A Art History 178B
Russian 101B	Spanish 1715	Animal Science 148 Animal Science 170	Art History 178C
Russian 101C	Spanish 172	Animal Science 170 Animal Science 194HC	Art History 179B
Russian 102 Russian 122	Spanish 173 Spanish 175	Anthropology 1	Art History 182 Art History 183A
Russian 123	Spanish 182	Anthropology 2	Art History 183B
Russian 124	Spanish 194H	Anthropology 4 Anthropology 5	Art History 183C
Russian 126	Spanish 198	Anthropology 13	Art History 183D
Russian 128 Russian 129	Spanish 199 Textiles & Clothing 7	Anthropology 15	Art History 184 Art History 187
Russian 130	Textiles & Clothing 174	Anthropology 20 Anthropology 23	Art History 190F
Russian 133	Women's Studies 20	Anthropology 24	Art History 190H
Russian 139 Russian 140	Women's Studies 25 Women's Studies 50	Anthropology 32	Asian American Studies 1 Asian American Studies 2
Russian 141	Women's Studies 102	Anthropology 50 Anthropology 54	Asian American Studies 2 Asian American Studies 4
Russian 142	Women's Studies 136	Anthropology 100	Asian American Studies 100
Russian 150	Women's Studies 138	Anthropology 101	Asian American Studies 112
Russian 192 Science & Tech Studies 121	Women's Studies 162 Women's Studies 164	Anthropology 103	Asian American Studies 113 Asian American Studies 115
Science & Tech Studies 129	Women's Studies 178A	Anthropology 104N Anthropology 105	Asian American Studies 116
Science and Society 25	Women's Studies 178B	Anthropology 109	Asian American Studies 121
Science and Society 25V	Women's Studies 178C Women's Studies 178D	Anthropology 110	Asian American Studies 130
Sociology 4 Sociology 5	Women's Studies 178D Women's Studies 178E	Anthropology 117	Asian American Studies 141 Asian American Studies 150B
Sociology 104	Women's Studies 178F	Anthropology 120 Anthropology 121	Asian American Studies 150E
Sociology 138	Women's Studies 179	Anthropology 122A	Asian American Studies 150F
Sociology 145A Sociology 145B	Women's Studies 182 Women's Studies 184	Anthropology 122B	Asian American Studies 189E Asian American Studies 189I
Sociology 147	Women's Studies 185	Anthropology 123AN Anthropology 124	Atmospheric Science 116
Sociology 153	Women's Studies 193	Anthropology 125A	Avian Ŝciences 123
Sociology 158		Anthropology 125B	Biological Sciences 10V
* This course may not be used to satisfy a	college or university composition requireme	ent and GE writing experience simultaneously	/.

^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth. # Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

n: 1 : 1c : 122	C C.D D 1 (147	F1 (* 120	F 1:1 162
Biological Sciences 122	Comm & Reg Develpmnt 147	Education 120	English 153
Biological Sciences 122P	Comm & Reg Development 149	Education 122	English 155A
Biological Sciences 124	Comm & Reg Development 151	Education 130 Education 147	English 155B English 155C
Biological Sciences 132 Biological Sciences 133	Comm & Reg Develpmnt 152 Comm & Reg Develpmnt 153A	Education 150	English 156
Biological Sciences 194H	Comm & Reg Develpmint 155A Comm & Reg Develpmint 154	Education 150	English 158A
Biotechnology 171	Comm & Reg Develpmnt 156	Education 181	English 158B
Biotechnology 188	Comm & Reg Develpmnt 157	Education 183	English 159
Biotechnology 194H	Comm & Reg Develpmnt 164	Engineering 45	English 164
Chemistry 115	Comm & Reg Develpmnt 176	Engineering 111	English 165
Chemistry 125	Comm & Reg Develpmnt 180	Engineering 121	English 166
Chemistry 150	Comparative Literature 1	Engineering Aerospace Sci 127	English 167
Chicano Studies 10	Comparative Literature 2	Engineering Aerospace Sci 130B	English 168
Chicano Studies 21	Comparative Literature 3	Engr: Biological Systems 75	English 171A
Chicano Studies 21S	Comparative Literature 4	Engr: Biological Systems 114	English 171B
Chicano Studies 23	Comparative Literature 5	Engr: Biological Systems 120	English 173
Chicano Studies 30	Comparative Literature 6	Engr: Biological Systems 125	English 175
Chicano Studies 40	Comparative Literature 7	Engr: Biological Systems 127	English 177
Chicano Studies 40S	Comparative Literature 8	Engr: Biological Systems 128	English 178
Chicano Studies 50	Comparative Literature 9	Engr: Biological Systems 135	English 179
Chicano Studies 60	Comparative Literature 12	Engr: Biological Systems 165	English 180
Chicano Studies 65	Comparative Literature 13	Engr: Biological Systems 170A	English 181A
Chicano Studies 70	Comparative Literature 14	Engr: Biological Systems 170B	English 181B
Chicano Studies 100	Comparative Literature 20	Engr: Biological Systems 170BL	English 182
Chicano Studies 110 Chicano Studies 111	Comparative Literature 24	Engr: Biological Systems 170C	English 183 English 184
Chicano Studies 111 Chicano Studies 112	Comparative Literature 25	Engr: Biological Systems 170CL	English 185A
Chicano Studies 112 Chicano Studies 120	Comparative Literature 53A Comparative Literature 53B	Engineering Biomedical 116 Engineering Biomedical 126	English 185B
Chicano Studies 120 Chicano Studies 121	Comparative Literature 53C	Engineering Biomedical 173	English 186
Chicano Studies 121 Chicano Studies 122	Comparative Literature 100	Engr: Chemical 155A	English 189
Chicano Studies 1225	Comparative Literature 110	Engr: Chemical 155B	English 194H
Chicano Studies 123	Comparative Literature 120	Engr: Chemical 158C	English 195H
Chicano Studies 125S	Comparative Literature 135	Engr: Chemical 161L	Entomology 1
Chicano Studies 130	Comparative Literature 138	Engr: Civil & Environ 123	Entomology 2
Chicano Studies 131	Comparative Literature 139	Engr: Civil & Environ 137	Entomology 100
Chicano Studies 131S	Comparative Literature 140	Engr: Civil & Environ 143	Entomology 102
Chicano Studies 132	Comparative Literature 141	Engr: Civil & Environ 148B	Entomology 105
Chicano Studies 135S	Comparative Literature 142	Engr: Civil & Environ 155	Entomology 110
Chicano Studies 145S	Comparative Literature 144	Engr: Civil & Environ 163	Entomology 117
Chicano Studies 147S	Comparative Literature 145	Engr: Computer Science 15	Entomology 119
Chicano Studies 150	Comparative Literature 146	Engr: Computer Science 188	Entomology 153
Chicano Studies 154	Comparative Literature 147	Engr: Materials Science 162L	Entomology 158
Chicano Studies 155	Comparative Literature 148	Engr: Materials Science 172L	Environmental Horticulture 1
Chicano Studies 156	Comparative Literature 151	Engr: Materials Science 174L	Environmental Horticulture 120
Chicano Studies 160	Comparative Literature 152	Engr: Materials Science 180	Environmental Horticulture 125
Chicano Studies 165	Comparative Literature 152S	Engr: Materials Science 181	Environmental Horticulture 160
Chicano Studies 170	Comparative Literature 153	Engr: Materials Science 182	Environmental Sci & Management 6
Chicano Studies 181	Comparative Literature 154	Engr: Materials Science 188A	Environmental Sci & Management 8
Chicano Studies 182 Chicano Studies 194HA	Comparative Literature 155	Engr: Materials Science 188B	Environmental Sci & Management 194H
Chicano Studies 194HB	Comparative Literature 156 Comparative Literature 157	Engineering Mechanical 107B Engineering Mechanical 150A	Environ Science & Policy 10 Environ Science & Policy 101
Chicano Studies 194HC	Comparative Literature 157 Comparative Literature 158	Engineering Mechanical 185A	Environ Science & Policy 105
Chinese 150	Comparative Literature 159	Engineering Mechanical 185B	Environ Science & Policy 163
Classics 1	Comparative Literature 160A	English 3	Environ Science & Policy 171
Classics 2	Comparative Literature 160B	English 4	Environmental Toxicology 102A
Classics 3	Comparative Literature 161A	English 5F	Environmental Toxicology 103B
Classics 15	Comparative Literature 161B	English 30A	Environmental Toxicology 110
Classics 20	Comparative Literature 163	English 30B	Environmental Toxicology 120
Classics 25	Comparative Literature 164A	English 40	Environmental Toxicology 127
Classics 50	Comparative Literature 164B	English 42	Environmental Toxicology 130
Classics 101A	Comparative Literature 164C	English 43	Environmental Toxicology 138
Classics 101B	Comparative Literature 164D	English 44	Evolution and Ecology 2
Classics 101C	Comparative Literature 165	English 45	Evolution and Ecology 11
Classics 101D	Comparative Literature 165S	English 46A	Evolution and Ecology 12
Classics 102	Comparative Literature 166	English 46G	Evolution and Ecology 106
Classics 110 Classics 120	Comparative Literature 1668	English 46C English 105	Evolution and Ecology 110 Evolution and Ecology 114
Classics 120 Classics 125	Comparative Literature 166B Comparative Literature 167	English 105 English 106	Evolution and Ecology 114 Evolution and Ecology 115
Classics 140	Comparative Literature 168A	English 107	Evolution and Ecology 138
Classics 140	Comparative Literature 168B	English 110A	Evolution and Ecology 141
Classics 142	Comparative Literature 169	English 110B	Evolution and Ecology 147
Classics 143	Comparative Literature 170	English 111	Evolution and Ecology 149
Classics 150	Comparative Literature 180	English 113A	Evolution and Ecology 180B
Classics 172A	Comparative Literature 180S	English 113B	Evolution and Ecology 194HA
Classics 172B	Comparative Literature 194H	English 115	Evolution and Ecology 194HB
Classics 173	Consumer Sciences 100	English 117	Evolution and Ecology 194HC
Classics 175	Design 1	English 122	Exercise Biology 104L
Classics 190	Design 40A	English 123	Exercise Biology 115
Communication 139	Design 40B	English 125	Exercise Biology 126
Communication 143	Design 144	English 130	Fiber And Polymer Science 110
Communication 144	Dramatic Art 1	English 133	Fiber And Polymer Science 150
Communication 146	Dramatic Art 155	English 137N	Fiber And Polymer Science 161
Communication 189A	Dramatic Art 156AN	English 138	Fiber And Polymer Science 161L
Communication 189B	Dramatic Art 156BN	English 139	Fiber And Polymer Science 180A
Communication 189C Communication 189D	Dramatic Art 156CN Dramatic Art 156D	English 142 English 143	Fiber And Polymer Science 180B Film Studies 1
Communication 194H		English 144	Film Studies 1
	Dramatic Art 158		· ····· Judies 13
Comm & Reg Develoret 1	Dramatic Art 158 Dramatic Art 160A		Film Studies 120
Comm & Reg Develpmnt 1 Comm & Reg Develpmnt 2	Dramatic Art 160A	English 146N	Film Studies 120 Film Studies 121
Comm & Reg Develpmnt 2			Film Studies 120 Film Studies 121 Film Studies 121S
	Dramatic Art 160A Dramatic Art 160B	English 146N English 147	Film Studies 121
Comm & Reg Develpmnt 2 Comm & Reg Develpmnt 20	Dramatic Art 160A Dramatic Art 160B Education 81	English 146N English 147 English 149	Film Studies 121 Film Studies 121S

^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth. # Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

Film Studies 127	German 118B	History 115D	History 190A
Film Studies 142	German 118C	History 115E	History 190B
Film Studies 176A	German 118E	History 115F	History 190C
Film Studies 176B	German 120	History 116	History 190D
Film Studies 189	German 122	History 120	History 191A
Film Studies 195H	German 123	History 121A	History 191B
Film Studies 196H	German 125	History 121B	History 191C
Food Science & Technology 101A	German 126	History 121C	History 191D
Food Science & Technology 101B	German 127 German 129	History 122 History 125	History 191E History 191F
Food Science & Technology 103 Food Science & Technology 104L	German 131	History 130A	History 1911 History 193A
Food Science & Technology 107	German 132	History 130B	History 193B
Food Science & Technology 123L	German 133	History 130C	History 193D
Food Science & Technology 127	German 134	History 131A	History 194A
Food Science & Technology 159	German 141	History 131B	History 194B
French 21	German 142	History 131C	History 194C
French 22	German 143	History 132	History 194D
French 23	German 160	History 133	History 194E
French 50	German 168	History 134A	History 195B
French 51 French 52	German 176A German 185	History 135A History 135B	History 196A History 196B
French 53	Greek 100	History 136	Human Development 101
French 100	Greek 101	History 138A	Human Development 102
French 101	Greek 102	History 138B	Human Development 117
French 102	Greek 103A	History 138C	Human Development 120
French 103	Greek 103B	History 139A	Human Development 161
French 105	Greek 104	History 139B	Humanities 1D
French 106	Greek 105	History 140	Humanities 2A
French 107	Greek 111	History 141	Humanities 3
French 107A	Greek 112	History 142A	Humanities 4D
French 107B	Greek 113	History 142B	Humanities 7 Humanities 8
French 108 French 110	Greek 114 Greek 115	History 143 History 144A	Humanities 8 Humanities 9D
French 115	Greek 115	History 144B	Humanities 13
French 116	Greek 130	History 145	Humanities 15
French 117A	History 3	History 146A	Humanities 18
French 117B	History 4A	History 146B	Humanities 60
French 118A	History 4B	History 147A	Humanities 180
French 118B	History 4C	History 147B	International Agricultural Dev 10
French 119A	History 6	History 147C	International Agricultural Dev 103
French 119B	History 7A	History 148A	International Agricultural Dev 162
French 119C French 120	History 7B History 7C	History 148B History 148C	International Relations 1 International Relations 131
French 121	History 8	History 149	International Relations 190
French 122	History 9A	History 151A	International Relations 192
French 124	History 9B	History 151B	International Relations 194HA
French 125	History 10A	History 151C	International Relations 194HB
French 127	History 10B	History 151D	Italian 50
French 128	History 10C	History 159	Italian 101
French 130	History 11	History 160	Italian 101S
French 133	History 15	History 162	Italian 107
French 140	History 17A	History 163A History 163B	Italian 107S
French 141 French 160	History 17B History 72A	History 164	Italian 108 Italian 108S
French 162	History 72B	History 165	Italian 112
French 194H	History 85	History 166A	Italian 113
French 195H	History 101	History 166B	Italian 114
Geology 1	History 102A	History 167	Italian 115D
Geology 3G	History 102B	History 168	Italian 119
Geology 4	History 102D	History 169A	Italian 120B
Geology 16G	History 102E	History 169B	Italian 121
Geology 36	History 102F	History 170A History 170B	Italian 121S
Geology 81 Geology 103	History 102G History 102H	History 170B History 170C	Italian 131 Italian 139B
Geology 105 Geology 105	History 102H History 102I	History 171A	Italian 140
Geology 105 Geology 106	History 102]	History 171B	Italian 140 Italian 141
Geology 108	History 102K	History 171D	Italian 142
Geology 109L	History 102L	History 172	Italian 145
Geology 110	History 102M	History 173	Italian 145S
Geology 115	History 102N	History 174A	Italian 150
Geology 134	History 1020	History 174B	Italian 190X
Geology 136	History 102P	History 174C	Italian 195H
Geology 144 Geology 181	History 102Q History 102R	History 174D History 175	Japanese 10 Japanese 101
Geology 181 Geology 183	History 102K History 102S	History 175 History 176A	Japanese 101 Japanese 102
Geology 194A	History 1023	History 176B	Japanese 152
Geology 194B	History 103	History 177A	Japanese 156
Geology 194HA	History 104A	History 177B	Jewish Studies 10
Geology 194HB	History 104B	History 178A	Jewish Studies 101
German 10	History 104C	History 178B	Jewish Studies 110
German 40	History 110	History 179	Jewish Studies 111
German 45	History 110A	History 180AN	Jewish Studies 112
German 48 German 101A	History 111A History 111B	History 180BN History 181	Jewish Studies 120 Landscape Architecture 1
German 101A German 103	History 1116 History 111C	History 181	Landscape Architecture 1 Landscape Architecture 2
German 104	History 112A	History 183A	Landscape Architecture 2 Landscape Architecture 3
German 105	History 112B	History 183B	Landscape Architecture 30
German 113	History 112C	History 184	Landscape Architecture 50
German 114	History 113	History 185A	Landscape Architecture 180F
German 115	History 115A	History 185B	Landscape Architecture 180K
German 116	History 115B	History 188	Latin 101
German 117	History 115C	History 189	Latin 102

^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth. # Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

