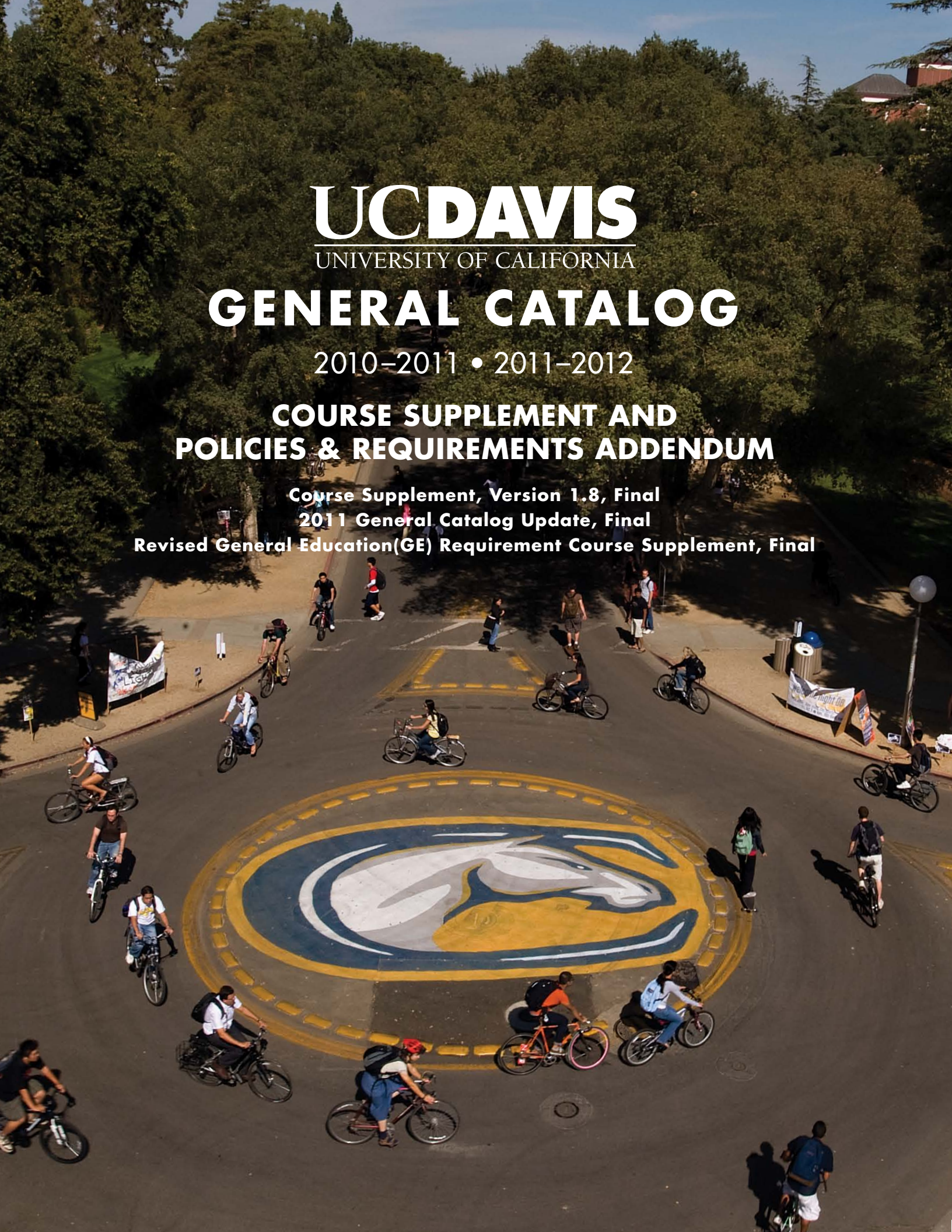

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- Engineering: Civil and Environmental
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The 2010-2012 UC Davis General Catalog Supplement contains updated information regarding requirements and courses for the 2010-2012 academic years. Use this document in conjunction with the *2010-2012 UC Davis General Catalog*. If a department is not listed in this document, there are no changes to that department's programs.

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Introduction

The 2010-2012 General Catalog Course Supplement and Policies & Requirements Addendum addresses important changes to the *UC Davis 2010-2012 General Catalog*. Changes are contained in two sections; the Course Supplement and Policies & Requirements Addendum.

Additionally, the *2011 General Catalog Update* combines all the changes from the Course Supplement and Policies & Requirements Addendum. up to Summer 2011; release date 06.17.2011.

Course Supplement

Changes, cancellations, or the addition of new courses, are contained in the Course Supplement, below.

The changes listed in the Course Supplement section are released using the following schedule:

- Version C1.0; release date 6/25/10
- Version C1.1; release date 9/20/10
- Version C1.2; release date 11/1/10
- Version C1.3; release date 1/31/11
- Version C1.4; release date 5/2/11
- 2011 General Catalog Update; release date 6/17/11
- Version C1.5; release date 9/21/11
- Version C1.6; release date 10/31/11
- Version C1.7; release date 2/6/12
- Version C1.8 (final); release date 4/17/12

Policies and Requirements Addendum

Revised or the addition of new undergraduate/graduate/professional degree programs and requirements, and revised or the addition of new *General Catalog* policies or procedures are contained in the Policies & Requirements Addendum.

The changes listed in the Policies & Requirements Addendum section are released using the following schedule:

- Version P1.0; release date 9/20/10 (2010-2011 Academic year)
- 2011 General Catalog Update; release date 6/17/11
- Version P1.1 (final); release date 9/21/11 (2011-2012 Academic year)

New or Revised General Education (GE) Requirement Course Supplement—Fall 2011

All approved new or revised General Education (GE) Requirement course are contained in the New or Revised General Education (GE) Requirement Course Supplement—Fall 2011. For all students who need to search for fall 2011 Former General Education (GE) courses (prior to fall 2011 catalog rights) and New GE courses (begin with fall 2011 catalog rights), use the Office of the University Registrar Course Search Tool at *https://registrar4.ucdavis.edu/courses/search/index.cfm*.

- New or Revised General Education (GE) Requirement Course Supplement; release date 9/21/11

Course Supplement

African American and African Studies

New and changed courses in African American and African (AAS)

Lower Division Courses

10. African-American Culture and Society (4)
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.—I. (I.) Harrison
(change in existing course—eff. winter 12)

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.—II. (II.) Adebanwi, Adejunmobi
(change in existing course—eff. winter 12)

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.—II. (II.) Harrison, Osumare
(change in existing course—eff. winter 12)

16. Verbal and Performance Arts in Africa (4)
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.—II. (II.) Adejunmobi
(change in existing course—eff. winter 12)

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.) Adejunmobi
(change in existing course—eff. winter 12)

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.—I. (I.) Ng'weno
(change in existing course—eff. fall 11)

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: ArtHum, Div, Wrt.—III. (III.) Acham
(change in existing course—eff. winter 12)

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.—III. (III.) Osumare

(change in existing course—eff. spring 12)

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.—II. (II.)

(change in existing course—eff. winter 12)

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

(change in existing course—eff. winter 12)

107A. African Descent Communities and Culture in the Caribbean and Latin America (4)
Lecture/discussion—4 hours. Prerequisite: upper 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.—I. (I.) Ng'weno

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.—II. (II.) Ng'weno

(change in existing course—eff. winter 12)

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.—I. (I.) Adebanwi, Adejunmobi

(change in existing course—eff. winter 12)

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.— (II.) Adebanwi, Adejunmobi

(change in existing course—eff. winter 12)

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.—III. (III.) Acham

(change in existing course—eff. winter 12)

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.)—I. (I.) Turner

(change in existing course—eff. fall 11)

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.—III, IV. (III, IV.) Harrison

(change in existing course—eff. winter 12)

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.—(III.) Harrison, Osumare

(change in existing course—eff. winter 12)

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.—(III.) Harrison, Ng'weno, Osumare

(change in existing course—eff. winter 12)

152. Major Voices in Black World Literature (4)
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.—(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.—III. (III.) Adejunmobi

154. University Gospel Choir (2)
(cancelled course—eff. fall 10)

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.—III. (III.) Adejunmobi

(change in existing course—eff. winter 12)

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.—(II.) Adejunmobi

(change in existing course—eff. winter 12)

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, DIv, Wrt.—III. (III.)

(change in existing course—eff. winter 12)

165. Afro-Christianity and the Black Church (4)
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.—(II.) Harrison

(change in existing course—eff. winter 12)

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.—IV. (IV.) Acham

(change in existing course—eff. summer 11)

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.—II. (II.) Acham

(change in existing course—eff. fall 11)

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 Africa 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, DIv.—(II.)

(change in existing course—eff. spring 12)

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.—II. (II.) Ng'weno

(change in existing course—eff. fall 11)

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.—(III.) Acham

(change in existing course—eff. fall 11)

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

(change in existing course—eff. winter 12)

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 SocSci, Div.—II. (II.) Ng'weno

(change in existing course—eff. winter 12)

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

(change in existing course—eff. spring 12)

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.—II. (II.) Acham

(change in existing course—eff. fall 11)

Agricultural and Resource Economics

New and changed courses in Agricultural and Resource Economics (ARE)

Upper Division Course

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.—I, II, III. (I, II, III.) Taylor

(change in existing course—eff. fall 11)

Graduate Course

256. Applied Econometrics (4)
(cancelled course—eff. fall 12)

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 application.—III. (III.) Lybbert

(change in existing course—eff. fall 11)

American Studies

New and changed courses in American Studies (AMS)

Lower Division Course

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, WE.—III. Smith, Sze

(change in existing course—eff. spring 12)

Animal Biology (A Graduate Group)

New and changed courses in Animal Biology (ABG)

Graduate Course

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

(new course—eff. winter 12)

Animal Science

New and changed courses in Animal Science (ANS)

Upper Division Courses

104. Principles and Applications of Domestic Animal Behavior (3)
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.—II. (II.) Tucker

(change in existing course—eff. winter 12)

105. Domestic Animal Behavior (2)
(cancelled course—eff. winter 12)

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

(new course—eff. spring 12)

Anthropology

New and changed courses in Anthropology (ANT)

Lower Division Courses

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

(new course—eff. fall 97)

99. Special Study for Lower Division Students (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

(new course—eff. fall 97)

Upper Division Courses

102. Cultural Ecology (4)
(cancelled course—eff. winter 12)

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, WE.

(change in existing course—eff. fall 11)

123. Psychological Anthropology (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 2 or Science and Technology Studies 1. History of the relationship between anthropology and psychoanalysis. 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: Div, SocSci, Wrt.—II. (II.) Giordano

(change in existing course—eff. winter 11)

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.—II. (II.) Dumit

(change in existing course—eff. fall 12)

146N. Topics in the Anthropology of Europe (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Recent ethnographies of different nation-states 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, WE.

(change in existing course—eff. spring 11)

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.—II. Smith

(change in existing course—eff. winter 11)

Applied Biological Systems Technology

New and changed courses in Applied Biological Systems Technology (ABT)

Lower Division Course

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.)—II. (II.) Grismer, Shafii

(change in existing course—eff. fall 10)

Upper Division Course

175. Introduction to Precision Agriculture (3)
(cancelled course—eff. fall 12)

Art History

New and changed courses in Art History (AHI)

Lower Division Course

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.—I. (I.) Burnett

(change in existing course—eff. winter 11)

Art Studio

Revised General Education courses in Art Studio (ART)

Upper Division Course

147. Theory and Criticism of Photography (4)
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

(change in existing course—eff. fall 12)

Asian American Studies

New and changed courses in Asian American Studies (ASA)

Upper Division Course

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

(change in existing course—eff. winter 10)

Atmospheric Science

New and changed courses in Atmospheric Science (ATM)

Graduate Courses

291A-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.)

(change in existing course—eff. fall 10)

Biological Sciences

New and changed courses in Biological Sciences (BIS)

Lower Division Course

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.—I, II, III. (I, II, III.) Grosberg

(change in existing course—eff. fall 10)

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 laboratories 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.—I, II, III. (I, II, III.) Shaffer

(change in existing course—eff. fall 10)

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 o.rganisms; 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: SciEng, Wrt.—III. (III.) Westerdahl

(change in existing course—eff. fall 11)

Upper Division Course

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.—I, II, III. (I, II, III.) Brady, Chan, Draper, Dvorak, Engebrecht, Heyer, Kliebenstein, Langley, O'Neill, Rodriguez, Sanders, Turelli

(change in existing course—eff. fall 11)

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 students who have completed Biological Sciences 105 or Animal Biology 102.—I, II, III. (I, II, III.) Cheng, Etzler, Gasser, Hilt, Leary

(change in existing course—eff. fall 11)

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.—I, II, III. (I, II, III.) Cheng, Etzler, Gasser, Hilt, Leary

(change in existing course—eff. fall 11)

104. Regulation of Cell Function (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.—I, II, III. (I, II, III.) Dinesh-Kumar, Edwards, Etzler, Kaplan, S. Lin, B. Liu, McNally, Privalsky, Shiozaki, Starr

(change in existing course—eff. fall 11)

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 stu-

dents who have completed both Animal Biology 102 and 103.—I, II, III. (I, II, III.) Fiehn, Hilt, Murphy, Theg

(change in existing course—eff. fall 11)

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.—III. (II.) Brady

(new course—eff. winter 11)

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

(new course—eff. spring 13)

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

(new course—eff. spring 12)

Biochemistry, Molecular, Cellular and Developmental Biology

New and changed courses in Biochemistry, Molecular, Cellular and Developmental Biology (BCB)

Graduate Courses

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.)

(new course—eff. fall 11)

298. Group Study (1-5)
Prerequisite: consent of instructor. (S/U grading only.)—I, II, III. (I, II, III.)

(new course—eff. fall 11)

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only.)—I, II, III. (I, II, III.)

(new course—eff. fall 11)

Biochemistry and Molecular Biology

New and changed courses in Biochemistry and Molecular Biology (BMB)

Graduate Courses

290. Seminar (1)
(cancelled course—eff. winter 12)

299. Research (1-12)
(cancelled course—eff. spring 12)

Biophysics

New and changed courses in Biophysics (BPH)

Graduate Courses

200. Current Techniques in Biophysics (2)
(cancelled course—eff. fall 09)

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 Biomedical Engineering 255.)—II. (II.) Chuang, Matthews

(new course—eff. fall 11)

Cell and Developmental Biology

New and changed courses in Cell and Developmental Biology (CDB)

Graduate Courses

200. Current Techniques in Cell Biology (2)
(cancelled course—eff. spring 11)

200LA. Cell and Developmental Biology Laboratory (3)
(cancelled course—eff. winter 12)

200LB. Cell and Developmental Biology Laboratory (6)
(cancelled course—eff. winter 12)

290. Current Topics in Cell and Developmental Biology (1)
(cancelled course—eff. fall 11)

290C. Research Conference in Cell and Developmental Biology (1)
(cancelled course—eff. spring 12)

298. Group Study (1-5)
(cancelled course—eff. spring 12)

299. Research (1-12)
(cancelled course—eff. spring 12)

Chemistry

New and changed courses in Chemistry (CHE)

Upper Division Course

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.)

(change in existing course—eff. fall 11)

Graduate Courses

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.

(change in existing course—eff. fall 11)

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.

(change in existing course—eff. fall 11)

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.

(change in existing course—eff. fall 11)

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.

(change in existing course—eff. fall 11)

Chicana/Chicano Studies

New and changed courses in Chicana/Chicano Studies (CHI)

Upper Division Course

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 Torre

(new course—eff. fall 11)

Chinese

New and changed courses in Chinese (CHN)

Lower Division Course

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
(change in existing course—eff. fall 12)

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
(change in existing course—eff. spring 12)

107. Traditional Chinese Fiction (in English) (4)
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 representative works such as The Story of the Stone and famous Ming-Qing short stories. GE credit: ArtHum, Div, Wrt.—II. (II.) Halperin
(change in existing course—eff. winter 12)

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 third-year 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.—IV. (IV.)
(new course—eff. summer 10)

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.)
(new course—eff. summer 11)

Classics

New and changed courses in Classics (CLA)

Lower Division Course

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.—Albu, Watanabe
(new course—eff. fall 11)

Upper Division Courses

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.—Bulman
(change in existing course—eff. fall 11)

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.—Bulman
(change in existing course—eff. fall 11)

Communication

New and changed courses in Communication (CMN)

Lower Division Course

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
(new course—eff. spring 12)

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.—I, II, III, IV. (I, II, III, IV.) Feng
(change in existing course—eff. fall 11)

102. Empirical Methods in Communication (4)
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.—I, II, III, IV. (I, II, III, IV.) Bell, Jenkins, Motley, Palomares, Yegiyan
(change in existing course—eff. fall 11)

103. Gender Differences in Communication (4)
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.—I, II. Palomares
(change in existing course—eff. fall 11)

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.—I, II, III. (I, II, III.) Feng, Jenkins
(change in existing course—eff. fall 11)

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.—II. (II.) Berger, Yegiyan
(change in existing course—eff. fall 11)

140. Introduction to Mass Communication (4)
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.—I, II, III, IV. (I, II, III, IV.) Cho, Hwang, Taylor, Yegiyan
(change in existing course—eff. fall 11)

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.—II, III. (II, III.) Hwang, Taylor
(change in existing course—eff. fall 11)

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.—I, II, III. (I, II, III.)
(change in existing course—eff. fall 11)

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 advocacy campaigns. Not open for credit to students who have completed course 160. GE credit: SocSci.—III. (III.) Barnett
(change in existing course—eff. winter 12)

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.—I, II. (I, II.) Bell, Jenkins
(change in existing course—eff. fall 11)

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
(change in existing course—eff. fall 12)

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
(change in existing course—eff. fall 12)

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.—III. (III.)
(change in existing course—eff. fall 11)

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.—III. (III.)
(change in existing course—eff. fall 11)

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.—III. Berger, Feng, Jenkins, Palomares
(change in existing course—eff. fall 11)

189B. Proseminar in Mass Communication (4)
Seminar—3 hours; term paper. Prerequisite: course 101, 102, 140; consent of instructor. Open to Communication majors only. 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.—III. Berger, Hwang, Taylor, Yegiyan
(change in existing course—eff. fall 11)

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.—III. Barnett, Bell, Feng, Taylor
(change in existing course—eff. fall 11)

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.—III. Barnett
(change in existing course—eff. fall 11)

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.)
(change in existing course—eff. fall 11)

Graduate Courses

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 Pubic Health Science 232.) Offered in alternate years.—(II.) Bell
(new course—eff. fall 11)

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
(new course—eff. fall 10)

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 irregularly.—II. (II.) Bell, Taylor
(new course—eff. fall 10)

Community and Regional Development

New and changed courses in Community and Regional Development (CRD)

Lower Division Course

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.—I. (I.) Galt
(change in existing course—eff. spring 10)

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.—I. (I.) Kenney
(change in existing course—eff. summer 10)

140. Dynamics of Regional Development (4)
Lecture—4 hours; extensive writing; term paper; project. Prerequisite: one undergraduate social science course or permission 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.—II. (II.) Kenney
(change in existing course—eff. winter 10)

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 patterns of production and circulation and their implications for workers, communities and societies, both in the U.S. and around the globe. GE credit: SocSci.—I. (I.) Benner
(change in existing course—eff. summer 10)

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.—II. (II.) Galt

(change in existing course—eff. summer 10)

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: Div, SocSci, Wrt.—III. London

(new course—eff. spring 11)

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: Div, SocSci, Wrt.—III. London

(new course—eff. spring 10)

152. Community Development (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, Wrt.—I. (I.) Hirtz

(change in existing course—eff. winter 10)

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.—Hirtz

(new course—eff. spring 10)

154. Social Theory and Community Change (4)
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: Div, SocSci, Wrt.—I. (I.) Hirtz

(change in existing course—eff. winter 10)

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 citizenship status on work; responses of workers, communities, and policy-makers to workplace changes.—I. (I.)

(change in existing course—eff. winter 10)

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

(change in existing course—eff. winter 10)

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.)

(change in existing course—eff. summer 10)

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: Div, SocSci, Wrt.—II. (II.) Guarnizo

(change in existing course—eff. winter 10)

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

(new course—eff. spring 10)

Graduate Courses

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

(change in existing course—eff. winter 10)

Comparative Literature

New and changed courses in Comparative Literature (COM)

Lower Division Courses

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.—II. (II.) Schiesari

(change in existing course—eff. fall 12)

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.—I. (I.)

(change in existing course—eff. winter 11)

Upper Division Courses

152S. 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

(change in existing course—eff. spring 12)

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.—III. (III.) Adejunmobi

(change in existing course—eff. spring 12)

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. 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.—III. (III.)

(change in existing course—eff. fall 12)

Graduate Courses

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, II, III.)

(change in existing course—eff. fall 11)

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 paper. Required of Ph.D. candidates.—I, II, III. (I, II, III.)
(change in existing course—eff. fall 11)

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, III.)
(change in existing course—eff. fall 11)

Design

New and changed courses in Design (DES)

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.—I. (I.) Housefield
(change in existing course—eff. fall 10)

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.—IV. (IV.)
(change in existing course—eff. summer 10)

14. Design Drawing (4)
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.—IV. (IV.)
(change in existing course—eff. fall 10)

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.—IV. (IV.)
(change in existing course—eff. summer 10)

16. 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.—I, II, III, IV. (I, II, III, IV.)
(change in existing course—eff. fall 10)

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.—IV. (IV.)
(change in existing course—eff. summer 10)

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.—I, IV. (I, IV.) Housefield
(change in existing course—eff. fall 10)

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 communication) 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.—II. (II.) Housefield
(change in existing course—eff. fall 10)

50. Model Making (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 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.—IV.(IV.) Kessler
(change in existing course—eff. fall 10)

***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 *77*A.—II, IV. (II, IV.)
(change in existing course—eff. fall 10)

Upper Division Courses

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 meaning through the addition of text.—I, II, IV. (I, II, IV) Sylva
(change in existing course—eff. fall 10)

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.—I, II, IV. (I, II, IV) Verba
(change in existing course—eff. fall 10)

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.—II, IV. (II, IV) Drew
(change in existing course—eff. fall 10)

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.—Avila
(change in existing course—eff. fall 10)

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.—I. (I.) Avila
(change in existing course—eff. fall 10)

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
(change in existing course—eff. spring 12)

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.—I, II, IV. (I, II, IV.)
(change in existing course—eff. spring 10)

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.—III. (III.)
(change in existing course—eff. spring 11)

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 motion-based, screen-based typography. Consideration of narrative structures, movement assemblage, and other visual languages, synthesized within a nuanced understanding of typography within digital space.—I. (I.) Drew
(change in existing course—eff. spring 11)

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.—II, III, IV. (II, III, IV.) Sylva
(change in existing course—eff. spring 11)

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 traditional graphic media.—II, III, IV. (II, III, IV.) Sylva, Verba
(change in existing course—eff. spring 11)

156B. Visual Presentation: Visual Merchandising (4)
(cancelled course—eff. spring 12)

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, sequencing, 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.—Verba
(new course—eff. spring 11)

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.—III. (III.) Avila
(change in existing course—eff. spring 11)

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.—II, IV. (II, IV.) McNeil
(change in existing course—eff. spring 11)

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.—III. (III.) McNeil
(change in existing course—eff. spring 11)

Graduate Course

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.—I. (I.)
(change in existing course—eff. spring 11)

Dramatic Art

New and changed 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.—I, II, III, IV. (I, II, III, IV.) Bogad, Hunter, Rossini
(change in existing course—eff. fall 11)

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.)
(change in existing course—eff. fall 12)

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.)
(change in existing course—eff. spring 12)

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.)
(change in existing course—eff. fall 12)

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.)
(change in existing course—eff. fall 12)

Upper Division Courses

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.
(change in existing course—eff. fall 11)

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.—II. (II.) Morgan
(change in existing course—eff. fall 11)

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.
(change in existing course—eff. fall 12)

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.)
(change in existing course—eff. fall 12)

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.—II. (II.) Hunter
(change in existing course—eff. fall 11)

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.—I, II, III, IV. (I, II, III, IV.) Hunter
(change in existing course—eff. fall 11)

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.—I, II, III, IV. (I, II, III, IV.) Hunter
(new course—eff. fall 11)

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.)

(change in existing course—eff. spring 12)

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.—IV. (IV.)

(change in existing course—eff. fall 11)

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.—Bogad

(change in existing course—eff. fall 12)

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.—Hunter

(change in existing course—eff. fall 11)

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.—Rossini

(change in existing course—eff. fall 11)

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.—II, IV. (II, IV.) Hunter

(change in existing course—eff. fall 11)

158. Performance Studies Undergraduate Seminar (4)
Seminar—4 hours. Prerequisite: course 156AN, 156BN, or 156CN 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. Offered irregularly. GE credit: Wrt.—I, II, III, IV. (I, II, III, IV.)

(change in existing course—eff. fall 11)

160A. Principles of Playwriting (4-4)
Lecture/discussion—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.—II. (II.)

(change in existing course—eff. winter 12)

160B. Principles of Playwriting (4-4)
Lecture—4 hours. Prerequisite: two courses in Dramatic Art or related courses in other departments; course 160A or consent of instructor. Analysis of dramatic structure; preparation of scenarios; the composition of plays.—II. (II.)

(change in existing course—eff. winter 12)

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 Technocultural Studies 175.) May be repeated two times for credit.—III. (III.) Anderson, Drew

(new course—eff. fall 11)

Graduate Courses

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

(change in existing course—eff. winter 12)

270A. Individually Guided Research in Performance Studies (4)
(cancelled course—eff. fall 12)

270B. Individually Guided Research in Performance Studies (4)
(cancelled course—eff. fall 12)

270C. Individually Guided Research in Performance Studies (4)
(cancelled course—eff. fall 12)

290. Colloquia in Performance Studies (4)
(cancelled course—eff. fall 12)

290. Colloquia in Performance Studies (4)
Lecture/discussion—2 hours; laboratory—1 hour. Prerequisite: registration in Performance Studies Graduate Group and prior to Qualifying Examination. Designed to provide cohort identity and faculty exchange. Opportunity to present papers, hear guest lecturers, and see faculty presentations, gather for organizational and administrative news, exchange information and make announcements. Course must be taken every year that a Performance Studies graduate student is registered, prior to taking the Qualifying Examination. May be repeated four times for credit. Limited to four units per year. (S/U grading only.)—III. (III.)

(new course—eff. fall 11)

Professional Course

459. Approaches to Theatre and Dance (4)
(cancelled course—eff. fall 12)

Ecology

New and changed courses in Ecology (ECL)

Graduate Course

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, Eviner

(change in existing course—eff. fall 11)

210. Advanced Topics in Human Ecology (4)
(cancelled course—eff. winter 10)

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

(change in existing course—eff. fall 11)

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.) Jackson

(new course—eff. fall 11)

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, II, III. (I, II, III.)