Latin 103	Philosophy 5	Political Science 119	Religious Studies 1E
Latin 104	Philosophy 11	Political Science 120	Religious Studies 1F
Latin 105	Philosophy 13G	Political Science 121	Religious Studies 1G
Latin 106	Philosophy 14	Political Science 122	
			Religious Studies 1H
Latin 108	Philosophy 15	Political Science 123	Religious Studies 10A
Latin 109	Philosophy 16	Political Science 124	Religious Studies 11
Latin 110	Philosophy 17	Political Science 126	Religious Studies 12
Latin 112	Philosophy 21	Political Science 129	Religious Studies 21
Latin 115	Philosophy 22	Political Science 130	Religious Studies 23
Latin 116	Philosophy 24	Political Science 131	Religious Studies 30
Latin 118	Philosophy 30	Political Science 132	Religious Studies 40
Latin 119	Philosophy 31	Political Science 135	Religious Studies 60
Latin 120	Philosophy 32	Political Science 136	Religious Studies 65C
Latin 125	Philosophy 38	Political Science 137	Religious Studies 67
Latin 130	Philosophy 101	Political Science 140A	Religious Studies 68
Linguistics 6	Philosophy 102	Political Science 140B	Religious Studies 69
Linguistics 160	Philosophy 103	Political Science 140C	Religious Studies 80
Linguistics 163	Philosophy 104	Political Science 142A	Religious Studies 90
Linguistics 165	Philosophy 105	Political Science 142B	Religious Studies 100
Linguistics 180	Philosophy 107	Political Science 143A	Religious Studies 102
Linguistics 182	Philosophy 108	Political Science 143B	Religious Studies 103
Mathematics 189	Philosophy 109	Political Science 144A	Religious Studies 105
Med - Public Health Sciences 175W	Philosophy 111	Political Science 144B	Religious Studies 106
Medieval Studies 20A	Philosophy 114	Political Science 146A	Religious Studies 110
Medieval Studies 20B	Philosophy 115	Political Science 146B	Religious Studies 115
Medieval Studies 130A	Philosophy 116	Political Science 147A	Religious Studies 120
Medieval Studies 130B	Philosophy 117	Political Science 147B	Religious Studies 122
Medieval Studies 131	Philosophy 118	Political Science 147C	Religious Studies 125
Medieval Studies 189	Philosophy 119	Political Science 147D	Religious Studies 130
Microbiology 102L	Philosophy 120	Political Science 148A	Religious Studies 131
Microbiology 104L	Philosophy 123	Political Science 148B	Religious Studies 132
Microbiology 105L	Philosophy 125	Political Science 148C	Religious Studies 134
Middle East/S. Asian Std 100	Philosophy 131	Political Science 150	Religious Studies 140
Middle East/S. Asian Std 180	Philosophy 137A	Political Science 151	Religious Studies 141A
Middle East/S. Asian Std 181A	Philosophy 137B	Political Science 152	Religious Studies 141B
Molecular and Cellular Biology 120L	Philosophy 137C	Political Science 153	Religious Studies 141C
Molecular and Cellular Biology 144	Philosophy 141	Political Science 154	Religious Studies 145
Molecular and Cellular Biology 160L	Philosophy 143	Political Science 155	Religious Studies 150
Molecular and Cellular Biology 194H	Philosophy 151	Political Science 160	Religious Studies 156
Music 10	Philosophy 156	Political Science 162	Religious Studies 157
Music 24A	Philosophy 157	Political Science 163	Religious Studies 160
Music 24B	Philosophy 160	Political Science 164	Religious Studies 161
Music 24C	Philosophy 161	Political Science 165	Religious Studies 162
Music 28	Philosophy 162	Political Science 166	Russian 45
Music 105	Philosophy 168	Political Science 168	Russian 102
Music 106	Philosophy 170	Political Science 170	Russian 122
Music 110A	Philosophy 172	Political Science 171	Russian 123
Music 110B	Philosophy 174	Political Science 172	Russian 124
Music 110C	Philosophy 175	Political Science 174	Russian 126
Music 110D	Philosophy 178	Political Science 175	Russian 128
Music 110E	Philosophy 189A	Political Science 176	Russian 129
Music 110F	Philosophy 189B	Political Science 179	Russian 130
Music 110G	Philosophy 189C	Political Science 180	Russian 133
Music 115	Philosophy 189D	Political Science 183	Russian 139
Music 124A	Philosophy 189E	Political Science 187	Russian 140
Music 124B	Philosophy 189F	Political Science 190	Russian 141
Music 126	Philosophy 189G	Political Science 192A	Russian 142
Music 129A	Philosophy 189H	Political Science 192B	Russian 150
Music 129B	Philosophy 189I	Political Science 193	Russian 192
Music 129C	Physics 116C	Political Science 193W	Science & Tech Studies 1
Music 129D	Physics 122A	Political Science 194HA	Science & Tech Studies 20
Native American Studies 1	Physics 122B	Political Science 194HB	Science & Tech Studies 108
Native American Studies 5	Plant Biology 143	Political Science 195	Science & Tech Studies 109
Native American Studies 10	Plant Science 12	Political Science 196A	Science & Tech Studies 121
Native American Studies 12	Plant Science 141	Political Science 196B	Science & Tech Studies 129
Native American Studies 108	Plant Science 188	Political Science 196C	Science & Tech Studies 130A
Native American Studies 118	Plant Science 194H	Political Science 196D	Science & Tech Studies 130B
Native American Studies 119	Political Science 1	Political Science 196E	Science & Tech Studies 131
Native American Studies 119	Political Science 2	Portuguese 23	Science & Tech Studies 150
Native American Studies 130A	Political Science 3	Portuguese 100	Science & Tech Studies 161
Native American Studies 130B	Political Science 4	Portuguese 159	Science & Tech Studies 163
Native American Studies 130C	Political Science 5	Portuguese 161	Science & Tech Studies 164
Native American Studies 133B	Political Science 7	Portuguese 162	Science & Tech Studies 173
Native American Studies 135	Political Science 51	Portuguese 163	Science & Tech Studies 175
Native American Studies 146	Political Science 100	Portuguese 198	Science and Society 1
Native American Studies 157	Political Science 102	Psychology 132	Science and Society 7
Native American Studies 180	Political Science 104	Psychology 136	Science and Society 8
Native American Studies 181A	Political Science 105	Psychology 141	Science and Society 9
Native American Studies 181B	Political Science 106	Psychology 142	Science and Society 11
Native American Studies 188	Political Science 107	Psychology 146	Science and Society 20
Nematology 10V	Political Science 108	Psychology 158	Science and Society 25
Neuro, Physio & Behavior 106	Political Science 109	Psychology 162	Science and Society 25V
Neuro, Physio & Behavior 111C	Political Science 110	Psychology 170	Science and Society 40
Neuro, Physio & Behavior 140	Political Science 112	Psychology 175	
			Sociology 193
Neuro, Physio & Behavior 141	Political Science 113	Psychology 185	Soil Science 105
Neuro, Physio & Behavior 141P	Political Science 114	Psychology 194HA	Soil Science 109
Nutrition 11	Political Science 115	Psychology 194HB	Soil Science 111
Nutrition 115	Political Science 116	Religious Studies 1	Spanish 23
Nutrition 117	Political Science 117	Religious Studies 1A	Spanish 23S
Nutrition 127	Political Science 118A	Religious Studies 1B	Spanish 24
Nutrition 129	Political Science 118B	Religious Studies 1C	Spanish 24S
Philosophy 1	Political Science 118C	Religious Studies 1D	Spanish 31
		nt and GE writing experience simultaneousl	

^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth. # Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

Spanish 32
Spanish 33
Spanish 100
Spanish 100S
Spanish 110
Spanish 123
Spanish 133N
Spanish 134A
Spanish 134B
Spanish 136N
Spanish 137N
Spanish 140N
Spanish 142
Spanish 147
Spanish 149
Spanish 170
Spanish 170S
Spanish 175
Spanish 180
Spanish 181
Spanish 182
Spanish 194H
Spanish 198
Spanish 199
Technocultural Studies 1
Technocultural Studies 2
Technocultural Studies 4
Technocultural Studies 5
Technocultural Studies 6
Technocultural Studies 158
Technocultural Studies 190

Technocultural Studies 191
Textiles & Clothing 7
Textiles & Clothing 107
Textiles & Clothing 162L
Textiles & Clothing 163L
Textiles & Clothing 180A
Textiles & Clothing 180B
University Writing Program 1
University Writing Program 11
University Writing Program 18
University Writing Program 19
University Writing Program 98
University Writing Program 99
University Writing Program 101
University Writing Program 102A
University Writing Program 102B
University Writing Program 102C
University Writing Program 102D
University Writing Program 102E
University Writing Program 102F
University Writing Program 102G
University Writing Program 102H
University Writing Program 102I
University Writing Program 102J
University Writing Program 102K
University Writing Program 102L
University Writing Program 104A
University Writing Program 104B
University Writing Program 104C
University Writing Program 104D
University Writing Program 104E

University Writing Program 104F
University Writing Program 104I
University Writing Program 104T
University Writing Program 111A
University Writing Program 111B
University Writing Program 111C
University Writing Program 112A
University Writing Program 198
University Writing Program 199
Viticulture & Enology 111
Viticulture & Enology 123L
Viticulture & Enology 124
Viticulture & Enology 124L
Viticulture & Enology 125L
Viticulture & Enology 126L
Viticulture & Enology 128L
Washington Center 175
Washington Center 193
Wild, Fish & Conserv Biol 10
Wild, Fish & Conserv Biol 50
Wild, Fish & Conserv Biol 101
Wild, Fish & Conserv Biol 102L
Wild, Fish & Conserv Biol 121
Wild, Fish & Conserv Biol 153
Wild, Fish & Conserv Biol 154
Wild, Fish & Conserv Biol 155
Wild, Fish & Conserv Biol 156
Women's Studies 20
Women's Studies 25
Women's Studies 50
Women's Studies 60

Women's Studie	s 70
Women's Studie	s 102
Women's Studie	s 103
Women's Studie	s 104
Women's Studie	s 130
Women's Studie	
Women's Studie	s 137
Women's Studie	s 138
Women's Studie	s 139
Women's Studie	s 158
Women's Studie	s 162
Women's Studie	s 164
Women's Studie	s 170
Women's Studie	s 178A
Women's Studie	s 178B
Women's Studie	s 178C
Women's Studie	s 178D
Women's Studie	s 178E
Women's Studie	s 178F
Women's Studie	s 179
Women's Studie	s 180
Women's Studie	s 182
Women's Studie	s 184
Women's Studie	s 187
Women's Studie	s 189
Women's Studie	s 191
Women's Studie	s 193
Women's Studie	s 194HA
Women's Studie	
Women's Studie	s 195

^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth. # Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

FORMER GENERAL EDUCATION COURSES; PRE-FALL 2011

The following section pertains to students who matriculated to UC Davis prior to Fall 2011. Students who matriculated for the first time in Fall 2011 or later should refer to the New General Education Courses; Fall 2011 and On, on page 538.

For the most up-to-date General Education courses, use the GE search tool at http://registrar4.ucdavis.edu/courses/GE_courses/.

TOPICAL BREADTH

These courses provide GE credit for topical breadth. Many of these courses also satisfy the GE requirement for social-cultural diversity (indicated by **D**) and/or provide GE credit for writing experience (indicated by **W**). Complete lists of the courses that satisfy the social-cultural diversity requirement and the courses that provide writing experience credit follow this list.

Arts & Humanities		Art History 172B	W	Classics 102W	Comparative Literature 180S	V
	D 117	Art History 173		Classics 110W	Critical Theory 101	
Afr Am & Afr Std 12		Art History 175	DW	Classics 140W	Design 40B	
Afr Am & Afr Std 15		Art History 176A		Classics 141W	Design 137B †	
Afr Am & Afr Std 16		Art History 176B		Classics 142W	Design 142A	D
Afr Am & Afr Std 50		Art History 177A		Classics 143W	Design 142B	
Afr Am & Afr Std 52	DW	Art History 177B		Classics 171	Design 143	
Afr Am & Afr Std 107A	DW	Art History 178A		Classics 172AW	Dramatic Art 1	
.fr Am & Afr Std 107B	DW	Art History 178B		Classics 172BW	Dramatic Art 1S	
Afr Am & Afr Std 107C	DW	Art History 178C		Classics 173W	Dramatic Art 5	
dr Am & Afr Std 111		Art History 179B		Classics 174W	Dramatic Art 20	
Afr Am & Afr Std 123		Art History 182		Classics 177	Dramatic Art 1115	D Z
Afr Am & Afr Std 150A		Art History 183A	vv	Classics 179W	Dramatic Art 1113	7
dr Am & Afr Std 150B		Art History 183B	D W		Dramatic Art 144 †	
dr Am & Afr Std 152				Comparative Literature 1*		
fr Am & Afr Std 153		Art History 183C		Comparative Literature 2*	Dramatic Art 144B †	D
fr Am & Afr Std 160		Art History 184		Comparative Literature 3*	Dramatic Art 150	DV
fr Am & Afr Std 162		Art History 185		Comparative Literature 4	Dramatic Art 151S	ъ. т
fr Am & Afr Std 163		Art History 186		Comparative Literature 5	Dramatic Art 154	DV
		Art History 187		Comparative Literature 6	Dramatic Art 155	DV
fr Am & Afr Std 168		Art History 188A		Comparative Literature 7	Dramatic Art 155B	
fr Am & Afr Std 169		Art History 188B	W	Comparative Literature 8W	Dramatic Art 156AN	
fr Am & Afr Std 170		Art History 188D	W	Comparative Literature 9	Dramatic Art 156BN	DV
fr Am & Afr Std 171		Art History 188E		Comparative Literature 12	Dramatic Art 156CN	
fr Am & Afr Std 175A		Art History 189		Comparative Literature 13W	Dramatic Art 156D	
fr Am & Afr Std 180 †	D	Art Studio 10		Comparative Literature 14W	East Asian Studies 88	
r Am & Afr Std 185		Art Studio 24		Comparative Literature 20W	East Asian Studies 113	
nerican Studies 1A	DW	Art Studio 26	W	Comparative Literature 24	Education 147	
nerican Studies 1B †		Art Studio 30	D W	Comparative Literature 25	English 3	
nerican Studies 1C †				Comparative Literature 23	English 4	
merican Studies 1E †		Art Studio 147			English 4	
merican Studies 5 †		Art Studio 148		Comparative Literature 53B	English 30A	
		Art Studio 149		Comparative Literature 53CDW	English 30B	
nerican Studies 10 †		Art Studio 150		Comparative Literature 100	English 105	'
nerican Studies 21		Asian American Studies 4		Comparative Literature 110 DW	English 106	
nerican Studies 25 †		Asian American Studies 112 †	·	Comparative Literature 120W	English 107	<i>I</i>
nerican Studies 30 †		Asian American Studies 130		Comparative Literature 135	English 111	V
nerican Studies 55 †	DW	Asian American Studies 141 †	·D	Comparative Literature 138	English 113A	
nerican Studies 59 †	DW	Asian American Studies 150F		Comparative Literature 140W	English 113B	
merican Studies 110 †	DW	Chicano Studies 60		Comparative Literature 141W	English 117	
merican Studies 120 †	DW	Chicano Studies 65		Comparative Literature 144W	English 122	
merican Studies 130 †		Chicano Studies 111	D	Comparative Literature 145 DW	English 139	
merican Studies 151 †		Chicano Studies 150	D W			
merican Studies 152 †				Comparative Literature 146W	English 156	
merican Studies 153 †		Chicano Studies 154		Comparative Literature 147 DW	English 160	
merican Studies 154 †		Chicano Studies 160		Comparative Literature 148	English 161A	
		Chicano Studies 181	DW	Comparative Literature 151 DW	English 161B	
merican Studies 155 †		Chicano Studies 182 †	DW	Comparative Literature 152	English 162	
nerican Studies 156 †		Chinese 10		Comparative Literature 152S D W	English 163	V
merican Studies 157 †	DW	Chinese 11	DW	Comparative Literature 153 DW	English 171A	DV
nerican Studies 158		Chinese 50		Comparative Literature 154	English 171B	
thropology 145 †	DW	Chinese 100A		Comparative Literature 155DW	English 173	
t History 1A		Chinese 101		Comparative Literature 156	English 175	
t History 1B		Chinese 102		Comparative Literature 157W	English 179	
t History 1C	D	Chinese 103		Comparative Literature 157W Comparative Literature 158W	English 180	
rt History 1D				Comparative Literature 150W		
t History 1DV		Chinese 104		Comparative Literature 159 DW	English 182	
t History 1E		Chinese 105		Comparative Literature 160AW	English 184	
t History 5		Chinese 106		Comparative Literature 160BW	Entomology 1 †	
	u w	Chinese 107		Comparative Literature 161AW	Film Studies 1	
rt History 10		Chinese 108		Comparative Literature 161BW	Film Studies 45	
rt History 25	#	Chinese 109A	DW	Comparative Literature 163W	Film Studies 120	D'
t History 100	W	Chinese 109C		Comparative Literature 164AW	Film Studies 121	
t History 110		Chinese 109D	DW	Comparative Literature 164BW	Film Studies 1215	
rt History 150		Chinese 109E	DW	Comparative Literature 164CW	Film Studies 124	
t History 151	D	Chinese 109G		Comparative Literature 164DW	Film Studies 125	
t History 152	D	Chinese 109H		Comparative Literature 165	Film Studies 129	
rt History 153		Chinese 109I		Comparative Literature 165S D W	Film Studies 142	
t History 155						
t History 156		Chinese 110		Comparative Literature 166	Film Studies 176A	
rt History 163A		Chinese 150		Comparative Literature 166AW	Film Studies 176B	
		Classics 1		Comparative Literature 166BW	French 50	
rt History 163B		Classics 2	W	Comparative Literature 167W	French 51	
rt History 163C		Classics 3		Comparative Literature 168AW	French 52	
t History 163D		Classics 10		Comparative Literature 168BW	French 101	
rt History 164	DW	Classics 20	W	Comparative Literature 169W	French 102	
rt History 168		Classics 25		Comparative Literature 170W	French 103	
t History 172A		Classics 50		Comparative Literature 170W	French 107	

This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously.