(change in existing course—eff. fall 11)

210. Advanced Topics in Human Ecology (4)
(cancelled course—eff. fall 10)

Economics

New and changed courses in Economics (ECN)

Upper Division Courses

115A. Economic Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A and 1B. Major issues encountered in emerging from international poverty, including 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 Agricultural and Resource Economics 115A.) GE credit: SocSci, Div.—I, II, III. (I, II, III.) Taylor

(change in existing course—eff. fall 11)

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 evalua-

tion, the California energy crisis, market structure and power, global climate change, and command-and-control regulation.—I. (I.) Rapson

(new course—eff. fall 11)

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 conduct of monetary policy.—I, II, III. (I, II, III.) Salyer, Siegler

(change in existing course—eff. spring 12)

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.—III. (III.)

(change in existing course—eff. fall 11)

Graduate Courses

256. Applied Econometrics (4)
(cancelled course—eff. fall 12)

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.—Woo

(new course—eff. fall 11)

Education

New and changed courses in Education (EDU)

Upper Division Course

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.)

(change in existing course—eff. fall 11)

Graduate Courses

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.—(I.) Enright

(new course—eff. fall 11)

252. Multicultural Teaching and Curriculum (3)
(cancelled course—eff. fall 11)

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 work-in-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, II, III.)

(new course—eff. winter 09)

Engineering

New and changed courses in Engineering (ENG)

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.—I, II. (I, II.) VanderGheynst

(change in existing course—eff. fall 11)

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.—I, II, III. (I, II, III.)

(change in existing course—eff. summer 10)

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.—I, II, III. (I, II, III.)

(change in existing course—eff. fall 10)

Upper Division Courses

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.—I, II, III. (I, II, III.) Hess, Schaaf, Velinsky

(change in existing course—eff. fall 10)

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.—I, II, III. (I, II, III.)

(change in existing course—eff. fall 10)

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.—I, II, III. (I, II, III.)

(change in existing course—eff. summer 10)

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.—I, II, III. (I, II, III.)

(change in existing course—eff. fall 10)

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.—Delwiche, Hartsough

(change in existing course—eff. fall 11)

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.—(III.) Rosa

(change in existing course—eff. fall 11)

122. Introduction to Mechanical Vibrations (4)
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.—I. (I.) Hubbard

(change in existing course—eff. fall 10)

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.) Hwang

(new course—eff. fall 12)

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.)

(change in existing course—eff. winter 13)

Engineering: Aerospace Science and Engineering

New and changed courses in Aerospace Science and Engineering (EAE)

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
(change in existing course—eff. spring 11)

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.—I. (I.) Chattot
(change in existing course—eff. fall 10)

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. Specialization of equations for aircraft. Fundamentals of feedback. Aircraft flight control systems. Specialization of equations of motion for orbiting spacecraft. Spacecraft attitude control systems.—II. (II.) R. Hess
(change in existing course—eff. winter 11)

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
(change in existing course—eff. winter 12)

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. Aircraft design including: refinement and iteration of initial design; cost analysis, detailed design, and analysis of aircraft structure; propulsion system; aerodynamics, stability, and control/handling qualities; or manufacturing. Offered in alternate years.—III. van Dam
(change in existing course—eff. spring 11)

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 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.—I. (I.) Sarigul-Klijn
(change in existing course—eff. fall 10)

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.—II. (II.)—La Saponara
(change in existing course—eff. winter 11)

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. La Saponara
(change in existing course—eff. fall 10)

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.—II. (II.) R. Davis
(change in existing course—eff. winter 11)

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.—III. (III.) Sarigul-Klijn
(change in existing course—eff. spring 11)

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, subsystem design. Prototype space mission concepts are presented and a multidisciplinary mission design is developed that considers all relevant architecture elements. Offered in alternate years.—(I.) Joshi
(change in existing course—eff. fall 11)

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.—IV. (IV.) Hafez
(cancelled course—eff. summer 11)

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.—IV. (IV.)
(change in existing course—eff. summer 11)

Engineering: Applied Science—Davis

New and changed courses in Engineering: Applied Science—Davis (EAD)

Upper Division Course

188. Science and Technology of Sustainable Power Generation (4)
(cancelled course—eff. fall 10)

Graduate Course

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 Biomedical Engineering 255 and Biophysics 255.)—II. (II.) Chuang, Matthews
(new course—eff. fall 11)

Engineering: Biological Systems

New and changed courses in Engineering: Biological Systems (EBS)

Lower Division Course

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; composition 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.—II. (II.) Slaughter, Zicari
(change in existing course—eff. fall 11)

Upper Division Course

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.—II. (II.) K. McCarthy, Upadhyaya
(change in existing course—eff. fall 11)

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
(new course—eff. spring 12)

162. Industrial Bioprocessing (4)
(cancelled course—eff. spring 12)

Engineering: Biomedical

New and changed courses in Biomedical Engineering (BIM)

Lower Division Course

1. Introduction to Biomedical Engineering (2)
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
(change in existing course—eff. fall 12)

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
(change in existing course—eff. fall 12)

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.
(new course—eff. spring 12)

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.
(new course—eff. spring 12)

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.
(new course—eff. spring 12)

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
(change in existing course—eff. fall 12)

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
(change in existing course—eff. fall 12)

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
(change in existing course—eff. fall 12)

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.) Qi
(change in existing course—eff. fall 12)

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
(change in existing course—eff. fall 12)

110A. Biomedical Engineering Senior Design Experience (3)
Lecture/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.—II. (II.)
(change in existing course—eff. winter 13)

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.—III. (III.)
(change in existing course—eff. spring 13)

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.)
(new course—eff. fall 12)

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
(change in existing course—eff. fall 12)

116. Physiology for Biomedical Engineers (5)
Lecture—2 hours; discussion—3 hours. Prerequisite: Biological Sciences 2A, Mathematics 22B, Physics 9C. Basic human physiology for the nervous, musculoskeletal, cardiovascular, respiratory, gastrointestinal, 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.) Louie
(change in existing course—eff. spring 13)

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. GE credit: SciEng.—III. (III.) Savageau
(change in existing course—eff. spring 11)

118. Microelectromechanical Systems (4)
Lecture—3 hours; laboratory—2 hours. Prerequisite: Chemistry 2A; Engineering 100; Biomedical Engineering 106 or Engineering 103. Theory and practice of MEMS, including fundamentals of microfabrication techniques, microscale sensing and actuating principles, and microsystem designs and implementations. Demonstration laboratory sections, integrated with lectures, conducted weekly at the North California Nanofabrication Center.—II. (II.) Pan
(change in existing course—eff. spring 07)

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
(change in existing course—eff. fall 12)

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
(change in existing course—eff. fall 12)

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 x-

ray imaging, computed tomography, magnetic resonance imaging, ultrasound and nuclear imaging. GE credit: QL, SE, SL, VL.—III. (III.) Ferrara

(change in existing course—eff. fall 12)

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

(change in existing course—eff. fall 12)

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 engineering 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

(change in existing course—eff. fall 12)

161L. Biomolecular Engineering Laboratory (3)

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. GE credit: SciEng.—II. (II.) Yokobayashi

(change in existing course—eff. fall 11)

161S. 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

(change in existing course—eff. summer 12)

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 biomechanics 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

(change in existing course—eff. spring 12)

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

(change in existing course—eff. fall 12)

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

(change in existing course—eff. fall 12)

192. Internship in Biomedical Engineering (1-12)

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.)

(change in existing course—eff. fall 12)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. Special study for advanced undergraduates. (P/NP grading only.) GE credit: SE.

(change in existing course—eff. fall 12)

Graduate Courses

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

(change in existing course—eff. fall 11)

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

(change in existing course—eff. fall 11)

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

(new course—eff. fall 11)

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

(new course—eff. fall 11)

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

(new course—eff. fall 11)

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.)

(change in existing course—eff. fall 11)

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.)

(new course—eff. fall 11)

Engineering: Chemical

New and changed 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, semi-batch, 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.)

(change in existing course—eff. fall 12)

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.)

(change in existing course—eff. spring 12)

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.)

(change in existing course—eff. spring 12)

Upper Division Courses

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.)

(change in existing course—eff. fall 12)

146. Chemical Kinetics and Reaction Engineering (5)

(cancelled course—eff. spring 12)

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.)

(change in existing course—eff. fall 12)

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. Profit-

ability analysis techniques. Green chemistry, health risk assessment and life cycle assessment concepts.—I. (I.)

(change in existing course—eff. fall 10)

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, SE.—II. (II.)

(change in existing course—eff. fall 12)

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.)

(change in existing course—eff. fall 12)

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.—II. (II.) Gates

(change in existing course—eff. winter 12)

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.—III. (III.) Stroeve

(change in existing course—eff. spring 12)

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.)

(change in existing course—eff. spring 12)

198. Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SciEng | SE.—I, II, III. (I, II, III.)

(change in existing course—eff. spring 12)

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.)

(change in existing course—eff. spring 12)

Engineering: Civil and Environmental

New and changed courses in Engineering: Civil and Environmental (ECI)

Lower Division Course

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.—I. (I.) Darby

(change in existing course—eff. fall 11)

Upper Division Course

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.—II. (II.) Modera

(new course—eff. winter 11)

Graduate Courses

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/techniques for nondestructive evaluation; structural control; actuators and dampers for smart structures; piezoelectrics and acoustic emissions; micro- and nano-fabrication.—II. (II.) Loh

(new course—eff. winter 11)

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.—III. (III.) Kendall

(new course—eff. winter 11)

Engineering: Computer Science

New and changed courses in Engineering: Computer Science (ECS)

Lower Division Course

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.—I, II, III. (I, II, III.) Liu

(change in existing course—eff. fall 11)

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

(change in existing course—eff. spring 12)

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.)

(change in existing course—eff. spring 12)

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. (I, II, III.)

(change in existing course—eff. spring 12)

Upper Division Courses

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, III.)

(change in existing course—eff. spring 12)

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.—II, III. (II, III.) Davidson, Joy

(new course—eff. winter 10)

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 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.—II, III. (II, III.) Davidson, Joy

(new course—eff. winter 10)

Engineering: Electrical and Computer

New and changed courses in Engineering: Electrical and Computer (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. (I.)
(change in existing course—eff. fall 12)

89A-F. Special Topics in Electromagnetics (1-5)
Prerequisite(s): 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.
(new course—eff. winter 11)

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.—I, II. (I, II.)
(change in existing course—eff. fall 11)

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.—III. (III.)
(change in existing course—eff. spring 11)

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.)—II. (II.)
(change in existing course—eff. winter 11)

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 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.)—III. (III.)
(change in existing course—eff. spring 11)

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.—II. (II.) Knoesen, Yoo
(change in existing course—eff. winter 12)

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. (III.) Knoesen
(change in existing course—eff. fall 13)

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.—III. (III.)
(change in existing course—eff. fall 11)

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. Introduction to digital filter design. GE credit: QL, SE.—I. (I.)
(change in existing course—eff. fall 12)

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
(change in existing course—eff. winter 13)

170. Introduction to Computer Architecture (4)
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
(change in existing course—eff. fall 12)

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
(change in existing course—eff. spring 12)

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
(change in existing course—eff. spring 12)

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.)
(change in existing course—eff. fall 12)

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
(change in existing course—eff. fall 12)

Graduate Courses

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; model-based image reconstruction methods; maximum likelihood and Bayesian methods; applications to CT, PET, and SPECT. (Same course as Biomedical Engineering 252.)—II. (II.) Qi
(new course—eff. fall 11)

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
(change in existing course—eff. fall 11)

247. Advanced Semiconductor Devices (4)
Lecture—3 hours; project. Prerequisite: graduate standing in Engineering. Semiconductor devices, including MOSFETs, heterojunction transistors, light-emitting 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
(change in existing course—eff. fall 11)

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 queueing networks, communication systems, and multi-agent systems. Offered in alternate years.—(II.) Zhao
(change in existing course—eff. spring 12)

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

(change in existing course—eff. spring 11)

Engineering: Materials Science and Engineering

New and changed courses in Materials Science and Engineering (EMS)

Lower Division Course

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.—I. (I.) Risbud

(new course—eff. fall 10)

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

(change in existing course—eff. spring 12)

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.—I. (I.)

(change in existing course—eff. fall 11)

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.—I. (I.)

(change in existing course—eff. fall 11)

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.—III. (III.)

(change in existing course—eff. spring 12)

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 structure-property relationship. Fundamentals of the manufacturing processes for electronic, optical, functional and structural materials. GE credit: Wrt.—II. (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

(change in existing course—eff. winter 13)

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

(change in existing course—eff. spring 13)

Graduate Courses

260. Advanced Thermodynamics of Solids (4)

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

(new course—eff. fall 10)

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 students who previously completed course 240.—II, III. (II, III.) Asta

(new course—eff. winter 10)

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

(change in existing course—eff. fall 11)

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

(new course—eff. winter 10)

Engineering: Mechanical

New and changed courses in Engineering: Mechanical (EME)

Lower Division Course

5. Computer Programming for Engineering Applications (4)

Lecture—3 hours; discussion—1 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.—I. (I.) Cheng

(change in existing course—eff. fall 10)

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 Engineering and Mechanical Engineering/Materials Science Engineering majors. Inviscid incompressible flow, compressible flow, thermodynamic relations, ideal gas mixtures, psychrometrics, reacting mixtures and combustion.—I, II, III. (I, II, III.)

(change in existing course—eff. fall 10)

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; experiments 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.—I, II, III, IV. (I, II, III, IV.) Kennedy

(change in existing course—eff. fall 10)

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. I, III. (I, III.) Ravani

(change in existing course—eff. fall 10)

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.—III. (III.) Kennedy, Shaw

(change in existing course—eff. spring 11)

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

(change in existing course—eff. spring 13)

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.—I, II, III. (I, II, III.) Aldredge, Shaw

(change in existing course—eff. fall 10)

English

New and changed 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.—I, II, III. (I, II, III.)

(change in existing course—eff. winter 12)

5F. Introduction to Creative Writing: Fiction (4)
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.—I, II, III. (I, II, III.)

(change in existing course—eff. fall 11)

5P. Introduction to Creative Writing: Poetry (4)
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.—I, II, III. (I, II, III.)

(change in existing course—eff. fall 11)

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.—I, II, III. (I, II, III.)

(change in existing course—eff. fall 10)

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.—I, II, III. (I, II, III.)

(change in existing course—eff. fall 10)

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.—I, II, III. (I, II, III.)

(change in existing course—eff. fall 10)

Upper Division Courses

100FA. Creative Writing Advanced Fiction (4)
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.)

(change in existing course—eff. fall 11)

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.

(change in existing course—eff. fall 11)

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.)

(change in existing course—eff. fall 11)

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.

(change in existing course—eff. fall 11)

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.

(change in existing course—eff. fall 10)

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.—III. (III.)

(change in existing course—eff. winter 11)

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.

(change in existing course—eff. winter 11)

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.

(new course—eff. fall 10)

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.—III. (III.)

(change in existing course—eff. fall 10)

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.

(change in existing course—eff. fall 11)

189. Seminar in Literary Studies (4)
Seminar—3 hours; term paper. Prerequisite: course 110A or 110B. Intensive, focused study of literature at an advanced level. May be organized by topic, author, period, movement, or genre. High participation. Limited enrollment. May be repeated one time if topic differs. GE credit: Wrt.

(change in existing course—eff. fall 10)

Graduate Courses

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.)

(new course—eff. fall 11)

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.)

(new course—eff. fall 11)

Entomology

New and changed courses in Entomology (ENT)

Lower Division Course

50. Insects in the Environment (3)
(cancelled course—eff. spring 11)

Graduate Course

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

(new course—eff. fall 10)

Environmental and Resource Sciences

New and changed courses in Environmental and Resource Sciences (ERS)

Lower Division Courses

6. Map Reading and Remote Sensing (3)
(cancelled course—eff. fall 11)

8. Water Quality at Risk (3)
(cancelled course—eff. fall 11)

30. World Ecosystems & Geology (3)
(cancelled course—eff. summer 11)

47. Watershed Processes and Water Quality in the Tahoe Basin (2)
(cancelled course—eff. fall 11)

92. Resource Sciences Internship (1-12)
(cancelled course—eff. fall 11)

98. Directed Group Study (1-5)
(cancelled course—eff. fall 11)

99. Special Study for Undergraduates (1-5)
(cancelled course—eff. fall 11)

Upper Division Courses

100. Principles of Hydrologic Science (4)
(cancelled course—eff. fall 11)

100L. Principles of Hydrologic Science Laboratory (2)
(cancelled course—eff. fall 11)

108. Environmental Monitoring (3)
(cancelled course—eff. fall 11)

120. Global Environmental Interactions (4)
(cancelled course—eff. fall 11)

121. Water and Society (3)
(cancelled course—eff. fall 11)

131. Air as a Resource (3)
(cancelled course—eff. fall 11)

136. Chemistry of the Hydrosphere (3)
(cancelled course—eff. fall 11)

140. Culinary and Medicinal Herbs (3)
(cancelled course—eff. fall 11)

141. Role of Fire in Natural Ecosystems (4)
(cancelled course—eff. fall 11)

144. Trees and Forests (4)
(cancelled course—eff. fall 11)

185. Aerial Photo Interpretation and Remote Sensing (4)
(cancelled course—eff. fall 11)

186. Environmental Remote Sensing (3)
(cancelled course—eff. fall 11)

186L. Environmental Remote Sensing Lab (2)
(cancelled course—eff. fall 11)

192. Resource Sciences Internship (1-12)
(cancelled course—eff. fall 11)

194H. Senior Honor Thesis (2-6)
(cancelled course—eff. fall 11)

195. Integrating Environmental Science and Management (2)
(cancelled course—eff. spring 12)

198. Directed Group Study (1-5)
(cancelled course—eff. fall 11)

199. Special Study for Advanced Undergraduates (1-5)
(cancelled course—eff. fall 11)

Environmental Science and Management

New and changed 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.)—I. (I.) Bahre

(new course—eff. fall 11)

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.—II, III. (II, III.)

(change in existing course—eff. fall 11)

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.)—IV. (IV) Grismer

(change in existing course—eff. fall 11)

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 grading only.) May be repeated for credit.—I, II, III. (I, II, III.)

(new course—eff. fall 11)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

(new course—eff. fall 11)

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.)

(new course—eff. fall 11)

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-plant-atmosphere 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.—I. (I.) Grismer

(new course—eff. fall 11)

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.)—III. (III.) Hopmans

(new course—eff. fall 11)

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 management. Not open to students who have successfully completed Environmental and Resource Sciences 121. (Formerly Environmental and Resource Sciences 121.) GE credit: SciEng.—I. (I.) Silk

(new course—eff. fall 11)

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.)—II. (II.) Latimer

(new course—eff. fall 11)

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.)—I. (I.) Berry, Dahlgren, Rice

(new course—eff. fall 11)

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.)—I. (I.)

(new course—eff. fall 11)

186L. Environmental Remote Sensing Lab (2)

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.)—III. (III.) Ustin

(new course—eff. fall 11)

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.)

(new course—eff. fall 11)

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.

(new course—eff. fall 11)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only).—I,II,III. (I,II,III.)

(new course—eff. fall 11)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only).—I,II,III. (I,II,III.)

(new course—eff. fall 11)

Environmental Science and Policy

New and changed 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

(change in existing course—eff. fall 12)

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.—II, III. (II, III.)

(change in existing course—eff. fall 11)

30G. The Global Ecosystem: Laboratory/ Discussion (2)

(cancelled course—eff. winter 12)

Upper Division Course

102. Cultural Ecology (4)

(cancelled course—eff. winter 12)

Environmental Toxicology

New and changed courses in Environmental Toxicology (ETX)

Lower Division Course

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 | SE, SL, VL.—II. (II.) Kanthaswamy

(change in existing course—eff. spring 12)

Graduate Courses

234. Current Topics in Neurotoxocology (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

(new course—eff. fall 10)

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 Forensics 281.)—III. (III.)

(new course—eff. spring 11)

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 Forensics 284.) Offered in alternate years.—I. Kanthaswamy

(new course—eff. fall 10)

Epidemiology

New and changed courses in Epidemiology (EPI)

Graduate Course

204A. Foundation of Statistical Models, Methods, and Data Analysis for Scientists (4)

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.) Iosif

(change in existing course—eff. spring 11)

Evolution and Ecology

New and changed courses in Evolution and Ecology (EVE)

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 Evolution and Ecology. Internships supervised by a member of the faculty. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

(change in existing course—eff. spring 10)

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.—I, II, III. (I, II, III.)

(change in existing course—eff. spring 11)

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.—(II.) Moore, Turelli

(change in existing course—eff. winter 12)

119. 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.)—III. (III.) Rejmanek

(change in existing course—eff. spring 11)

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

(change in existing course—eff. fall 13)

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

(change in existing course—eff. winter 13)

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; Biological 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.—I. Strauss

(new course—eff. fall 10)

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.)—I, II, III. (I, II, III.)

(change in existing course—eff. winter 10)

Exercise Science

New and changed courses in Exercise Science (EXS)

Graduate Course

221. Anthropometry in Physical Activity (3)
Lecture—2 hours; laboratory. 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.

Film Studies

New and changed 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.—I, II, III. (I, II, III.)

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

(new course—eff. fall 12)

Upper Division Course

121S. 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.—I, III. (I, III.) Heyer-Caput

(new course—eff. fall 10)

Food Science and Technology

New and changed courses in Food Science and Technology (FST)

Lower Division Course

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

(change in existing course—eff. fall 12)

Upper Division Course

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.—I. (I.)

(change in existing course—eff. fall 10)

Graduate Course

298. Group Study (1-5)
(S/U grading only.)

(change in existing course—eff. fall 11)

Forensic Science

New and changed courses in Forensic Science (FOR)

Graduate Courses

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.)

(new course—eff. fall 11)

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.)

spring 11)

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. (Environmental Toxicology 284.) Offered in alternate years.—I. Kanthaswamy

(new course—eff. fall 10)

French

New and changed courses in French (FRE)

Upper Division Courses

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.—II. (I.) Asquith
(change in existing course—eff. fall 11)

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.—I. (II.) Guynn
(change in existing course—eff. fall 11)

103. Introduction to French Prose (4)
Lecture—3 hours. 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.—III. (III.) Simon
(change in existing course—eff. fall 11)

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 non-literary composition. Technical terminology in such diverse fields as government and world business.—I. (I.)
(change in existing course—eff. fall 11)

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.—(I.) Peureux, Simon
(new course—eff. fall 11)

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.) Peureux, Simon
(new course—eff. fall 11)

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.—(II.) Peureux
(change in existing course—eff. fall 11)

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.—(III.) Guynn, Peureux, Simon
(change in existing course—eff. fall 11)

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.—(II.) Simon
(change in existing course—eff. fall 11)

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.—II. Simon
(change in existing course—eff. fall 11)

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.—II. Asquith, Fort
(change in existing course—eff. fall 11)

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.—(III.) Asquith, Fort, Simon
(change in existing course—eff. spring 11)

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. GE credit: ArtHum.—(I.) Asquith
(change in existing course—eff. fall 11)

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.—(I.) Fort
(change in existing course—eff. fall 11)

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.—(II.) Fort
(change in existing course—eff. fall 11)

124. Post-Colonialist and Francophone (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 syncretism, theories of post-colonialism. May be repeated one time for credit. Offered in alternate years. GE credit: ArtHum, Div.—(III.) Adejunmobi
(change in existing course—eff. spring 11)

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.—II.
(change in existing course—eff. fall 11)

127. Paris: Modernity and Metropolitan Culture (4)
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.—(III.)
(change in existing course—eff. fall 11)

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.—III. Guynn, Peureux
(change in existing course—eff. spring 11)

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.—I.
(change in existing course—eff. fall 11)

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.—II. (II.)
(change in existing course—eff. fall 11)

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.—II. (II.)
(change in existing course—eff. fall 11)

Graduate Courses

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
(change in existing course—eff. fall 11)

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
(change in existing course—eff. fall 11)

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.) Fort
(change in existing course—eff. fall 11)

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.) Asquith
(change in existing course—eff. fall 11)

Geography

New and changed 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
(new course—eff. fall 11)

200B. Geographical Concepts (4)
(cancelled course—eff. fall 11)

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, Rios
(new course—eff. fall 11)

200C. Theory and Practice of Geography (4)
(cancelled course—eff. fall 11)

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.) Hijmans
(new course—eff. spring 12)

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
(new course—eff. fall 11)

200E. Advanced Research Design in Geography (2)
Lecture/discussion—2 hours. Prerequisite: graduate standing; courses 200AN, 200BN, 200CN and 20ODN. 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
(new course—eff. fall 11)

Geology

New and changed courses in Geology (GEL)

Lower Division Course

50L. Physical Geology Laboratory (2)
Laboratory—6 hours. Prerequisite: course 50 (preferably taken concurrently). Introduction to classification and recognition of minerals and rocks and to interpretation of topographic and geologic maps and aerial photographs. Students with credit for course 1L or the equivalent may receive only 1 unit for course 50L.—I. II. (I, II.) Billen, Zierenberg

Upper Division Courses

100. Earth Dynamics I: Extensional and Translational Processes (3)
(cancelled course—eff. spring 12)

100L. Earth Dynamics I: Structure/Tectonics Laboratory (1)
(cancelled course—eff. spring 12)

Graduate Courses

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
(change in existing course—eff. fall 97)

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
(change in existing course—eff. fall 97)

German

New and changed courses in German (GER)

Lower Division Courses

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
(new course—eff. fall 12)

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
(new course—eff. fall 12)

Upper Division Courses

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.—II, III. Fisher
(change in existing course—eff. fall 11)

118D. Germany Between 1949 and 1989: Division and Restoration (4)
(cancelled course—eff. fall 10)

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. Richter
(new course—eff. spring 11)

Graduate Courses

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.)

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.)

Greek

New and changed courses in Greek (GRK)

Upper Division Course

100N. Readings in Greek Prose (4)
(cancelled course—eff. winter 12)

105N. Attic Orators (4)
(cancelled course—eff. winter 12)

Health Informatics

New and changed courses in Health Informatics (MHI)

Graduate Courses

289A-G, H-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, II, III. (I, II, III.)
(new course—eff. winter 11)

Hebrew

New and changed courses in Hebrew (HEB)

Lower Division Course

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.—IV. (IV.)

History

New and changed courses in History (HIS)

Upper Division Courses

109B. Environmental History, Disease and Public Health (4)
Lecture/discussion—3 hours; term paper. Prerequisite: upper division standing. Analysis of environmental changes from pre-history to the present and their influence on disease distribution, virulence and public health; many of these changes have been driven by human action and transformations of pathogens have accelerated under globalization. GE credit: Div, SciEng & SocSci.—III. (III.) Davis
(change in existing course—eff. fall 10)

115F. History of Modern North Africa, 1800 to the Present (4)
Lecture—3 hours; term paper. History of Morocco, Algeria, Tunisia and Libya (the Maghrib), 1800 to the present. Topics include conquest and pacification, reform movements, the rise of nationalism, decolonization, state capitalism, economic liberalization, Islamism, democratization and human rights, the interplay of history and memory. GE credit: ArtHum, Div, Wrt.—II. (II.) Miller
(change in existing course—eff. fall 11)

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.)—III. (III.)
(change in existing course—eff. fall 11)

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.)—I, II, III. (I, II, III.)
(change in existing course—eff. fall 11)

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
(change in existing course—eff. fall 12)

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: ArtHum or SocSci, Div, Wrt.—III. (III.) Anooshahr
(new course—eff. fall 11)

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.—I.
(change in existing course—eff. fall 11)

Graduate Course

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 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 studied.
(new course—eff. winter 11)

Human Development

New and changed courses in Human Development (HDE)

Upper Division Courses

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, IV. (I, II, IV.) Chen, Harper, Kraft
(change in existing course—eff. fall 11)

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.) Gueyr, Nishina
(change in existing course—eff. fall 11)

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.—I, III. (I, III.) Nishina
(new course—eff. spring 11)

Graduate Course

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.) Guyer
(new course—eff. fall 11)

Humanities

New and changed courses in Humanities (HUM)

Upper Division Courses

113. Goethe's Faust (4)
(cancelled course—eff. fall 10)

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.—I. Richter
(new course—eff. winter 09)

Hydrologic Science

New and changed courses in Hydrologic Science (HYD)

Lower Division Course

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.)—IV. (IV) Grismer
(change in existing course—eff. fall 11)

Immunology

New and changed courses in Immunology (IMM)

Professional Courses

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.)—I. (I.) Baumler
(change in existing course—eff. fall 11)

202L. Advanced Immunology Laboratory Rotations (5)
Laboratory/discussion—15 hours. Laboratory assignment in two research laboratories. One four-week 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/U grading only.)—II. (II.) Bevins
(new course—eff. fall 11)

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.—III. (III.) Murphy
(new course—eff. fall 11)

International Agricultural Development

New and changed courses in International Agricultural Development (IAD)

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.—II. (II.) Brush
(change in existing course—eff. spring 11)

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.)
(change in existing course—eff. spring 11)

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.—III. (III.) Brush
(change in existing course—eff. spring 11)

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.)—II, (II.)
(change in existing course—eff. spring 11)

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.—I. Gradziel
(change in existing course—eff. spring 11)

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: Div, SciEng, Wrt.—IV. (IV.)
(change in existing course—eff. spring 11)

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.—II. (II.) Marcotte
(change in existing course—eff. spring 11)

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.)—I, II, III. (I, II, III.)
(change in existing course—eff. spring 11)

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.)
(change in existing course—eff. spring 11)

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.)—III. (III.) Marcotte
(change in existing course—eff. spring 11)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. Directed group study. (P/NP grading only.)—I, II, III. (I, II, III.)
(change in existing course—eff. spring 11)

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.)
(change in existing course—eff. spring 11)

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.—I. (I.) Marcotte
(change in existing course—eff. spring 11)

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.) Vosti
(change in existing course—eff. spring 11)

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.) Pittroff, Van Kessel
(change in existing course—eff. spring 11)

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.) Brown, Gepts, Piedrahita
(change in existing course—eff. spring 11)

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.) Offered in alternate years.—Orlove
(change in existing course—eff. spring 11)

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.—III. Jarvis
(change in existing course—eff. spring 11)

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.)—III. Brown, Van Horn
(change in existing course—eff. spring 11)

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.)
(change in existing course—eff. spring 11)

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.)
(change in existing course—eff. spring 11)

298. Directed Group Study (1-5)
Prerequisite: consent of instructor. Directed group study. (S/U grading only.)—I, II, III. (I, II, III.)
(change in existing course—eff. spring 11)

299. Research (1-12)
Prerequisite: consent of instructor. Research. (S/U grading only.)—I, II, III. (I, II, III.)
(change in existing course—eff. spring 11)

Professional Courses

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. Teaching assistant training practicum. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)
(change in existing course—eff. spring 11)

International Commercial Law (A Graduate Group)

New and changed courses in International Commercial Law (A Graduate Group) (ICL)

Graduate Courses

214S. 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.
(new course—eff. spring 12)

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.
(new course—eff. spring 12)

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
(new course—eff. summer 04)

242S. 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
(new course—eff. fall 11)

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
(new course—eff. summer 02)

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
(new course—eff. fall 11)

Italian

New and changed courses in Italian (ITA)

Lower Division Courses

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.)
(new course—eff. winter 04)

1ST. Elementary Italian (5)
(cancelled course—eff. fall 03)

2S. 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.)
(new course—eff. winter 04)

2ST. Elementary Italian (5)
(cancelled course—eff. fall 03)

3S. 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.
(new course—eff. winter 04)

4S. 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.)
(change in existing course—eff. spring 12)

4ST. Intermediate Italian (3)
(cancelled course—eff. fall 03)

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.)
(new course—eff. winter 04)

5ST. Intermediate Italian (3)
(cancelled course—eff. fall 03)

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.)
(change in existing course—eff. spring 12)

9ST. Reading Italian (3)
(cancelled course—eff. fall 03)

98S. 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.)
(new course—eff. fall 11)

99S. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. Opportunity for a faculty member to work with an advanced undergraduate 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. (III.)
(new course—eff. fall 11)

Upper Division Courses

101. Advanced Conversation, Composition, and Grammar (4)
Lecture—3 hours. Prerequisite: course 9 or consent of instructor.—I. (I.) Heyer-Caput, Cannon
(change in existing course—eff. fall 11)

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.—III. (III.) Cannon
(change in existing course—eff. fall 11)

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.—III. (III.)
(new course—eff. winter 04)

107S. Survey of Italian Culture and Institutions (4)
(cancelled course—eff. fall 03)

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.—III.
(new course—eff. winter 04)

108ST. Contemporary Issues in Italian Culture and Society (4)
(cancelled course—eff. fall 03)

121S. 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.—I, III. (I, III.) Heyer-Caput
(new course—eff. fall 10)

192S. 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.)
(new course—eff. fall 11)

Japanese

New and changed courses in Japanese (JPN)

Lower Division Courses

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.—III. (III.) Sorensen
(change in existing course—eff. fall 11)

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.—III. (III.) Sorensen
(change in existing course—eff. fall 11)

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
(change in existing course—eff. fall 12)

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.—I. (I.) Sorensen
(change in existing course—eff. winter 12)

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.—II. (II.) Sorensen
(change in existing course—eff. winter 12)

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.—II. Chang
(change in existing course—eff. fall 11)

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.—(I.) Chang
(change in existing course—eff. fall 11)

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.—(III.) Sorensen
(change in existing course—eff. fall 11)

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.—(III.) Sorensen
(change in existing course—eff. fall 11)

Landscape Architecture

New and changed courses in Landscape Architecture (LDA)

Lower Division Course

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
(change in existing course—eff. spring 12)

Upper Division Courses

168. Mountain Landscapes and Life (3)
(cancelled course—eff. spring 10)

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, III.) McNiel
(change in existing course—eff. fall 11)

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.—I. Greco
(change in existing course—eff. fall 10)

181K. Social Factors in Landscape Architecture Design and Planning Studio (3)
Studio—6 hours. Prerequisite: Psychology 155, course 170, 180K concurrently. Priority to Landscape Architecture majors. Application of design theory and methods to real-world projects. Familiarize students with the major concepts in environmental psychology as they relate to landscape architecture; to discuss the needs of various user groups; and post occupancy evaluations. Offered in alternate years.—I. Owens
(new course—eff. fall 10)

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.—I, II, III. (I, II, III.)
(change in existing course—eff. fall 10)

Latin

New and changed courses in Latin (LAT)

Upper Division Course

100N. Readings in Latin Prose (4)
(cancelled course—eff. fall 11)

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.—Albu
(change in existing course—eff. fall 11)

110N. Ovid (4)
(cancelled course—eff. fall 11)

111. Silver Age Latin (4)
(cancelled course—eff. fall 11)

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.—Stem

(change in existing course—eff. fall 11)

114. Cicero: Philosophical Works (4)

(cancelled course—eff. fall 10)

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, WE.—Seal

(new course—eff. fall 11)

Law

New and changed courses in Law (LAW)

Professional Courses

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.

(change in existing course—eff. fall 11)

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 transfer.

(change in existing course—eff. fall 10)

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.

(change in existing course—eff. fall 10)

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.

(change in existing course—eff. fall 11)

210T. Policing Seminar (2)

(cancelled course—eff. fall 10)

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.

(new course—eff. fall 12)

211T. Advanced Negotiations Strategy and Client Counseling (3)

(cancelled course—eff. spring 13)

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.

(change in existing course—eff. winter 11)

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.

(change in existing course—eff. fall 11)

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.

(change in existing course—eff. fall 11)

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.

(new course—eff. fall 10)

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.

(new course—eff. fall 10)

218T. Constitutional Law II—First Amendment (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.

(new course—eff. spring 10)

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 law.

(change in existing course—eff. spring 12)

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.

(change in existing course—eff. fall 12)

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/U grading only.)

(new course—eff. fall 10)

219T. Advanced Evidence (3)

(cancelled course—eff. fall 10)

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.

(change in existing course—eff. spring 12)

220B. Tax and Distributive Justice (3)

(cancelled course—eff. spring 11)

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).

(new course—eff. spring 11)

220T. Tax and Distributive Justice (3)

(cancelled course—eff. fall 10)

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.

(change in existing course—eff. spring 11)

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.

(change in existing course—eff. fall 10)

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.

(change in existing course—eff. fall12)

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.

(new course—eff. fall 12)

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.

(change in existing course—eff. fall 10)

228B. Accounting for Lawyers (2)
Discussion—2 hours. Exposes student to basic principles of accounting, from the perspective of the practicing attorney.
(new course—eff. fall 10)

228T. Accounting for Lawyers (2)
Discussion—2 hours. Exposes student to basic principles of accounting, from the perspective of the practicing attorney.
(cancelled course—eff. fall 10)

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.
(change in existing course—eff. fall 12)

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 the environment.
(new course—eff. fall 11)

231A. Sexual Orientation, Gender Identity, and the Law (3)
Discussion—3 hours. Examines the legal and social regulation of sexual orientation and gender identity.
(change in existing course—eff. spring 12)

235T. Public Regulatory Law (3)
(cancelled course—eff. fall 11)

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.
(new course—eff. fall 09)

239. Representing Clients in Mediation (2)
Discussion—2 hours. Restricted to 24 students. Interactive course focuses on attorney representation of clients in mediation.
(change in existing course—eff. fall 10)

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.
(change in existing course—eff. spring 12)

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.
(change in existing course—eff. spring 12)

248BT. Human Rights in the Former Soviet Union: Legal Tools for Repression and Redress: Part II (2)
Seminar—2 hours. Provides a historical context for the current political and human rights situation in the former Soviet Union.
(new course—eff. spring 11)

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?
(new course—eff. fall 10)

248G. Legal Spanish for U.S. Lawyers (2)
Seminar—2 hours. Prerequisite: must satisfy one of the following: undergraduate degree in Spanish; a minor in Spanish with experience living in a Spanish-speaking country; grew up in a Spanish-speaking household and achieved proficiency; able to pass an informal assessment by the instructor. 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. (S/U grading only.)
(change in existing course—eff. fall 10)

248TC. International Economics Law (3)
Disussion—3 hours. Examine the architecture of the international economic system, with a focus on both trade and investment.
(new course—eff. fall 10)

250AT. Legal Theory Workshop (2)
Seminar—3 hours. Introduction to cutting edge research by legal academics and professors in affiliated disciplines.
(new course—eff. spring 13)

251. Labor Law (3)
Discussion—3 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.
(new course—eff. spring 03)

258A. Legal Ethics and Corporate Practice (3)
Discussion—3 hours. Focus on corporate practice to explore the ethical responsibilities of lawyers.
(new course—eff. fall 09)

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.
(change in existing course—eff. fall 10)

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.
(new course—eff. fall 12)

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.
(new course—eff. fall 11)

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.
(new course—eff. fall 12)

265. Natural Resources Law Seminar (2)
Seminar—2 hours. Prerequisite: course 285 or 256 recommended but not required. Restricted to 15 students. Seminar devoted to in-depth coverage of a specific topic or topics in natural resources law. Elective course for Environmental Law Certificate Program.
(change in existing course—eff. fall 10)

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.
(change in existing course—eff. fall 12)

269A. Basic Finance (3)
(cancelled course—eff. fall 10)

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.
(change in existing course—eff. fall 10)

269D. Seminar on Financial Regulation (2)
Seminar—2 hours. Introduction to the legal and regulatory issues presented by contemporary capital markets.
(new course—eff. fall 11)

269T. Law of Financial Markets (2)
(cancelled course—eff. fall 11)

271. Nonprofit Organizations and Drafting (4)
Extensive writing or discussion—4 hours. Prerequisite: course 215 or consent of instructor. Restricted to 13 students. Learn special legal rules and concepts applicable to non-profit organizations; particularly IRC 501(c)(3) nonprofits. Combination skills class and a lecture course.
(change in existing course—eff. fall 10)

271A. NonProfit Organizations: State and Local Governance Issues (2)
Discussion—2 hours. Prerequisite: Prior or concurrent enrollment in course 215, or consent of instructor. Focuses on the state and local laws applicable to nonprofit organizations; i.e., public interest, cultural, religious, educational and other not-for-profit entities.
(change in existing course—eff. fall 09)

271B. Nonprofit Organizations: Tax Exemptions & Taxation Focus (2)
Discussion—2 hours. Prerequisite: course 215 or consent of instructor; course 220 recommended. Focuses on the conceptual basis and substantive law criteria for the federal and state income tax exemption of nonprofit organizations.
(change in existing course—eff. spring 09)

274. Theory and History of Intellectual Property (3)
Discussion—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.
(new course—eff. spring 11)

274A. International Intellectual Property (3)
Discussion—3 hours. Prerequisite: prior or concurrent enrollment in course 274. In September 2007, the World Intellectual Property Organization adopted a development agenda that would rewrite that body's mandate, placing the concerns of the poor at the center of international intellectual property law and policy.
(change in existing course—eff. fall 09)

274BT. Chinese Intellectual Property Law (2)
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.
(new course—eff. fall 12)

275. Complex Litigation (3)
Discussion—3 hours. Issues that frequently arise in large complex litigation involving multiple parties and multiple claims.
(change in existing course—eff. fall 10)

275TA. Intellectual Property Agreement Drafting for Biotech & Pharma (2)
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.
(change in existing course—eff. fall 11)

277. Native American Law Seminar (2)
Seminar—2 hours. Seminar focuses on legal relations between Native American tribes and the federal and state governments.
(change in existing course—eff. fall 11)

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.
(change in existing course—eff. spring 12)

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.
(change in existing course—eff. spring 13)

283. Remedies (3)
Discussion—2 hours. Limited enrollment; for 2Ls only this semester. Enrollment by application and selection of the professor; for details, contact Prof. Randon. Survey of modern American civil remedies law in both private and public law contexts. Topics include equitable remedies, equitable defenses, contempt power, injunctive relief, restitution, and money damages in torts and contracts.
(change in existing course—eff. fall 10)

285A. California Environmental Issues Seminar (2)
Discussion—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.
(new course—eff. fall 10)

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.
(new course—eff. fall 12)

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.
(new course—eff. fall 11)

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.
(change in existing course—eff. spring 12)

285T. 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.
(new course—eff. fall 10)

285TA. Environmental Justice (3)
Discussion—3 hours. Introduction to the field of environmental justice.
(new course—eff. fall 11)

288. Advanced Constitutional Law Seminar (2)
Seminar—2 hours. Prerequisite: prior or concurrent enrollment in course 218 or 218A. Limited enrollment. Seminar explores in-depth selected topics or problems in constitutional law and theory. The current focus will include diverse topics including abortion rights, the development of Second Amendment jurisprudence, and other subject areas.
(new course—eff. fall 11)

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.
(new course—eff. fall 12)

295A. Trademark and Unfair Competition Law (3)
Discussion—3 hours. Prerequisite: course 274 recommended, not required. 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.
(change in existing course—eff. fall 10)

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.
(change in existing course—eff. fall 12)

296C. Fictional Characters and Real People (2)
Discussion—2 hours. Celebrities and fictional characters both have a powerful hold on the human imagination and are important parts of our modern myths. Examines the legal protection available for each.
(new course—eff. spring 11)

296D. Art Law (2)
Discussion—2 hours. Selected Topics in Art Law.
(new course—eff. fall 11)

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.
(new course—eff. fall 12)

Professional Courses

435. Family Protection Clinic (4)
Clinical activity—4-8 hours. Full–Year Clinic Prerequisite: prior or concurrent enrollment in course 219 to qualify for state court certification; prior or concurrent enrollment in course 272 and 263A recommended, not required. One-Semester Clinic Prerequisite: prior or concurrent enrollment in course 272 and 263A recommended, not required. Full–Year Clinic: each student required to enroll for two semesters, receiving four units each semester for total of eight units; class limited to seven students. One-semester clinic: each student required to meet weekly for a 2-hour seminar; class limited to four students. Represent low-income persons in family law and related matters arising out of situations involving family violence. (S/U grading only.)
(new course—eff. fall 11)

440. Immigration Law Clinical (4)
Clinical activity—8 Hours. Starting in Fall 2011, the Immigration Clinic will be a full-year clinic. Each student is required to enroll for two semesters, receiving four units each semester for total of eight units. Prior or concurrent enrollment in course 292 and 219, recommended, not required. Provides legal representation to indigent non-citizens in removal proceedings before U.S. Immigration Courts, the Board of Immigration Appeals, and federal courts, including the Ninth Circuit Court of Appeals. (S/U grading only; deferred grading only, pending completion of sequence.)
(change in existing course—eff. fall 11)

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 only.)
(new course—eff. fall 12)

499A. Independent Research Project (1-4)
Students receive credit for individual projects. May be repeated for credit.
(new course—eff. fall 10)

Linguistics

New and changed courses in Linguistics (LIN)

Lower Division Courses

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
(new course—eff. spring 12)

20. Oral English for International Students (3)
Lecture/discussion—3 hours. Open to non-native speakers of English with priority enrollment to international teaching assistants with qualifying placement exam scores. Intensive work in oral English for international students, to increase fluency, accuracy, and use of appropriate discourse strategies in academic settings (e.g., seminar, discussion, laboratory). Training in segmental features of English sounds, intonation, stress, non-verbal cues, and register. May be repeated for credit. (P/NP grading only.)—II, III. (II, III.)
(change in existing course—eff. fall 11)

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.
(change in existing course—eff. fall 12)

Graduate Courses

201. Proseminar (1)
Seminar—1 hour. Introduction to research activity of faculty in the Graduate Group in Linguistics and guest speakers. May be repeated up to four units for credit. (S/U grading only.)—I. (I.)
(new course—eff. fall 10)

250. Principles of Typological Linguistics (4)
Seminar—3 hours; term paper. Cross-linguistic comparison and typology, including word order, morphological typology, complex clauses, semantic categories and their grammaticalization, and applications of typology to language acquisition.—Farrell, Hawkins
(new course—eff. fall 10)

275. Neurobiology of Language (4)
Lecture/discussion—3 hours; term paper. Survey of historical and modern conceptions of the neurobiology of language. Aphasia, functional neuroimaging, functional neuroanatomy of human language. Offered in alternate years.—(I.) Corina
(new course—eff. fall 10)

Management

New and changed courses in Management (MGT/MGB/MGP)

Graduate Courses

201B. Organizational Strategy and Structure (3)
Lecture/discussion—3 hours. Prerequisite: completion of first year courses in Graduate School of Management or the equivalent. Open to MBA students only. Strategic management of organizations, including analysis of industries, firm resources and capabilities and corporate strategy. Strategy formulation, implementation and strategic decision-making. Firm and industry life cycles and change. Analysis of organizational design and structure including differentiation and integration.—I. (I.) Dokko
(change in existing course—eff. fall 11)

207A. Advanced Legal Research (2)
(cancelled course—eff. fall 10)

210T. Policing Seminar (2)
(cancelled course—eff. fall 10)

218T. Selected Topics in Constitutional Law (2)
(cancelled course—eff. fall 10)

219. Evidence (4)
(cancelled course—eff. fall 10)

220T. Tax and Distributive (3)
(cancelled course—eff. fall 10)

228A. Mergers and Acquisitions Law (3)
(cancelled course—eff. fall 10)

228T. Accounting for Lawyers (2)
(cancelled course—eff. fall 10)

234. Pricing (3)
Lecture/discussion—3 hours. Prerequisite: completion of first year core courses at the Graduate School of Management or equivalent, including courses 202A & 203B. Restricted to students in the MBA Program. Combines lectures, cases and homework to teach students tools and skills necessary to analyze pricing situations, make pricing decisions, and implement them, in a systematic manner.—II. (II.) Jiang
(new course—eff. winter 11)

236A. Securities Regulation (2)
(cancelled course—eff. fall 10)

243. Customer Relationship Management (3)
Lecture/discussion—3 hours. Prerequisite: completion of first-year core courses at the Graduate School of Management or the equivalent. Restricted to MBA students only. Customer Relationship Management (CRM) is a management approach under which marketing activities are organized and measured around customers (rather than around brands.) This approach is appealing because customers, not brands, are those who make buying decisions.—I. (I.) Aravindakshan
(new course—eff. fall 10)

245. Business Writing (3)
Lecture/discussion—3 hours. Prerequisite: completion of first-year core courses at the Graduate School of Management or the equivalent. Restricted to MBA students only. Techniques for sharpening writing skills are introduced, along with grammatical structure, word choice, and punctuation. Learn to develop styles that are pitch-perfect for given situations and to think strategically about each communication challenge in a management setting.
(change in existing course—eff. fall 11)

246. Negotiation and Team Building (3)
Laboratory/discussion—3 hours. Prerequisite: courses 202, 205. 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.
(change in existing course—eff. fall 11)

247B. Corporate Tax (3)
(cancelled course—eff. fall 10)

248T. Fundamentals of Public International Law (1)
(cancelled course—eff. fall 10)

250. Technology Competition and Strategy (3)
Lecture/discussion—3 hours. Prerequisite: completion of first-year 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 competition and strategy in the network, technology and information industries.—II. (II.) Bhargava
(new course—eff. winter 11)

254. Housing Law (2)
(cancelled course—eff. fall 10)

258A. Legal Ethics and Corporate Practice (3)
(cancelled course—eff. fall 10)

259. Feminist Legal Theory (3)
(cancelled course—eff. fall 10)

262. Antitrust (3)
(cancelled course—eff. fall 09)

262. Money and Security Markets (3)
Lecture—3 hours. Examines how money and securities markets are organized; how public agencies, businesses, others obtain and invest funds in those markets. Relationship between interest rates, monetary policy, government's role in improving capital markets, approaches to assessing changes in regulation of specific markets.—I. (I.)
(new course—eff. fall 09)

265. Venture Capital and the Finance of Innovation (3)
Lecture/discussion—3 hours. Prerequisite: completion of first-year core courses at the Graduate School of Management or the equivalent. Restricted to students in the MBA program. Examines venture capital finance and the related practice of R&D finance. Goal is to apply finance tools and framework to the world of venture capital and financing of projects in high-growth industries.—II. (II.) Yasuda
(new course—eff. winter 11)

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 orally.
(change in existing course—eff. fall 11)

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
(new course—eff. winter 11)

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
(change in existing course—eff. fall 11)

271A. NonProfit Organizations: State and Local Governance Issues (2)
(cancelled course—eff. fall 10)

271B. Nonprofit Organizations: Tax Exemptions and Taxation Focus (2)
(cancelled course—eff. fall 10)

274A. International Intellectual Property and Development (3)
(cancelled course—eff. fall 10)

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
(new course—eff. spring 11)

286B. Public Health Law (2)
(cancelled course—eff. fall 10)

291A. International Finance (4)
(cancelled course—eff. fall 10)

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.)
(new course—eff. fall 10)

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
(change in existing course—eff. fall 11)

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.) Friedman
(new course—eff. fall 11)

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
(new course—eff. fall 11)

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.) Mathur
(new course—eff. winter 12)

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
(new course—eff. winter 12)

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.) Suran
(change in existing course—eff. winter 12)

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.)—II. (II.)
(new course—eff. spring 12)

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
(new course—eff. winter 11)

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
(new course—eff. winter 11)

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
(new course—eff. spring 11)

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
(new course—eff. fall 10)

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
(new course—eff. fall 10)

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 project-based, work could be either individual or in groups depending on enrollments and/or interests of students.—III. (III.) Bunch
(new course—eff. spring 11)

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
(new course—eff. winter 11)

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
(new course—eff. spring 11)

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
(new course—eff. fall 10)

464. Practicum for Taxes and Business Strategy (1)
Project—1 hour. Prerequisite: course 264. Restricted to students in the MBA program. Practical application 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
(new course—eff. fall 10)

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
(new course—eff. winter 11)

467. Practicum for Teams and Technology (1)
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
(new course—eff. spring 11)

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
(new course—eff. winter 11)

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
(new course—eff. fall 11)

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.)
(change in existing course—eff. summer 11)

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, II, III.)
(change in existing course—eff. summer 11)

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 meth-

odologies previously acquired in other Graduate School of Management courses. (S/U grading only.)—I, II, III. (I, II, III.)

(new course—eff. summer 11)

Master of Public Health

New and changed courses in Master of Public Health (MPH)

Graduate Course

210. Public Health Informatics (2)

(cancelled course—eff. fall 11)

Mathematics

New and changed courses in Mathematics (MAT)

Lower Division Courses

12. Precalculus (3)

Lecture—3 hours. Prerequisite: two years of high school algebra, plane geometry, plane trigonometry; 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.)

(change in existing course—eff. winter 12)

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.)

(change in existing course—eff. winter 12)

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.—I, II, III. (I, II, III.)

(change in existing course—eff. winter 12)

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.)

(change in existing course—eff. winter 12)

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 equations, 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.)

(change in existing course—eff. winter 12)

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.)

(change in existing course—eff. winter 12)

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.)

(change in existing course—eff. winter 12)

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.—I, II. (I, II.)

(change in existing course—eff. fall 10)

Upper Division Course

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.