[†] Also assigned to another area of topical breadth. # Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

French 107A	W	History 110	† D W	History 185B	W	Latin 106	W
	W		AW	History 189		Latin 108	
French 115			BW	History 190A †		Latin 109	
French 116				History 190B †		Latin 110	
			CW				
French 117A			A D W	History 190C †		Latin 112	
French 117B		History 112	B D W	History 190D	. D W	Latin 115	W
French 118A		History 113	D W	History 191A	. D W	Latin 116	W
French 118B			A D W	History 191B		Latin 125	
	W		B	History 191C		Linguistics 1 †	
							٧٧
	W		C D W	History 191D		Linguistics 106	
French 119C		History 115	E D W	History 191E	. D W	Linguistics 150 †	W
French 120	W	History 115	F D W	History 191F	. D W	Linguistics 182 †	D W
	W	History 116		History 193A †		Medieval Studies 20A	
French 122			A W	History 193B †		Medieval Studies 20B	
	D				. D W		
			BW	History 193C †		Medieval Studies 130A	
	W	History 121	CW	History 193D †	. D W	Medieval Studies 130B	W
French 127	W	History 122		History 194A	. D W	Middle East/S. Asian Std 100	D W
	W	History 125	W	History 194B		Middle East/S. Asian Std 180	
	D		A	History 194C		Middle East/S. Asian Std 181A †	D 11
	D				. D		***
French 162		History 130		History 194D		Music 10	
German 10	D W	History 130	C	History 194E		Music 11	D
German 40	D W	History 131.	A	History 195B	. D W	Music 105	D W
German 45			BW	History 196A		Music 106	
	W				. Б 11		
	vv		CW	Humanities 1D (course 1 required	***	Music 110A	
German 101A		History 133		concurrently)	W	Music 110B	
German 101B		History 134.	A	Humanities 2A		Music 110C	W
	W	History 135		Humanities 2B		Music 110D	
		History 135		Humanities 4D (course 4 required		Music 110E	
					117		
	D W		W	concurrently)		Music 110F	
	W	History 138	AW	Humanities 7	. D W	Music 110G	
	W	History 138	BW	Humanities 8 †		Music 115	W
	D W		CW	Humanities 9 (course 9D required		Music 129A	
					44		
	D W		A †W	concurrently)		Music 129B	
	W		B †W	Humanities 13		Music 129C	
German 118B .	W		W	Humanities 15		Music 129D	D W
	W		A	Humanities 18 †		Native American Studies 5	
German 118E			B D W				
German 110E	***			Humanities 60 †	. D W	Native American Studies 10 †	
German 119	W	History 143	D W	Humanities 144		Native American Studies 33	D
German 120		History 144	B D W	Humanities 180	W	Native American Studies 101	D
German 121			W	Integrated Studies 8B		Native American Studies 181A	
				Italian 50			
German 122			AW		vv	Native American Studies 181B	
German 123			BW	Italian 105		Native American Studies 181C	
German 124		History 147	A † W	Italian 105S	. D W	Native American Studies 191	D
German 125			B † W	Italian 107		Philosophy 1	
German 126			C † D W	Italian 107S		Philosophy 11	
					D 117		
German 127			A D W	Italian 108		Philosophy 14	
German 129	D	History 148	B D W	Italian 108S	. D W	Philosophy 15	W
German 131		History 148	C D W	Italian 112		Philosophy 21	W
German 132			† D W	Italian 113		Philosophy 22	
						Dl.:1	VV
German 133			AW	Italian 114		Philosophy 24	
German 134		History 1511	B	Italian 115A		Philosophy 30 †	W
German 141	W	History 151	C	Italian 115B		Philosophy 31 †	
German 142	W		D D W	Italian 115C		Philosophy 32 †	W
German 143				Italian 115D		Philosophy 38	
German 173	W						
	W			Italian 118		Philosophy 101	
German 160		History 162	D W	Italian 119		Philosophy 102	W
German 168	D	History 163.	A	Italian 120A		Philosophy 103	
	W	History 163		Italian 120B		Philosophy 105	
	vv			_	D 117		
German 185	**-	History 164				Philosophy 107 †	
	W	History 165		Italian 1215	. D W	Philosophy 108 †	
Greek 102	W	History 166.	A	Italian 131		Philosophy 109 †	W
	W	History 166		Italian 139B		Philosophy 114	
	W		W	Italian 140	13 7	Philosophy 115	
			vv				
	W	History 168		Italian 141		Philosophy 123	
	W		A D W	Italian 142		Philosophy 125	W
Greek 112		History 169	B D W	Italian 150	. D W	Philosophy 151	
	W		A D W	Japanese 10		Philosophy 157	
	W		B D W	Japanese 50		Religious Studies 1	D W
Cwool, 115	W	History 170		Japanese 101		Religious Studies 1A	
	XX 7	History 171.	A D W	Japanese 102		Religious Studies 1B	
Greek 116			B D W	Japanese 103	D W	Religious Studies 1C	D W
Greek 116	D W	History 1711					
Greek 116 History 3 †	D W		D W	Iapanese 104		Religious Studies 117	
Greek 116 History 3 † History 4A	D W	History 1711	DW W	Japanese 104	. D W	Religious Studies 1D	D W
Greek 116 History 3 † History 4A History 4B	D W W	History 1711 History 172	W	Japanese 105	. D W . D W	Religious Studies 1E	D W
Greek 116 History 3 † History 4A History 4B History 4C	DW W W	History 1711 History 172 History 173	W	Japanese 105	. D W . D W . D W	Religious Studies 1EReligious Studies 1F	D W D W D W
Greek 116 History 3 † History 4A History 4B History 4C History 6 †		History 1711 History 172 History 173	W	Japanese 105 Japanese 106 Japanese 107	. D W . D W . D W . D W	Religious Studies 1E	D W D W D W
Greek 116 History 3 † History 4A History 4B History 4C History 6 †		History 171 History 172 History 173 History 174	W D. W A W	Japanese 105 Japanese 106 Japanese 107	. D W . D W . D W . D W	Religious Studies 1EReligious Studies 1FReligious Studies 1G	D W D W D W
Greek 116 History 3 † History 4A History 4B History 4C History 6 † History 7A †	D. W W W W D. W D. W	History 171 History 172 History 173 History 174 History 174		Japanese 105	. D W . D W . D W . D W	Religious Studies 1E Religious Studies 1F Religious Studies 1G Religious Studies 10A	D W D W D W D W
Greek 116 History 3 † History 4A History 4B History 4C History 6 † History 7A † History 7B †	D. W W W D. W D. W D. W	History 1711 History 172 History 173 History 174 History 1741 History 1741		Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109	. D W . D W . D W . D W . D W	Religious Studies 1E Religious Studies 1F Religious Studies 1G Religious Studies 10A Religious Studies 111	D W D W D W D W D W
Greek 116 History 3 † History 4A History 4B History 4C History 6 † History 7A † History 7B †	D. W W W W D. W D. W D. W D. W	History 1711 History 172 History 173 History 174 History 1741 History 1741 History 1741		Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151	. D W . D W . D W . D W . D W . D W . D W	Religious Studies 1E Religious Studies 1F Religious Studies 1G Religious Studies 10A Religious Studies 11 Religious Studies 12	D W D W D W D W D W D W
Greek 116 History 3 † History 4A History 4B History 4C History 6 † History 7A † History 7B †	D. W W W D. W D. W D. W	History 1711 History 172 History 173 History 174 History 1741 History 1741 History 1741		Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109	. D W . D W . D W . D W . D W . D W . D W	Religious Studies 1E Religious Studies 1F Religious Studies 1G Religious Studies 10A Religious Studies 111	D W D W D W D W D W D W
Greek 116 History 3 † History 4A History 4B History 4C History 6 † History 7A † History 7B † History 7C † History 8	D. W W W W D. W D. W D. W D. W D. W D. W	History 171 History 172 History 173 History 174 History 174 History 174 History 174 History 175		Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151 Japanese 152	. D W . Religious Studies 1F Religious Studies 1G Religious Studies 10A Religious Studies 11 Religious Studies 12 Religious Studies 21	D W D W D W D W D W D W	
Greek 116 History 3 † History 4A History 4B History 6 † History 7A † History 7B † History 7C † History 8	D. W W W W D. W D. W D. W D. W D. W D. W	History 171 History 172 History 173 History 174. History 174 History 174 History 174 History 175 History 176		Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151 Japanese 151 Japanese 152 Japanese 156	. D . W . gious Studies 1F Religious Studies 1G Religious Studies 10A Religious Studies 11 Religious Studies 11 Religious Studies 12 Religious Studies 21 Religious Studies 23	D W D W D W D W D W D W D W	
Greek 116 History 3 † History 4A History 4B History 4C History 6 † History 7A † History 7B † History 7C † History 8 History 9A	D. W W W D. W D. W D. W D. W D. W D. W D	History 171 History 172 History 173 History 174 History 174 History 174 History 175 History 176 History 176 History 176		Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151 Japanese 152 Japanese 156 Jewish Studies 101	D W D W D W D W D W D W D D W D W D W	Religious Studies 1E Religious Studies 1F Religious Studies 1G Religious Studies 10A Religious Studies 11 Religious Studies 11 Religious Studies 21 Religious Studies 21 Religious Studies 23 Religious Studies 30	D W D W D W D W D W D W D W D W
Greek 116 History 3 † History 4A History 4B History 4C History 6 † History 7A † History 7B † History 7C † History 8 History 9B History 9B History 10A †	D. W W W W D. W D. W D. W D. W D. W D. W	History 171 History 172 History 173 History 174 History 174 History 174 History 175 History 176 History 176 History 176 History 176		Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151 Japanese 152 Japanese 156 Jewish Studies 101 Jewish Studies 110	D W D W D W D W D W DW DW DW DW D W	Religious Studies 1E Religious Studies 1F Religious Studies 1G Religious Studies 10A Religious Studies 11 Religious Studies 11 Religious Studies 21 Religious Studies 21 Religious Studies 23 Religious Studies 30 Religious Studies 40	D W D W D W D W D W D W D W D W D W D W D W D W D W D W D W D W D W D W D W W
Greek 116 History 3 † History 4A History 4B History 4C History 6 † History 7A † History 7B † History 7C † History 8 History 9B History 9B History 10A †	D. W W W D. W D. W D. W D. W D. W D. W D	History 171 History 172 History 173 History 174 History 174 History 174 History 175 History 176 History 176 History 176 History 176		Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151 Japanese 152 Japanese 156 Jewish Studies 101	D W D W D W D W D W DW DW DW DW D W	Religious Studies 1E Religious Studies 1F Religious Studies 1G Religious Studies 10A Religious Studies 11 Religious Studies 11 Religious Studies 21 Religious Studies 21 Religious Studies 23 Religious Studies 30	D W D W D W D W D W D W D W D W D W D W D W D W D W D W D W D W D W D W D W W
Greek 116 History 3 † History 4A History 4B History 4C History 6 † History 7A † History 7B † History 7C † History 8 History 9A History 9B History 10A † History 10B †	D. W W W W D. W D. W D. W D. W D. W D. W	History 171 History 172 History 173 History 174 History 174 History 174 History 175 History 176 History 176 History 177 History 177 History 177		Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151 Japanese 152 Japanese 156 Jewish Studies 101 Jewish Studies 110 Jewish Studies 111	D W D W D W D W D W D D W D D W D W D W D W D W	Religious Studies 1E Religious Studies 1F Religious Studies 1G Religious Studies 10A Religious Studies 11 Religious Studies 12 Religious Studies 21 Religious Studies 23 Religious Studies 30 Religious Studies 40 Religious Studies 40	D W D W D W D W D W D W D W D W D W D W D W D W D W D W D W D W D W D W
Greek 116 History 3 † History 4A History 4B History 4C History 6 † History 7A † History 7B † History 7C † History 7B History 9A History 9A History 9B History 10A † History 10B History 10B	D. W W W W D. W D. W D. W D. W D. W D. W	History 171 History 173 History 174 History 174 History 174 History 175 History 176 History 176 History 177 History 177 History 177 History 177 History 178		Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151 Japanese 151 Japanese 156 Jewish Studies 101 Jewish Studies 110 Jewish Studies 111 Jewish Studies 111	D. W D. W D. W D. W D. W D. W D. W D. W	Religious Studies 1E Religious Studies 1F Religious Studies 1G Religious Studies 10A Religious Studies 10A Religious Studies 11 Religious Studies 21 Religious Studies 21 Religious Studies 23 Religious Studies 30 Religious Studies 40 Religious Studies 40 Religious Studies 42 Religious Studies 60 †	D W D W
Greek 116 History 3 † History 4A History 4B History 4C History 6 † History 7A † History 7B † History 7C † History 9B History 9A History 10A † History 10B History 10B History 10C History 10C History 10C History 15	D. W W W D. W D. W D. W D. W D. W D. W D	History 171 History 172 History 173 History 174 History 174 History 174 History 175 History 176 History 176 History 177 History 178 History 178 History 178		Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151 Japanese 151 Japanese 156 Jewish Studies 110 Jewish Studies 110 Jewish Studies 111 Jewish Studies 111 Jewish Studies 112 Jewish Studies 120	D. W D. W D. W D. W D. W D. W D. W D. W	Religious Studies 1E Religious Studies 1F Religious Studies 1G Religious Studies 10A Religious Studies 10A Religious Studies 11 Religious Studies 21 Religious Studies 21 Religious Studies 23 Religious Studies 30 Religious Studies 40 Religious Studies 40 Religious Studies 42 Religious Studies 60 † Religious Studies 65C	D W D W
Greek 116 History 3 † History 4A History 4B History 4C History 6 † History 7A † History 7B † History 7C † History 9B History 9B History 10A † History 10B History 10C History 10C History 10C History 11C History 11C History 11C History 11C History 11C History 11C History 11C History 11C	D. W W W W D. W D. W D. W D. W D. W D. W	History 171 History 172 History 174 History 174 History 174 History 175 History 176 History 176 History 177 History 177 History 178 History 178 History 178 History 178 History 178		Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151 Japanese 152 Japanese 156 Jewish Studies 101 Jewish Studies 110 Jewish Studies 111 Jewish Studies 112 Jewish Studies 120 Landscape Architecture 1 †	D. W D. W D. W D. W D. W D. W D. W D. W	Religious Studies 1E Religious Studies 1F Religious Studies 1G Religious Studies 10A Religious Studies 111 Religious Studies 11 Religious Studies 12 Religious Studies 21 Religious Studies 23 Religious Studies 23 Religious Studies 40 Religious Studies 40 Religious Studies 40 Religious Studies 60 † Religious Studies 60 † Religious Studies 65C Religious Studies 67	D W D W
Greek 116 History 3 † History 4A History 4B History 4C History 6 † History 7A † History 7B † History 7C † History 9B History 9B History 10A † History 10B History 10C History 10C History 10C History 11C History 11C History 11C History 11C History 11C History 11C History 11C History 11C	D. W W W D. W D. W D. W D. W D. W D. W D	History 171 History 172 History 174 History 174 History 174 History 175 History 176 History 176 History 177 History 177 History 178 History 178 History 178 History 178 History 178		Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151 Japanese 151 Japanese 156 Jewish Studies 110 Jewish Studies 110 Jewish Studies 111 Jewish Studies 111 Jewish Studies 112 Jewish Studies 120	D. W D. W D. W D. W D. W D. W D. W D. W	Religious Studies 1E Religious Studies 1F Religious Studies 1G Religious Studies 10A Religious Studies 10A Religious Studies 11 Religious Studies 21 Religious Studies 21 Religious Studies 23 Religious Studies 30 Religious Studies 40 Religious Studies 40 Religious Studies 42 Religious Studies 60 † Religious Studies 65C	D W D W
Greek 116 History 3 † History 4A History 4B History 4C History 6 † History 7A † History 7B † History 7C † History 7B History 9A History 9B History 10A † History 10B History 10B History 10B History 10B History 10B History 10C History 15 History 15 History 15 History 16 History 17 History 17 History 17 History 17 History 17 History 17	D. W W W W D. W D. W D. W D. W D. W D. W	History 171 History 172 History 174 History 174 History 174 History 175 History 176 History 176 History 177 History 177 History 178 History 178 History 180 History 180 History 180		Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151 Japanese 152 Japanese 156 Jewish Studies 101 Jewish Studies 110 Jewish Studies 111 Jewish Studies 112 Jewish Studies 120 Landscape Architecture 1 † Landscape Architecture 30	D. W D. W D. W D. W D. W D. W D. W D. W	Religious Studies 1E Religious Studies 1F Religious Studies 1G Religious Studies 10A Religious Studies 10A Religious Studies 11 Religious Studies 12 Religious Studies 21 Religious Studies 23 Religious Studies 30 Religious Studies 40 Religious Studies 40 Religious Studies 60 Religious Studies 67 Religious Studies 67 Religious Studies 68	D W D W
Greek 116 History 3 † History 4A History 4B History 4C History 6 † History 7A † History 7B † History 7C † History 8 History 9A History 10A † History 10B History 10B History 10B History 10B History 10A History 10B History 10A History 10B History 10A	D. W W W D. W D. W D. W D. W D. W D. W D	History 171 History 173 History 174 History 174 History 174 History 175 History 176 History 176 History 177 History 177 History 178 History 180 History 180 History 180 History 180		Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151 Japanese 151 Japanese 152 Japanese 156 Jewish Studies 101 Jewish Studies 110 Jewish Studies 111 Jewish Studies 112 Jewish Studies 120 Landscape Architecture 1 † Landscape Architecture 30 Latin 101	D. W D. W D. W D. W D. W D. W D. W D. W	Religious Studies 1E Religious Studies 1F Religious Studies 1G Religious Studies 10A Religious Studies 10A Religious Studies 11 Religious Studies 21 Religious Studies 21 Religious Studies 23 Religious Studies 30 Religious Studies 40 Religious Studies 40 Religious Studies 60† Religious Studies 65C Religious Studies 67 Religious Studies 68 Religious Studies 68 Religious Studies 69	D W D W
Greek 116 History 3 † History 4A History 4B History 4C History 6 † History 7A † History 7B † History 7B † History 9B History 9B History 10A † History 10B History 10C History 17A History 17A History 17A History 17A History 17A History 17A History 17B	D. W W W W D. W D. W D. W D. W D. W D. W	History 171 History 172 History 174 History 174 History 174 History 175 History 175 History 176 History 177 History 177 History 178 History 180 History 180 History 181 History 181 History 181		Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151 Japanese 151 Japanese 156 Jewish Studies 110 Jewish Studies 110 Jewish Studies 111 Jewish Studies 112 Jewish Studies 120 Landscape Architecture 1† Landscape Architecture 30 Latin 101 Latin 101	D. W D. W D. W D. W D. W D. W D. W D. W	Religious Studies 1E Religious Studies 1F Religious Studies 1G Religious Studies 1G Religious Studies 10A Religious Studies 11 Religious Studies 21 Religious Studies 21 Religious Studies 21 Religious Studies 30 Religious Studies 40 Religious Studies 40 Religious Studies 40 Religious Studies 60 † Religious Studies 65C Religious Studies 67 Religious Studies 67 Religious Studies 68 Religious Studies 69 Religious Studies 69 Religious Studies 90	D W D D
Greek 116 History 3 † History 4A History 4B History 4C History 6 † History 7A † History 7B † History 7B † History 9B History 9B History 10A † History 10B History 10C History 17A History 17A History 17A History 17B History 17B History 17B History 17B History 17B History 17B History 17B History 72B History 72B	D. W W W W D. W D. W D. W D. W D. W D. W	History 171 History 172 History 174 History 174 History 174 History 175 History 176 History 176 History 177 History 178 History 178 History 180 History 180 History 180 History 183 History 183 History 183 History 183		Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151 Japanese 152 Japanese 156 Jewish Studies 101 Jewish Studies 110 Jewish Studies 112 Jewish Studies 112 Jewish Studies 120 Landscape Architecture 1 † Landscape Architecture 30 Latin 101 Latin 102 Latin 102 Latin 103	D. W D. W D. W D. W D. W D. W D. W D. W	Religious Studies 1E Religious Studies 1F Religious Studies 1G Religious Studies 10A Religious Studies 10A Religious Studies 11 Religious Studies 12 Religious Studies 21 Religious Studies 23 Religious Studies 30 Religious Studies 30 Religious Studies 60 Religious Studies 60† Religious Studies 65C Religious Studies 67 Religious Studies 68 Religious Studies 68 Religious Studies 69 Religious Studies 90 Religious Studies 90 Religious Studies 102	D W D W
Greek 116 History 3 † History 4A History 4B History 4C History 6 † History 7A † History 7B † History 7B † History 9B History 9B History 10A † History 10B History 10C History 17A History 17A History 17A History 17B History 17B History 17B History 17B History 17B History 17B History 17B History 72B History 72B	D. W W W D. W D. W D. W D. W D. W D. W D	History 171 History 172 History 174 History 174 History 174 History 175 History 176 History 176 History 177 History 178 History 178 History 180 History 180 History 180 History 183 History 183 History 183 History 183		Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151 Japanese 151 Japanese 156 Jewish Studies 110 Jewish Studies 110 Jewish Studies 111 Jewish Studies 112 Jewish Studies 120 Landscape Architecture 1† Landscape Architecture 30 Latin 101 Latin 101	D. W D. W D. W D. W D. W D. W D. W D. W	Religious Studies 1E Religious Studies 1F Religious Studies 1G Religious Studies 10A Religious Studies 10A Religious Studies 11 Religious Studies 11 Religious Studies 21 Religious Studies 23 Religious Studies 30 Religious Studies 40 Religious Studies 40 Religious Studies 60 Religious Studies 65C Religious Studies 67 Religious Studies 67 Religious Studies 68 Religious Studies 69 Religious Studies 90 Religious Studies 90 Religious Studies 102 Religious Studies 102 Religious Studies 103	DW
Greek 116 History 3 † History 4A History 4B History 4C History 6 † History 7A † History 7B † History 7B † History 9A History 9A History 9B History 10A † History 10C History 1DB History 2DB HISTORY 2DB HISTOR	D. W W W W D. W D. W D. W D. W D. W D. W	History 171 History 172 History 174 History 174 History 174 History 175 History 176 History 176 History 177 History 177 History 178 History 180 History 180 History 180 History 180 History 181 History 183 History 183 History 183 History 184		Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151 Japanese 152 Japanese 156 Jewish Studies 101 Jewish Studies 110 Jewish Studies 112 Jewish Studies 112 Jewish Studies 120 Landscape Architecture 1 † Landscape Architecture 30 Latin 101 Latin 102 Latin 102 Latin 103	D. W D. W D. W D. W D. W D. W D. W D. W	Religious Studies 1E Religious Studies 1F Religious Studies 1G Religious Studies 10A Religious Studies 10A Religious Studies 11 Religious Studies 12 Religious Studies 21 Religious Studies 23 Religious Studies 30 Religious Studies 30 Religious Studies 60 Religious Studies 60† Religious Studies 65C Religious Studies 67 Religious Studies 68 Religious Studies 68 Religious Studies 69 Religious Studies 90 Religious Studies 90 Religious Studies 102	D W D W