(change in existing course—eff. winter 12)

Graduate Courses

204. Applied Asymptotic Analysis (4)

(cancelled course—eff. fall 11)

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 theorem.—II. (II.)

(new course—eff. fall 10)

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.)

(new course—eff. spring 11)

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.)

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. (I.)

(new course—eff. spring 11)

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.

(new course—eff. spring 11)

Medicine, School of

New and changed courses in Medical Sciences (MDS)

Professional Courses

411A. Doctoring 1 (4)

Discussion—1 hour; clinical activity—1 hour; lecture/discussion—1 hour. Prerequisite: approval of 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.) Callahan, Eidson-Ton, Jerant, Johl, Servis

(change in existing course—eff. winter 12)

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

(change in existing course—eff. winter 12)

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

(change in existing course—eff. spring 10)

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

(new course—eff. summer 11)

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.)—I, II, III, IV. (I, II, III, IV.)

(new course—eff. winter 12

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.)—I. (I.) Romano

(new course—eff. fall 11)

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

(new course—eff. spring 12)

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

(new course—eff. summer 12)

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

(new course—eff. summer 12)

489R. USMLE Directed Remedial Studies (1-9)
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.) Nuovo, Servis

(new course—eff. spring 11)

490A. PRIME Seminar Series: Fall 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.)—I. (I.) Eidson-Ton, Fancher

(change in existing course—eff. winter 12)

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

(change in existing course—eff. winter 12)

490C. PRIME Seminar Series: Spring 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.)—III. (III.) Eidson-Ton, Fancher

(change in existing course—eff. winter 12)

490D. PRIME Seminar Series: Summer 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.)—IV. (IV.) Eidson-Ton, Fancher

(change in existing course—eff. winter 12)

490E. PRIME Seminar Series: Healthcare and Technology (1)
(cancelled course—eff. winter 12)

490F. PRIME Seminar Series: Health Equity (1)
(cancelled course—eff. fall 11)

490G. PRIME Seminar Series: Community Engagement Part 2 (1)
(cancelled course—eff. winter 12)

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, III, IV. (I, II, III, IV.)

(new course—eff. winter 11)

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

(change in existing course—eff. spring 12)

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

(change in existing course—eff. spring 12)

Medicine: Anesthesiology and Pain Medicine

New and changed courses in 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.)

(change in existing course—eff. fall 11)

Professional Courses

460. Anesthesiology Clinical Clerkship (3-18)
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

(change in existing course—eff. fall 11)

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

(change in existing course—eff. spring 11)

463. Multidisciplinary Pain Management (6)
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.) Galicia

(change in existing course—eff. fall 10)

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

(new course—eff. spring 10)

Medicine: Biological Chemistry

New and changed courses in Biological Chemistry (BCM)

Graduate Course

214. Molecular Medicine (1)
(cancelled course—eff. spring 12)

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
(change in existing course—eff. winter 12)

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.) Carraway, Sweeney
(change in existing course—eff. summer 11)

414. Molecular Medicine (1)
(cancelled course—eff. spring 12)

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, Segal
(new course—eff. spring 12)

Medicine: Cardiology

New and changed courses in Cardiology (CAR)

Professional Course

299. Cardiology Research (1-12)
Prerequisite: consent of instructor. (S/U grading only.)
(new course—eff. spring 10)

Medicine: Dermatology

New and changed courses in 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 research on the skin. (P/NP grading only.)—Isseroff, Izumiya, Liu, Murphy, Takada
(change in existing course—eff. fall 11)

199. Special Study in Cutaneous Biology (1-4)
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
(change in existing course—eff. fall 11)

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
(change in existing course—eff. fall 11)

Professional Courses

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
(change in existing course—eff. fall 11)

465. Specialty Externship in Dermatology (3-16)
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.) Fazel
(new course—eff. summer 11)

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
(change in existing course—eff. fall 11)

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
(change in existing course—eff. fall 11)

Medicine: Family and Community Medicine

New and changed courses in Medicine—Family and Community Medicine (FAP)

Upper Division Course

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
(change in existing course—eff. fall 11)

Professional Courses

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. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.) Long
(new course—eff. summer 10)

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
(new course—eff. summer 10)

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
(new course—eff. summer 10)

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
(new course—eff. summer 10)

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
(new course—eff. winter 12)

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

(new course—eff. winter 12)

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.)

(new course—eff. spring 11)

437. Primary Care Clinics-Knights Landing (3)
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

(new course—eff. winter 12)

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.)

(change in existing course—eff. summer 11)

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.) Eidson-Ton

(new course—eff. winter 11)

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 university-based 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

(change in existing course—eff. spring 11)

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

(change in existing course—eff. spring 11)

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

(new course—eff. fall 11)

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, II.) Nesbitt

(change in existing course—eff. winter 12)

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

(new course—eff. summer 10)

495. LGBTIQQA Healthcare Lecture Series (1)
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

(new course—eff. winter 12)

Medicine: Human Physiology

New and changed courses in Human Physiology (HPH)

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

(change in existing course—eff. summer 11)

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

(change in existing course—eff. winter 12)

Medicine: Internal Medicine

New and changed courses in Internal Medicine (IMD)

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

(change in existing course—eff. winter 12)

414. One Health: A Course on Global Health (1)
Conference—8 hours. Global health problems are complex and require culturally-sensitive, socially-acceptable, 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

(new course—eff. summer 11)

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-Garcia

(new course—eff. spring 11)

420. Hematology (2)
(cancelled course—eff. fall 10)

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

(change in existing course—eff. summer 10)

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.)

(new course—eff. spring 11)

439R. Directed Studies in Internal 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.)
(change in existing course—eff. summer 11)

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
(change in existing course—eff. summer 10)

Medicine: Internal Medicine—Emergency Medicine

New and changed courses in Internal Medicine—Emergency Medicine (EMR)

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.)
(change in existing course—eff. spring 12)

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
(change in existing course—eff. spring 12)

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
(change in existing course—eff. fall 11)

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
(change in existing course—eff. summer 10)

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
(change in existing course—eff. fall 11)

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
(change in existing course—eff. summer 10)

Medicine: Internal Medicine—Endocrinology, Diabetes, and Metabolism

New and changed courses in Internal Medicine—Rheumatology-Allergy (ENM)

Professional Course

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
(new course—eff. summer 10)

Medicine: Internal Medicine—Hematology-Oncology

New and changed courses in Internal Medicine—Hematology-Oncology (HON)

Graduate Courses

420. Oncology (2)
(cancelled course—eff. spring 12)

420A. Oncology (4)
Lecture—2 hours. Prerequisite: consent of instructor. Restricted to Medical student only. Covers the principles of oncology and the pathophysiology of specific, common cancers correlated with organ systems pathophysiology and systemic pathology courses. (P/F grading only.)—II. (II.) Welborn
(change in existing course—eff. spring 12)

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.)
(change in existing course—eff. winter 11)

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
(change in existing course—eff. summer 12)

Medicine: Internal Medicine—Pulmonary Medicine

New and changed courses in Internal Medicine—Pulmonary Medicine (PUL)

Professional Course

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/F grading only.)—I, II, III. (I, II, III.) Black
(new course—eff. summer 11)

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.)
(change in existing course—eff. spring 09)

Medicine: Medical Microbiology

New and changed courses in Medical Microbiology (MMI)

Professional Courses

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
(change in existing course—eff. winter 12)

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
(change in existing course—eff. winter 12)

Medicine: Neurology

New and changed courses in Neurology (NEU)

Graduate Courses

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.) Wheelock
(change in existing course—eff. winter 11)

Medicine: Obstetrics and Gynecology

New and changed courses in Medicine: Obstetrics and Gynecology (OBG)

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, Internal Medicine 405, and Human Physiology 405.) (P/F grading only; deferred grading only, pending completion of sequence.)—II, III. (II, III.) Long, Sweeney, Towner
(change in existing course—eff. winter 12)

420. Genetics and Reproduction (2)
(cancelled course—eff. spring 10)

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. (I, II, III, IV.)
(new course—eff. spring 11)

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.)
(change in existing course—eff. summer 11)

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
(change in existing course—eff. summer 10)

Medicine: Ophthalmology

New and changed courses in Medicine: Ophthalmology (OPT)

Professional Course

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
(change in existing course—eff. summer 10)

Medicine: Otolaryngology

New and changed courses in Otolaryngology (OTO)

Upper Division Course

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
(change in existing course—eff. summer 11)

Medicine: Pathology

New and changed courses in Medicine: Pathology (PMD)

Professional Courses

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
(change in existing course—eff. winter 12)

465. Applied Clinical Laboratory Medicine (3-6)
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
(change in existing course—eff. winter 12)

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
(new course—eff. summer 11)

475. Anatomic and Clinical Pathology AI (3-9)
Clinical activity—40-80 hours. Prerequisite: fourth-year 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
(new course—eff. winter 12)

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
(change in existing course—eff. summer 12)

Medicine: Pediatrics

New and changed courses in Medicine: Pediatrics (PED)

Professional Courses

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
(change in existing course—eff. summer 10)

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
(new course—eff. spring 12)

493B. Living with Intellectual & Developmental Disability in the Community (1-6)
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

(change in existing course—eff. summer 12)

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.)

(new course—eff. spring 11)

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.)

(change in existing course—eff. summer 11)

472. Clinical Rotation in Adolescent Medicine (3-9)
Clinical activity—39 hours; lecture—1 hour. Prerequisite: 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

(change in existing course—eff. summer 11)

493B. Living with Intellectual & Developmental Disability in the Community (6)
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

(new course—eff. winter 12)

Medicine: Pharmacology and Toxicology

New and changed courses in Medicine: Pharmacology and Toxicology (PHA)

Graduate Courses

207. Drug Discovery and Development (3)
Lecture/discussion—2 hours; extensive writing—1 hour. 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

(new course—eff. winter 10)

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

(change in existing course—eff. spring 11)

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

(change in existing course—eff. spring 12)

Medicine: Psychiatry

New and changed courses in Medicine: Psychiatry (PSY)

Upper Division Course

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

(new course—eff. winter 09)

Professional Courses

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

(new course—eff. winter 11)

418. Off-Campus Clinical Experience (3-9)
Clinical activity—20-40 hours. Prerequisite: fourth-year 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, IV.)

(change in existing course—eff. winter 12)

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.)

(new course—eff. spring 11)

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.)

(change in existing course—eff. summer 11)

Medicine: Public Health Sciences

New and changed courses in Medicine: Public Health Sciences (SPH)

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

(new course—eff. summer 11)

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

(new course—eff. spring 12)

211. Infectious Diseases and Global Health (3)
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

(new course—eff. winter 11)

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.—(III.) Schenker

(change in existing course—eff. spring 12)

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

(new course—eff. fall 11)

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
(change in existing course—eff. fall 11)

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
(change in existing course—eff. winter 12)

Medicine: Radiation Oncology

New and changed courses in Medicine: 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
(change in existing course—eff. fall 10)

Graduate Course

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
(change in existing course—eff. winter 11)

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 residents, 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
(change in existing course—eff. winter 11)

498. Group Study in Diagnostic Radiology (1-12)
(cancelled course—eff. fall 10)

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
(change in existing course—eff. winter 11)

Medicine: Radiology—Diagnostic

New and changed courses in Medicine: Radiology—Diagnostic (RDI)

Professional Course

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
(new course—eff. winter 11)

Medicine: Surgery

New and changed courses in Medicine: 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.) Si
(new course—eff. summer 11)

Professional Courses

493D. 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
(change in existing course—eff. summer 12)

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.)
(change in existing course—eff. summer 11)

Medieval Studies

New and changed courses in Medieval Studies (MST)

Upper Division Course

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.)
(change in existing course—eff. fall 12)

20B. The Culture of the High Middle Ages (5)
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.)
(change in existing course—eff. fall 12)

Microbiology

New and changed courses in Microbiology (MIC)

Upper Division Courses

100. Chemical and Biological Weapons (3)
(cancelled course—eff. winter 12)

102. General Microbiology (4)
(cancelled course—eff. winter 13)

102L. General Microbiology Laboratory (3)
(cancelled course—eff. winter 13)

104. General Microbiology (4)
Lecture—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
(new course—eff. fall 12)

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
(new course—eff. fall 12)

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

(change in existing course—eff. winter 13)

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

(change in existing course—eff. winter 13)

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.—II. (II.) Stewart

(change in existing course—eff. fall 10)

Graduate Course

200A. Biology of Prokaryotes (3)
(cancelled course—eff. winter 12)

201L. Advanced Microbiology Laboratory Rotations (5)
(cancelled course—eff. fall 12)

210. Molecular Mechanisms in Microbial Pathogenesis (3)
(cancelled course—eff. spring 12)

250. Biology of Yeasts (5)
(cancelled course—eff. spring 12)

260. Bacterial Genetic Regulatory Mechanisms (3)
(cancelled course—eff. spring 12)

Microbiology (A Graduate Group)

New and changed courses in Microbiology (MIB)

Graduate Courses

200A. Microbial Biology (3)
Lecture—3 hours. Prerequisite: course Microbiology 102 or equivalent; prior coursework in Microbiology. 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.—I. (I.)

(new course—eff. fall 10)

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.)

(new course—eff. fall 10)

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.)

(new course—eff. fall 10)

Middle East/South Asia Studies

New and changed courses in Middle East/South Asia Studies (MSA)

Upper Division Courses

180A. 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.

(new course—eff. spring 12)

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. (II.)

(new course—eff. fall 11)

Molecular and Cellular Biology

New and changed courses in Molecular and Cellular Biology (MCB)

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.)

(change in existing course—eff. fall 12)

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.—I, II, III. (I, II, III.) Burgess, Gasser, Harmer, Powers

(change in existing course—eff. fall 11)

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.—I, III. (I, III.) Fraser, Wilson

(change in existing course—eff. fall 11)

124. Macromolecular Structure and Function (4)
Lecture—4 hours. Prerequisite: Biological Sciences 103, Chemistry 107B, 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.—I. (I, III.) Baldwin, Browning

(change in existing course—eff. fall 11)

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.)—II. (II.) Callis, Tian

(change in existing course—eff. fall 11)

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

(change in existing course—eff. fall 12)

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.)—I, II, III. (I, II, III.) Callis, Gasser

(change in existing course—eff. fall 11)

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.—II. (II.) Callis, Gasser

(change in existing course—eff. fall 11)

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.—(I.) Scholey

(change in existing course—eff. fall 11)

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
(change in existing course—eff. fall 12)

150L. Laboratory in Developmental Biology (1)
(cancelled course—eff. winter 12)

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.)—III. (I, II, III.)
(change in existing course—eff. fall 11)

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
(change in existing course—eff. fall 12)

161. Molecular Genetics (3)
(cancelled course—eff. spring 11)

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
(change in existing course—eff. fall 12)

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: SciEng.—II. (II.) Natzle, Rose
(change in existing course—eff. fall 11)

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.—III. (III.) Burgess
(change in existing course—eff. fall 11)

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.—I, II, III. (I, II, III.) Chedin, Rodriguez
(change in existing course—eff. fall 11)

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 disciplines on research in the biological sciences. Social impacts of genomic research. GE credit: SciEng.—II. (II.) Burtis, Korf
(change in existing course—eff. fall 11)

Graduate Courses

200A. Current Techniques in Cell Biology (2)
(cancelled course—eff. fall 11)

200B. Current Techniques in Biochemistry (2)
(cancelled course—eff. spring 12)

200C. Current Techniques in Biophysics (2)
(cancelled course—eff. fall 11)

221C. Molecular Biology (4)
(cancelled course—eff. fall 11)

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.
(change in existing course—eff. fall 11)

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, gametogenesis, 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
(change in existing course—eff. fall 11)

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
(change in existing course—eff. fall 11)

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.) Armstrong, Erickson
(change in existing course—eff. fall 11)

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
(change in existing course—eff. fall 11)

Molecular, Cellular, and Integrative Physiology

New and changed courses in Molecular, Cellular, and Integrative Physiology (MCP)

Graduate Course

234. Current Topics in Neurotoxocology (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
(new course—eff. fall 10)

Music

New and changed courses in Music (MUS)

Lower Division Courses

3B. Introduction to Music Theory, Part II (4)
Lecture—1 hour; recitation—3 hours. Prerequisite: completion of course 3A or permission of the instructor. Development of melodic and harmonic writing skills. Basic analysis training.—II, III. (II, III.) Triest
(change in existing course—eff. winter 10)

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.) Levy, Pelo, Reynolds
(change in existing course—eff. fall 12)

28. Introduction to African American Music (4)
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.—III. (III.)
(change in existing course—eff. fall 11)

Upper Division Courses

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 non-majors. GE credit: ArtHum, Div, Wrt.—I. Bauer
(change in existing course—eff. fall 11)

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 non-majors. GE credit: ArtHum, Wrt.—Reynolds
(change in existing course—eff. fall 11)

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.—(III.)
(change in existing course—eff. fall 11)

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.—(II.) Levy
(change in existing course—eff. winter 12)

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.)
(change in existing course—eff. winter 09)

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. (I.) Nowlen
(change in existing course—eff. fall 11)

154. University Gospel Choir (2)
(cancelled course—eff. fall 10)

Graduate Course

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.—Graham
(new course—eff. fall 11)

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.
(change in existing course—eff. spring 11)

Native American Studies

New and changed courses in Native American Studies (NAS)

Lower Division Course

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.—I, II, III. (I, II, III.) Coates, Crum, Middleton, Montejo
(change in existing course—eff. fall 11)

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.—I, II, III. (I, II, III.)
(change in existing course—eff. fall 11)

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.—I, II, III, IV. (I, II, III, IV.) Hernandez-Avila, Marci, Mendoza
(change in existing course—eff. fall 11)

55. Americanisms: Native American Contributions to World Civilization (4)
(cancelled course—eff. fall 11)

Upper Division Courses

108. Indigenous Languages of California (4)
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
(change in existing course—eff. fall 12)

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.—Mendoza
(change in existing course—eff. spring 12)

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
(change in existing course—eff. fall 12)

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
(change in existing course—eff. fall 12)

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
(change in existing course—eff. fall 12)

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.—I. Coates
(change in existing course—eff. fall 12)

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: SocSci, Div, Wrt.—I. (I.) Crum
(change in existing course—eff. fall 11)

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: SocSci, Div, Wrt.—II. (II.) Crum
(change in existing course—eff. fall 11)

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.—III. (III.) Crum
(change in existing course—eff. fall 11)

133B. Ethnohistory of Native Peoples of Mexico and Central America 1500 to 2000 (4)
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. May be repeated one time for credit. Offered in alternate years. GE credit: Div, SocSci, Wrt.—(III.) Montejo
(change in existing course—eff. fall 11)

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 terminol-

ogies and impacts of colonization on contemporary constructions of gender identities. Offered in alternate years. GE credit: AH or SS, DD, OL, WE.—(III.) Coates

(new course—eff. fall 12)

156. Native American Ethics and Value Systems (4)
(cancelled course—eff. fall 11)

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. GE credit: Div.—(II.) Hernández-Ávila, Montejo

(change in existing course—eff. fall 11)

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.)

(change in existing course—eff. fall 12)

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.—I. (I.) Hernández-Avila

(change in existing course—eff. fall 11)

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.—II. (II.) Hernandez-Avila, Montejo

(change in existing course—eff. fall 11)

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.—III, IV. (III, IV.) Hernández-Ávila

(change in existing course—eff. fall 11)

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.)—I, II, III, IV. (I, II, III, IV.) Tsinhnahjinnie

(change in existing course—eff. fall 11)

Graduate Course

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.—Tsinhnahjinnie

(new course—eff. fall 11)

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 privately-held collections. Includes onsite viewing and research of museum collections and archives. Offered in alternate years.—Tsinhnahjinnie

(new course—eff. fall 12)

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.) Middleton

(new course—eff. fall 10)

Nature and Culture

New and changed courses in Nature and Culture (NAC)

Lower Division Courses

1. Intersections of Nature and Culture (4)
(cancelled course—eff. fall 11)

98. Directed Group Study (1-5)
(cancelled course—eff. winter 12)

99. Individual Study (1-5)
(cancelled course—eff. winter 12)

Upper Division Courses

100. The Culture of Nature: Theoretical Frameworks and Case Studies (4)
(cancelled course—eff. fall 11)

120. Environmental Ethics (4)
(cancelled course—eff. fall 11)

130. The Nature of Exploration (4)
(cancelled course—eff. fall 11)

140. Animal Rights (4)
(cancelled course—eff. fall 11)

160. Art and the Natural World (4)
(cancelled course—eff. fall 11)

180. Fieldwork in Nature and Culture (4)
(cancelled course—eff. fall 11)

194H. Special Study for Honors Students (3)
(cancelled course—eff. fall 11)

195H. Honors Project (3)
(cancelled course—eff. fall 11)

197T. Tutoring in Nature and Culture (1-5)
(cancelled course—eff. winter 12)

198. Directed Group Study (1-5)
(cancelled course—eff. winter 12)

199. Individual Study (1-5)
(cancelled course—eff. winter 12)

Nematology

New and changed 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.—III. (III.) Westerdahl

(change in existing course—eff. fall 11)

Neurobiology, Physiology, and Behavior

New and changed courses in Neurobiology, Physiology, and Behavior (NPB)

Lower Division Course

14. Illusions: Fooling the Brain (3)
Lecture—3 hours. Introduction to perceptual processing in the human nervous system; illusions. GE credit: SciEng.—II. (II.) Ditterich

(change in existing course—eff. winter 12)

Upper Division Course

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.—I, II, III. (I, II, III.) Chapman, Cheng, Mulloney, Sutter

(change in existing course—eff. spring 10)

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.—I, II, III. (I, II, III.) Debello, Furlow, Ishida, Goldberg, Fuller, Usrey, Weidner, Wingfield

(change in existing course—eff. spring 10)

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.—(III.)

(change in existing course—eff. fall 10)

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.—III.

(change in existing course—eff. fall 10)

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.—III.
(change in existing course—eff. fall 10)

Graduate Course

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.) Miller
(change in existing course—eff. fall 09)

Neuroscience

New and changed courses in Neuroscience (NSC)

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 Neurobiology, Physiology, and Behavior 211 and Psychology 211.) (S/U grading only.)—II. (II.) Miller
(change in existing course—eff. fall 09)

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. (S/U grading only.)—II, III. (II, III.) Diaz, McAllister, Zito
(change in existing course—eff. spring 11)

Nursing, School of

New and changed courses in Nursing (NRS)

Graduate Courses

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.)
(change in existing course—eff. fall 10)

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, II, III.)
(new course—eff. fall 11)

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, II, III. (I, II, III.)
(new course—eff. winter 11)

299D. Dissertation 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 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.)
(new course—eff. winter 11)

Professional Course

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.)
(new course—eff. winter 12)

Nutrition

New and changed courses in Nutrition (NUT)

Upper Division Course

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.—II. (II.) DePeters
(change in existing course—eff. fall 11)

Performance Studies

New and changed 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.
(new course—eff. fall 12)

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.
(new course—eff. fall 12)

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.
(new course—eff. fall 12)

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.
(new course—eff. fall 12)

Pharmacology and Toxicology

New and changed courses in Pharmacology and Toxicology (PTX)

Graduate Course

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
(new course—eff. fall 11)

Philosophy

New and changed courses in Philosophy (PHI)

Lower Division Courses

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.—I, IV. (I, IV.) Antonelli, Gilmore, Landry, Mattey
(change in existing course—eff. summer 11)

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
(new course—eff. fall 12)

Upper Division Courses

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
(new course—eff. fall 12)

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.—Szaif
(change in existing course—eff. fall 11)

Graduate Course

213. Advanced Logic for Graduate Students (4)
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
(change in existing course—eff. fall 11)

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
(new course—eff. winter 12)

Physical Education

New and changed courses in Physical Education (PHE)

Lower Division Course

8. Student-Athlete Life Skills (1)
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. (I, II.)
(change in existing course—eff. summer 12)

Upper Division Course

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 coaching. 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
(new course—eff. spring 12)

Physics

New and changed courses in Physics (PHY)

Lower Division Course

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.—I. (I.) Terning
(new course—eff. fall 10)

Upper Division Courses

110A. Electricity and Magnetism (4)
Lecture—3 hours. Prerequisite: courses 9B, 9C, 9D and Mathematics 21D, 22A, and 22B with grade C- or better, or consent of department. Theory of electrostatics, electromagnetism, Maxwell's equations, electromagnetic waves.—I, II, III. (I, II, III.)
(change in existing course—eff. winter 10)

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. (I, II, III.)
(change in existing course—eff. winter 10)

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.)
(change in existing course—eff. winter 10)

Plant Biology

New and changed courses in Plant Biology (PLB)

Upper Division Courses

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.—I. (I.) O'Neill
(change in existing course—eff. fall 11)

118. Introductory Phycology and Bryology (5)
(cancelled course—eff. winter 12)

119. 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.)—III. (III.) Rejmanek
(change in existing course—eff. spring 11)

140. Culinary and Medicinal Herbs (3)
(cancelled course—eff. fall 11)

147. Survey of Plant Communities of California (4)
(cancelled course—eff. fall 12)

Plant Biology (A Graduate Group)

New and changed courses in Plant Biology (A Graduate Group) (PBI)

Graduate Courses

201. Plant Senescence: Cellular and Molecular Aspects (4)
(cancelled course—eff. fall 11)

202. Advanced Physiology of Cultivated Plants (2)
(cancelled course—eff. fall 11)

205B. Advanced Plant Physiology (3)
(cancelled course—eff. fall 11)

205C. Advanced Plant Physiology/ Biochemistry (3)
(cancelled course—eff. fall 11)

208. Plant Hormones and Regulators (4)
(cancelled course—eff. fall 11)

211. Ecophysiological Methods (3)
(cancelled course—eff. fall 11)

217. Membrane Biology of Plants (3)
(cancelled course—eff. fall 11)

218A. Advanced Concepts in Plant Cell Biology: Cell Biogenesis (3)
(cancelled course—eff. fall 11)

218B. Advanced Concepts in Plant Cell Biology: Signal Transduction and Intercellular Communication (3)
(cancelled course—eff. fall 11)

219. Reproductive Biology of Flowering Plants (3)
(cancelled course—eff. fall 11)

225. Methods and Instrumentation for Crop and Soil Science (3)
(cancelled course—eff. fall 11)

Plant Pathology

New and changed courses in Plant Pathology (PLP)

Upper Division Courses

151A. Fungal Biodiversity in Natural Environments (4-4)
(cancelled course—eff. winter 12)

151B. Fungal Biodiversity in Natural Environments (4-4)
(cancelled course—eff. winter 12)

155. Ecology of Forest Diseases (3)
(cancelled course—eff. winter 12)

Graduate Courses

208. Ecology of Plant Pathogens and Epidemiology of Plant Diseases (4)
(cancelled course—eff. winter 12)

209. Principles of Plant Disease Control (3)
(cancelled course—eff. winter 12)

215X. Genetics and Molecular Biology of Plant Pathogens (4)
(cancelled course—eff. winter 12)

222. Experimental Approaches in Plant Pathology (2)
(cancelled course—eff. winter 12)

230L. Plant Pathology Laboratory (2)
(cancelled course—eff. winter 12)

293. Seminar on Soil Microbiology and Root Diseases (1)
(cancelled course—eff. winter 12)

Plant Sciences

New and changed courses in Plant Sciences (PLS)

Lower Division Course

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.)—I, III. (I, III.) Marrush
(new course—eff. fall 08)

Upper Division Courses

142. Ecology of Crop Systems (4)
(cancelled course—eff. fall 11)

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.)—I. (I.) Berry, Dahlgren, Rice
(change in existing course—eff. fall 11)

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: VL, SE.—III. (III.) Young
(new course—eff. spring 12)

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: SS, VL.—III. (III.) Young
(new course—eff. spring 12)

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.—I. Gradziel
(change in existing course—eff. spring 11)

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 software-assisted identification of common weeds. Not open for credit to students who have completed Plant Biology 176. (Former course Plant Biology 176.)—II. (II.) DiTomaso, Fischer
(change in existing course—eff. fall 11)

Political Science

New and changed courses in Political Science (POL)

Lower Division Course

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, Wrt.—I, II, III. (I, II, III.)
(change in existing course—eff. fall 11)

Upper Division Course

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.
(change in existing course—eff. fall 11)

Graduate Courses

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.
(change in existing course—eff. spring 11)

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.—III.
(change in existing course—eff. spring 11)

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.
(change in existing course—eff. spring 11)

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.—I. (I.) Haptonstahl, Jones, Joyce
(change in existing course—eff. fall 11)

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.—II. (II.) Huckfeldt, Jones
(change in existing course—eff. fall 11)

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.).—III. (III.) Haptonstahl, Jones
(change in existing course—eff. fall 11)

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.—I. (I.) Boudreau
(change in existing course—eff. fall 11)

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.—II. (II.) Scott, Taylor
(change in existing course—eff. fall 11)

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 years.—I. Money
(change in existing course—eff. spring 11)

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.

(change in existing course—eff. spring 11)

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.—III. (III.) Huckfeldt, Jones

(change in existing course—eff. fall 11)

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.

(change in existing course—eff. spring 11)

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.—(I.) Haptonstahl, Jones

(change in existing course—eff. fall 11)

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 differs.—I, II, III. (I, II, III.)

(change in existing course—eff. spring 11)

Psychology

New and changed courses in Psychology (PSC)

Upper Division Course

157. Stereotyping, Prejudice, and Stigma (4)
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, II, III.) Sherman

(change in existing course—eff. fall 11)

Graduate Courses

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

(new course—eff. winter 10)

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

(change in existing course—eff. fall 09)

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

(new course—eff. fall 11)

Religious Studies

New and changed courses in Religious Studies (RST)

Lower Division Courses

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, DD, WC, WE.—I, II, III, IV. (I, II, III, IV.)

(change in existing course—eff. summer 12)

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. GE credit: ArtHum, Div, Wrt.—I, II. (I, II) Janowitz, Lai

(new course—eff. fall 09)

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.—Coudert

(new course—eff. fall 12)

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.—I, II. (I, II.) Vidas

(new course—eff. fall 12)

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.—II. Elmore, Venkatesan

(new course—eff. winter 11)

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.—Venkatesan

(new course—eff. fall 12)

Upper Division Courses

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.—Chin

(new course—eff. spring 10)

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.— (II.) Coudert

(new course—eff. spring 12)

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 relationship of established Christian institutions to new Christian movements. Offered irregularly. GE credit: ArtHum, Div, Wrt.— I, II, III. (I, II, III.) Chin, Coudert

(new course—eff. spring 12)

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.—II. (II.) Vidas

(new course—eff. fall 11)

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

(new course—eff. fall 12)

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.—Chin, Coudert

(change in existing course—eff. fall 11)

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.—II. Venkatesan

(new course—eff. winter 12)

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.—I, III. (I, III.) Venkatesan
(new course—eff. fall 11)

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
(new course—eff. spring 12)

Russian

New and changed courses in Russian (RUS)

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.—I. (I.)
(change in existing course—eff. fall 11)

121. Nineteenth-Century Russian Prose (4)
(cancelled course—eff. fall 12)

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, Chekhov. Offered alternately in English or Russian. GE credit: ArtHum, Wrt.—I, II, III. (I, II, III.) Stuchebrukhov
(new course—eff. fall 11)

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
(new course—eff. spring 12)

127. Nineteenth-Century Russian Poetry (4)
(cancelled course—eff. fall 12)

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.—I. (I.) Kaminer
(new course—eff. fall 10)

143. Alexander Solzhenitsyn (4)
(cancelled course—eff. winter 11)

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.
(new course—eff. winter 11)

Science and Society

New and changed courses in Science and Society (SAS)

Lower Division Course

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 Environmental and Resource Sciences 8. (Formerly Environmental and Resource Sciences 8.) GE credit: SciEng or SocSci, Wrt. —II. (II.) Hernes
(new course—eff. winter 11)

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.) Leveau
(new course—eff. fall 12)

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
(new course—eff. spring 12)

Science and Technology Studies

New and changed courses in Science and Technology Studies (STS)

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.—I. (I.) Biagioli
(new course—eff. fall 11)

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
(change in existing course—eff. fall 11)

129. Health and Medicine in a Global Context (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or Anthropology 2. 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 Anthropology 129.) GE credit: SocSci, Div, Wrt | SS, WC, WE.—II. (II.) Dumit
(change in existing course—eff. fall 12)

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.—I. Milburn
(change in existing course—eff. fall 11)

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 fieldwork, 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.—III. (III.)
(change in existing course—eff. fall 11)

Sociology

New and changed courses in Sociology (SOC)

Upper Division Course

100. Origins of Modern Sociological Theory (4)
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.—I, II, III. (I, II, III.)
(change in existing course—eff. fall 08)

Spanish

New and changed courses in Spanish (SPA)

Lower Division Courses

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. —IV. (IV.) López-Burton
(change in existing course—eff. summer 11)

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.—I, II, III. (I, II, III.)
(new course—eff. fall 10)

Lower Division Course

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.—I, II, III. Colombi
(change in existing course—eff. spring 10)

Statistics

New and changed courses in Statistics (STA)

Lower Division Course

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.—II, III. (II, III.)
(change in existing course—eff. spring 10)

Upper Division Courses

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.—I, III. (I, III.)
(change in existing course—eff. fall 11)

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.—I, II, III. (I, II, III.)
(change in existing course—eff. fall 11)

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.—(II.)
(change in existing course—eff. winter 12)

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.—I, II. (I, II.)
(change in existing course—eff. fall 11)

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.—I, II, III. (I, II, III.)
(change in existing course—eff. fall 11)

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.—I, II, III. (I, II, III.)
(change in existing course—eff. spring 10)

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, confidence intervals, testing hypotheses, linear regression, analysis of variance, elements of large sample theory and nonparametric inference.—II, III. (II, III.)
(change in existing course—eff. winter 10)

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.—III. (III.)
(change in existing course—eff. spring 09)

Graduate Courses

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.)
(change in existing course—eff. fall 11)

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.)
(change in existing course—eff. fall 11)

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.)
(change in existing course—eff. fall 11)

Technocultural Studies

New and changed courses in Technocultural Studies (TCS)

Upper Division Courses

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, (III.) Drew
(new course—eff. spring 11)

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
(new course—eff. fall 11)

University Writing Program

New and changed courses in University Writing Program (UWP)

Lower Division Courses

1. Expository Writing (4)
Lecture/discussion—4 hours. Prerequisite: completion of Entry-Level Writing Requirement. Composition, the essay, paragraph structure, diction, and related topics. Frequent writing assignments. GE credit: Wrt.—I, II, III, IV. (I, II, III, IV.)
(change in existing course—eff. fall 10)

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.—II. (II.)

(change in existing course—eff. winter 11)

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.—I, II, III. (I, II, III.)

(change in existing course—eff. fall 10)

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.—I, II. (I, II.)

(change in existing course—eff. fall 10)

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.)

(change in existing course—eff. fall 05)

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. Not open for credit to students who have completed English 101. GE credit: Wrt | AH, WE.—I, II, III, IV. (I, II, III, IV.)

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; restricted to majors or to students concurrently enrolled in an upper division course in a specific academic discipline or interdisciplinary field. Advanced instruction in writing in that discipline and practice in effective styles of communication. May be repeated for credit when topic differs. Not open for credit to students who have completed English 102A or course 102A in the same academic field. Offered irregularly. GE credit: Wrt | AH, WE.

102B. Writing in the Disciplines: Biology (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent; 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; 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. Not open for credit to students who have completed English 102C. 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; upper division standing.Open to majors in international relations or to students concurrently enrolled in an upper division course accepted for the major. Advanced instruction in writing in international relations. Not open for credit to students who have completed English 102D. 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; upper division standing. Open to upper division students 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 the discipline of engineering. Not open for credit to students who have completed English 102E. 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; 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. Not open for credit to students who have completed English 102F. 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; upper division standing; restricted 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 English 102A or course 102A in the same academic field. Not offered every year. 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; restricted 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 English 102A or course 102A in the same academic field. GE credit: Wrt | AH, WE.—I. (I.)

102I. 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; restricted 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 English 102A or course 102A in the same academic field. GE credit: 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; restricted to majors and minors or to students concurrently enrolled in an upper division 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 English 102A or course 102A in the same academic field. GE credit: Wrt | AH, WE.—I, III. (I, III.)

102K. Writing in the Disciplines: Sociology (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing; restricted 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 English 102A or course 102A in the same academic field. GE credit: Wrt | AH, WE.—III. (III.)

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. GE 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.)

(change in existing course—eff. fall 12)

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.—I, II, III. (I, II, III.)

(change in existing course—eff. fall 10)

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.—I, II, III. (I, II, III.)

(change in existing course—eff. fall 10)

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.—I, II, III. (I, II, III.)

(change in existing course—eff. fall 10)

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.—I, II, III. (I, II, III.)

(change in existing course—eff. fall 10)

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.—I, II, III. (I, II, III.)
(change in existing course—eff. fall 10)

104I. Writing in the Professions: Internships (4)
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.—III. (III.)
(change in existing course—eff. fall 10)

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.)
(new course—eff. fall 12)

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.
(new course—eff. fall 10)

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
(new course—eff. fall 10)

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
(new course—eff. fall 10)

Veterinary Medicine

New and changed courses in Veterinary Medicine (VMD)

Professional Courses

400A. Freshman Doctoring (2.5)
(cancelled course—eff. fall 12)

400B. Sophomore Doctoring (2.6)
(cancelled course—eff. summer 12)

401A. The Normal Anatomy of the Canine Locomotor System (3.4)
(cancelled course—eff. winter 12)

401B. The Normal Anatomy of the Canine Head (1.7)
(new course—eff. spring 12)

402A. Cardiovascular Anatomy (0.7)
(cancelled course—eff. winter 12)

402B. Cardiovascular Physiology (1.7)
(cancelled course—eff. spring 12)

402C. Respiratory Anatomy and Physiology (2)
(cancelled course—eff. spring 12)

402D. Structure and Function of the Urinary System and Body Fluids (2.3)
(cancelled course—eff. fall 12)

403. Physiological Chemistry (5.1)
(cancelled course—eff. winter 12)

405. Veterinary Parasitology (3.6)
(cancelled course—eff. fall 12)

406. Principles of Behavior (0.7)
(cancelled course—eff. winter 12)

408. Nutrition and Nutritional Diseases in Animals (2.9)
(new course—eff. spring 12)

409. Epidemiology (1.7)
(cancelled course—eff. winter 12)

413. Veterinary Food Safety (1.3)
Lecture—10 sessions; discussion—2 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. The food system and diseases transmitted by food. Topics include sources of contaminants, the function of processing in food safety, and the role of veterinarians in pre-harvest food safety and in food protection in general.—III. (III.) Weimer
(change in existing course—eff. spring 11)

412. Fundamentals of Zoonoses (1.1)
(cancelled course—eff. summer 12)

413. Veterinary Food Safety (1.3)
(cancelled course—eff. summer 12)

414A. Principles of Veterinary Pharmacology and Toxicology (2.5)
(cancelled course—eff. fall 11)

414B. Veterinary Pharmacology (2.5)
(cancelled course—eff. winter 12)

414C. Veterinary Toxicology (1.9)
(cancelled course—eff. summer 12)

415A. Freshman Clinical Skills (1.1)
(cancelled course—eff. fall 12)

415B. Sophomore Clinical Skills (1.2)
(cancelled course—eff. summer 12)

419. Virology (2.7)
(cancelled course—eff. fall 11)

420. Immunology (3)
(cancelled course—eff. fall 12)

421. Principles of Neurosciences (2.7)
(new course—eff. spring 12)

424. Shelter Medicine (1)
Seminar—10 sessions. Prerequisite: second-, or third-year standing in the School of Veterinary Medicine. Shelter medicine is a newly emerging specialty in veterinary medicine building on the clever solutions and experience of hundreds of shelter veterinarian, managers, technicians, rescue and foster homes, and others, who have learned their skill in the trenches. May be repeated one time for credit. (S/U grading only.)—III. (III.) Hurley
(change in existing course—eff. spring 12)

425. Veterinary Genetics (1.8)
(cancelled course—eff. fall 12)

427. Cell and Tissue Structure and Function (3.3)
(cancelled course—eff. winter 12)

430. Principles of Radiography and Radiologic Interpretation (3.6)
(cancelled course—eff. fall 12)

431. Endocrinology (1.8)
(cancelled course—eff. fall 12)

432. Normal Gastrointestinal System (2.9)
(new course—eff. spring 12)

433. Veterinary Oncology (1.2)
(cancelled course—eff. fall 11)

434. Introduction to Veterinary Hematology (1.5)
(cancelled course—eff. fall 12)

435. Veterinary Clinical Pathology (3.9)
(cancelled course—eff. summer 12)

436. Veterinary Ethics and Law (1.2)
(cancelled course—eff. spring 12)

446. Veterinary Reproduction (4.2)
(cancelled course—eff. winter 12)

447. Introduction to Public Veterinary Practice and Foreign Animal Diseases (1)
(cancelled course—eff. fall 11)

451. Veterinary Bacteriology and Mycology (4.9)
(cancelled course—eff. fall 11)

452. General Pathology (3.1)
(cancelled course—eff. fall 11)

459. Systemic Pathology (5.5)
(cancelled course—eff. summer 12)

Veterinary Medicine: Anatomy, Physiology and Cell Biology

New and changed courses in Anatomy, Physiology and Cell Biology (APC)

Professional Course

410. Equine Locomotor Anatomy (1.8)
(cancelled course—eff. summer 12)

Veterinary Medicine: Doctor of Veterinary Medicine

New and changed courses in Doctor of Veterinary Medicine (DVM)

Professional Courses

449. Externship (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. Approved program of study to receive training and experience outside the School of Veterinary Medicine. Opportunities include private practice and provides first-hand experiences in diagnostic and therapeutic capabilities and management and business methods in the private sector. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Ilkiw
(change in existing course—eff. fall 10)

450. Cardiology (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. Diagnostic techniques of history taking, cardiac physical examination, electrocardiography, radiography, echocardiography, and cardiac catheterization and medical, interventional, and surgical therapy of cardiac disorders will be taught along with the etiology and pathophysiology of various cardiac disorders. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Kittleson
(change in existing course—eff. fall 10)

451. Clinical Pathology (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. Focus on the practical use and application of laboratory testing in a practice setting to facilitate optimal management of patients. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Owens
(change in existing course—eff. fall 10)

452. Small Animal Community Medicine (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. Practice wellness care in pediatric and adult patients, address medical management of geriatric patients, and develop a practical, problem-oriented approach to routine medical issues presenting in general practice.—I, II, III, IV. (I, II, III, IV.) Meadows
(change in existing course—eff. fall 10)

453. Small Animal Community Surgery—Gourley (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. General surgery service to include instruction in physical exams, basic anesthesia, pain management and routine surgeries. Sample surgeries include routine spays and neuters, cystotomy, mass removal, digit amputation, enucleation, etc. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Montgomery
(change in existing course—eff. fall 10)

454. Companion Avian and Exotic Pet Medicine (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. Basic components of husbandry, nutrition, handling, diseases, medical and surgical treatment of companion exotics including avian (companion and wildlife), small exotic mammal, reptilian, amphibian and aquatic animal patients. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Hawkins
(change in existing course—eff. fall 10)

455. Dentistry/Oral Surgery (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. Examination, diagnosis and treatment of small animals presenting with oral or dental diseases. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Verstraete
(change in existing course—eff. fall 10)

456. Dermatology (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. Exposure to veterinary dermatology. Exposure to veterinary dermatology. Learn the importance of obtaining a good history, performing a good physical examination and characterizing lesions. Various diagnostic and therapeutic techniques specific to dermatology will be demonstrated. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) White
(change in existing course—eff. fall 10)

457. Equine Emergency/Critical Care Surgery (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. In-depth training and hands-on experience in various facets of equine emergency case management, including the diagnosis, management, and treatment of both equine emergency medical and surgical patients. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Dechant
(change in existing course—eff. fall 10)

458. Equine Emergency Nights (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. Provide service for emergency surgical and medical management for all equine and camelid emergencies; i.e., colic, wounds, musculoskeletal injuries, septic foals, dystocia, and neurologic and ophthalmologic emergencies. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Dechant
(change in existing course—eff. fall 10)

459. Equine Field Service (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. On-farm practical experience in the diagnosis, treatment and prevention of equine disease problems. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Spier
(change in existing course—eff. fall 10)

460. Equine Medicine—General (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. Learn and practice the highest level of equine internal medicine with the goal to generate or implement a problem-oriented approach to clinical problems, determine a diagnostic work-up, prognosis and treatment plan for patients. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Pusterla
(change in existing course—eff. fall 10)

461. Equine Reproduction (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. Routine reproductive management of the horse on local brood mare farms as part of a field service program and of stallion and mare infertility in a tertiary referral setting at the VMTH. Participate in weekly clinical and endocrinology rounds. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Ball
(change in existing course—eff. fall 10)

462. Equine Surgery and Lameness I (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. Advanced training and experience in equine surgery services to manage all orthopedic and non-orthopedic elective surgical disorders as well as equine lameness disorders. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Galuppo
(change in existing course—eff. fall 10)

463. Farrier Shop (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. Introduction to the normal structure and function of the equine foot. Principles of corrective shoeing for many lameness disorders. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Galuppo
(change in existing course—eff. fall 10)

464. Small Animal Community Surgery—CCAH I (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. General surgery service to include instruction in physical exams, basic anesthesia, pain management and routine surgeries. Surgeries include routine spays and neuters and other minor procedures such as simple mass removals. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Montgomery
(change in existing course—eff. fall 10)

465. Equine Surgery and Lameness II (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. Advanced training and experience in equine surgery services to manage all orthopedic and non-orthopedic elective surgical disorders as well as equine lameness disorders. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Galuppo
(change in existing course—eff. fall 10)

466. Small Animal Medicine B (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. Improve clinical skills required to manage cases in the Small Animal Service including comprehensive histories, preforming complete physical examinations, obtaining samples, interpreting results, conducting special procedures and assisting faculty and residents in the diagnosis, prevention, management and treatment of disease. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Johnson
(change in existing course—eff. fall 10)

467. Small Animal Outpatient Medicine (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. Exposure to general medicine outpatient cases and to develop a practical, problem oriented approach to routine medical issues presenting in general practice. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Davis
(change in existing course—eff. fall 10)

469. California Animal Health and Food Safety Laboratory (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. Overview of how CAHFS interfaces with the production animal industry and practitioners. Understanding of the laboratory approach to the diagnosis of predominately production animal diseases. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Breitmeyer
(change in existing course—eff. fall 10)

470. Food Animal Preceptorship (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. Individual animal medicine and surgery as well as herd reproductive programs on the farm. A regular client base with a variety of species is served: dairy cattle, beef cattle, goats and sheep. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Lane
(change in existing course—eff. fall 10)

471. Livestock Medicine and Surgery (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. Hands-on clinical experience diagnosing, treating, and managing medical and surgical diseases of primary care and referral cases

involving dairy cattle, beef cattle, sheep, dairy goats, meat goats, and pigs. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Angelos

(change in existing course—eff. fall 10)

472. Food Animal Reproduction/Herd Health (1.5-18)

Prerequisite: fourth-year standing in the School of Veterinary Medicine. Exposure to individual animal medicine and surgery as well as herd reproductive programs on the farm. A regular client base with a variety of species is served: dairy cattle, beef cattle, goats and sheep. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Lane

(change in existing course—eff. fall 10)

473. Dairy Production Medicine—Tulare (1.5-18)

Prerequisite: fourth-year standing in the School of Veterinary Medicine. Advanced training and experience in a clinical dairy health and production medicine delivery system. Exposure to contemporary dairy production and population medicine programs. Develop ability to communicate with producers and farm employees. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Champagne

(change in existing course—eff. fall 10)

474. Equine Emergency/Critical Care Medicine (1.5-18)

Prerequisite: fourth-year standing in the School of Veterinary Medicine. In-depth training and hands-on experience in various facets of equine emergency case management, including the diagnosis, management, and treatment of both equine emergency medical and surgical patients. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Magdesian

(change in existing course—eff. fall 10)

475. Lab Animal Medicine (1.5-18)

Prerequisite: fourth-year standing in the School of Veterinary Medicine. Provide exposure to various management activities and techniques used by laboratory animal veterinarians both antemortem & postmortem to support animal research primarily involving rodents but may include many vertebrates from fish to non-human primates. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Hewett

(change in existing course—eff. fall 10)

476. Large Animal Anesthesia (1.5-18)

Prerequisite: fourth-year standing in the School of Veterinary Medicine. Advanced training and experience in anesthetic management, acute care problem-solving and decision-making of healthy and physiologically stressed large animal patients. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Brosnan

(change in existing course—eff. fall 10)

477. Large Animal Radiology (1.5-18)

Prerequisite: fourth-year standing in the School of Veterinary Medicine. Training in the art of making quality radiographs of large animal patients and interpreting radiographic studies. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Puchalski

(change in existing course—eff. fall 10)

478. Large Animal Ultrasonography (1.5-18)

Prerequisite: fourth-year standing in the School of Veterinary Medicine. Hands-on experience in the ultrasonographic diagnosis of primarily musculoskeletal injuries and abdominal disorders in horses and the occasional nonequine patient. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Whitcomb

(change in existing course—eff. fall 10)

479. Small Animal Emergency—Nights (1.5-18)

Prerequisite: fourth-year standing in the School of Veterinary Medicine. Emergency practice includes the immediate recognition, evaluation, and care of patients with acute illness and injury. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Jandrey

(change in existing course—eff. fall 10)

480. Neurology/Neurosurgery (1.5-18)

Prerequisite: fourth-year standing in the School of Veterinary Medicine. Provide specialized veterinary care for animals with neurological diseases; i.e., disorders of the brain, inner ear, spinal cord, and vertebrae and diseases affecting muscles, nerves and the neuromuscular junction. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Dickinson

(change in existing course—eff. fall 10)

481. Nutrition (1.5-18)

Prerequisite: fourth-year standing in the School of Veterinary Medicine. Advanced training and experience in the principles and practice of small animal clinical nutrition. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Larsen

(change in existing course—eff. fall 10)

482. Oncology (1.5-18)

Prerequisite: fourth-year standing in the School of Veterinary Medicine. Advanced training and experience in diagnosis, staging, medical management, and prognostication of cancer in animal patients. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Skorupski

(change in existing course—eff. fall 10)

483. Ophthalmology (1.5-18)

Prerequisite: fourth-year standing in the School of Veterinary Medicine. Ongoing education, training, and experience in an ophthalmic specialty practice dealing with companion and exotic species. Learn to take histories related to ocular problems, to competently examine an eye, and to perform basic diagnostic procedures. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Hollingsworth

(change in existing course—eff. fall 10)

484. Small Animal Orthopedic Surgery (1.5-18)

Prerequisite: fourth-year standing in the School of Veterinary Medicine. Lameness examinations and treatments for all orthopedic diseases to include osteoarthritis, developmental diseases, trauma-induced injuries and cancer. Both medical and surgical treatments are used and presented to owners in an evidenced based fashion. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Kapatkin

(change in existing course—eff. fall 10)

485. Anatomic Pathology (1.5-18)

Prerequisite: fourth-year standing in the School of Veterinary Medicine. Advanced training and experience to develop a general understanding of the nature of common pathologic lesions and their interpretation in light of clinical history. Postmortem techniques and pract233, 244ice in writing descriptions of gross lesions. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Affolter

(change in existing course—eff. fall 10)

486. Primate Medicine (1.5-18)

Prerequisite: fourth-year standing in the School of Veterinary Medicine. Acquire skills to perform physical examinations, blood collection, cystocentesis, catheter placement, fluid therapy, basic wound care, bandaging, suturing, amputations, and orogastric tube feedings. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Christe

(change in existing course—eff. fall 10)

487. Radiation Oncology (1.5-18)

Prerequisite: fourth-year standing in the School of Veterinary Medicine. Staging and treatment of patients with cancer and use of radiation therapy in the treatment of cancer in companion animals. Management of clinical patients, the indications for radiation therapy and technical aspects treatment planning and dose calculations. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Theon

(change in existing course—eff. fall 10)

488. Shelter Medicine (1.5-18)

Prerequisite: fourth-year standing in the School of Veterinary Medicine. Exposure to all areas in a variety of shelters in the Sacramento and Bay Area. Accompany Shelter Medicine Program personnel on consultations; depending on schedule. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Hurley

(change in existing course—eff. fall 10)

489. Physical Rehabilitation (1.5-18)

Prerequisite: fourth-year standing in the School of Veterinary Medicine. Participate in physical rehabilitation evaluation to diagnose movement dysfunction, design and effectively implement an evidence-based treatment plan to restore, maintain or enhance optimal physical function after injury, surgery or disability. Emphasis on development of observation and manual assessment skills. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Woelz

(change in existing course—eff. fall 10)

490. Small Animal Anesthesia (1.5-18)

Prerequisite: fourth-year standing in the School of Veterinary Medicine. Experience in anesthetizing small animals in a clinical setting. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Pypendop

(change in existing course—eff. fall 10)