^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth. # Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

Religious Studies 105		Science & Engineering	Entomology 103W	Med: Cell Bio & Human Anat 101
Religious Studies 106		Animal Science 1W	Entomology 104	Med: Cell Bio & Human Anat 101L
Religious Studies 115 Religious Studies 120		Animal Science 2W	Entomology 107W Entomology 109W	Microbiology 10 Molecular and Cellular Biology 10
Religious Studies 131		Animal Science 18	Entomology 110W	Molecular and Cellular Biology 10 Molecular and Cellular Biology 121
Religious Studies 134		Animal Science 42W	Entomology 117W	Molecular and Cellular Biology 121 Molecular and Cellular Biology 162
Religious Studies 141A		Animal Science 104	Entomology 119W	Molecular and Cellular Biology 163
Religious Studies 141B		Animal Science 106W	Entomology 153W	Molecular and Cellular Biology 164
Religious Studies 141C		Animal Science 115	Entomology 156#	Molecular and Cellular Biology 178
Religious Studies 143		Animal Science 120	Entomology 158 †W	Molecular and Cellular Biology 182
Religious Studies 144		Animal Science 123 Animal Science 124W	Environmental Horticulture 1 W	Nematology 10VW
Religious Studies 156		Animal Science 146W	Environmental Sci & Management 8W	Neuro, Physio & Behavior 10
Religious Studies 157 Religious Studies 160 †		Anthropology 1	Environmental Sci & Management 30 Environmental Sci & Management 100	Neuro, Physio & Behavior 12 # Neuro, Physio & Behavior 14
Religious Studies 161		Anthropology 5W	Environmental Sci & Management 121	Neuro, Physio & Behavior 15
Religious Studies 162 †		Anthropology 15	Environmental Sci & Management 131 W	Neuro, Physio & Behavior 68
Religious Studies 165		Anthropology 32DW	Environ Science & Policy 10#	Neuro, Physio & Behavior 132
Religious Studies 175A	DW	Anthropology 34	Environ Science & Policy 30#	Neuro, Physio & Behavior 139
Russian 45	DW	Anthropology 151W	Environ Science & Policy 121W	Nutrition 10
Russian 102	***	Anthropology 152W Anthropology 153W	Environmental Toxicology 10	Nutrition 11W
Russian 122	W	Anthropology 154AW	Environmental Toxicology 20W	Nutrition 114W
Russian 123		Anthropology 157#	Environmental Toxicology 30	Nutrition 115W
Russian 126 Russian 128		Anthropology 158 DW	Environmental Toxicology 101 Environmental Toxicology 127	Nutrition 120AN †
Russian 129	D W	Anthropology 181	Environmental Toxicology 127 Environmental Toxicology 128	Nutrition 127
Russian 130		Anthropology 183W	Environmental Toxicology 135	Philosophy 13 †
Russian 133	W	Astronomy 10G	Environmental Toxicology 146	Philosophy 30 †W
Russian 139		Astronomy 10L	Evolution and Ecology 2W	Philosophy 31 †
Russian 140		Astronomy 10S	Evolution and Ecology 11	Philosophy 32 †W
Russian 141		Atmospheric Science 5	Evolution and Ecology 12W	Philosophy 107 †W
Russian 142	DW	Atmospheric Science 6	Evolution and Ecology 108	Philosophy 108 †W
Russian 143	DW	Atmospheric Science 10	Evolution and Ecology 138W	Physics 10W
Russian 150		Avian Sciences 11	Evolution and Ecology 141W	Physics 30
Science & Tech Studies 120		Biological Sciences 10	Exercise Biology 10	Physics 160 †
Science & Tech Studies 130A †		Biological Sciences 10VW	Exercise Biology 106 Exercise Biology 106L	Plant Biology 105 Plant Biology 108
Science & Tech Studies 130B Science & Tech Studies 131 †		Biological Sciences 101	Exercise Biology 113	Plant Biology 112
Science & Tech Studies 173		Biological Sciences 104	Exercise Biology 115 Exercise Biology 115	Plant Biology 116
Science and Society 40 †		Biological Sciences 183	Exercise Biology 117	Plant Biology 143 DW
Science and Society 42 †		Biotechnology 1	Exercise Biology 126	Plant Pathology 140W
Spanish 139	D	Chemistry 2A	Fiber And Polymer Science 110 † W	Plant Science 8
Spanish 141		Chemistry 2B	Food Science & Technology 3	Plant Science 12 † DW
Spanish 141S	D	Chemistry 2C	Food Science & Technology 10 †	Plant Science 14W
Spanish 143		Chemistry 10W Chemistry 150W	Food Science & Technology 120	Plant Science 120
Spanish 144	D W	Chicano Studies 40	Food Science & Technology 128	Plant Science 130W
Spanish 147Spanish 148		Chicano Studies 40S	Geology 1 Geology 2#	Plant Science 141 †W Science & Tech Studies 1 †
Spanish 148S		Chicano Studies 140A	Geology 3#	Science & Tech Studies 20 †W
Spanish 149		Design 137B †	Geology 4	Science & Tech Studies 130A † W
Spanish 160		Engineering 1	Geology 10	Science & Tech Studies 130BW
Spanish 170	D	Engineering 6	Geology 16	Science & Tech Studies 131 †W
Spanish 170S		Engineering 7 Engineering 10W	Geology 16GW	Science & Tech Studies 161W
Spanish 172	D	Engineering 10W Engineering 17	Geology 18	Science and Society 1 †
Spanish 173	D	Engineering 17 Engineering 20	Geology 28	Science and Society 2 †W
Spanish 174Spanish 175		Engineering 100	Geology 30 Geology 32	Science and Society 3 †W Science and Society 4 †W
Spanish 176		Engineering 160 †	Geology 35	Science and Society 5 †W
Technocultural Studies 1	D	Engr: Applied Sci-Davis 137	Geology 36W	Science and Society 7 †
Technocultural Studies 2		Engr: Biological Systems 75	Geology 101W	Science and Society 8 †W
Technocultural Studies 4		Engineering Biomedical 1	Geology 105W	Science and Society 9 †W
Technocultural Studies 5		Engineering Biomedical 108	Geology 106W	Science and Society 10 †W
Technocultural Studies 6		Engineering Biomedical 110A	Geology 108W	Science and Society 11 †W
Technocultural Studies 150		Engineering Biomedical 110B Engineering Biomedical 110L	Geology 109 (course 109L required	Science and Society 12 †
Technocultural Studies 158	117	Engineering Biomedical 117	concurrently)# Geology 110W	Science and Society 13 †
University Writing Program 112A Women's Studies 20		Engineering Biomedical 161A	Geology 110W	Science and Society 15 †
Women's Studies 25		Engineering Biomedical 161L	Geology 134W	Science and Society 20 †W
Women's Studies 50 †		Engineering Biomedical 161S	Geology 138	Science and Society 25 † DW
Women's Studies 60 †	DW	Engineering Biomedical 173	Geology 143W	Science and Society 30 †W
Women's Studies 70 †	D	Engr: Chemical 98	Geology 145W	Science and Society 40 †
Women's Studies 130 †		Engr: Chemical 99	History 109B †	Science and Society 42 †
Women's Studies 136 †		Engr: Chemical 166 Engr: Chemical 170	Human Development 117W	Science and Society 70A †
Women's Studies 137 †		Engr: Chemical 170 Engr: Chemical 190C	Hydrologic Science 10 †W	Science and Society 120 †W
Women's Studies 138 † Women's Studies 158 †		Engr: Chemical 198	Integrated Studies 8AW International Agricultural Dev 162 .DW	Science and Society 135S †
Women's Studies 160		Engr: Chemical 199	Landscape Architecture 50	Soil Science 10 Statistics 10 †W
Women's Studies 162		Engr: Civil & Environ 123 † DW	Linguistics 175	Statistics 12
Women's Studies 164		Engr: Computer Science 10	Math & Physical Sci 1	Statistics 13
Women's Studies 165 †		Engr: Computer Science 15W	Mathematics 16A	Statistics 13V
Women's Studies 170 †		Engr: Computer Science 193A	Mathematics 16B	Statistics 32
Women's Studies 178A	DW	Engr: Computer Science 193B	Mathematics 16C	Statistics 100
Women's Studies 178B		Engineering Electrical & Compu 100	Mathematics 17A	Statistics 102
Women's Studies 178C		Engineering Electrical & Compu 118 Engineering Electrical & Compu 135	Mathematics 17B	Statistics 103
Women's Studies 178D		Engr: Materials Science 2	Mathematics 17C	Statistics 104
Women's Studies 178E Women's Studies 178F		Engr: Materials Science 2 Engr: Materials Science 188A	Mathematics 21A Mathematics 21AH	Statistics 106 Statistics 108
Women's Studies 178F		Entomology 1 †	Mathematics 21B	Statistics 108 Statistics 120
Women's Studies 180		Entomology 2W	Mathematics 21BH	Statistics 138
Women's Studies 195 †		Entomology 10	Mathematics 21C	Statistics 144
		Entomology 100W	Mathematics 21CH	Textiles & Clothing 6
		Entomology 101	Mathematics 21M	Textiles & Clothing 162
		Entomology 102	Mathematics 36	Viticulture & Enology 3 †#
* This are made as a large control of	م بكونون	allana ar university as massitian resultana	nt and CE writing avantiance simultaneous	d.

^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth. # Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth. # Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

Psychology 142 W Science and Society 4 † W Sociology 4 D.W Women's Studies 1 Psychology 142 W Science and Society 4 † W Sociology 5 D.W Women's Studies 1 Psychology 155 Science and Society 5 † W Sociology 11 W Women's Studies 1 Psychology 158 D.W Science and Society 7 † D.W Sociology 25 W Women's Studies 1 Psychology 162 W Science and Society 8 † W Sociology 30A D. Women's Studies 1 Psychology 168 Science and Society 9 † W Sociology 30B D. Women's Studies 1 Psychology 175 W Science and Society 10 † W Sociology 30B D. Women's Studies 1 Psychology 185 W Science and Society 10 † W Sociology 125 Psychology 185 W Science and Society 10 † W Sociology 125 Religious Studies 60 † D.W Science and Society 11 † W Sociology 131 D.W Women's Studies 1 Religious Studies 160 † D.W Science and Society 12 † D.W Sociology 132 D. Women's Studies 1 Religious Studies 160 † D.W Science and Society 13 † W Sociology 146 D.W Women's Studies 1 Religious Studies 162 † D.W Science and Society 18 † D.W Sociology 170 Science & Tech Studies 20 † W Science and Society 20 † W Statistics 10 † W Women's Studies 1 Science & Tech Studies 20 † W Women's Studies 1	102
Science & Tech Studies 20 †	

SOCIAL-CULTURAL DIVERSITY

These courses satisfy the GE requirement for social-cultural diversity. Many of these courses also provide GE credit for topical breadth or writing experience. Refer to the topical breadth and writing experience course lists to determine if any additional GE credit applies.

Afr Am & Afr Std 10	Anthropology 3	Art History 163B	Chinese 104
Afr Am & Afr Std 12	Anthropology 4	Art History 163C	Chinese 105
Afr Am & Afr Std 15	Anthropology 131	Art History 163D	Chinese 106
			Chinese 107
Afr Am & Afr Std 16	Anthropology 15	Art History 164	
Afr Am & Afr Std 17	Anthropology 20	Art History 175	Chinese 108
Afr Am & Afr Std 50	Anthropology 23	Art History 183B	Chinese 109A
Afr Am & Afr Std 52	Anthropology 24	Art History 183C	Chinese 109C
Afr Am & Afr Std 80	Anthropology 32	Art History 185	Chinese 109D
Afr Am & Afr Std 107A	Anthropology 34	Art History 186	Chinese 109E
Afr Am & Afr Std 107B	Anthropology 50	Art History 187	Chinese 109G
Afr Am & Afr Std 107C	Anthropology 101	Art History 188A	Chinese 109H
Afr Am & Afr Std 110	Anthropology 104N	Art History 189	Chinese 109I
Afr Am & Afr Std 111	Anthropology 110	Art Studio 30	Chinese 110
Afr Am & Afr Std 123	Anthropology 117	Art Studio 149	Chinese 150
Afr Am & Afr Std 133	Anthropology 120	Asian American Studies 1	Classics 171
Afr Am & Afr Std 145A	Anthropology 121	Asian American Studies 2	Classics 175
Afr Am & Afr Std 145B	Anthropology 122A	Asian American Studies 3	Communication 135
Afr Am & Afr Std 150A	Anthropology 122B	Asian American Studies 4	Comm & Reg Develpmnt 1
Afr Am & Afr Std 150B	Anthropology 124	Asian American Studies 100	Comm & Reg Develpmnt 2
Afr Am & Afr Std 152	Anthropology 125A	Asian American Studies 102	Comm & Reg Develpmnt 147
Afr Am & Afr Std 153	Anthropology 125B	Asian American Studies 112	
			Comm & Reg Develpmnt 149
Afr Am & Afr Std 156	Anthropology 126A	Asian American Studies 114	Comm & Reg Develpmnt 151
Afr Am & Afr Std 157	Anthropology 126B	Asian American Studies 115	Comm & Reg Develpmnt 153A
Afr Am & Afr Std 160	Anthropology 127	Asian American Studies 116	Comm & Reg Develpmnt 153E
Afr Am & Afr Std 162	Anthropology 128A	Asian American Studies 130	Comm & Reg Develpmnt 1530
Afr Am & Afr Std 163	Anthropology 128B	Asian American Studies 131	Comm & Reg Develpmnt 154
Afr Am & Afr Std 165	Anthropology 129	Asian American Studies 141	Comm & Reg Develpmnt 157
Afr Am & Afr Std 168	Anthropology 131	Asian American Studies 150B	Comm & Reg Develpmnt 176
Afr Am & Afr Std 169	Anthropology 132	Asian American Studies 150C	Comparative Literature 4
Afr Am & Afr Std 170	Anthropology 134	Asian American Studies 150D	Comparative Literature 5
Afr Am & Afr Std 171	Anthropology 139AN	Asian American Studies 150E	Comparative Literature 6
Afr Am & Afr Std 172	Anthropology 139BN	Asian American Studies 150F	Comparative Literature 7
Afr Am & Afr Std 175A	Anthropology 140A	Chicano Studies 10	Comparative Literature 9
Afr Am & Afr Std 1791	Anthropology 140B	Chicano Studies 21	Comparative Literature 12
Afr Am & Afr Std 185	Anthropology 141B	Chicano Studies 30	Comparative Literature 25
Agricult & Res Econ 15	Anthropology 142	Chicano Studies 40	Comparative Literature 53A
Agricult & Res Econ 115A	Anthropology 143A	Chicano Studies 40S	Comparative Literature 53B
Agricult & Res Econ 150	Anthropology 144	Chicano Studies 50	Comparative Literature 53C
American Studies 1A	Anthropology 145	Chicano Studies 60	Comparative Literature 100
American Studies 1B	Anthropology 146N	Chicano Studies 65	Comparative Literature 110
American Studies 1C	Anthropology 148A	Chicano Studies 70	Comparative Literature 135
		Chicano Studies 110	
American Studies 1E	Anthropology 149A		Comparative Literature 138
American Studies 10	Anthropology 149B	Chicano Studies 112	Comparative Literature 145
American Studies 21	Anthropology 158	Chicano Studies 120	Comparative Literature 147
American Studies 25	Anthropology 170	Chicano Studies 121	Comparative Literature 148
American Studies 30	Anthropology 172	Chicano Studies 123	Comparative Literature 151
American Studies 55	Anthropology 173	Chicano Studies 130	Comparative Literature 152
American Studies 59	Anthropology 176	Chicano Studies 131	
			Comparative Literature 152S
American Studies 110	Anthropology 178	Chicano Studies 1315	Comparative Literature 153
American Studies 120	Art History IC	Chicano Studies 150	Comparative Literature 154
American Studies 130	Art History 1D	Chicano Studies 154	Comparative Literature 155
American Studies 139	Art History 1DV	Chicano Studies 160	Comparative Literature 156
American Studies 151	Art History 1E	Chicano Studies 181	Comparative Literature 159
American Studies 152	Art History 5	Chicano Studies 182	Comparative Literature 165
American Studies 153	Art History 150	Chinese 10	Comparative Literature 165S
American Studies 154	Art History 151	Chinese 11	Comparative Literature 166
American Studies 155	Art History 152	Chinese 50	Consumer Sciences 100
American Studies 156	Art History 153	Chinese 100A	Design 142A
American Studies 157	Art History 155	Chinese 101	Design 142B
Anthropology 1	Art History 156	Chinese 102	Dramatic Art 1
			Dramatic Art 1S
Anthropology 2	Art History 163A	Chinese 103	
* This course may not be used to satisfy a	college or university composition requireme	nt and GE writing experience simultaneously	/.