491. Small Animal Emergency—Days (1.5-18)

Prerequisite: fourth-year standing in the School of Veterinary Medicine. Emergency practice includes the immediate recognition, evaluation, and care of patients with acute illness and injury. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Aldrich

(change in existing course—eff. fall 10)

492. Small Animal Intensive Care Unit (1.5-18)

Prerequisite: fourth-year standing in the School of Veterinary Medicine. Gain and demonstrate competence in both the immediate and ongoing care of a diverse group of critically ill small animal patients. Gain proficiency in invasive procedures, cardiopulmonary resuscitation, stabilization of the respiratory distress patient and hemodynamic stabilization. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Hopper

(change in existing course—eff. fall 10)

493. Small Animal Medicine A (1.5-18)

Prerequisite: fourth-year standing in the School of Veterinary Medicine. Improve clinical skills required to manage cases in the Small Animal Service including comprehensive histories, preforming complete physical examinations, obtaining samples, interpreting results, conducting special procedures and assisting faculty and residents in the diagnosis, prevention, management and treatment of disease. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Johnson

(change in existing course—eff. fall 10)

494. Small Animal Radiology (1.5-18)

Prerequisite: fourth-year standing in the School of Veterinary Medicine. Participate in technical aspects of producing radiographs, interpreting radiographic and other diagnostic imaging studies and perform-

ing diagnostic ultrasound exams. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Pollard

(change in existing course—eff. fall 10)

495. Small Animal Soft Tissue Surgery (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. Participate in management of cases referred for advanced surgical techniques to include all aspects of case management from hospital admission to discharge including daily case rounds. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Mayhew

(change in existing course—eff. fall 10)

496. Behavior (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. Understand the importance of behavior in companion animal practice, primarily that of dogs and cats. Apply the knowledge to prevent and treat problematic behaviors in companion animals. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Bain

(change in existing course—eff. fall 10)

497. Research (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. Research rotations are designed for combined degree students who require a period of time (up to 12 weeks) to complete a discrete portion of their thesis work. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Tablin

(change in existing course—eff. fall 10)

498. Fish Health (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. Focus on the application of basic fish health principles to address current problems as experienced by fish as held for research, as large populations in state fish hatcheries and as part of the collection of large public/private aquaria. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Weber

(change in existing course—eff. fall 10)

499. Zoological Medicine (1.5-18)
Prerequisite: fourth-year standing in the School of Veterinary Medicine. Experience in order to become proficient in performing physical examinations and collecting diagnostic samples form a variety of non-domestic animals. Majority of the rotations spent providing patient care at the Sacramento Zoo. May be repeated up to 23 units for credit.—I, II, III, IV. (I, II, III, IV.) Wack

(change in existing course—eff. fall 10)

Veterinary Medicine: School of Veterinary Medicine

New and changed courses in School of Veterinary Medicine (VET)

Professional Courses

400. Prologue (2-18)
Prerequisite: first-year standing in the School of Veterinary Medicine. Outline expectations and skill set required to participate successfully in the DVM curriculum to include curriculum mapping, bioinformatics, student-centered learning and an introduction to critical thinking, problem solving and working in teams. (S/U grading only.)—I. (I.) Angelos, Clark, Kass

(new course—eff. fall 11)

401. Basic Foundations (2-18)
Prerequisite: first-year standing in the School of Veterinary Medicine. Essential basic information regarding histology, general pathology, biochemistry, pharmacology and population health that is foundational to all blocks. (S/U grading only.)—I. (I.) Bannasch, Mellema, Mohr, Puschner, Tablin

(new course—eff. fall 11)

402. Heme/Lymph/Coag (2-18)
Prerequisite: first-year standing in the School of Veterinary Medicine. The lexicon, morphology, production, structure and function of peripheral blood cells, their bone marrow precursors and the lymphoid system, the process and regulation of hemostasis, and the laboratory evaluation of all of these in health and disease.—I. (I.) Jandrey, Skorupski, Vernau

(new course—eff. fall 11)

403. Musculoskeletal (2-18)
Prerequisite: first-year standing in the School of Veterinary Medicine. Anatomy, histology, and physiology necessary for understanding form and function of the bones, joints, muscles, and tendons in producing locomotion; and the pathologic processes that produce typical responses to injury of musculoskeletal structures in domestic animals. (S/U grading only; deferred grading only, pending completion of sequence.)—I, III. (I, III.) Puchalski, Stover, Whitcomb

(new course—eff. fall 11)

404. Neuroscience/Senses/Behavior (2-18)
Prerequisite: first-year standing in the School of Veterinary Medicine. Establish a basis for clinical neurology, ophthalmology, and behavior by providing an integrated study of normal neurobiology, neuroanatomy, neurophysiology, neuropathology, neurpharmacology, neurotoxicology, ophthalmology and behavior.—III. (III.) Hollingsworth, Pessah, Sturges, Wisner

(new course—eff. spring 12)

405. Gastrointestinal/Metabolism (2-18)
Prerequisite: first-year standing in the School of Veterinary Medicine. Examine interrelatedness and functions of the organs associated with the gastrointestinal tract. Applied problems in pharmacology, physical examination, diagnostic testing, and imaging are used to reinforce a basic understanding of organ anatomy, physiology, pathophysiology, and nutrition/metabolism.—III. (III.) Lloyd, Marks, Nieto, Pesavento, Ramsey

(new course—eff. spring 12)

406. Nutrition/Toxicology (2-18)
Prerequisite: first-year standing in the School of Veterinary Medicine. Basic principles of nutrition and toxicology as well as pathophysiologic changes, diagnostic procedures and treatments of nutritional diseases and intoxications of domestic animals and wildlife. Incorporate case examples and directed self-learning to reinforce important concepts.—III. (III.) Buckpitt, Fascetti, Knych, Puschner, Pypendop

(new course—eff. spring 12)

407. VMTH Rotation—Y1 (1.5)
Clinical Activity—10-15 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Integrate basic and preclinical material working with senior student in a clinical environment. (S/U grading only; deferred grading only, pending completion of sequence.)—I, III. (I, III.) Ilkiw

(change in existing course—eff. fall 12)

408. Cardiology/Respiratory (2-18)
Prerequisite: second-year standing in the School of Veterinary Medicine. Normal cardiovascular and respiratory system biology and the integrated response of those systems to injury or disease.—I. (I.) Barter, Hopper, Mellema, Pinkerton, Wilson

(new course—eff. fall 12)

409. Renal/Urinary (2-18)
Prerequisite: second-year standing in the School of Veterinary Medicine. Examine and explore the normal morphology (gross and microscopic), physiology, pathology and imaging of the upper and lower urinary tract in multiple species.—I. (I.) Cowgill, Murphy, Schelegle, Westropp

(new course—eff. fall 12)

410. Endocrinology/Reproduction (2-18)
Prerequisite: second-year standing in the School of Veterinary Medicine. Anatomy and histology of endocrine glands and understand the physiology at the molecular, cellular and organismal level.—I. (I.) Conley, Meyers, Nelson, Raybould

(new course—eff. fall 12)

411. Skin (2-18)
Prerequisite: second-year standing in the School of Veterinary Medicine. Structure and function of the skin and specialized keratinized structures in veterinary species. Review mechanisms by which skin responds to perturbations and discuss wound healing and skin pathology.—I. (I.) Affolter, Outerbridge

(new course—eff. fall 12)

412. Oncology (2-18)
Prerequisite: second-year standing in the School of Veterinary Medicine. Basic mechanisms, etiology, causes and the approach to diagnosis and treatment of cancer with emphasis on veterinary patients.—I. (I.) Chen, Kent

(new course—eff. fall 12)

413. Oncology (2-18)
Prerequisite: second-year standing in the School of Veterinary Medicine. Integrate immunology, microbiology, virology, parasitology of common infectious, zoonotic and foreign animal diseases.—I. (I.) Byrne, Pusterla, Sykes

(new course—eff. fall 12)

414. Population Health (2-18)
Prerequisite: second-year standing in the School of Veterinary Medicine. Principles of evidence-based medicine, study design and inference, and disease transmission in populations. Topics include biostatistics, outbreak investigation and response, diagnostic tests, vaccine strategies, food safety, foreign animal diseases, and impact of environmental health on animals and humans.—I. (I.) Aly, Ernest, Johnson

(new course—eff. fall 12)

415. Clinical Foundations (2-18)
Prerequisite: second-year standing in the School of Veterinary Medicine. Essential concepts that are shared across year three blocks to include foundational material in anesthesia, surgery and emergency medicine with cases that include interpretation of clinical pathology and imaging.—I. (I.) Borjesson, Epstein, Giulivi, J. Pascoe, P. Pascoe

(new course—eff. fall 12)

416. VMTH Rotation - Y2 (1.5)
Clinical Activity—10-15 hours. Prerequisite: second-year standing in the School of Veterinary Medicine. Integrate basic and preclinical material working with a senior student in a clinical environment. (S/U grading only; deferred grading only, pending completion of sequence.)—I, III. (I, III.) Ilkiw

(new course—eff. fall 12)

Veterinary Medicine: Medicine and Epidemiology

New and changed courses in Veterinary Medicine: Medicine and Epidemiology (VME)

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
(change in existing course—eff. winter 11)

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.) Sparger
(new course—eff. fall 09)

Professional Courses

410. Husbandry, Feeding and Management of Captive Animals (2)
(cancelled course—eff. summer 12)

461A. Small Animal Medicine—Level I (3.6)
(cancelled course—eff. summer 12)

463A. Food Animal Medicine, Level I (3.6)
(cancelled course—eff. summer 12)

464A. Equine Medicine, Level I (3.2)
(cancelled course—eff. summer 12)

481. Clinical Rounds (1)
(cancelled course—eff. winter 12)

Veterinary Medicine: Molecular Biosciences

New and changed courses in Veterinary Medicine: Molecular Biosciences (VMB)

Graduate Course

234. Current Topics in Neurotoxocology (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
(new course—eff. fall 10)

Professional Course

480. Case Studies in Small and Exotic Animal Clinical Toxicology (1.7)
Discussion—17 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Class size limited to 40 students. Clinical systematic approach to poisoning problems in small and exotic animals emphasizing diagnosis and treatment.—II. (II.) Jandrey, Poppenga
(change in existing course—eff. winter 11)

Veterinary Medicine: Pathology, Microbiology, and Immunology

New and changed courses in Veterinary Medicine: Pathology, Microbiology, and Immunology (PMI)

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
(new course—eff. fall 10)

221. Topics in Virus Research (1)
Discussion—1 hour. Prerequisite: graduate student 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
(new course—eff. fall 10)

Professional Courses

458R. Surgical Pathology Conference (1)
Discussion—1 hour. Prerequisite: resident status at the Veterinary Medical Teaching Hospital. Diagnosis and discussion of current surgical pathology cases based on clinical records and microscopic study. May be repeated 12 times for credit. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.) Affolter
(new course—eff. spring 12)

492R. Surgical Pathology Conference (2)
Seminar—1 hour; discussion—1 hour. Prerequisite: consent of instructor. Resident standing in the Veterinary Medical Teaching Hospital. Diagnosis and discussion of current cases submitted to the surgical biopsy service. May be repeated 12 times for credit. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.) Affolter
(new course—eff. fall 10)

Veterinary Medicine: Population Health and Reproduction

New and changed courses in Veterinary Medicine: Population Health and Reproduction (PHR)

Upper Division Course

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)
(new course—eff. spring 10)

Graduate Courses

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
(new course—eff. winter 12)

214. Vector-Borne Infectious Diseases: Changing Patterns (2)
(cancelled course—eff. winter 12)

232. Advanced Reproductive Biology (3)
(cancelled course—eff. spring 11)

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. In-depth 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.) Sacks
(new course—eff. spring 10)

Professional Courses

429DL. Dairy Herd Health Management Laboratory (0.6)
(cancelled course—eff. fall 12)

429E. Goat Herd Health (1)
Lecture—10 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Application of problem-solving and epidemiologic methods to goat diseases and their control and prevention.—III. (III.) Rowe
(change in existing course—eff. spring 11)

432. Reproductive Technology in Mammals and Birds (0.8)
(cancelled course—eff. spring 11)

432L. Reproductive Technology in Mammals and Birds, Laboratory (0.2)
(cancelled course—eff. spring 11)

446A. Large Animal Reproduction (1.2)
(cancelled course—eff. summer 12)

446B. Equine Reproduction (0.6)
(cancelled course—eff. fall 11)

457. Veterinary Practice Management (2)
(cancelled course—eff. spring 10)

Veterinary Medicine: Preventive Veterinary Medicine

New and changed courses in Veterinary Medicine: 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.—I. (I.) Farver
(change in existing course—eff. fall 10)

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
(change in existing course—eff. winter 11)

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
(change in existing course—eff. fall 10)

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
(new course—eff. spring 10)

412. Introduction to Information Management (3)
(cancelled course—eff. fall 10)

Veterinary Medicine: Surgical and Radiological Sciences

New and changed courses in Veterinary Medicine: Surgical and Radiological Sciences (VSR)

Graduate Course

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.) Brosnan
(new course—eff. spring 12)

Professional Courses

404A. Small Animal Radiology (2.9)
(cancelled course—eff. summer 12)

404B. Large Animal Radiology (1.6)
(cancelled course—eff. winter 12)

406. Small Animal Diagnostic Ultrasound (1)
(cancelled course—eff. fall 11)

413L. Small Animal Dentistry Lab (0.3)
Laboratory—3 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine; concurrent enrollment in course 413. Principles of oral examination, oral radiography, routine periodontal treatment and dental extraction techniques. (S/U grading only; deferred grading only, pending completion of sequence.)—II, III. (II, III.) Verstraete
(new course—eff. winter 11)

424. Clinical Veterinary Oncology (1.2)
(cancelled course—eff. fall 11)

425R. Veterinary Cancer Biology: Clinical Applications (1)
(cancelled course—eff. winter 12)

460. Emergency and Critical Patient Care (2)
Lecture—24 sessions. Prerequisite: third-year standing in School of Veterinary Medicine. Introduction to the essential and practical concepts of care for emergency and critically ill patients.—III. (III.). Mellema
(change in existing course—eff. spring 12)

468. Equine Lameness and Radiology (3.6)
Lecture—36 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Principles for the clinical evaluation and radiographic interpretation of lameness disorders of the fore-and hindlimbs of horses. Methods used in large animal radiography and the latest techniques for managing and treating equine lameness.—III. (III.) Galuppo
(change in existing course—eff. spring 11)

Viticulture and Enology

New and changed courses in Viticulture and Enology (VEN)

Graduate Courses

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 geostatistics. Offered in alternate years.—(II.) Smart
(new course—eff. fall 11)

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
(change in existing course—eff. fall 11)

Wildlife, Fish, and Conservation Biology

New and changed courses in Wildlife, Fish, and Conservation Biology (WFC)

Lower Division Course

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. Special study for undergraduates. (P/NP grading only.)—I, II, III. (I, II, III.)
(new course—eff. winter 10)

Upper Division Courses

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.—II. (II.) Fangue
(new course—eff. spring 10)

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.—(II.) Caro
(change in existing course—eff. winter 11)

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.—I. (I.) Van Vuren
(new course—eff. spring 10)

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
(new course—eff. winter 10)

Policies & Requirements Addendum

Revised Terminology for Fees

Effective fall 2011, the following terms used to describe fess have been changed:

- Registration Payment Plan (RPP) is now the Deferred Payment Plan (DPP)
- Education fee and Educational fee, is now Tuition
- Registration Fee Payment Deadline is now Student Fee Payment Deadline
- Nonresident Tuition Fee is now Nonresident Supplemental Tuition

Revised General Education (GE) Requirement*

Changes to Revised General Education (GE) Requirement; Effective Fall 2011

The revised General Education (GE) requirement has two components, **Topical Breadth** and **Core Literacies**, and is defined in terms of units, not courses. The units of most undergraduate courses at UC Davis are assigned to one of the three **Topical Breadth Areas**. The literacies are crucial both for success in one's profession and also for a thoughtful engaged citizenship in the community, nation and world. 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. However, units may be counted toward satisfaction of only one Core Literacy. Course units that satisfy requirements in the candidate's major or majors may also be counted toward satisfaction of General Education requirements.

Students may take courses P/NP to fulfill their General Education requirements, up to the limits set by college and campus regulations. 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.

The requisite units for both components of the revised General Education requirements is summarized below, however, a full description of each of the Core Literacies can be found at *http://ge.ucdavis.edu/local_resources/docs/GE-requirement-June08-final.pdf*.

A. Topical Breadth Component ..... 52 units total

- Arts and Humanities12-20 units
- Science and Engineering12-20 units
- Social Sciences 12-20 units
  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.

B. Core Literacies Component ..... 35 units

1. Literacy with Words and Images at least 20 units
   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

   c. Oral skills coursework or additional writing experience coursework ..... at least 3 units

   d. Visual literacy coursework ..... at least 3 units

2. Civic and Cultural Literacy . at least 9 units

   a. American Cultures, Governance, and History . . . . . at least 6 units; of which at least 3 units must be in coursework certified as focusing on issues of domestic diversity

   b. World Cultures .... at least 3 units

3. Quantitative Literacy..... at least 3 units

4. Scientific Literacy .... at least 3 units

Degrees Offered by UC Davis

Changes to Degree Program list

Majors

* = closed to new students

Natural Sciences
B.S. . . . . L&S

Nature and Culture
A.B.* . . . . . L&S

Sustainable Agriculture and Food Systems
B.S. . . . . A&ES

Minor Programs Offered by UC Davis

Change to Minor Program list

Biomedical Engineering . . . . . ENGR
Human Rights . . . . . L&S

Topical Breadth Assigned Subject Areas for Majors and Minors

Changes to Topical Breadth list

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
Music
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
Expository Writing
Film Studies
French
German
Global and International Studies (Arts and Humanities Emphasis)
Greek
History
Italian
Japanese
Jewish Studies
Landscape Restoration
Latin
Luso-Brazilian Studies
Medieval and Early Modern Studies
Music
Native American Studies
Philosophy
Religious Studies
Russian
Sexuality Studies
Social and Ethnic Relations
Spanish
Women's Studies

The Minor

Changes to The Minor section

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/pages/current_students/advising/policy.html#minor*. 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.

There are currently four 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

Department of Biological and Agricultural Engineering:

- Energy Science & Technology
- Energy Policy

Department of Civil and Environmental Engineering:

- Construction Engineering and Management

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.

Undergraduate Education

Changes to Undergraduate Education chapter

COLLEGE OF LETTERS AND SCIENCE

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 societ-

ies, 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 20 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
- Expository Writing
- Film Studies
- French
- German
- Global and International Studies
- Greek
- Human Rights
- Italian
- Japanese
- Latin
- Medieval and Early Modern Studies
- Music
- Native American Studies
- Religious Studies
- Russian
- Sexuality Studies
- Social and Ethnic Relations
- Spanish
- Women's Studies

College Requirements for the Bachelor's Degree

COLLEGE OF ENGINEERING

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

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.

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 Engineering Accreditation Commission of ABET; *http://www.abet.org*:

- Biochemical Engineering
- Biological Systems Engineering
- Chemical Engineering
- Civil Engineering
- Computer Engineering
- Electrical Engineering
- Electronic Materials Engineering
- Materials Science and Engineering
- Mechanical Engineering
- Optical Science and Engineering

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*:

- Aerospace Science and Engineering
- Biomedical Engineering
- Computational Applied Science
- Chemical Engineering/Materials Science and Engineering
- Mechanical Engineering/Materials Science and Engineering

Minor Programs. The College of Engineering currently offers six minor programs:

- Construction Management and Engineering; in the Department of Civil and Environmental Engineering
- Energy Science and Technology; in the Department of Biological and Agricultural Engineering
- Energy Policy; in the Department of Biological and Agricultural Engineering
- Optical Science and Engineering (in the department of Applied Science)
- 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.

Minor:

- Optical Science

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.

Majors:

- 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.

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.

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.

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 Engineering

Unit Requirements

Each candidate for the degree of Bachelor of Science in Engineering must satisfactorily complete an approved curriculum in engineering. With the exception of General Education Core Literacies and a one course overlap between a major and minor program of study, no unit of coursework you complete may be used to satisfy two different degree requirements. Detailed requirements for the approved curricula are given in the Undergraduate 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 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 Committee on Student Petitions, a body of eight faculty members and nonvoting staff advisers and student representatives. 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.

Electives

In general, there are three kinds of elective courses in the engineering curricula; General Education, Technical and Unrestricted.

General Education Electives. **The following section pertains to students who matriculated to UC Davis prior to Fall 2011. Students who matriculate for the first time in Fall 2011 or later should refer to the Revised General Education Requirement. Students in the College of Engineering may not elect to take a course in satisfaction of any degree requirement on a Pass/No Pass basis.**

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 will need to take a minimum of 24 units of credit in meeting the General Education requirement (or 33 units for majors in Computer Science and Engineering). In addition, to add a degree of depth and coherence to the general education requirement, the College of Engineering requires that students complete two upper division topical breadth courses.

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 electives.

In addition, to ensure that your GE program has a degree of depth and coherence, you must take at least two Arts and Humanities or Social Science topical breadth courses that are upper division courses (courses numbered 100 or above).

2011-2012 Technical Electives List

Technical electives permit you to tailor a program to your own academic and career objectives. For some, the technical electives offer the opportunity to prepare for a specific occupation. For others, they offer an opportunity to broaden a background in the sciences and engineering. You may receive technical elective credit up to a maximum of 6 units for any combination of engineering courses numbered 190C, 192, 198, and 199. (You should note that academic credit for 199 courses is limited to a maximum of five units for each substantially different project). Academic credit for engineering internship courses (192) is limited to a maximum of 5 units per quarter. (Individual departments may allow fewer units.) With the exception of the following courses, upper-division courses in chemistry, engineering, mathematics, physics, and statistics may be taken as technical electives.

The courses which may ***not*** be used are:

- Chemistry 195, 197
- Engineering Computer Science 188
- Engineering 191Engineering 198: Gearing Up for Grad School/Undergraduate Research
- Engineering 160 (restricted to one unit of technical elective)

- Mathematics 197TC,
- Physics 137, 160 (both are restricted to one unit of technical elective), 195, 197T
- Statistics 100, 102, 103, 104, 106, 108

In addition to the upper-division chemistry, engineering, mathematics, physics, and statistics courses not excepted above, the following courses, **when not used to satisfy other degree requirements**, ***may*** be taken as technical electives.

- Agricultural and Resource Economics (ARE) 100A, 100B, 106, 112, 118, 130, 132, 135, 136, 138. 139, 140, 155, 156, 157, 171A, 171B
- Animal Biology (ABI) 102, 103
- Animal Genetics (ANG) 101, 105, 107, 111, 120
- Animal Science (ANS) 103, 104, 105, 106, 115, 118, 119, 120, 120L, 123, 124, 125, 126, 127, 128, 129 131, 136, 137, 140, 142, 143, 144, 145, 146, 147, 149, 149L
- Applied Biological Systems Technology (ABT) 101, 110L, 121, 142, 161, 163, 165, 175, 180, 182, 181N
- Atmospheric Science (ATM) 110, 111, 115, 116, 120, 121A, 121B, 124, 128, 133, 149, 150, 158, 160
- Avian Sciences (AVS) 100, 103, 115, 121, 123, 149, 150, 160, 170
- Biological Sciences (BIS) 1A, 1B, 1C, 2A, 2B, 2C, 101, 101D, 102, 103, 104, 120, 120P, 122, 122P, 132
- Biotechnology (BIT) 160, 161A, 161B
- Chemistry (CHE) 2B, 2BH, 2C, 2CH, 8A, 8B
- Economics (ECN) 100, 101, 102, 103, 122, 140
- Engineering (ENG) 17, 35, 45
- Entomology (ENT) 100, 100L, 101, 102, 103, 104, 109, 110, 116, 117, 119, 123, 135, 153, 156, 156L
- Environmental Horticulture (ENH) 100, 102, 105, 120, 125, 129, 130, 133, 144, 145, 150, 160
- Environmental and Resource Sciences (ERS) 100, 100L, 121, 131, 136, 140, 141, 144, 185, 186, 186L,
- Environmental Science and Policy (ESP) 100, 110, 116, 116G, 121, 123, 124, 125A, 125B, 125C, 126, 150A, 150B, 150C, 151, 151L, 155, 155L, 160, 163, 167, 168A, 168B, 170, 171, 173, 175, 178, 179, 179L
- Environmental Toxicology (ETX) 101, 102A, 102B, 103A, 103B, 111, 120, 127, 128, 131, 135, 138, 146
- Evolution and Ecology (EVE) 100, 101, 102, 103, 104, 105, 108, 112, 112L, 115, 117, 119, 134, 134F, 134L, 138, 140, 141, 147, 149, 175
- Exercise Biology (EXB) 101, 102, 103, 110, 111, 112, 113, 115, 116, 117, 125, 126
- Fiber and Polymer Science (FPS) 100, 150, 161, 161L
- Food Science and Technology (FST) 100A, 100B, 101A, 101B, 102A, 102B, 103, 104, 104L, 107, 108, 109, 110A, 110B, 117, 119, 120, 120L, 123, 123L, 127, 128, 131, 159, 160
- Geology (GEL) 17, 32, 35, 36, 50, 50L, 60, 100, 100L, 101, 101L, 103, 105, 106, 107, 107L, 108, 109, 109L, 110, 116, 116G, 130, 131, 134, 138, 139, 142, 143, 144, 145, 146, 147, 148, 150A, 150B, 150C, 152, 156, 160, 161, 162, 163
- Hydrologic Science (HYD) 110, 115, 124, 134, 141, 142, 143, 144, 146, 151, 182
- Management (MGT) 11A, 11B, 100, 120, 140, 150, 160, 170, 180
- Microbiology (MIC) 102, 102L, 105, 120, 120L, 140, 150, 155L, 160, 162, 170
- Molecular and Cellular Biology MCB) 120L, 121, 123, 126, 140L, 142, 143, 144, 145, 150, 150L, 160L, 161, 162, 163, 164
- Nematology (NEM)100, 110
- Neurobiology, Physiology, and Behavior (NPB) 100 through 169
- Nutrition (NUT) 111AV, 111B, 112, 114, 115, 116A, 116B, 116AL, 116BL, 117, 118, 119A, 119B, 122, 123, 123L, 124, 127, 130
- Physics (PHY) 9D, 9HD, 9HE if not used to satisfy other degree requirements
- Plant Biology (PLB) 102, 105, 108, 111, 111D, 112, 112D, 113, 113D, 116, 117, 118, 119, 123, 126, 140, 141, 142, 143, 144, 145, 146, 147, 148, 150, 152, 153, 154, 157, 158, 160, 161A, 161B, 170, 171, 172, 172L, 173, 174, 176, 178
- Plant Pathology (PLP) 120, 123, 130, 140, 148, 150, 151A, 151B, 155, 185
- Plant Sciences (PLS) any upper division course except 120 and 190 through 199
- Soil Science (SSC) 100, 102, 105, 107, 109, 111, 112, 118, 120
- Wildlife, Fish and Conservation Biology (WFC) 100, 101, 101L, 102, 102L, 110, 110L, 111, 111L, 120, 120L, 121, 122, 130, 136, 141, 151, 152, 153, 154, 155, 156, 157, 158

You are urged to discuss the selection of technical elective courses with your academic adviser.