[#] Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

Dramatic Art 5	History 151D	Music 129C	Religious Studies 175A
Dramatic Art 111S	History 159	Music 129D	Russian 45
Dramatic Art 114	History 160	Native American Studies 1	Russian 129
Dramatic Art 144	History 162	Native American Studies 5	Russian 139
Dramatic Art 144B	History 169A	Native American Studies 10	Russian 140
Dramatic Art 150	History 169B	Native American Studies 32	Russian 141
Dramatic Art 154	History 170A	Native American Studies 33	Russian 142
Dramatic Art 155	History 170B	Native American Studies 46	Russian 143
Dramatic Art 156AN	History 171A	Native American Studies 101	Russian 150
Dramatic Art 156BN	History 171B	Native American Studies 107	Science & Tech Studies 32
Dramatic Art 156CN	History 173	Native American Studies 115	Science & Tech Studies 120
Dramatic Art 156D	History 177A	Native American Studies 116	Science & Tech Studies 121
East Asian Studies 88	History 177B	Native American Studies 117	Science & Tech Studies 129
East Asian Studies 113	History 178A	Native American Studies 120	Science & Tech Studies 150
Economics 115A	History 178B	Native American Studies 130A	Science and Society 1
Education 122	History 179	Native American Studies 130B	Science and Society 7
Education 147	History 183A	Native American Studies 130C	Science and Society 12
Engr: Civil & Environ 123	History 183B	Native American Studies 133	Science and Society 15
English 30A	History 184	Native American Studies 133A	Science and Society 25
English 30B	History 190A	Native American Studies 133B	Science and Society 40
English 125	History 190B	Native American Studies 134	Science and Society 135S
English 139	History 190C	Native American Studies 157	Sociology 4
English 140	History 190D	Native American Studies 181A	Sociology 5
English 141	History 191A	Native American Studies 181B	Sociology 30A
English 166	History 191B	Native American Studies 181C	Sociology 30B
English 167	History 191C	Native American Studies 188	Sociology 128
English 171A	History 191D	Native American Studies 191	Sociology 129
English 171B	History 191E	Nutrition 120AN	Sociology 130
English 178	History 191F	Nutrition 120BN	Sociology 131
English 179	History 193A	Philosophy 11	Sociology 132
English 181A	History 193B	Philosophy 14	Sociology 133
English 181B	History 193D	Philosophy 118	Sociology 134
English 182	History 194A	Philosophy 119	Sociology 135
English 185A	History 194B	Physical Education 120	Sociology 145A
English 185B	History 194C	Plant Biology 143	Sociology 145B
English 185C	History 195B	Plant Science 12	Sociology 146
English 186	History 196A	Political Science 124	Sociology 149
Environ Science & Policy 101	History 196B	Political Science 126	Sociology 172
Exercise Biology 10	Human Development 12	Political Science 140B	Spanish 139
Exercise Biology 120	Human Development 103	Political Science 143A	Spanish 141
Film Studies 120	Human Development 160	Political Science 143B	Spanish 141S
Film Studies 121	Humanities 7	Political Science 146A	Spanish 147
Film Studies 129	Humanities 8	Political Science 146B	Spanish 148
French 51	Humanities 13	Political Science 148B	Spanish 148S
French 52	Humanities 15	Political Science 148C	Spanish 149
French 53	Humanities 18	Political Science 152	Spanish 160
French 124	Humanities 60	Political Science 166	Spanish 170
French 133	International Agricultural Dev 10	Political Science 168	Spanish 170S
German 10	International Agricultural Dev 103	Political Science 176	Spanish 172
German 40	International Agricultural Dev 162	Psychology 157	Spanish 173
German 113	Italian 105S	Psychology 158	Spanish 174
German 116	Italian 108	Psychology 170	Spanish 175
German 117	Italian 108S	Religious Studies 1	Spanish 176
German 129	Italian 121	Religious Studies 1A	Technocultural Studies 159
German 168	Italian 121S	Religious Studies 1B	Textiles & Clothing 7
History 3	Italian 141	Religious Studies 1C	Textiles & Clothing 8
History 6	Italian 150 Japanese 10	Religious Studies 1D	Textiles & Clothing 107
History 7A		Religious Studies 1E Religious Studies 1F	Textiles & Clothing 174 Wild, Fish & Conserv Biol 10
History 7B History 7C	Japanese 50 Japanese 101	Religious Studies 1G	Women's Studies 20
History 8	Japanese 102	Religious Studies 10A	Women's Studies 25
History 9A	Japanese 103	Religious Studies 11	Women's Studies 50
History 9B	Japanese 104		WOLLELL S STUDIES SO
1113101 y 7D	INTERIOR SECTION	Religious Studies 12	Women's Studies 60
History 10A		Religious Studies 12 Religious Studies 21	Women's Studies 60 Women's Studies 70
History 10A History 15	Japanese 105	Religious Studies 21	Women's Studies 70
History 15	Japanese 105 Japanese 106	Religious Studies 21 Religious Studies 23	Women's Studies 70 Women's Studies 102
History 15 History 17A	Japanese 105 Japanese 106 Japanese 107	Religious Studies 21 Religious Studies 23 Religious Studies 30	Women's Studies 70 Women's Studies 102 Women's Studies 130
History 15 History 17A History 17B	Japanese 105 Japanese 106 Japanese 107 Japanese 108	Religious Studies 21 Religious Studies 23 Religious Studies 30 Religious Studies 42 Religious Studies 60	Women's Studies 70 Women's Studies 102 Women's Studies 130 Women's Studies 136
History 15 History 17A History 17B History 72A	Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109	Religious Studies 21 Religious Studies 23 Religious Studies 30 Religious Studies 42 Religious Studies 60	Women's Studies 70 Women's Studies 102 Women's Studies 130 Women's Studies 136 Women's Studies 137
History 15 History 17A History 17B History 72A History 72B	Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151	Religious Studies 21 Religious Studies 23 Religious Studies 30 Religious Studies 42 Religious Studies 60 Religious Studies 65C Religious Studies 67	Women's Studies 102 Women's Studies 102 Women's Studies 130 Women's Studies 136 Women's Studies 137 Women's Studies 138
History 15 History 17A History 17B History 72A History 72B History 109B	Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151 Japanese 152	Religious Studies 21 Religious Studies 23 Religious Studies 30 Religious Studies 42 Religious Studies 60 Religious Studies 65C Religious Studies 67	Women's Studies 70 Women's Studies 102 Women's Studies 130 Women's Studies 136 Women's Studies 137 Women's Studies 138 Women's Studies 139
History 15 History 17A History 17B History 72A History 72B	Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151	Religious Studies 21 Religious Studies 23 Religious Studies 30 Religious Studies 42 Religious Studies 60 Religious Studies 65C	Women's Studies 102 Women's Studies 102 Women's Studies 130 Women's Studies 136 Women's Studies 137 Women's Studies 138
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History 15 History 17A History 17B History 72B History 72B History 109B History 110 History 112A History 112B History 113 History 115A History 115B History 115C History 115D	Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151 Japanese 152 Japanese 156 Jewish Studies 10 Jewish Studies 101 Jewish Studies 111 Jewish Studies 111 Jewish Studies 112 Jewish Studies 120 Linguistics 6	Religious Studies 21 Religious Studies 23 Religious Studies 30 Religious Studies 42 Religious Studies 60 Religious Studies 65 Religious Studies 65 Religious Studies 67 Religious Studies 68 Religious Studies 68 Religious Studies 80 Religious Studies 90 Religious Studies 90 Religious Studies 102 Religious Studies 102 Religious Studies 103 Religious Studies 104 Religious Studies 104	Women's Studies 70 Women's Studies 102 Women's Studies 130 Women's Studies 136 Women's Studies 137 Women's Studies 137 Women's Studies 139 Women's Studies 140 Women's Studies 160 Women's Studies 160 Women's Studies 160 Women's Studies 165 Women's Studies 165 Women's Studies 165 Women's Studies 170 Women's Studies 170
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History 15 History 17A History 17B History 72B History 72B History 109B History 110 History 112A History 112B History 115B History 115B History 115C History 115E History 115F History 115F History 115F History 12B History 14B History 14A History 14A History 14A History 14A History 144B History 144B History 144B History 144C	Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151 Japanese 151 Japanese 156 Jewish Studies 10 Jewish Studies 10 Jewish Studies 110 Jewish Studies 111 Jewish Studies 112 Jewish Studies 120 Linguistics 6 Linguistics 160 Linguistics 163 Linguistics 180 Linguistics 180 Linguistics 182 Middle East/S. Asian Std 100 Middle East/S. Asian Std 180 Music 11 Music 28	Religious Studies 21 Religious Studies 23 Religious Studies 30 Religious Studies 30 Religious Studies 42 Religious Studies 60 Religious Studies 67 Religious Studies 67 Religious Studies 67 Religious Studies 68 Religious Studies 80 Religious Studies 80 Religious Studies 80 Religious Studies 102 Religious Studies 102 Religious Studies 105 Religious Studies 105 Religious Studies 105 Religious Studies 106 Religious Studies 115 Religious Studies 115 Religious Studies 131 Religious Studies 131 Religious Studies 134 Religious Studies 143 Religious Studies 144 Religious Studies 146 Religious Studies 156 Religious Studies 156 Religious Studies 157	Women's Studies 70 Women's Studies 102 Women's Studies 130 Women's Studies 136 Women's Studies 137 Women's Studies 137 Women's Studies 139 Women's Studies 139 Women's Studies 140 Women's Studies 160 Women's Studies 160 Women's Studies 162 Women's Studies 162 Women's Studies 165 Women's Studies 178 Women's Studies 178 Women's Studies 178 Women's Studies 178B Women's Studies 178C Women's Studies 178C Women's Studies 178D Women's Studies 178E Women's Studies 178F Women's Studies 178F Women's Studies 179 Women's Studies 180 Women's Studies 180 Women's Studies 180 Women's Studies 180 Women's Studies 180
History 15 History 17A History 17B History 72B History 72B History 109B History 110 History 112A History 112B History 115B History 115C History 115D History 115D History 115E History 115F History 115F History 12B History 14B History 144B History 144B History 144A History 144B History 147C History 148A	Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151 Japanese 152 Japanese 155 Jewish Studies 10 Jewish Studies 101 Jewish Studies 110 Jewish Studies 111 Jewish Studies 111 Jewish Studies 112 Jewish Studies 112 Jewish Studies 120 Linguistics 6 Linguistics 160 Linguistics 163 Linguistics 166 Linguistics 180 Linguistics 180 Linguistics 180 Middle East/S. Asian Std 100 Middle East/S. Asian Std 180 Music 11 Music 28 Music 105	Religious Studies 21 Religious Studies 23 Religious Studies 30 Religious Studies 42 Religious Studies 60 Religious Studies 65 Religious Studies 67 Religious Studies 67 Religious Studies 68 Religious Studies 69 Religious Studies 80 Religious Studies 90 Religious Studies 102 Religious Studies 102 Religious Studies 103 Religious Studies 104 Religious Studies 105 Religious Studies 105 Religious Studies 105 Religious Studies 115 Religious Studies 115 Religious Studies 111 Religious Studies 131 Religious Studies 131 Religious Studies 134 Religious Studies 134 Religious Studies 143 Religious Studies 144 Religious Studies 157 Religious Studies 157 Religious Studies 157 Religious Studies 160	Women's Studies 70 Women's Studies 102 Women's Studies 130 Women's Studies 136 Women's Studies 137 Women's Studies 137 Women's Studies 138 Women's Studies 139 Women's Studies 140 Women's Studies 160 Women's Studies 162 Women's Studies 164 Women's Studies 164 Women's Studies 165 Women's Studies 170 Women's Studies 178A Women's Studies 178B Women's Studies 178B Women's Studies 178C Women's Studies 178C Women's Studies 178E Women's Studies 178E Women's Studies 178F Women's Studies 178F Women's Studies 179 Women's Studies 180 Women's Studies 180 Women's Studies 180 Women's Studies 184 Women's Studies 184
History 15 History 17A History 17B History 72A History 72B History 109B History 110 History 112A History 112B History 115B History 115B History 115C History 115E History 115E History 115F History 115F History 115F History 130A History 132 History 144B History 148A History 148B	Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151 Japanese 152 Japanese 155 Jewish Studies 10 Jewish Studies 101 Jewish Studies 110 Jewish Studies 111 Jewish Studies 112 Jewish Studies 112 Jewish Studies 120 Linguistics 66 Linguistics 166 Linguistics 163 Linguistics 166 Linguistics 180 Linguistics 180 Linguistics 180 Middle East/S. Asian Std 100 Middle East/S. Asian Std 180 Music 11 Music 28 Music 105 Music 105 Music 126	Religious Studies 21 Religious Studies 23 Religious Studies 30 Religious Studies 30 Religious Studies 42 Religious Studies 60 Religious Studies 65C Religious Studies 67 Religious Studies 68 Religious Studies 69 Religious Studies 80 Religious Studies 90 Religious Studies 102 Religious Studies 102 Religious Studies 103 Religious Studies 105 Religious Studies 106 Religious Studies 105 Religious Studies 105 Religious Studies 105 Religious Studies 105 Religious Studies 115 Religious Studies 115 Religious Studies 113 Religious Studies 131 Religious Studies 134 Religious Studies 143 Religious Studies 144 Religious Studies 156 Religious Studies 157 Religious Studies 157 Religious Studies 160 Religious Studies 160	Women's Studies 70 Women's Studies 102 Women's Studies 130 Women's Studies 136 Women's Studies 137 Women's Studies 137 Women's Studies 139 Women's Studies 139 Women's Studies 140 Women's Studies 160 Women's Studies 160 Women's Studies 162 Women's Studies 162 Women's Studies 165 Women's Studies 178 Women's Studies 178 Women's Studies 178 Women's Studies 178B Women's Studies 178C Women's Studies 178C Women's Studies 178D Women's Studies 178E Women's Studies 178F Women's Studies 178F Women's Studies 179 Women's Studies 180 Women's Studies 180 Women's Studies 180 Women's Studies 180 Women's Studies 180
History 15 History 17A History 17B History 72B History 72B History 109B History 110 History 112A History 112B History 115B History 115C History 115D History 115D History 115E History 115F History 115F History 12B History 14B History 144B History 144B History 144A History 144B History 147C History 148A	Japanese 105 Japanese 106 Japanese 107 Japanese 108 Japanese 109 Japanese 151 Japanese 152 Japanese 155 Jewish Studies 10 Jewish Studies 101 Jewish Studies 110 Jewish Studies 111 Jewish Studies 111 Jewish Studies 112 Jewish Studies 112 Jewish Studies 120 Linguistics 6 Linguistics 160 Linguistics 163 Linguistics 166 Linguistics 180 Linguistics 180 Linguistics 180 Middle East/S. Asian Std 100 Middle East/S. Asian Std 180 Music 11 Music 28 Music 105	Religious Studies 21 Religious Studies 23 Religious Studies 30 Religious Studies 42 Religious Studies 60 Religious Studies 65 Religious Studies 67 Religious Studies 67 Religious Studies 68 Religious Studies 69 Religious Studies 80 Religious Studies 90 Religious Studies 102 Religious Studies 102 Religious Studies 103 Religious Studies 104 Religious Studies 105 Religious Studies 105 Religious Studies 105 Religious Studies 115 Religious Studies 115 Religious Studies 111 Religious Studies 131 Religious Studies 131 Religious Studies 134 Religious Studies 134 Religious Studies 143 Religious Studies 144 Religious Studies 157 Religious Studies 157 Religious Studies 157 Religious Studies 160	Women's Studies 70 Women's Studies 102 Women's Studies 130 Women's Studies 136 Women's Studies 137 Women's Studies 137 Women's Studies 138 Women's Studies 139 Women's Studies 140 Women's Studies 160 Women's Studies 162 Women's Studies 164 Women's Studies 164 Women's Studies 165 Women's Studies 170 Women's Studies 178A Women's Studies 178B Women's Studies 178B Women's Studies 178C Women's Studies 178C Women's Studies 178E Women's Studies 178E Women's Studies 178F Women's Studies 178F Women's Studies 179 Women's Studies 180 Women's Studies 180 Women's Studies 180 Women's Studies 184 Women's Studies 184

^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth.

Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

WRITING EXPERIENCE

These courses satisfy the GE requirement for writing experience. Many of these courses also provide GE credit for topical breadth or social-cultural diversity. Refer to the topical breadth and social-cultural diversity course lists to determine if any additional GE credit applies.