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.

COLLEGE OF LETTERS AND SCIENCE

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 and, in the case of the A.B. degree, provides students the opportunity to become acquainted with performance in the fine arts.

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, 15V, 151, 152, 153, 154A, 154B, 155, 156A, 156B, 157, 158
- Astronomy
- Avian Sciences 13
- Biological Sciences
- Cell Biology and Human Anatomy 101, 101L
- Chemistry
- Engineering 6, 10, 35, 102
- 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
- Entomology 10, 100, 153
- Environmental and Resource Sciences 131
- Environmental Science and Policy 30, 100, 121
- Environmental Toxicology 101
- Evolution and Ecology
- Exercise Biology 101, 103, 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, 128, 129, 130, 131, 135, 146, 180B
- Statistics
- Wildlife, Fish, and Conservation Biology 10

Undergraduate Readmission

Changes to Undergraduate Readmission deadline dates

Quarter	Deadline Date
Fall 2010	Jul 30, 2010
Winter 2011	Oct 29, 2010
Spring 2011	Jan 31, 2011
Fall 2011	Jul 29, 2011
Winter 2012	Oct 31, 2011
Spring 2012	Jan 31, 2012

Fall: The last business day of July
Winter: The last business day of October
Spring: The last business day of January

Academic Senate Distinguished Teaching Awards; 2010-2011

Jay Rosenheim *(Entomology) Academic Senate Distinguished Teaching Award*
Dean Tantillo *(Chemistry) Academic Senate Distinguished Teaching Award*
Charles Walker *(History) Academic Senate Distinguished Teaching Award*
Gergely Zimanyi *(Physics) Academic Senate Distinguished Teaching Award*
Carol Erickson *(Molecular & Cellular Biology) Academic Senate Distinguished Teaching Award*
John Scott *(Political Science) Academic Senate Distinguished Teaching Award*

Agricultural and Environmental Education

Changes to the Agricultural and Environmental Education major requirements

B.S. Major Requirements (AEE):

Units

Government/U.S. Constitution.....4
History 17A or Political Science 1..... 4

Preparatory Subject Matter..... 50

A minimum of eight (8) units is required in each area of Animal Science, Agricultural Business and Economics, Applied Biological Systems Technology, Environmental Horticulture, Environmental Science and Natural Resources; and Plant and Soil Science.

Animal Science 1, 2, 21, 41..... 8
Applied Biological Systems Technology 16, 52, 49, 101 9
Agricultural & Resource Economics 15 and either Economics 1A or 1B..... 8
Environmental Horticulture 1, 6, Plant Sciences 5 9
Environmental Science and Policy 10; Environmental Toxicology 10, Hydrologic Science 10, 47..... 8
Plant Sciences 1, 2, 15, 49; Viticulture and Enology 2, 3 8

Science/Math Preparatory 42-44
Biological Sciences 2A & 2B.....9
Chemistry 2A & 2B.....10
Geology 1, 20, Soil Science 10.....9
Mathematics 16A &16B, or 17A&B, or 21A&B.....6-8
Physics 7A & 7B.....8

Depth Subject Matter 21
Agricultural Education 100 3
International Agricultural Development 103 4
Education 110, 115, 142 10
Environmental Science and Policy 110.....4

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, 176
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, 154
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 Major.....149-151

American Studies

Changes to the American Studies major requirements

A.B. Major Requirements:

UNITS

Preparatory Subject Matter.....24
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 and ethnic diversity.....4

One course from Anthropology 2, Sociology 2, Women's Studies 50, or an equivalent course in social science approaches to culture....4
One course from History 17A, 17B, 72A, 72B....4
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 Matter....40

American Studies 100 and 160....8
American Studies Electives: Three additional upper-division American Studies courses....12
Emphasis....20
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 in the emphasis. The student may choose the senior thesis option (190A-190B) for 8 units of the emphasis and take the remaining 12 units outside the program.

Total Units for the Major....64

Recommended

Completion of the college requirement in English composition before enrollment in American Studies 190A.

Biological Sciences

Changes to the Biological Sciences major requirements

A.B. Major Requirements:

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 fulfill this recommendation only for transfer students admitted prior to fall 2013.

Depth Subject Matter....38-42

Biological Sciences 101....4
Biological Sciences 102 or 105....3
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....4
Philosophy of Biological Science: One from Nature and Culture 100, 120, 140; Philosophy 108; Science and Technology Studies 130A, 130B, 131; Veterinary Medicine 170....4
Physiology: One from Environmental Horticulture 102; Entomology 101, 102; Neurobiology, Physiology, and Behavior 101; Plant Biology 111, 112....3-5
One course each in animal, microbial and plant diversity....8-17
Animal Diversity: Entomology 100, 107, 109; Evolution and Ecology 105, 112 and 112L, 134; Nematology 110; Wildlife, Fish, and Conservation Biology 110, 111, 120.
Microbial Diversity: Microbiology 101, 162; Pathology, Microbiology, and Immunology 127, 128; Plant Biology 118, 148; Plant Pathology 148; Soil Science 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.

Total units for the major....77-94

B.S. Major Requirements:

UNITS

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-2B (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....49

Biological Sciences 101, 105 (or 102+103)*, 104....10-13
*Students in the following Areas of Emphasis must complete Biological Sciences 102+103: Microbiology (Microbial Physiology and Molecular Genetics, and Microbial Diversity and Ecology options only), and Molecular and Cellular Biology. All other students (including the Biotechnology and Applied Microbiology option, and Medical Microbiology option in the Microbiology Area of Emphasis) may choose between completing Biological Sciences 105 or 102+103.
Statistics 100....4
Field Requirement, Area of Emphasis Requirement, and additional units (if necessary) to achieve a total of 49 units or more....32-35
Note: Although a course may be listed in more than one category, that course may satisfy only one requirement.

Field Requirement: Breadth in biology is achieved by completing one course from each field *(a)* through *(e)* below. You must take one course in each field regardless of your area of emphasis. If you plan an area of emphasis in Evolution, Ecology and Biodiversity; Marine Biology; or Microbiology, please refer to that area of emphasis before choosing 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; Plant Biology 143....3-5
(b) Ecology: Anthropology 154BN; Biological Sciences 122; Entomology 104, 156; Environmental Science and Policy 100, 121; Evolution and Ecology 101; Microbiology 120; Wildlife, Fish, and Conservation Biology 151....3-5
(c) Microbiology: Food Science and Technology 104; Microbiology 101, 102, 140, 150, 162; Pathology, Microbiology, and Immunology 127, 128; Soil Science 111....3-5
(d) Neurobiology, Physiology, and Behavior: Anthropology 154A; Entomology 102, 104; Neurobiology, Physiology, and Behavior 100, 101, 102, 141....3-5
(e) Plant Biology: Environmental Horticulture 102, 105; Evolution and Ecology 108, 117, 119, 140; Plant Biology 102, 105, 108, 111, 112, 113, 116, 117, 118, 119, 143, 147, 148; Plant Pathology 120, 130, 148; Plant Sciences 144, 176....3-5

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 one requirement.

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 groups12

(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*, 118*, 147*, 148*; Wildlife, Fish, and Conservation Biology 110, 110L*, 111, 111L*, 120, 120L*.
(b) Advanced Evolution and Ecology: Evolution and Ecology 102, 103, 107, 115, 117*, 119*, 138, 141, 147, 149, 150, 180A*, 180B*.

(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. Acceptable courses for this requirement are identified above by an asterisk (*)

Marine Biology emphasis....12-19

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/Geology116N, 150A, 150B, 150C; Evolution and Ecology 115; Wildlife, Fish, and Conservation Biology 1573-4

(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 120L, 1213-5

(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 Laboratory6-10

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 150C 3-4
Biological Sciences 124..... 3
Option 3 (summer session 1): 10
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..... 3
(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.

Microbiology emphasis..... 12-20

Complete one of four options listed below or complete an individual option with approval from your faculty adviser.

(1) Microbial Physiology and Molecular Genetics option..... 15-18
Students must complete Biological Sciences 102+103 for this option.
Students must complete Microbiology 102 to satisfy Field requirement *(c)*
Microbiology 102L, 140, 150..... 9
Select one course from Microbiology 170; Molecular and Cellular Biology 121, 161..... 3
Select one course from Microbiology 105 and 105L, 155L, 170; Pathology, Microbiology, and Immunology 127... 3-6
(2) Microbial Diversity and Ecology option..... 15-17
Students must complete Biological Sciences 102+103 for this option.
Students must complete Microbiology 102 to satisfy Field requirement *(c)*
Microbiology 102L, 105 and 105L, 120..... 12
Select one course from Food Science and Technology 104; Microbiology 140, 150, 162, 170; Pathology, Microbiology, and Immunology 127, 128; Plant Biology 148; Plant Pathology 148; Soil Science 111..... 3-5
(3) Biotechnology and Applied Microbiology option..... 16-19
Students choose to complete Biological Sciences 105 or 102+103 for this option.
Students must complete Microbiology 102 to satisfy Field requirement *(c)*
Microbiology 102L..... 3
Select two courses from Microbiology 140, 150, 170..... 6
Select one course from Food Science and Technology 102A, 104..... 3-4
Select one course from Microbiology 155L; Molecular and Cellular Biology 120L, 160L..... 4-6
(4) Medical Microbiology option..... 12-20
Students choose to complete Biological Sciences 105 or 102+103 for this option.
Students may choose to complete the Field *(c)* requirement and the laboratory requirement for this option with Microbiology 101, or Microbiology 102 and 102L. Students are encouraged to complete Microbiology 101 to satisfy Field *(c)* and this option's laboratory requirement simultaneously.
Students completing Microbiology 102 for Field (c) must also complete Microbiology 102L to satisfy the laboratory requirement for this option 3
Pathology, Microbiology, and Immunology 126 3
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 3

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 or 161 3
(2) Laboratory Experience: One or more laboratory courses from 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
(3) Restricted Electives 6-8
Select two or more courses from Molecular and Cellular Biology 123, 124, 126, 143, 144, 145, 150, 162, 163, 164, 182; Neurobiology, Physiology, and Behavior 103; Pathology, Microbiology, and 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 160L 15
(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.
(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, 111L, 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; 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 4-5
(2) Physiology, development and molecular biology: Plant Biology 111, 112, 113; Plant Pathology 130..... 3
(3) Evolution and ecology: Evolution and Ecology 100, 117; Plant Biology 117, 143 3-4
(4) Laboratory requirement: Biotechnology 161A, 161B; Evolution and Ecology 108; Plant Biology 105, 108, 116, 118, 148; Plant Pathology 148..... 4-5

Total Units for the Major 104-114

Biotechnology

Changes to the Biotechnology major requirements

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 human endeavor.

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 grade:

	UNITS
Plant Sciences 120 or Statistics 100	4
Biotechnology 1	4
Biological Sciences 2A, 2B, 2C	14
Chemistry 2A, 2B, 2C	15
Organic Chemistry, one of the following groups	6-12
Chemistry 8A, 8B; or Chemistry 118A, 118B, 118C; or Chemistry 128A, 128B, 128C, 129A	
Math, one of the following groups	6-8
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 Biotechnology, 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 biochemical, 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:

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 6-8
- Physics 7A-7B 8
- Plant Sciences 120 or Statistics 100 4
- Biotechnology 1 4
- Select one course from: 0-4
  - University Writing Program 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 104A, 104B, 104C, 104D, 104E, 104F (may overlap with college composition requirement)

Depth Subject Matter 16-20

- Biological Sciences 101 4
- Biological Sciences 104 3
- Molecular and Cellular Biology 121 or 161 3
- Biotechnology 171 3
- Internship or independent research; course 192 or 199 or Biotechnology 189L 3
- Undergraduate research proposal: Biotechnology 188 (optional) 3
- 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
- Restricted Electives 12
- 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 Option 38-45

- 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 Biology 102 and 103 28-35
- Restricted Electives 10
- 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 Option 39-46

- 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 103 29-36
- 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 200L, 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 140

Bioinformatics Option 37-44

- 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 103 27-34
- Restricted Electives 10
- 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.

Cinema and Technocultural Studies

Changes to the Technocultural Studies program

(College of Letters and Science)

Jaimey Fisher, Ph.D., Program Director

Program Office. Cruess Hall; (530) 752-0105

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 4
- 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 4
- 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 8
- Note: One of these two courses may be from Design 15, 16 or Dramatic Art 10, 21A, 21B, 24.

Depth Subject Matter 36-40

- One course from English 161A, 161 B or Film Studies 124 4
- One course from English 162; Film Studies 127; Philosophy 127; Women and Gender Studies 162 4
- 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 72

Major Adviser. See Program office

Minor Program Requirements:

UNITS

Film Studies 24
Film Studies 1 4
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 162
(*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

Restrictions. No more than two courses from a single department or program may be offered in satisfaction of the minor requirements.

Note: With a minor advisor's prior approval, up to four units of internship (e.g., American Studies 192, Communication 192, or Women's Studies 192) in television/video/film production may be offered toward satisfying the requirements of the minor. Such courses will be considered part of the "Film/Video Production" category.

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 TCS, 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 TCS graduates' track records and talents.

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 28
Technocultural Studies 1, 2, 4, 5, 6, 7A-E 24
American Studies 1A or 5 4
Depth Subject Matter 44
Technocultural Studies 190, 191 8
Production emphasis 32
Choose five from production based Technocultural Studies 100, 101, 103, 104, 110, 111, 112, 113, 121, 122, 123, 192, plus two from Technocultural Studies 120, 150, 151, 152, 153, 154, 155, 158, 159, plus a four-unit class from another department or program relevant to the student's area of concentration, as approved by Technocultural Studies.
Studies emphasis 32
Choose two from production based Technocultural Studies 100, 101, 103, 104, 110, 111, 112, 113, 121, 122, 123, 192, plus five from Technocultural Studies 120, 150, 151, 152, 153, 154, 155, 158, 159, plus a four-unit class from another department or program relevant to student's area of concentration, as approved by Technocultural Studies.
Technocultural Studies 198 4

Total Units for the Major 72

Major Adviser. See Program office

Design

Changes to the Design major requirements.

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 4
Design 1 4
Three courses from the following: Art 2 or Design 14; Design 15, 16 12
Design 40A or 40B 4
One course from the following: Art 9; Design 13, 21, 50, 60, 70, 77 4
Depth Subject Matter 44
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 12
Choose either six courses from List A below, or five courses from List A and one course from List B 24
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: ART 113, Chicano Studies 172, Dramatic Art 124A, 124B, 124C, 124E, 170
List B. Capstone Course Option: Design 154, 179, 180B, 187
Note. Substitutions for the listed courses may be allowed under certain circumstances with prior departmental approval.

Total Units for the Major 68

Engineering

Changes to the Engineering section

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 Aeronautical 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
Materials Science and Engineering
Mechanical Engineering
Optical Science and Engineering

Two combined majors are offered leading to the B.S. degree:

Chemical Engineering/Materials Science and Engineering
Mechanical Engineering/Materials Science and Engineering

Minor Programs

The College of Engineering offers six undergraduate minors:

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)

Optical Science and Engineering (Department of Applied Science)

Sustainability in the Built Environment (Department of Civil and Environmental Engineering)

Engineering: Applied Science

Changes to the Engineering: Applied Science major requirements

Optical Science and Engineering

The Optical Science and Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 (410) 347-7700.

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

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
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	4
Engineering 45	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
General Education electives	32
Total Lower Division Units	**102**

Upper Division Required Courses

Applied Science Engineering 108A, 108B, 108L 115, 161A-B, 165, 166, and 167	36
Electrical and Computer Engineering 130A, 130B, and 135	11
Physics 104A	4
Chemistry 110A	4
Applied Science Engineering 137 or Engineering 190	3
Optics electives	16
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	12
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

Minor Requirements:

	UNITS
Applied Science 108A-B, 108L	12
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**

Engineering: Biological and Agricultural

Changes to the Engineering: Biological and Agricultural major requirements

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 the use and preservation of environmental resources 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 involving the integration of engineering with biology.

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	10
Biological Sciences 2A-2B-2C	14
Engineering 6, 35, 17	11
Biological Systems Engineering 1, 75	8
University Writing Program 1	4
Communication 1 or 3	4
General Education electives	29
Minimum Lower Division Units	**113**

Upper Division Requirements:

In the junior and senior years, the Biological Systems Engineering major requires courses that focus on the integration of biology and physical sciences with engineering. Depending on your area of interest, you may select elective courses from seven specializations:

Agricultural Engineering

Aquacultural Engineering

Bioenergy Engineering

Biomechanics/Premedicine/Preveterinary Medicine

Biotechnical Engineering

Ecological Systems Engineering

Food Engineering

Forest Engineering

You may also develop your own specialization in consultation with your adviser. The upper division requirements are listed following the areas of specialization.

Areas of Specialization

Agricultural Engineering. Students specializing in agricultural engineering integrate analysis and design with applied biology to solve problems in producing, transporting and processing agricultural products leading to food, fiber, energy, pharmaceuticals and other human needs. Agricultural engineers design machinery, processes, and systems for productive 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. Agricultural engineers are employed as practicing professionals and managers with agricultural producers, equipment manufacturers, food processors, consulting engineering firms, start-up companies and government agencies.

Recommended biological science electives:

Plant Emphasis

Plant Biology 111
Soil Science 100
Select one course from Agricultural Management and Rangeland Resources 110A, Entomology 100, Plant Sciences 114, Environmental Horticulture 102

Animal Emphasis

Neurobiology, Physiology, and Behavior 101
Soil Science 100
Select one course from Avian Sciences 100, Animal Science 143, 144, 146

Recommended engineering electives:

Biological Systems Engineering 114, 145
Civil and Environmental Engineering 141, 141L
Engineering 180

Suggested Advisers: M. Delwiche, J. Fan, K. Giles, M. Grismer, D. Hills, B. Jenkins, D. Slaughter, S. Upadhyaya, W. Wallender, R. Zhang

Aquacultural Engineering. Aquacultural engineers design, build, and manage equipment and systems for the production of aquatic plants and animals. Aquacultural engineers must have a solid understanding of biology and processes related to water quality to work with the wide variety of systems used for aquaculture production. Systems range from sophisticated indoor operations with water

treatment and recirculation to low-input earthen ponds. Employment opportunities for aquacultural engineers include engineering consulting companies and government agencies. The aquaculture industry is expanding rapidly in various areas around the world, creating international employment opportunities for aquacultural engineers.

Recommended biological science electives:

Animal Science 118, 131, 136
Wildlife, Fish, and Conservation Biology 120, 121

Recommended engineering electives:

Civil and Environmental Engineering 140, 140L, 141, 141L, 148A, 148B
Suggested adviser: R. Piedrahita

Suggested adviser: R. Piedrahita

Bioenergy. Specialization in bioenergy is for students interested in the production of energy from renewable biological resources. The area of bioenergy requires discovery, development and dissemination of new mechanisms and processes for the sustainable production and use of biological materials from plants and microbes. To obtain training in the area, the core engineering and biology courses in the Biological Systems Engineering major are coupled with electives in environmental chemistry, thermal and power systems, life-cycle analysis, plant molecular biology, and plant production. Biological engineers specializing in bioenergy will be needed in the future to work within industrial, government, and academic settings to expand the current sources of energy available in the U.S. and around the world.

Recommended biological science electives:

Biological Sciences 101, 103
Microbiology 102
Plant Biology 113
Plant Sciences 101, 142

Recommended engineering electives:

Biological Systems Engineering 162
Civil and Environmental Engineering 143, 148A, 149, 150, 153
Mechanical Engineering 161, 162, 163

Suggested advisers: J. Fan, B. Hartsough, B. Jenkins, T. Jeoh, J. VanderGheynst, R. Zhang

Biomechanics/Pre-Medicine/Pre-Veterinary Medicine. This specialization is for students interested in the biomechanics of humans and animals, with emphasis on the physical, chemical, and biological factors affecting motion and function. Combined training in mechanics, material properties, and ergonomics allows graduates to work in industry on the design, evaluation, and application of medical devices and systems as well as worker health and safety. Some students use the specialization as preparation for medical or veterinary school with the assurance of a marketable degree in engineering in case their post-graduation plans change. The Biomechanics specialization is also excellent preparation for graduate work in biomedical engineering. Students interested in medical or veterinary school should consult with admissions advisers from the appropriate school to plan for successful admission, including necessary summer experience.

Recommended Biological Science Electives:

Biological Sciences 102
Neurobiology, Physiology and Behavior 101
Exercise Biology 103
Cell Biology and Human Anatomy 101
Recommended Engineering Electives:
Biological Systems Engineering 128, 175
Biomedical Engineering 109, 116, 118, 126

Additional courses for medical or veterinary school application:

Chemistry 2C, 118C (medical)
Biological Sciences 101
Microbiology 102, 102L
Molecular and Cell Biology 150, 150L

Suggested Advisers: M. Delwiche, F. Fathallah, J. VanderGheynst

Biotechnical Engineering. This specialization is for students interested in the biotechnology industries. Core engineering courses are combined with training in genetics, biochemistry, microbiology, and molecular biology. Modern laboratory techniques in biochemistry are also included in the specialization to provide hands-on skills. Biotechnology is an area of industrial growth in the U.S. and will increasingly need engineers to transfer laboratory developments to large scale production. Present industrial activities include the production of genetically altered plants, plant materials and food products, production and packaging of biocontrol agents for plant pests and diseases; microbial production of biological products; tissue culture; and bioremediation.

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 175
Chemical Engineering 161B, 161C, 161L
Engineering 180

Suggested Advisers: M. Delwiche, J. Fan, K. Giles, M. Grismer, T. Jeoh, N. Nitin, J. VanderGheynst, R. Zhang

Ecological Systems Engineering. Specialists in ecological systems engineering are concerned with the design, development, and management of ecosystems. Typical applications include the rehabilitation of disturbed ecosystems, the design of mitigation areas, the incorporation of ecologically sustainable features into land developments, and the design and management of public and private landscapes. An understanding of ecology and the interaction of ecological communities, coupled with knowledge of engineering design and economics, are stressed in this specialization. Employment opportunities include environmental consulting firms, government regulatory agencies, and agencies involved in wild land resource management.

Recommended biological science electives:

Entomology 100
Environmental Science and Policy 100
Microbiology 120
Soil Science 100, 111
Select one course from Atmospheric Science 133, Plant Biology 121, Environmental Toxicology 101 or 112A

Recommended engineering electives:

Biological Systems Engineering 115, 135, 145
Civil and Environmental Engineering 148A or 149
Recommended courses:
Applied Biological Systems Technology 180
Environmental and Resource Science 100
Landscape Architecture 1 (no technical elective credit will be granted for this course in any engineering major)

Suggested Advisers: K. Giles, M. Grismer, B. Jenkins, R. Piedrahita, J. VanderGheynst, R. Zhan

Food Engineering. The food industry is the largest industrial sector of the U. S. economy. Food engineers conceive, design, and operate food processes, equipment, and plants for efficient food production with minimal impact on the environment. Students specializing in food engineering 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 understanding 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.

Recommended biological sciences electives:

Biological Sciences 101, 102, 103; Environmental Science and Policy 110; Environmental Toxicology 101, 131; Food Science and Technology 104L, 119, 120, 128; Plant Sciences 152, 172

Recommended engineering electives:

Biological Systems Engineering 160, 175; Chemical Engineering 157, 159; Mechanical Engineering 171, 172

Suggested Advisers: J. Krochta, K. McCarthy, M. McCarthy, N. Nitin, R. P. Singh, D. Slaughter

Forest Engineering. Forest engineers apply engineering principles to solve problems in managing forest lands. Forestry has evolved from an emphasis on wood production toward multiple use, ecosystem management and consideration of non-economic objectives such as retaining biodiversity. Forest engineers help to develop the equipment and techniques for reforestation, harvesting, forest residue management, and development of roads and recreation facilities.

Following the sophomore year, students are encouraged to attend an eight-week field course, followed by a semester at UC Berkeley taking forestry courses, and forest ecology, planning, and operations. Students complete their engineering programs at UC Davis, taking courses in planning methods, equipment development, and road design. Forest engineers are employed by the US Forest Service and other public agencies, the forest industry, consulting firms, and equipment manufacturers.

Recommended biological science electives:

Environmental Science Policy and Management 120* (Soil Characteristics, 4.5 units) or Soil Science 100
Environmental Science Policy and Management 182* (Forest Operations Management, 6 units)
Environmental Science Policy and Management 185* (Multi-Resource Silviculture, 6 units)

Recommended engineering electives:

Biological Systems Engineering 114, 115
Civil and Environmental Engineering 141, 141L, 171, 171L, 179

Recommended Courses:

Applied Biological Systems Technology 180
Environmental Science Policy and Management 101A-E* (Forestry Summer Program, 15 units)
Environmental and Resource Sciences 185
Plant Sciences 144

*Environmental Science Policy and Management courses are offered at UC Berkeley campus.

Suggested Adviser: B. Hartsough

Upper Division Required Courses

	UNITS
Chemistry 8A or 118A	2 or 4
Chemistry 8B or 118B	4
Engineering 100, 102, 104 105, 106	18
Biological Systems Engineering 103, 125, 127, 130, 165, 170A, 170B, 170BL, 170C, 170CL	29
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	4
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 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).....4
Upper Division Composition Requirement* one course from the following: University Writing Program 101, 102A, 102B, 102E, 102F, 102G, 104A, 104E, 104F 4
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: R. Piedrahita

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 management.

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 152B	4
Applied Science 188	4
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 vanDam (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 Minor	**18**

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) 752-1451

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.

Engineering: Biomedical

Changes to the Engineering: Biomedical major requirements

The Biomedical Engineering Undergraduate Major

Modern Biomedical Engineering is a diverse and interdisciplinary area of study that integrates knowledge drawn from engineering and the biomedical sciences. Biomedical Engineers work in systems ranging from medical imaging to the design of artificial organs. Some major recent 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 provide a cutting-edge, interdisciplinary, biomedical engineering education to students. To accomplish this, the Biomedical Engineering curriculum has been designed to provide a solid foundation in both engineering and the life sciences, and provide sufficient flexibility in the upper division requirements to encourage students to explore specializations within Biomedical Engineering.