Afr Am & Afr Std 12	Anthropology 128B	Avian Sciences 13	Comparative Literature 12
Afr Am & Afr Std 15	Anthropology 129	Biological Sciences 10V	Comparative Literature 13
Afr Am & Afr Std 16	Anthropology 130A	Biological Sciences 132	Comparative Literature 14
Afr Am & Afr Std 17	Anthropology 130BN	Biotechnology 188	Comparative Literature 20
Afr Am & Afr Std 50	Anthropology 132	Chemistry 10	Comparative Literature 25
Afr Am & Afr Std 52	Anthropology 134	Chemistry 115	Comparative Literature 53A
Afr Am & Afr Std 80	Anthropology 136	Chemistry 125	Comparative Literature 53B
Afr Am & Afr Std 107A	Anthropology 139AN	Chemistry 150	Comparative Literature 53C
Afr Am & Afr Std 107B	Anthropology 139BN	Chicano Studies 10	Comparative Literature 100
Afr Am & Afr Std 107C	Anthropology 140A	Chicano Studies 21S	Comparative Literature 110
Afr Am & Afr Std 111	Anthropology 140B	Chicano Studies 40	Comparative Literature 120
Afr Am & Afr Std 152	Anthropology 141B	Chicano Studies 40S	Comparative Literature 135
Afr Am & Afr Std 153	Anthropology 142	Chicano Studies 110	Comparative Literature 138
Afr Am & Afr Std 157	Anthropology 143A	Chicano Studies 112	Comparative Literature 140
	Anthropology 144		Comparative Literature 141
Afr Am & Afr Std 162		Chicano Studies 121	
Afr Am & Afr Std 163	Anthropology 145	Chicano Studies 123	Comparative Literature 144
Afr Am & Afr Std 170	Anthropology 146N	Chicano Studies 150	Comparative Literature 145
Afr Am & Afr Std 172	Anthropology 148A	Chicano Studies 181	Comparative Literature 146
Afr Am & Afr Std 175A	Anthropology 149A	Chicano Studies 182	Comparative Literature 147
Afr Am & Afr Std 185	Anthropology 149B	Chinese 10	Comparative Literature 148
Agricult & Res Econ 15	Anthropology 151	Chinese 11	Comparative Literature 151
Agricult & Res Econ 150	Anthropology 152	Chinese 50	Comparative Literature 152
	Anthropology 172		
Agricultural Education 100	Anthropology 153	Chinese 100A	Comparative Literature 152S
Agricultural Education 160	Anthropology 154A	Chinese 102	Comparative Literature 153
Agricultural Education 172	Anthropology 154BN	Chinese 103	Comparative Literature 154
American Studies 1A	Anthropology 157L (course 157 required	Chinese 104	Comparative Literature 155
American Studies 1B	concurrently)	Chinese 105	Comparative Literature 156
American Studies 1C	Anthropology 158	Chinese 106	Comparative Literature 157
American Studies 1E	Anthropology 170	Chinese 107	Comparative Literature 158
American Studies 5	Anthropology 172	Chinese 108	
			Comparative Literature 159
American Studies 10	Anthropology 173	Chinese 109A	Comparative Literature 160A
American Studies 21	Anthropology 176	Chinese 109C	Comparative Literature 160B
American Studies 25	Anthropology 178	Chinese 109D	Comparative Literature 161A
American Studies 30	Anthropology 183	Chinese 109E	Comparative Literature 161B
American Studies 55	Art History 5	Chinese 109G	Comparative Literature 163
American Studies 59	Art History 100	Chinese 109H	Comparative Literature 164A
American Studies 110	Art History 110	Chinese 109I	Comparative Literature 164B
		Chinese 110	
American Studies 120	Art History 153		Comparative Literature 164C
American Studies 130	Art History 155	Chinese 150	Comparative Literature 164D
American Studies 139	Art History 156	Classics 1	Comparative Literature 165
American Studies 151	Art History 163A	Classics 2	Comparative Literature 165S
American Studies 152	Art History 163B	Classics 20	Comparative Literature 166
American Studies 153	Art History 163C	Classics 25	Comparative Literature 166A
American Studies 154	Art History 163D	Classics 50	Comparative Literature 166B
American Studies 155	Art History 164	Classics 102	Comparative Literature 167
American Studies 156	Art History 168	Classics 110	Comparative Literature 168A
American Studies 157	Art History 172A	Classics 140	Comparative Literature 168B
Animal Science 1	Art History 172B	Classics 141	Comparative Literature 169
Animal Science 2	Art History 173	Classics 142	Comparative Literature 170
Animal Science 42	Art History 175	Classics 143	Comparative Literature 180
Animal Science 106	Art History 176A	Classics 171	Comparative Literature 180S
Animal Science 124	Art History 176B	Classics 172A	Consumer Sciences 100
Animal Science 141	Art History 177A	Classics 172B	Critical Theory 101
Animal Science 146	Art History 177B	Classics 173	Design 143
Animal Science 148	Art History 178A	Classics 174	Dramatic Art 1
Animal Science 170	Art History 178B	Classics 175	Dramatic Art 1S
Anthropology 1	Art History 178C	Classics 190	Dramatic Art 111S
		Communication 1 *	
Anthropology 2	Art History 179B		Dramatic Art 114
Anthropology 4	Art History 182	Communication 143	Dramatic Art 150
Anthropology 5	Art History 183B	Communication 189A	Dramatic Art 154
Anthropology 13	Art History 183C	Communication 189B	Dramatic Art 155
Anthropology 15	Art History 184	Communication 189C	Dramatic Art 156AN
Anthropology 23	Art History 185	Communication 189D	Dramatic Art 156BN
Anthropology 24	Art History 186	Comm & Reg Develpmnt 1	Dramatic Art 156CN
Anthropology 32	Art History 187	Comm & Reg Develpmnt 2	Dramatic Art 156D
Anthropology 34	Art History 188A	Comm & Reg Develpmnt 20	Dramatic Art 158
Anthropology 50	Art History 188B	Comm & Reg Develpmnt 147	East Asian Studies 88
Anthropology 101	Art History 188D	Comm & Reg Development 149	East Asian Studies 113
Anthropology 105	Art History 188E	Comm & Reg Develpmnt 151	Education 110
Anthropology 109	Art History 189	Comm & Reg Develpmnt 152	Education 119
Anthropology 110	Art Studio 26	Comm & Reg Develpmnt 154	Education 120
Anthropology 117	Art Studio 30	Comm & Reg Develpmnt 157	Education 122
Anthropology 120	Art Studio 147	Comm & Reg Develpmnt 176	Education 147
Anthropology 121	Art Studio 148	Comparative Literature 1 *	Engineering 10
Anthropology 121 Anthropology 122A	Art Studio 149	Comparative Literature 2 *	Engineering 45
			Engineering Biomedical 116
Anthropology 122B	Art Studio 150	Comparative Literature 3 *	
Anthropology 124	Asian American Studies 1	Comparative Literature 4 *	Engr: Chemical 155A
Anthropology 125B	Asian American Studies 2	Comparative Literature 5	Engr: Chemical 155B
Anthropology 126A	Asian American Studies 4	Comparative Literature 6	Engr: Chemical 161L
Anthropology 126B	Asian American Studies 150B	Comparative Literature 7	Engr: Civil & Environ 123
Anthropology 127	Atmospheric Science 10	Comparative Literature 8	Engr: Civil & Environ 146
Anthropology 128A	Avian Sciences 11	Comparative Literature 9	Engr: Civil & Environ 155
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^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth. # Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

Engr: Civil & Environ 163	Entomology 103	Greek 113	History 180BN
Engr: Civil & Environ 165	Entomology 107	Greek 114	History 181
Engr: Computer Science 15	Entomology 109	Greek 115	History 183A
Engr: Computer Science 188	Entomology 110	Greek 116	History 183B
Engr: Materials Science 162L Engr: Materials Science 172L	Entomology 117 Entomology 119	History 3 History 4A	History 184 History 185A
Engr: Materials Science 174	Entomology 153	History 4B	History 185B
Engr: Materials Science 174L	Entomology 156L (course 156 required	History 4C	History 189
Engr: Materials Science 180	concurrently)	History 6	History 190A
Engr: Materials Science 181	Entomology 158	History 7A	History 190B
Engr: Materials Science 182	Environmental Horticulture 1	History 7B	History 190C
Engr: Materials Science 260	Environmental Sci & Management 8	History 7C	History 190D
English 3 * English 4	Environmental Sci & Management 131	History 9A History 9B	History 191A History 191B
English 5F	Environ Science & Policy 101 Environ Science & Policy 105	History 10A	History 191C
English 30A	Environ Science & Policy 121	History 10B	History 191D
English 30B	Environ Science & Policy 161	History 10C	History 191E
English 40	Environ Science & Policy 163	History 15	History 191F
English 42	Environmental Toxicology 20	History 17A	History 193A
English 43	Environmental Toxicology 110	History 17B	History 193B
English 44	Evolution and Ecology 2	History 72A	History 193D
English 45 English 46A	Evolution and Ecology 12 Evolution and Ecology 138	History 72B History 102S	History 194A History 195B
English 46B	Evolution and Ecology 141	History 110	History 196A
English 46C	Exercise Biology 104L	History 111A	History 196B
English 105	Fiber And Polymer Science 110	History 111B	Honors Challenge 94
English 107	Film Studies Í	History 111C	Honors Challenge 194
English 110A	Film Studies 120	History 112A	Human Development 101
English 110B	Film Studies 121	History 112B	Human Development 102
English 111 English 113A	Film Studies 121S	History 113	Human Development 117
English 113B	Film Studies 124 Film Studies 125	History 115A History 115B	Human Development 120 Human Development 161
English 115 English 115	Film Studies 129	History 115C	Humanities 1D (course 1 required
English 117	Film Studies 142	History 115D	concurrently)
English 122	Film Studies 176A	History 115E	Humanities 3
English 123	Film Studies 176B	History 115F	Humanities 4D (course 4 required
English 125	Film Studies 189	History 121A	concurrently)
English 130	French 50	History 121B	Humanities 7
English 133	French 51	History 121C	Humanities 8
English 137N English 138	French 52 French 53	History 125 History 130A	Humanities 9D (course 9 required concurrently)
English 139	French 107A	History 131B	Humanities 13
English 140	French 107B	History 131C	Humanities 15
English 141	French 119A	History 132	Humanities 18
English 142	French 119B	History 136	Humanities 60
English 143	French 120	History 138A	Humanities 144
English 144	French 121	History 138B	Humanities 180
English 146N English 147	French 125 French 127	History 138C History 139A	Hydrologic Science 10 Integrated Studies 8A
English 149	French 130	History 139B	Integrated Studies 8B
English 150A	Geology 2G (course 2 required	History 141	Integrated Studies 8C
English 150B	concurrently)	History 142A	International Agricultural Dev 10
English 153	Geology 3G (course 3 required	History 142B	International Agricultural Dev 162
English 155A	concurrently)	History 143	Italian 50
English 155B	Geology 16G	History 144B	Italian 105S
English 155C	Geology 36	History 145	Italian 108
English 156 English 158A	Geology 101 Geology 105	History 146A History 146B	Italian 108S Italian 121
English 158B	Geology 106	History 147A	Italian 121S
English 159	Geology 108	History 147B	Italian 140
English 160	Geology 109L (course 109 required	History 147C	Italian 141
English 161A	concurrently)	History 148A	Italian 142
English 161B	Geology 110	History 148B	Italian 145
English 162 English 163	Geology 115 Geology 134	History 148C History 149	Italian 145S Italian 150
English 164	Geology 143	History 151A	Japanese 10
English 165	Geology 145	History 151B	Japanese 50
English 166	German 10	History 151C	Japanese 101
English 167	German 40	History 151D	Japanese 102
English 168	German 48	History 159	Japanese 103
English 171A	German 105	History 160	Japanese 104
English 171B English 173	German 112 German 113	History 162 History 167	Japanese 105 Japanese 106
English 175 English 175	German 113 German 114	History 169A	Japanese 100 Japanese 107
English 177	German 115	History 169B	Japanese 108
English 178	German 116	History 170A	Japanese 151
English 179	German 117	History 170B	Japanese 152
English 180	German 118A	History 171A	Japanese 156
English 181A	German 118B	History 171B	Jewish Studies 10
English 181B	German 118C	History 171D	Jewish Studies 101
English 182 English 184	German 119 German 141	History 172 History 173	Jewish Studies 110 Jewish Studies 111
English 184 English 185A	German 141 German 142	History 174 History 174A	Jewish Studies 111 Jewish Studies 112
English 185B	German 144	History 174A History 174B	Jewish Studies 120
English 185C	German 176A	History 174C	Jewish Studies 121
English 186	Greek 101	History 175	Landscape Architecture 1
English 187A	Greek 102	History 177A	Landscape Architecture 2
English 189	Greek 103A	History 177B	Landscape Architecture 3
Entomology 2 Entomology 100	Greek 103B Greek 104	History 178A History 178B	Landscape Architecture 30 Latin 101
Entomology 100 Entomology 100L (course 100 required	Greek 111	History 1786 History 179	Latin 101 Latin 102
concurrently)	Greek 112	History 180AN	Latin 102 Latin 103
* This source many not be used to estick a	college or university composition requirem	ant and CE writing averagions simultaneous	L.

^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth. # Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

Latin 104	Philosophy 24	Political Science 160	Science & Tech Studies 130A
Latin 105	Philosophy 30	Political Science 162	Science & Tech Studies 130B
Latin 106	Philosophy 32	Political Science 163	Science & Tech Studies 131
Latin 108	Dhilasanhy 20	Political Science 164	
	Philosophy 38		Science & Tech Studies 150
Latin 109	Philosophy 101	Political Science 165	Science & Tech Studies 161
Latin 110	Philosophy 102	Political Science 168	Science & Tech Studies 164
Latin 112	Philosophy 103	Political Science 170	Science & Tech Studies 165
Latin 115	Philosophy 105	Political Science 171	Science & Tech Studies 173
Latin 116	Philosophy 107	Political Science 172	Science and Society 1
Latin 125	Philosophy 108	Political Science 174	Science and Society 2
Law 210	Philosophy 109	Political Science 175	Science and Society 3
Law 210A	Philosophy 114	Political Science 176	Science and Society 4
Law 286	Philosophy 115	Political Science 179	Science and Society 5
Law 286C	Philosophy 118	Political Science 180	Science and Society 7
	Philosophy 119		
Law 408A	rimosophy 119	Political Science 183	Science and Society 8
Linguistics 1	Philosophy 123	Political Science 187	Science and Society 9
Linguistics 6	Philosophy 125	Political Science 190	Science and Society 10
Linguistics 141	Physics 10	Political Science 192A	Science and Society 11
Linguistics 150	Plant Biology 143	Political Science 192B	Science and Society 12
	Plant Pathology 140	Political Science 193W	
Linguistics 152			Science and Society 13
Linguistics 160	Plant Science 12	Psychology 141	Science and Society 15
Linguistics 163	Plant Science 14	Psychology 142	Science and Society 18
Linguistics 166	Plant Science 130	Psychology 158	Science and Society 20
Linguistics 180	Plant Science 141	Psychology 162	Science and Society 25
	Plant Science 188	Psychology 170	
Linguistics 182		1 3ychology 170 Dl	Science and Society 30
Mathematics 108	Political Science 1	Psychology 175	Science and Society 40
Mathematics 189	Political Science 2	Psychology 185	Science and Society 120
Med - Public Health Sciences 175W	Political Science 3	Religious Studies 1	Science and Society 135S
Medieval Studies 20A	Political Science 4	Religious Studies 1A	Science and Society 140
Medieval Studies 20B	Political Science 5	Religious Studies 1B	Sociology 2
Medieval Studies 130A	Political Science 7	Religious Studies 1C	Sociology 3
Medieval Studies 130B	Political Science 100	Religious Studies 1D	Sociology 4
Middle East/S. Asian Std 100	Political Science 102	Religious Studies 1E	Sociology 5
Middle East/S. Asian Std 180	Political Science 104	Religious Studies 1F	Sociology 11
Music 10	Political Science 105	Religious Studies 1G	Sociology 25
Music 24A	Political Science 106	Religious Studies 10	Sociology 120
Music 24B	Political Science 107	Religious Studies 10A	Sociology 126
Music 24C	Political Science 108	Religious Studies 11	Sociology 127
Music 28	Political Science 109	Religious Studies 12	Sociology 128
Music 105	Political Science 110	Religious Studies 21	Sociology 131
Music 106	Political Science 112	Religious Studies 23	Sociology 134
Music 110A	Political Science 113	Religious Studies 30	Sociology 135
Music 110B	Political Science 114	Religious Studies 40	Sociology 141
Music 110C	Political Science 115	Religious Studies 42	Sociology 143B
Music 110D	Political Science 116	Religious Studies 60	Sociology 145A
Music 110E	Political Science 117	Religious Studies 65C	Sociology 145B
Music 110F	Political Science 118A	Religious Studies 67	Sociology 146
Music 110G	Political Science 118B	Religious Studies 68	Sociology 149
Music 115	Political Science 118C	Religious Studies 69	Sociology 172
Music 124A	Political Science 119	Religious Studies 80	Sociology 181
Music 124B	Political Science 120	Religious Studies 102	Soil Science 112
Music 126	Political Science 121	Religious Studies 103	Spanish 147
Music 129A	Political Science 122	Religious Studies 104	Spanish 149
Music 129B	Political Science 123	Religious Studies 105	Spanish 160
Music 129C	Political Science 124	Religious Studies 106	Statistics 10
Music 129D	Political Science 126	Religious Studies 115	Textiles & Clothing 7
Native American Studies 5 *	Political Science 129	Religious Studies 120	Textiles & Clothing 107
Native American Studies 10	Political Science 130	Religious Studies 125	University Writing Program 1 *
Native American Studies 46	Political Science 131	Religious Studies 126	University Writing Program 18 *
Native American Studies 115	Political Science 132	Religious Studies 141A	University Writing Program 19 *
Native American Studies 119	Political Science 135	Religious Studies 141B	University Writing Program 101 *
Native American Studies 120 Native American Studies 130A			University Whiting Flugram 101
	Political Science 136	Religious Studies 141C	University Writing Program 102A *
Native American Studies 130B	Political Science 137	Religious Studies 143	University Writing Program 102B *
Native American Studies 130C	Political Science 140A	Religious Studies 144	University Writing Program 102C *
Native American Studies 133A	Political Science 140B	Religious Studies 156	University Writing Program 102D *
Native American Studies 133B	Political Science 140C	Religious Studies 157	University Writing Program 102E *
Native American Studies 134	Political Science 142A	Religious Studies 160	University Writing Program 102F *
Native American Studies 181A	Political Science 142B	Religious Studies 161	University Writing Program 102G *
Native American Studies 181B	Political Science 143A	Religious Studies 162	University Writing Program 102H
Native American Studies 181C	Political Science 143B	Religious Studies 165	University Writing Program 102I
Native American Studies 188	Political Science 144A	Religious Studies 175A	University Writing Program 102J
Nematology 10V	Political Science 144B	Russian 45	University Writing Program 102K
Nematology 150	Political Science 146A	Russian 122	University Writing Program 102L
Neuro, Physio & Behavior 104L	Political Science 146B	Russian 129	University Writing Program 104A *
			University Whiting Flogram 104A "
Neuro, Physio & Behavior 111L	Political Science 147A	Russian 133	University Writing Program 104B *
Nutrition 11	Political Science 147B	Russian 140	University Writing Program 104C *
Nutrition 114	Political Science 147C	Russian 141	University Writing Program 104D *
Nutrition 115	Political Science 147D	Russian 142	University Writing Program 104E *
Nutrition 117	Political Science 148A	Russian 143	University Writing Program 104F *
Philosophy 1	Political Science 148B	Russian 150	University Writing Program 104I
Philosophy 5	Political Science 148C	Science & Tech Studies 20	University Writing Program 111A
Philosophy 11	Political Science 150	Science & Tech Studies 32	University Writing Program 111B
Philosophy 14	Political Science 151	Science & Tech Studies 108	University Writing Program 111C
Philosophy 15	Political Science 152	Science & Tech Studies 109	University Writing Program 112A
Philosophy 17	Political Science 153	Science & Tech Studies 120	, 5 5
Philosophy 21	Political Science 154	Science & Tech Studies 121	
Philosophy 22	Political Science 155	Science & Tech Studies 129	
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^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously. † Also assigned to another area of topical breadth. # Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

Wild, Fish & Conserv Biol 102L Wild, Fish & Conserv Biol 121 Wild, Fish & Conserv Biol 153 Wild, Fish & Conserv Biol 155 Wild, Fish & Conserv Biol 156 Women's Studies 20 Women's Studies 25 Women's Studies 50

Women's Studies 60 Women's Studies 136 Women's Studies 137 Women's Studies 138 Women's Studies 139 Women's Studies 170 Women's Studies 178A Women's Studies 178B

Women's Studies 178C Women's Studies 178D Women's Studies 178E Women's Studies 178F Women's Studies 179 Women's Studies 182 Women's Studies 184 Women's Studies 191

TOPICAL BREADTH ASSIGNED SUBJECT AREAS FOR MAJORS AND MINORS; PRE-FALL 2011

The following section only pertains to students who matriculated to UC Davis prior to Fall 2011.

Arts & Humanities

Majors

African American and African Studies American Studies Art History Art Studio Asian American Studies (Humanities emphasis) Chicana/Chicano Studies (Cultural emphasis) Chinese Classical Civilization Comparative Literature Design Dramatic Art English Film Studies French German History Italian **Japanese** Landscape Architecture Medieval and Early Modern Studies Native American Studies Philosophy Religious Studies Russian Spanish Technocultural Studies Women's Studies

Minors

African American and African Studies American Studies Art History Art Studio Asian American Studies Chicana/Chicano Studies Chinese Classical Civilization Comparative Literature Dramatic Art English Film Studies French German Global and International Studies (Arts and Humanities Emphasis) Greek History Italian Japanese Jewish Studies Landscape Restoration Luso-Brazilian Studies Medieval and Early Modern Studies

Music Native American Studies Philosophy Professional Writing Religious Studies Russian Sexuality Studies Social and Ethnic Relations Spanish Ŵomen's Studies

Science & Engineering

Majors

Agricultural & Environmental Education Animal Biology Animal Science Animal Science & Management Anthropology (B.S.degree only) Applied Mathematics Applied Physics Atmospheric Science Biochemistry and Molecular Biology Biological Sciences Biotechnology Cell Biology Chemistry Clinical Nutrition Computer Science Ecological Management and Restoration Engineering (all majors) Entomology
Environmental Horticulture & Urban Forestry Environmental Science & Management Environmental Toxicology Evolution, Ecology & Biodiversity Exercise Biology Fiber and Polymer Science Food Science Genetics Geology Hydrology Mathematical and Scientific Computation Mathematics Microbiology Natural Sciences Neurobiology, Physiology, and Behavior Nutrition Science Physics Plant Biology Plant Sciences Psychology (B.S. degree) Statistics Sustainable Agriculture & Food Systems

Viticulture & Enology Wildlife, Fish, & Conservation Biology

Minors

Agri Computing & Info Systems Agricultural Pest Management Agricultural Systems & Environment Animal Science—Animal Biology Animal Science—Animal Genetics Animal Science—Aquaculture Animal Science—Dairy/Livestock Animal Science—Equine
Anthropology (Evolutionary
emphasis) Applied Computing & Info Systems Atmospheric Science Avian Ŝciences **Biological Sciences** Chemistry Community Nutrition Computer Science Construction Engineering and Management Engineering (all majors) Environmental Geology Environmental Horticulture Environmental Toxicology Exercise Biology Fiber and Polymer Science Forensic Entomology
Fungal Biology & Ecology
Geographic Information Systems Geographic Information Syste Geographic Studies Geology Geophysics Hydrologic Science Hydrology Insect Biology Insect Ecology & Evolution International Science Studies Landscape Restoration Mathematics Medical-Veterinary Entomology Nematology Nutrition Science Nutrition and Food Oceanography Physics Plant Biology Precision Agriculture Quantitative Biology and Bioinformatics Science and Society Soil Science Statistics Watershed Science Wildlife, Fish, and Conservation Biology

Social Sciences

Majors

Anthropology (A.B. degree) Asian American Studies (Social Science emphasis) Chicana/Chicano Studies (Social/ Policy Studies emphasis) Communication
Community and Regional Develop East Asian Studies Economics Environmental Policy Analysis & Planning Human Development International Agricultural Development International Relations Linguistics Managerial Economics Middle East/South Asia Studies Political Science Political Science—Public Service Psychology (A.B. degree) Science & Tech Studies Sociology Sociology—Organiza Textiles & Clothing -Organizational Studies

Minors

Aging and Adult Development Anthropology (General emphasis) Anthropology (Sociocultural emphasis) Communication Community Development Contemporary Leadership East Asian Stúdies Economics Education **Energy Policy** Environmental Policy Analysis Global and International Studies (Social Science emphasis) History & Philosophy of Science Human Development International Agricultural
Development Latin American
and Hemispheric Studies Linguistics Linguistics for Language Teachers Managerial Economics Middle East/South Asia Studies Political Science Psychology Science and Society Sociology Technology Management Textiles & Clothing War-Peace Studies

Technology Management

^{*} This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously.

[†] Also assigned to another area of topical breadth. # Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

GENERAL EDUCATION THEME OPTIONS

The following section only pertains to students who matriculated to UC Davis prior to Fall 2011.

General Education theme options are sets of GE courses sharing a common intellectual theme. These GE theme options are not a separate element of the GE requirement, but a way of selecting your GE courses so that you may benefit from a coherent focus of study while completing the GE requirement. Completion of a theme satisfies the GE requirement for students with majors assigned to the GE topical breadth area of Arts and Humanities. Students with majors assigned to the topical breadth area of either Science and Engineering or Social Science will need to complete additional GE courses in Arts and Humanities to satisfy the campus GE requirement.

Global Population and Environmental Issues

For centuries, there have been concerns and predictions about population growth and its potential effects on the environment and the quality of life. Perspectives on population and environmental issues often vary based on such factors as gender, social class, culture, nation, race/ethnicity, and religion. In this group of courses, students will learn about the complex interplay among environmental, economic, and ethical issues through the study of global population patterns. They will learn how science addresses the use of natural resources by humans, along with the fundamentals of environmental impacts such as global warming. This option group of courses explores diverse perspectives on global population and environmental issues by examining biological, physical, and social processes that influence the everyday lives of people around the world.

Topics might include the social, economic, and environmental challenges of population growth; and the ethics and dilemmas of natural resource use.

Global Population	
Atmospheric Science 5 [or 10]	SciEng, Wrt
Human Development 117	SciEng, Wrt
Agricultural and Resource Economics 15	SocSci, Div, Wrt
Science and Society 1	SciEng or SocSci, Div, Wrt
[or Fiber and Polymer Science 110	SciEng or SocSci, Wrt]
International Agricultural Development 10, [or Community & Regional	SocSci, Div, Wrt
Development 1	SocSci, Div, Wrt]

Biodiversity and Cultural Diversity

The nations with the greatest biodiversity often have tremendous ethnic and cultural diversity. This option examines diversity in many interrelated contexts: biological diversity and the impact of contemporary humans; values and cultural practices in regard to production and consumption; the clothes people wear; creation and use of social spaces; and the preservation of genetic resources for food, fiber, and pharmaceuticals.

Topics might include conservation biology; integration of human and natural systems; cultural expression through clothing and appearance; and discussion of what are cultural and social rights.

Biodiversity and Cultural Diversity			
Wildlife, Fish and Conservation Biology 10	SciEng, Div, Wrt		
Plant Biology 11	SciEng, Wrt		
Textiles and Clothing 7	SocSci, Div, Wrt		
Community and Regional Development 2	SocSci, Div, Wrt		
Landscape Architecture 2	SocSci, Wrt		

Food and Fiber

This option focuses on food and fiber systems, from their plant, animal, or synthetic sources to their ultimate use by humans for health, safety, communication, and pleasure. Understanding these systems enables students to see the connections between the food and clothes that are part of our everyday lives and the scientific, social, and cultural issues that make them so significant to society as a whole.

Topics might include food and clothing safety, quality, and availability; media and consumer perceptions; and cultural histories, values, and meanings.

Food and Fiber	
Animal Science 1	SciEng, Wrt
[or Plant Biology 12	SciEng, Div, Wrt]
Nutrition 10	SciEng
and Nutrition 11	SciEng, Wrt
[or Food Science and Technology 10	SciEng or SocSci]
Textiles and Clothing 6	SciEng
Textiles and Clothing 7 or 107	SocSci, Div, Wrt
Science and Society 1	SciEng or SocSci,
	Div, Wrt
Viticulture and Enology 3	SciEng or SocSci

Changing Agriculture

Changing demographics, environmental issues, and social-political trends in California all play a role in public perceptions and policies related to our food and fiber systems, natural resources, and community values. These perceptions, policies, and values need to be critically examined in the context of larger global economic trends and environmental health and safety. In this option group of courses, students can explore a range of challenging issues related to the complex interplay between rural and urban needs and values.

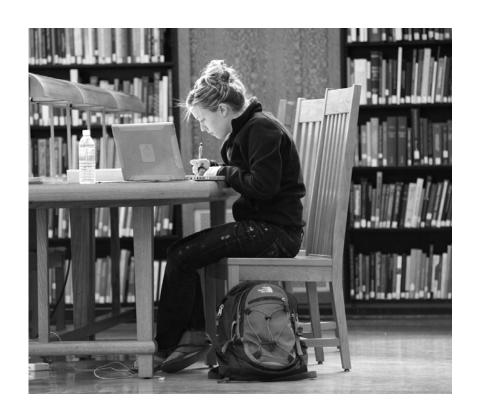
Topics might include holistic approaches to agriculture; international migration and agricultural development; and how plants and animals influence the course of history.

Changing Agriculture Theme Option			
Animal Science 1	SciEng, Wrt		
Entomology 110	SciEng, Wrt		
Plant Biology 12	SciEng, Div, Wrt		
Agricultural and Resource Economics 15	SocSci, Div, Wrt		
Environmental & Resource			
Sciences 121*	SciEng, Wrt		
Science and Society 2	SciEng or SocSci, Wrt		

This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously.

Also assigned to another area of topical breadth.

Credit for writing experience allowed if co-course taken concurrently (see writing experience list).



APPENDIX

RESIDENCE FOR TUITION INFORMATION

Policy Governing Residence

The determination of residence for tuition purposes at the University of California is governed by the UC Residency Policy and Guidelines. Under the UC Residency Policy, adult citizens and certain classes of aliens can establish residence for tuition purposes. There are particular rules that apply to the residence classification of minors and that establish exemptions The UC Residency Policy establishes the Residence Determination Date for each term as the day instruction begins at the last of the University of California campuses to open for the quarter, and for schools on the semester system, the day instruction begins for the semester. All of the UC requirements for residency must be met prior to the Residence Determination Date for classification as a resident. Documentary evidence may be required and all relevant indications will be considered in determining residence classifications.

You are cautioned that this summary is not a complete explanation of the regulations regarding residence. Please note that changes may be made in the residence requirements between the publication of this statement and the relevant residence determination date.

Office of the General Counsel

Requirements for Resident Classification, Rules Applying to Minors and Exemptions from Nonresident Supplemental Tuition can be found published as the "UC Residency Policy and Guidelines" available at Office of the General Counsel website under Educational Affairs and Campus Services.

Read the full text of UC Residency Policy-Residency Guidelines for Purposes of Tuition and Fees at http://www.ucop.edu/ogc/guides.html.

Nonresident Supplemental Tuition Fee for Nonresident Students

If you have not met all of the UC requirements for residency prior to the Residence Determination Date each term in which you propose to attend the University, you must pay Nonresident Supplemental Tuition in addition to all other fees.

Resident Determination Process

California residence for tuition purposes is determined for each student under the UC Residency Policy and Guidelines based on information provided to a campus Residence Deputy on the Statement of Legal Residence. Additional information and documentation in support of your claim of resident status for tuition purposes may be requested as needed. Applicants and students are responsible for submitting ALL RELEVANT DOCUMENTATION AND INFORMATION to the campus Residence Deputy in support of their in-state residency request. Information or documents requested but not made available to the Residence Deputy will NOT be considered or reviewed on appeal.

Incorrect Classification

If you were incorrectly classified as a resident, you are subject to reclassification and to payment of all Nonresident Supplemental Tuition not paid. If you concealed information or furnished false information and were classified incorrectly as a result, you are also subject to University discipline. Resident students who become nonresidents must immediately notify the campus Residence Deputy.

Appeals

Any student, following a final decision on their residence classification by the Residence Deputy may apply for an appeal with the Office of the General Counsel within 30 days of notification of the Residence Deputy's final decision.

All inquiries regarding the appeal process should be addressed to the Office of the General Counsel at Residency. Appeal@ucop.edu.

Petitions for Classification to Resident Status

Nonresident students may apply for a change of classification to resident status once all the requirements have been met. Petitions for Classification to Resident Status from continuing UC Davis students classified as nonresident for tuition purposes in a prior quarter must be filed during the filing period and no later than the Fee Payment Deadline for the term they wish to classify as a Resident. Deadline exceptions will only be made in the cases of a documented medical illness, death in the immediate family, or an administrative error on the part of the university. Petition supporting documents will not be accepted after the 20th day of instruction unless an extension has been requested from a Residence Deputy.

Inquiries

Inquiries regarding residence requirements, determination, classification and /or recognized exceptions should be directed to Residence Deputy, Office of the University Registrar, One Shields Avenue, Davis, California 95616 or residencedeputy@ucdavis.edu.

Inquiries regarding the UC Residence Policy and Guidelines or appeals, should be directed to Office of the General Counsel at Residency. Appeal@ucop.edu.

NO OTHER UNIVERSITY PERSONNEL ARE AUTHORIZED TO PROVIDE INFORMATION REGARDING RESIDENCE REQUIREMENTS.

UNIVERSITY POLICY ON NONDISCRIMINATION, SEXUAL HARASSMENT, DISABILITY **ACCOMMODATIONS, STUDENT RECORDS** AND PRIVACY

Nondiscrimination. The University of California, in accordance with applicable Federal and State law and University policy, does not discriminate on the basis of race, color, national origin, religion, sex, gender identity, pregnancy (including pregnancy, childbirth, and medical conditions related to pregnancy or childbirth), physical or mental disability, age, medical condition (cancerrelated or genetic characteristics), ancestry, marital status, citizenship, sexual orientation, or service in the uniformed services (includes membership, application for membership, performance of service, application for service, or obligation for service in the uniformed services) status as a Vietnam-era veteran or special disabled veteran. The University also prohibits sexual harassment. This nondiscrimination policy covers admission, access, and treatment in University programs and activities.

Discrimination, Harassment, or Arbitrary Treatment. If students have questions about student-related nondiscrimination policies or concerns about possible discrimination, harassment, or arbitrary treatment, they may contact Student Judicial Affairs for information and assistance (530) 752-1128. Additional resources for students include the UC Davis Compliance Officer (ADA and Title IX Officer) (530) 752-9466 or the dean's office for their college. Graduate students may also contact the Office of Graduate Studies (530) 752-0650 or the Graduate Students Association (530) 752-6108. Students are encouraged to seek assistance as soon as possible, as time limits may apply to grievance processes.

Campus policies provide for a prompt and effective response to student complaints. This response may include early resolution procedures or, as appropriate, an administrative review or investigation. The student will be informed of the results of the review.

Sexual Harassment. Sexual harassment is prohibited by law and by university policy and will not be condoned. Campus policy (PPM Section 380-12at http://manuals.ucdavis.edu/ppm/380/ 380-12.htm) describes campus procedures for resolving sexual harassment complaints, which may include interim actions, early resolution processes, and formal investigation procedures. If a complaint of sexual harassment is substantiated, the campus will take appropriate remedial action. The Sexual Harassment Education Program (530) 752-9255 255 works with students to resolve complaints of sexual harassment and provides referrals to other campus resources. Students may report sexual harassment to deans, supervisors, managers, the Campus Sexual Harassment Officer (Director of the Sexual Harassment Education Program) and other campus officials, including Student Judicial Affairs and Student Housing, and the Compliance Director (Title IX Officer) 530-752-9466. With the exception of certain confidential resources, University officials receiving a report of sexual harassment must immediately consult with the Sexual Harassment Officer. Students may seek confidential advice and support from Counseling and Psychological Services (530) 752-0871, the Campus Violence Prevention Program (530) 752-3299, the Lesbian, Gay, Bi-Sexual, and Transgender Resource Center (530) 752-24452, and the

Women's Resources and Research Center (530) 752-3372. Consultation with these resources will not lead to a report of sexual harassment unless additional action is taken by the individual seeking advice.

Accommodations for Students with Disabilities. Students with documented disabilities may be entitled to reasonable accommodations to gain access to the University's academic programs. More information about academic accommodations can be obtained by contacting the Student Disability Center (530) 752-3184 or http://sdc.ucdavis.edu. Questions or concerns about accommodations that are not related to academic programs should be directed to the UC Davis Compliance Director (ADA Officer) (530) 752-9466, For complaints of alleged discrimination on the basis of disability under PPM Section 280-05, contact Student Judicial Affairs (530) 752-1128 or the UC Davis Compliance Director.

Disclosures from Student Records. Students have the right to review records that relate to themselves in their capacity as students and to request corrections of records believed to be inaccurate. Most disclosures from student records to outside parties require prior consent from the student.

Under the Family Educational Rights and Privacy Act of 1974 and University and campus policies, UC Davis students have the following rights:

- A. To review their own student records within 45 days after the student submits a written request for access to the Registrar or other department in possession of the records. That office will make arrangements for access and notify the student when and where the records may be reviewed. If the records requested are in a different office, the request will be redirected and the student notified. The campus maintains several types of student records in various locations. Questions about how to obtain records should be referred to Student Iudicial Affairs at (530) 752-1128.
- **B.** To request amendment of their own student records if they believe the records are inaccurate or misleading, students should submit a written request to the office that maintains the records specifying the portion of the record the student wants changed and why it is believed to be inaccurate or misleading. That office has 45 days to determine whether the record should be changed and notify the student of the decision. If a student wishes to contest this decision, the student should contact Student Judicial Affairs.
- **C.** To restrict the disclosure of personally identifiable information contained in student records, except when law and policy permit disclosure without consent. Examples of circumstances in which the student's consent is not required for disclosure of student records include the following:
- Disclosure of "directory" or "public" information including the student's name; local and/or permanent address(es), email addresses and telephone number(s); dates of attendance; major field(s) of study [major, minor, concentration, specialization, and similar designations]; grade level; enrollment status (undergraduate/graduate, full time or part time, number of enrolled course units) degrees and honors received; most recent previous educational institution attended; participation in officially recognized activi-

ties, including Intercollegiate Athletics (ICA), and the name, weight and height of participants on ICA teams.

- To prevent disclosures of telephone numbers and/or addresses, students must submit a written request to the Registrar by the tenth day of instruction. To prevent disclosure of their e-mail address, students must follow instructions at https://computingaccounts.ucdavis.edu/, and select the Change your directory information option.
- Students may designate all information about themselves as confidential and withhold it from public disclosure by filing a request with the Office of the University Registrar in 12 Mrak Hall. If all information is designated confidential, UC Davis cannot respond to requests for verification of student status or degrees, make public any honors, or include the student's name in the commencement program without the student's specific written consent.
- Disclosure to campus officials (for example faculty, staff, student employees, or those under contract with the University) having a legitimate educational interest in the records. Legitimate educational interest means the information is relevant and necessary to a task or determination that is (a) an employment responsibility or an assigned subject matter for the inquirer and/or related to (b) the inquirer's participation in the student's education; (c) the discipline of a student; or (d) providing a service or benefit related to a student or student's family (such as health care, counseling, job placement, or financial aid).
- Disclosure of appropriate student records, including academic records, disciplinary records, and other student records, to other educational institutions in which a student seeks or intends to enroll, or is currently enrolled, so long as the disclosure is for purposes related to the student's enrollment or transfer

For more information, see UC Davis Policy and Procedure Manual Section 320-21 at http://manuals.ucdavis.edu/ppm/320/320-21.htm.

Contact Student Judicial Affairs (530) 752-1128 for questions about these rights and requirements. Student complaints regarding alleged violations of privacy rights should be submitted to Student Judicial Affairs.

Students may also contact the U.S. Department of Education concerning alleged violations of these requirements, addressed to the Family Policy Compliance Office, U.S. Department of Education, 400 Maryland Avenue, SW., Washington, DC. 20202-4605. See Section 99.63 at http://www.ed.gov/policy/gen/guid/fpco/ferpa/index.html.

Social Security Numbers. A student's Social Security number is used to verify personal identity in the UC Davis Student Records System. Students are mandated to disclose their social security number to UC Davis. In compliance with state law, Social security numbers are confidential and are not used as student identifiers.

Release of Registration Material and Grades. In compliance with student privacy rights under federal and state law and University policy, the Office of the Registrar may not release a students

grades, registration material, and/or identification card to anyone other than the student without specific written authorization signed by the student. The person to whom the information, material, or card is released must be designated by name and must present proof of identity. The signed authorization is kept in the "Record of Disclosures" in the student's file.

CAMPUS SECURITY, CRIME AWARENESS, AND ALCOHOL AND DRUG ABUSE PREVENTION

In accordance with federal law, UC Davis annually provides students and employees with information regarding campus security, crime statistics, and alcohol and drug abuse prevention, pursuant to the Student Right to Know and Campus Security Act of 1990 and the Drug Free Schools Act of 1989. The UC Davis Police and Campus Administration make continual efforts to reduce crime on campus. A well-informed community is better served and safer.

For a copy of the complete UC Davis security and crime prevention report, including crime statistics, campus security measures and crime reporting procedures, applicants for admission or prospective employees may contact the UC Davis Campus Violence Prevention Office, located in the UC Davis Police Department, contact (530) 752-3299, or jxsouza@ucdavis.edu.

ACCREDITATION

The University of California, Davis is accredited by the Accrediting Commission for Senior Colleges and Universities of the Western Association of Schools and Colleges (WASC), 985 Atlantic Avenue, Suite 100, Alameda, CA 94501 (510) 748-9001, an institutional accrediting body recognized by the Council for Higher Education and the U.S. Department of Education.

UC Davis is also accredited by the Accreditation Board for Engineering and Technology, Accreditation Council for Graduate Medical Education, Accreditation Review Commission on Education for the Physician Assistant (ARC-PA), American Association for Accreditation of Laboratory Animal Care, American Bar Association, American Chemical Society, American Dietetic Association, American Psychological Association, American Society of Crime Lab Directors Laboratory Accreditation Board (ASCLD/LAB); American Society of Landscape Architects, Association of American Law Schools, Association of American Medical Colleges, Association to Advance Collegiate Schools of Business, Commission on Accreditation for Dietetics Education; Commission on Collegiate Nursing Education; Commission on Teacher Credentialing, Computer Science Accreditation Commission, Council on Education and Public Health, the Council on Education of the American Veterinary Medical Association, Intersocietal Commission for the Accreditation of Vascular Laboratories (ICAVL), and the Liaison Committee on Medical Education.

Students interested in reviewing WASC accreditation documents may do so at http://wasc.ucdavis.edu. Those interested in reviewing profession-specific accreditation documents should contact the relevant Dean's office.

THE BOARD OF REGENTS

Governance of the University is entrusted to a corporation called The Board of Regents. Of the individuals composing the board, eighteen are California citizens appointed by the governor; and seven, including the president of the University and the governor of California, serve ex officio. A Student Regent is selected each year from a list of names submitted to the board by the Student Body Presidents' Council.

The Regents have delegated authority in academic matters to the Academic Senate of the faculty, which determines academic policy and supervises the instructional activities of the entire University. All of the permanent faculty, as well as key administrators, are members of the Senate.

The Regents have delegated authority for the organization of the University to the president. Mark G. Yudof is President and head of the Universitywide administration. Authority for the administration of each campus has been delegated to a chancellor.

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

Regents Ex Officio

Edmond G. Brown, Jr. (Jerry Brown) Governor of California and President of the Regents

Gavin Newsom

Lieutenant Governor of California

John A. Pérez

Speaker of the Assembly

Tom Torlakson

State Superintendent of Public Instruction

Bruce Hallett

President of the Alumni Associations of the University of California

Lori Pelliccioni

Vice President of the Alumni Associations of the University of California

Mark G. Yudof

President of the University

Appointed Regents

Current term expires on March 1 of year indicated.

Richard C. Blum, 2014

William De La Pena, 2018

Russell Gould, 2017

Eddie Island, 2017

Odessa P. Johnson, 2012

George Kieffer, 2021

Sherry L. Lansing, 2022

Monica Lozano, 2013

Hadi Makarechian, 2020

George M. Marcus, 2012

Norman J. Pattiz, 2014

Bonnie Reiss, 2020

Frederick Ruiz, 2016

Leslie Tang Schilling, 2013

Bruce D. Varner, 2018

Paul Watcher, 2016 Charlene Zettel, 2021

Student Regent

Alfredo Mireles, Jr., 2012

Faculty Representatives

Robert Anderson, 2012

Robert Powell, 2013

Principal Officers of the Regents

Charles F Robinson

General Counsel

Marie N. Berggren Acting Treasurer

Marsha Kelman

Secretary and Chief of Staff

Sheryl Vacca

Chief Compliance and Audit Officer

ADMINISTRATIVE OFFICERS OF THE UNIVERSITY

Mark G. Yudof

President of the University

Lawrence Pitts

Provost and Executive Vice President—Academic Affairs

Nathan Brostrom

Executive Vice President—Business Operations

Bruce B. Darling

Vice President—Laboratory Management

Peter J. Taylor

Executive Vice President—Chief Financial Officer

Daniel M. Dooley

Senior Vice President—External Relations

Patrick J. Lenz

Vice President—Budget and Capital Resources

John D. Stobo

Senior Vice President—Health Sciences and Services

Judy Sakaki

Vice President—Student Affairs

Robert L. Van Ness

Associate Vice President—Laboratory Operations

Glenn L. Mara

Acting Associate Vice President—Laboratory Programs

Steven V.W. Beckwith

Vice President—Research and Graduate Studies

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Chancellor at Berkeley

Linda P. B. Katehi

Chancellor at Davis

Michael V. Drake

Chancellor at Irvine

Gene D. Block

Chancellor at Los Angeles

Dorothy Leland

Chancellor at Merced

Timothy P. White

Chancellor at Riverside

Marye Anne Fox

Acting Chancellor at San Diego

Susan Desmond—Hellmann

Chancellor at San Francisco

Henry T. Y. Yang

Chancellor at Santa Barbara

George R. Blumenthal

Chancellor at Santa Cruz

ADMINISTRATIVE OFFICERS—UC DAVIS

Chancellor

Linda P. B. Katehi, Ph.D.

Chancellor Emeriti (and years served)

Larry N. Vanderhoef, Ph.D. (1994-2009) Theodore L. Hullar, Ph.D. (1987-1994)

Provost and Executive Vice Chancellor

Ralph J. Hexter, Ph.D.

Vice Chancellors

Harris A. Lewin, Ph.D.

Vice Chancellor—Research

John Meyer, M.P.A.

Vice Chancellor—Administrative and Resource Management

Claire Pomeroy, M.D., M.B.A.

Vice Chancellor—Human Health Sciences

Shaun B. Keister, Ph.D.

Vice Chancellor—Development and Alumni Relations

Fred E. Wood, Ph.D.

Vice Chancellor—Student Affairs

Vice Provosts

Maureen L. Stanton, Ph.D.

Vice Provost—Academic Affairs

William B. Lacy, Ph.D.

Vice Provost—University Outreach and International Programs

Peter M. Siegel, M.A.

Vice Provost—Information and Educational Technology

Patricia A. Turner, Ph.D.

Vice Provost—Undergraduate Education

Associate Chancellor

Karl M Engelbach, M.B.A.

Associate/Assistant Vice Chancellors and Vice Provosts

Rahim Reed, M.P.A., J.D.

Associate Executive Vice Chancellor—Campus Community Relations

Emily Galindo, M.B.A.

Associate Vice Chancellor—Student Affairs (Divisional and Auxiliary Services)

Griselda Castro, M.A.

Associate Vice Chancellor—Student Affairs (Student Life, Campus Community and Retention Services

Lora Jo Bossio, M.A.

Associate Vice Chancellor—Student Affairs (Enrollment, Wellness and Technology Services)

J. Michael Allred, M.B.A.

Associate Vice Chancellor—Administrative and Resource Management (Accounting and Financial Services—Finance/Controller)

Jill Parker, B.S.

Associate Vice Chancellor—Administrative and Resource Management (Safety Services)

Karen Slakey Hull, M.B.A.

Associate Vice Chancellor—Administrative and Resource Management (Human Resources)

Kelly Ratliff, M.B.A.

Associate Vice Chancellor—Administrative and Resource Management (Budget and Institutional Analysis)

Cindy Kiel, J.D.

Executive Associate Vice Chancellor—Research Administration

Bernd Hamann, Ph.D.

Associate Vice Chancellor—Research (Interdisciplinary Research and Strategic Initiatives)

Heather Young, Ph.D., R.N., F.A.A.N.

Associate Vice Chancellor—Betty Irene Moore School of Nursing

Mitchel Benson, M.S.J.

Associate Vice Chancellor—University Communications

Marie Carter-Dubois, M.B.A.

Assistant Executive Vice Chancellor—Office of the Provost

Marjorie M. Dickinson, B.A.

Assistant Vice Chancellor—Government Relations

Richard R. Engel, M.A.

Assistant Vice Chancellor—Alumni Relations

Clayton Halliday, A.I.A.

Assistant Vice Chancellor—Administrative and Resource Management (Design and Construction Management)

Diane Davies-Conley, C.P.A., M.B.A.

Assistant Vice Chancellor—Administrative and Resource Management (Chief Operating Officer)

Karl Mohr, M.A.

Assistant Vice Chancellor—Administrative and Resource Management (20/20 Initiative)

Robert Segar, M.L.A.

Assistant Vice Chancellor—Administrative and Resource Management (Campus Planning and Community Resources)

Sid England, Ph.D.

Assistant Vice Chancellor—Administrative and Resource Management (Environmental Stewardship and Sustainability)

Adrienne Martin, Ph.D

Associate Vice Provost—University Outreach and International Programs (International Programs)

Vacant

Associate Vice Provost—University Outreach and International Programs (University Outreach and Engagement)

Gary Ford, Ph.D.

Associate Vice Provost—Undergraduate Education

Gail Martinez, Ph.D.

Assistant Vice Provost—Undergraduate Education

Robert Kerr, Ph.D.

Assistant Vice Provost—University Outreach and International Programs (Alumni and Development)

Dave Shelby

Assistant Vice Provost—Information and Educational Technology

Chief campus Counsel

Steven A. Drown, J. D.

Chief Executive Officer—Medical Center

Ann Madden Rice, M.A.

Chief Officer—Regional and Community Engagement

Beverly "Babs" Sandeen, Ph.D.

Acting University Librarian

Randolph Siverson, Ph.D.

Registrar

Elias S. Lopez, Ph.D.

Directors

Nona Richardson, M.A.

Interim Director, Intercollegiate Athletics

Jeremiah Maher

Director, Internal Audit Services

Michelle Famula, M.D.

Director, Student Health & Wellness Center

Katy Maloney, B.S.

Director, Financial Aid

Richard R. Engel, M.A.

Executive Director, Cal Aggie Alumni Association

Barry Shiller, B.A.

Interim Executive Director, Strategic Communications

Emily Galindo, M.B.A.

Executive Director, Student Housing

Elias S. Lopez, Ph.D.

Executive Director, Technology Services and University Registrar

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School of Veterinary Medicine

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UC Davis Extension

Dennis Pendleton, Ph.D., Dean Rita Bunch, M.B.A., Assistant Dean/COO

PROPORTION OF UC DAVIS GRADUATES FINDING WORK IN THEIR FIELDS OF CHOICE

The percent of alumni whose full-time job is in the field of their choice is shown by field of study. Figures do not include the five percent of graduates who had not decided on a career field at the time of the survey.

Field of Study², Percentage finding work in field of choice

RETENTION DATA AND GRADUATION RATES AT UC DAVIS

Agricultural Sciences, 88% Biological Sciences, 67% Engineering, 86% Environmental Sciences, 79%

Humanities, Arts and Cultural Studies, 61% Human Sciences, 69% Mathematical and Physical Sciences, 88% Social Sciences, 67%

Total, 71%

Source: A 2009 survey of June 2007-08 graduates conducted by Student Affairs Research and Information. ²Fields of Study are groups of related undergraduate majors as organized into UC Davis colleges or divisions.

Freshmen*

(Retention and graduation rates through Summer 2011 for all undergraduates entering UC Davis as freshmen.)

Fall Quarter of Initial Enrollment:	Number of Students**	Percent Returned for Second Year	Percent Graduating in Four Years	Percent Graduating in Five Years	Percent Graduating in Six Years
1996	3,685	91%	38%	73%	79%
1997	3,524	90%	38%	71%	78%
1998	3,616	90%	39%	72%	78%
1999	3,816	90%	42%	75%	80%
2000	4,319	90%	43%	76%	81%
2001	4400	90%	43%	73%	79%
2002	4653	91%	47%	77%	81%
2003	4775	90%	50%	75%	80%
2004	4258	91%	51%	78%	82%
2005	4375	90%	51%	77%	82%

Transfer Students

(Retention and graduation rates through Summer 2011 for all undergraduates transferring to UC Davis from California community colleges.)

Fall Quarter of Initial Enrollment: 2000	Number of Students** 1,596	Percent Returned for Second Year 88%	Percent Graduating in Two Years 39%	Percent Graduating in Three Years 75%	Percent Graduating in Four Years 82%
2001	1,607	89%	40%	75%	83%
2002	1,668	90%	46%	78%	85%
2003	1,581	90%	47%	78%	83%
2004	1,734	89%	48%	78%	85%
2005	1,588	88%	53%	79%	84%
2006	1,617	90%	49%	80%	85%
2007	1,650	88%	48%	77%	84%

Retention is defined as enrollment at the third week census point of the fall term one year from initial fall term.

Graduation is define as having received a degree from UC Davis (does not include students who transferred to another institution to complete their degree).

Source: Institutional Analysis – Student Research and Information, UC Davis (February 13, 2012)

AVERAGE YEARLY SALARY OFFERED TO GRADUATES WITH BACHELOR'S, **MASTER'S, AND DOCTORATE DEGREES**

Field of Study:			
	Bachelor's	Master's	Doctorate
Engineering	\$56,738	\$67,780	\$76,994
Humanities/Social Sciences	\$37,435	\$48,916	\$51,119
Health Sciences/Life Sciences	\$44,988	\$55,810	no offers reported
Physical Sciences	\$48,133	\$66,700	\$78,036

¹Source: 2010-2011 National Salary Survey data provided by the National Association of Colleges and Employers.

^{*}Retention and graduation tracking limited to students enrolled full-time in their initial term of enrollment.

^{**}Students excluded from these counts include those who are now deceased or participated in any of the following: Military Service, Foreign Service, Religious Mission.



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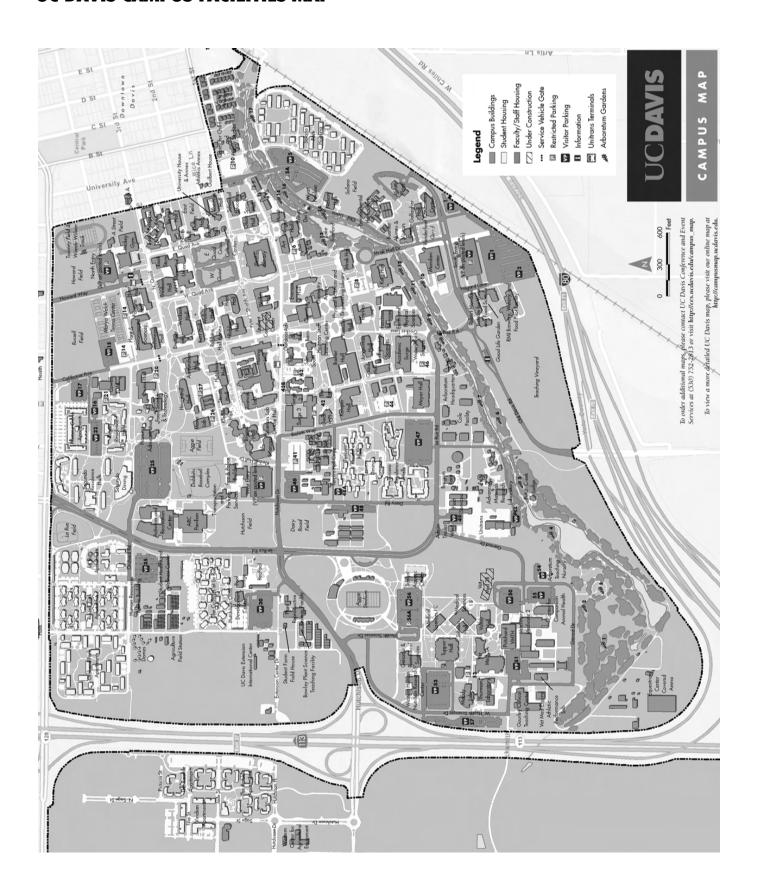
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UC DAVIS CAMPUS FACILITIES MAP



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