The program produces highly qualified, interdisciplinary engineers who are well-prepared to pursue graduate or professional degrees and/or careers in industry, hospitals, academic research institutes, teaching, national laboratories, or government regulatory agencies. The Bureau of Labor Statistics projects that employment growth for Biomedical Engineering will be much faster than the average for all occupations through 2014. As a recently established program, the Biomedical Engineering program is not currently accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology. The program will pursue accreditation with ABET in the next accreditation cycle.

Objectives

Our teaching is designed to impart a strong foundation in mathematics, life and physical sciences, and engineering, as well as knowledge of contemporary issues at the forefront of biomedical engineering research. Students completing the program will: 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 challenges 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 global and societal context and a commitment to professionalism and ethical responsibility; be instilled with sense of need for life-long learning; use the techniques, skill, and modern engineering tools necessary for engineering practice and for successful pursuit of post-baccalaureate studies.

For information about the graduate degree options, see the Biomedical Engineering (A Graduate Group), on page 178.

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
Minimum Lower Division Units	**84**

Upper Division Required Courses

Engineering 100 or Electrical and Computer Engineering 100	3
Engineering 105, 190	7
Biomedical Engineering 116 or Neurobiology Physiology Behavior 101	5
Biomedical Engineering 105, 106, 107, 108, 109, 110A-110B, 111	34
Science electives	8
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, 161S, 161L and Physics 9D, excluding courses for social science GE topical breadth.	
Engineering electives	20
Any graded upper division Biomedical Engineering course (except Biomedical Engineering 102, 161A, 161S, 161L). No more than 4 units allowed from lower division coursework. Engineering 4, 35, 45, 102, 103, 104, 104L, 106; Electrical and Computer Engineering 110AB, 118, 130AB, 140AB, 150AB, 151, 157AB, 160; Engineering Computer Science 124; Applied Science Engineering 108AB, 108L, 161AB, 165, 166, 167, 169, 170, 172; Biological Systems Engineering 128, 130, 165, 175; Chemical Engineering 141, 144, 155AB, 160, 161AB, 161L, 170; Materials Science and Engineering 147, 160, 162, 162L, 164, 172, 172L, 174, 174L, 180, 181, 182; Mechanical Engineering 50, 150AB, 151, 152, 154, 165, 171, 172.	
Minimum Upper Division Units	**77**
General Education electives	**32**
Minimum Units Required for Major	**193**

Additional upper division elective policies:

- 2 units from Chemistry 118AB may be applied toward Science elective if 118AB are also used to satisfy lower division subject credit.
- 2 units from Electrical and Computer Engineering 100 may be applied toward Engineering electives if Electrical and Computer Engineering 100 is taken to satisfy upper division subject credit.
- 4 units of Biomedical Engineering 199 may be counted toward 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

Since Biomedical Engineering is defined so broadly, a degree in Biomedical Engineering can mean many different things. Specializing in a subfield of engineering can help to provide more in-depth expertise in a focus area. You have the option to specialize in a subfield of Biomedical Engineering through judicious selection of your upper division electives in consultation with a staff or faculty advisor. One of the strengths of the UC Davis program is this flexibility to design your own emphasis. Biomedical Engineering includes a number of diverse areas of study:

Medical Devices

Development of devices used in diagnosis and treatment of disease or in biomedical research. This area applies electronics principles and techniques and can involve computer hardware design.

Biomaterials and Tissue Engineering

The study of living materials or the development of implantable synthetic materials. In this field Biomedical Engineers design materials that are biocompatible or bioactive for use in the human body. This area draws heavily from knowledge in the chemical and biological sciences.

Biomechanics

A broad subfield that includes orthopedic/rehabilitation engineering (design of wheelchairs, prosthetics etc) and the study of mechanical forces produced by biological systems. For example, 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.

Medical Imaging

The visualization of living tissues for diagnosis of disease. An imaging scientist can work in areas ranging 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.

Systems Engineering

Study of basic biological and physiological processes using engineering principles. Techniques and principles from engineering are applied to understand biological systems at a fundamental level. For example, stresses and strains are studied in cells to better understand how they propel themselves through tissues; modeling of biochemical processes allows engineers to mathematically describe chemical reactions occurring in cells in order to predict abnormalities that may lead to development of disease.

Premedical Students

If you intend to apply to medical school you will need to fulfill additional coursework to meet admissions requirements for the various medical school programs. These courses will be in addition to the listed curricular requirements.

Engineering: Chemical Engineering and Materials Science

Changes to the Engineering: Chemical Engineering and Materials Science major requirements

Chemical Engineering Undergraduate Program

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.

The Chemical 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, 2C or Chemistry 2AH, 2BH, 2CH	15
Chemical Engineering and Materials Science 5, 6	6
Chemical Engineering 51	4
Chemical Engineering 80	1
Engineering 45	4
English 3 or University Writing Program 1, or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5	4
General Education electives	27
Minimum Lower Division Units	**98**

Chemical Engineering Upper Division Required Courses

Chemical Engineering 140, 141, 142, 143, 146, 152A, 152B, 155A, 155B, 157, 158A, 158B, 158C	52
Chemistry 110A, 110B, 128A, 128B, 129A	16
Biological Sciences 102	3
Chemical Engineering and Materials Science Electives	6
Choose from the following: Chemistry 110C, 128C, 129B, 129C, 130A, 130B; Chemical Engineering 144, 160, 161A, 161B, 161L, 166, 170; Materials Science	

and Engineering 147, 160, 164, 181; Fiber and Polymer Science 150.
Technical Elective 10
Minimum Upper Division Units 87

Minimum Units Required for Major 185

Options for Junior and Senior Years

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.

Areas of Specialization

The most popular areas of specialization, together with lists of suggested technical electives, are identified and discussed in the following listing. Talk to the instructors of the courses listed regarding possible prerequisites before enrolling.

Suggested Technical Electives

Advanced Materials Processing:
Electrical and Computer Engineering 140A, 140B, 145A, 145B, 146A; Physics 140A, 140B; Materials Science and Engineering 172, 180, 181

Applied Chemistry:
Chemistry 110C, 115, 128C, 129B, 129C, 131, 150; Fiber and Polymer Science 100, 110, 150

Applied Mathematics:
Mathematics 118A, 118B, 118C, 119A, 119B, 121, 128A, 128B, 128C, 131, 135A, 135B, 185A, 185B

Computers and Automation:

Artificial Intelligence and Computer Graphics:
Computer Science and Engineering 170, 175

Numerical Analysis and Optimization:
Applied Science 115, 116, Civil and Environmental Engineering 153; Mathematics 128B, 128C, 168

Automatic Control:
Biological Systems Engineering 165; Electrical and Computer Engineering 150B, 157B; Biological and Agricultural Engineering 165; Mechanical Engineering 172

Environmental Engineering–Air Environment:
Civil and Environmental Engineering 149, 150; Atmospheric Science 121A, 121B, 158; Environmental Science & Policy 110; Environmental Toxicology 101, 102A, 102B, 131

Environmental Engineering–Water Environment:
Chemical Engineering 161A, 161B, 161L; Civil and Environmental Engineering 140, 140L, 148A, 148B; Microbiology 102; Biological Sciences 102, 103; Environmental Science & Policy 110, 150A, 151; Environmental Toxicology 101, 102A, 102B; Soil Science 100, 102, 107; Hydrologic Science 124

Food Process Engineering:
Biological Systems Engineering 132; Food Science and Technology 100A, 100B, 104, 104L

Management and Marketing:
Engineering 190; Agricultural Economics 113, 130, 136

Polymer Science:
Chemistry 108, 128C, 129B, 129C; Fiber and Polymer Science 150; Chemical Engineering 144; Materials Science and Engineering 147

Pre-Biomedical Engineering:
Four to six courses from: Anatomy, Physiology and Cell Biology 100; Biological Sciences 2A, 2B, 2C, 101, 102, 103, 104; Molecular and Cellular Biology 140L, 142, 161; Neurobiology, Physiology, and Behavior 101, 112, 113, 114

Pre-Medical:
Chemistry 128C, 129B, 129C; and six biology or biochemistry courses, such as Biological Sciences 2B, 2C, 101, 103, 104; Microbiology 102; Molecular and Cellular Biology 140L, 142, 150, 161: Neurobiology, Physiology, and Behavior 101, 112, 113, 114

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 transcript.

Chemical Engineering/Materials Science and Engineering Undergraduate Program

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 zirconium. Materials science and engineering is directed toward an understanding of the structure, properties, and behavior 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.

The Chemical Engineering/Materials Science program is not 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, 2C or Chemistry 2AH, 2BH, 2CH	15
Chemical Engineering and Materials Science 5, 6	6
Chemical Engineering 51	4
Chemical Engineering 80	1
Engineering 45	4
English 3 or University Writing Program 1, Comparative Literature 1, 2, 3, or 4 or Native American Studies 5	4
General Education electives	27
Total Lower Division Units	**98**

Upper Division Required Courses

Chemical Engineering 140, 141, 142, 143, 146, 152A, 152B, 155A, 155B, 157, 158A, 158B, 158C	52
Chemistry 110A, 110B, 128A, 128B, 129A	168
Biological Sciences 102	3
Materials Science and Engineering 160, 162, 162L, 164, and 172 or 174	18
Choose from Materials Science and Engineering 147, 172, 172L 174, 174L 180, 181, 182, 188A-B	4
Minimum Upper Division Units	**93**

Minimum Units Required for Major 191

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

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 manufacturing.

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.

The Biochemical 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, 2C or Chemistry 2AH, 2BH, 2CH	15
Biological Sciences 2A	4
Chemical Engineering and Materials Science 5, 6	6
Chemical Engineering 51	4
Chemical Engineering 80	1
English 3 or University Writing Program 1, or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5	4
General Education electives	23
Minimum Lower Division Units	**94**

Upper Division Required Courses

Chemical Engineering 140, 141, 142, 143, 146, 152A, 152B, 155A, 157, 158A, 158C, 161A, 161B, 161C, 161L	60
Biological Sciences 102	3
Microbiology 102	4
Chemistry 110A, 128A, 128B, 129A	12
Biochemical Engineering electives	10

Choose two laboratory courses from the laboratory electives list, and choose additional courses from the lecture elective list to provide a total of at least 10 units:

Laboratory elective list:
Biomedical Engineering 161L; Biotechnology 161A, 161B; Food Science and Technology 123L; Microbiology 102L, 155L; Molecular and Cellular Biology 120L (this course 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, 103, 104; 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 89

Minimum Units Required for Major 183

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

Materials science and engineering is directed toward an understanding of the structure, properties, and behavior 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 solid-state electronic 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 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 several combined majors with Materials Science and Engineering: Chemical Engineering/Materials Science and Engineering; Electronic Materials Engineering; and Mechanical Engineering/Materials Science and Engineering.

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.

The Materials Science and Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 (410) 347-7700.

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	19
Chemistry 2A, 2B, 2C or Chemistry 2AH, 2BH, 2CH	15
Engineering 17, 35, 45	11
Chemical Engineering and Materials Science 6	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
General Education electives	25
Minimum Lower Division Units	**104**

Upper Division Required Courses

Engineering 102, 103, 104, 190	15
Electrical Engineering 140A	4
Materials Science and Engineering 147, 160, 162, 162L, 164, 172, 172L, 174, 174L, 180, 181, 182, 188A, 188B	49
Select one course from Aeronautical Science and Engineering 137, 138, Biomedical Engineering 109, Civil and Environmental Engineering 132, 135, 143 or Mechanical Engineering 150A, 150B	4
Select one course from Engineering 180, Mathematics 135A, Statistics 120, 131A, Civil and Environmental Engineering 114, Chemical Engineering 140, Applied Science Engineering 115 OR Physics 104A	4
Select one course from Chemistry 110A, 124A,128A, or Physics 108, 108L, 110A, 122A, 151, 160	3
Minimum Upper Division Units	**79**

Minimum Units Required for Major 183

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 transcript.

Electronic Materials Engineering Undergraduate Program

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, magnetics, and superconductors 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 engineering science, 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.

The Electronic Materials 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-9D	19
Chemistry 2A-2B or 2AH, 2BH	10
Computer Science Engineering 30	4
Engineering 17, 35, 45	11
Chemical Engineering and Materials Science 6	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
General Education electives	25
Minimum Lower Division Units	**103**

Upper Division Required Courses

Electrical and Computer Engineering 100, 110A, 110B, 130A, 130B, 140A, 140B, 146A	32
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 114	4
Engineering 190	3
Electronic Materials elective	3
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 Units	**78**
Minimum Units Required for Major	**181**

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 transcript.

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
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.

Engineering: Civil and Environmental

Changes to the Engineering: Civil and Environmental major requirements

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. Fundamentals: To educate students in the fundamental principles needed for civil and environmental engineering: mathematics, basic sciences, and engineering sciences. Application: To educate students in the application of fundamental principles for solving civil and environmental engineering problems; provide proficiency in at least four of the environmental, geotechnical, structural, transportation, and water resource areas; and expose students to current research. Professionalism: To imbue students with attributes that lead to professional growth throughout their careers: a sense of community and ethical responsibility; an awareness of business practices; a recognition of the need for life-long learning, continuing education, and participation in professional societies; a preparedness for graduate education; an appreciation for diversity in the engineering profession; the ability to think independently and perform effectively in multidisciplinary teams; and the ability to communicate effectively. Service to State and Profession: To provide an educational program that serves the needs of the state and profession; recruit and retain a diverse student population that is representative of the state; engage in outreach activities; provide an efficient program that minimizes the time-to-degree and maximizes enrollment opportunities; and prepare students for entry into post-graduate education or practice.

Study Abroad and Civil Engineering. The department recently began offering courses in France, Ireland and Italy through the Summer Abroad program. Core and elective courses taken through Summer Abroad can be applied for credit toward the Civil Engineering major. 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 information. 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

	UNITS
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-22B	6
Physics 9A-9B-9C and choice of Physics 9D, Chemistry 2C, Biological Science 2A or Geology 50-50L*	19
Chemistry 2A-2B or 2AH-2BH	10
Civil and Environmental Engineering 3 (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. Non-engineering units from the approved Technical Elective list** may be substituted if within the four unit maximum.)	4
One course from Civil and Environmental Engineering 19, Engineering 6, or Computer Science Engineering 30	4
Engineering 17, 35, 45	11
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 3	4
Minimum Lower Division Units	**82**
*Units in excess of the requirement from Chemistry, Biological Sciences, Physics, or Geology courses may count toward the technical elective requirement. Please consult with the departmental staff adviser. **Departmental technical elective listing available from staff advisor. Maximum of four units from this list may count toward degree requirements.	
General Education electives	**32**

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 and expanding industrialization. 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 technical electives:

Applied Science Engineering 116; Atmospheric Science 121A, 158, 160; Chemical Engineering 143, 146, 161A, 161B, 170; Chemistry 107A, 107B, 128A, 128B; Civil and Environmental Engineering 140, 142, 143, 144, 145, 146, 148A, 148B, 149, 150, 153, 163; Engineering 180; Environmental Science and Policy 150A, 151; Mathematics 128A, 128B, 128C; Mechanical Engineering 161, 163, Microbiology 102, 105, 120, 140, 150; Soil Science 111, 112; Statistics 130A, 130B

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 technical electives:

Civil and Environmental Engineering 131, 132, 135, 137, 138, 139, 140, 144, 171, 171L, 173, 175, 179; Engineering 180; Geology 17, 50, 50L, 134, 161; Hydrologic Science 146; Mathematics 128A, 128B, 128C

Suggested Advisers: R. W. Boulanger, Y. F. Dafalias, J.T. DeJong, J. T. Harvey, B. Jeremic, B. L. Kutter

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 technical electives:

Civil and Environmental Engineering 130, 131, 132, 135, 136, 137, 138, 139, 171, 171L, 173, 175, 179; Engineering 122, 180; Materials Science and Engineering 174; Mathematics 128A, 128B, 128C

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 technical electives:

Civil and Environmental Engineering 137, 149, 153, 161, 162, 163, 165; Engineering 160; Environmental Science and Policy 167, 168A, 168B, 171, 173, 178, 179

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 activities.

Suggested technical electives:

Agricultural and Resource Economics 176; Atmospheric Science 121A; Biological and Agricultural Engineering 145; Civil and Environmental Engineering 141, 141L, 142, 144, 145, 148B, 153, 155; Environmental Science and Policy 150A, 151; Hydrologic Science 110

Suggested Advisers: F. Bombardelli, T. R. Ginn, M. L. Kavvas, J. R. Lund, S. G. Schladow, B. A. Younis

Civil Engineering

Upper Division Required Courses

Engineering 102, 103, 104, 104L, 105, 106 20
Applied Science Engineering 115 4
Civil and Environmental Engineering 114 4
One course from Civil and Environmental Engineering 153, Mathematics 118A, or Statistics 108 4
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.) 28*
Environment: Civil and Environmental Engineering148A 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, 139, 179;
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, 155
Technical electives 18
Fourteen units to be selected from upper division engineering courses not already used to fulfill another requirement; of these, seven units must be selected from letter-graded Civil and Environmental Engineering courses. Non-engineering units from the Technical Elective list** may be included, not to exceed four units total toward the degree.

Minimum Upper Division Units 78

Minimum Units Required for Major 192

*Units in excess of the 28 unit requirement may count toward the technical elective requirement. Please consult with the departmental staff adviser.
**Departmental technical elective listing available from staff advisor. Maximum of four units from this list may count toward degree requirements.

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 advisor in 2045 Ghausi Hall.

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, 11B 12

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.

Sustainability in the Built Environment .. 20

Civil and Environmental Engineering 123, 126 8
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 3 12

*Due to variability in series course offering, consent of minor advisor is required

Minor advisors. J. Darby, T. J. Harvey, F. Loge, A. Kendall, M. Modera, D. Niemeier, G. Schladow, D. Sperling, S. Wuertz, T. Young

The Graduate Program in Civil and Environmental Engineering

M.S. and Ph.D.
Professional Certificate
Designated Ph.D. emphasis available in Biotechnology
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-the-art 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 Technologies
- NSF NEES Geotechnical Centrifuge
- Tahoe Environmental Research Center

Complete Information on our website.

Engineering: Computer Science

Changes to the Engineering: Computer Science major requirements

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 206.

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 post-graduate 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 experimental approaches to problem solving; to ready graduates for lifelong learning; and to encourage graduates to contribute to their profession and society.

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/bs-ms.html*.

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*.

The Computer Science and Engineering program is accredited by the Computing 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-9D	19
Chemistry 2A	5
Engineering 20, 30, 40, 60	16
Computer Science Engineering 50 or Electrical and Computer Engineering 70	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	4
General Education electives	32
Minimum Lower Division Units	**110**

Upper Division Requirements:

Upper Division Required Courses

Computer Science Engineering 188	4
Electrical and Computer Engineering 100, 172, and 180A	14
Computer Science Engineering 120† or 122A†	4
Computer Science Engineering 132, 140A, 150, 152A, 154A, 154B and 160	28
Computer electives—a minimum of 4 courses and a minimum of 15 units chosen from Computer Science Engineering 120†, 122A†, 122B, 124, 129, 130, 140B, 142, 145, 152B, 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 Electrical and Computer Engineering 194ABC; Electrical and Computer Engineering 180B	15
Unrestricted elective	5
Minimum Upper Division Units	**70**
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.

Engineering: Electrical and Computer Engineering

Changes to the Engineering: Electrical and Computer Engineering major requirements

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.

The Electrical Engineering and the Computer Engineering curricula are both accredited by the Engineering Accreditation Commission of ABET; *http://www.abet.org*.

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 professional activities.

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, physical 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	6
Physics 9A-9B-9C-9D	19
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 4
General Education electives 32
Unrestricted electives 3
Minimum Lower Division Units ... 106

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: 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, 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 Computer Engineering 130B, 146A

Suggested Advisers: R. Amritharajah, K.W. Current, P.J. Hurst, S.H. Lewis, S.D. O'Driscoll, R.R. Spencer

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
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. Amritharajah, K.W. Current, 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 or 165
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, G.E. Ford, A.N. Gündes, B.C. Levy, A. Scaglione, Q. Zhao

Upper Division Required Courses

Electrical and Computer Engineering 100, 110A, 130A, 140A, 150A, 161, 180A, 196 31
Engineering 160, 190 or Computer Science Engineering 188 3-4
Upper-division electives*** 31
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, 180B;
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***, **** 9
Minimum Upper Division Units 74

Minimum Units Required for Major 180

* 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 170.

**** 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

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.

The Computer Engineering program is accredited by the Engineering Accreditation Commission of ABET; *http://www.abet.org*.

Lower Division Required Courses

UNITS

Mathematics 21A-21B-21C-21D 16
Mathematics 22A-22AL-22B 7
Physics 9A-9B-9C-9D 19
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 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
General Education electives 32
Total Lower Division Units 112

Upper Division Required Courses

Electrical and Computer Engineering 100, 110A, 140A, 161, 170*, 172, 173A, 180A, 180B, 196 40
Computer Science Engineering 122A, 150 8
Engineering 160, 190, or Computer Science Engineering 188 3-4
Upper-Division Elective Courses: 7-10
One design project course**: Electrical and Computer Engineering course with "Design Project" in the title
One upper division Electrical and Computer Engineering or Computer Science course (excluding Computer Science 157)
Technical electives** 9
Minimum Upper Division Units 68

Minimum Units Required for Major 180

* 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/electives.html*.

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 challenging 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 Macromolecular Assemblies
- Lawrence Livermore National Laboratory
- Lawrence Berkeley National Laboratory
- Los Alamos National Laboratory
- California Lighting Technology Center
- PlanetLab Consortium

Complete Information on our website.

Engineering: Mechanical and Aerospace Engineering

Changes to the Engineering: Mechanical and Aerospace Engineering major requirements

Division of Aerospace Science and Engineering

The Division of Aerospace Science and Engineering administers both the Aeronautical Science and Engineering Program (no longer open for admittance or transfer) and the Aerospace Science and Engineering Program within the Department of Mechanical and Aerospace Engineering. The curricula for both programs are identical.

As of Fall 2009, all students transferring into our aero program will be placed into the Aerospace Science and Engineering Program. All new students will be admitted into the Aerospace Science and Engineering Program. This program is not accredited by the Engineering Accreditation Commission of ABET; *http://www.abet.org*.

All students currently in the Aeronautical Science and Engineering program can remain in it; this program is accredited by the Engineering Accreditation Commission of ABET; *http://www.abet.org*.

The Aerospace Science & Engineering Undergraduate Program

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.

Aerospace Science and Engineering Undergraduate Major

The Aerospace Science and Engineering program is not 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-9D	19
Chemistry 2A-2B or 2AH-2BH	10
Engineering 4	3
Engineering 6 or Mechanical Engineering 5	4
Engineering 17, 35, 45	11
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
General Education electives	32
Minimum Lower Division Units	**109**

Upper Division Requirements:

A broad range of technical elective courses is available. Some students choose these electives from one area of study in order to begin developing a specialty. Others choose from several areas in order to broaden their background in the sciences and engineering. Typical aerospace science and engineering specialties include aero-thermodynamics, propulsion systems, aircraft performance, stability and control, aerospace structures and vehicles, aeroelasticity, flight testing, component and mechanism design, or space systems design. There are a number of electives that could be recommended to all aerospace science and engineering students regardless of their chosen area of specialization.

Suggested technical electives:

Aerospace Science and Engineering 139, 141

Suggested Advisers: J.J. Chattot, M. Hafez, R.A. Hess, S. Joshi, V. La Saponara, N. Sarigul-Klijn, C.P. van Dam, B.R. White

Upper Division Required Courses

Engineering 100, 102, 103, 104, 105	19
Mechanical Engineering 106, 107A, 107B, 165, 171, 172	22
Aeronautical Science and Engineering 126, 127, 129, 130A, 130B, 133, 135, 138	32
Select one course from Applied Science Engineering 115, Engineering 180 or Mathematics 128C	4
Engineering 190	3
Technical electives	7
A combined maximum of four units may be selected from project/independent study courses (185A, 185B, 192, 199)	
Minimum Upper Division Units	**87**

Minimum Units Required for Major 196

Aeronautical Science and Engineering Undergraduate Major

The Aeronautical Science and Engineering program is accredited by the Engineering Accreditation Commission of ABET; *http://www.abet.org*.

This program is no longer open for admission or transfer. Students previously admitted to this program who complete all degree requirements will receive a degree in Aeronautical Science and Engineering.

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	19
Chemistry 2A-2B or 2AH-2BH	10
Engineering 4	3
Engineering 6 or Mechanical Engineering 5	4
Engineering 17, 35, 45	11
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
General Education electives	32
Minimum Lower Division Units	**109**

Upper Division Requirements:

A broad range of technical elective courses is available. Some students choose these electives from one area of study in order to begin developing a specialty. Others choose from several areas in order to broaden their background in the sciences and engineering. Typical aerospace science and engineering specialties include aero-thermodynamics, propulsion systems, aircraft performance, stability and control, aerospace structures and vehicles, aeroelasticity, flight testing, component and mechanism design, or space systems design. There are a number of electives that could be recommended to all aerospace science and engineering students regardless of their chosen area of specialization.

Suggested technical electives:

Aerospace Science and Engineering 139, 141

Suggested Advisers: J.J. Chattot, M. Hafez, R.A. Hess, S. Joshi, V. La Saponara, N. Sarigul-Klijn, C.P. van Dam, B.R. White

Upper Division Required Courses

Engineering 100, 102, 103, 104, 105	19
Mechanical Engineering 106, 107A, 107B, 165, 171, 172	22
Aeronautical Science and Engineering 126, 127, 129, 130A, 130B, 133, 135, 138	32
Select one course from Applied Science Engineering 115, Engineering 180 or Mathematics 128C	4
Engineering 190	3
Technical electives	7
A combined maximum of four units may be selected from project/independent study courses (185A, 185B, 192, 199)	
Minimum Upper Division Units	**87**

Minimum Units Required for Major 196

The Mechanical Engineering Undergraduate Program

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, fluid 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 development, and/or pursue entrepreneurial endeavors.

Mechanical Engineering Undergraduate Program

The Mechanical 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.

Mechanical Engineering Programs Lower Division Requirements:

The lower division requirements for the Mechanical Engineering and Mechanical Engineering/Materials Science programs are the same.

Lower Division Required Courses

Requirements for the Mechanical Engineering and Mechanical Engineering/Materials Science and Engineering programs.

	UNITS
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-22B	6
Physics 9A-9B-9C-9D	19
Chemistry 2A-2B or 2AH-2BH	10
Engineering 4	3
Engineering 6 or Mechanical Engineering 5	4
Engineering 17, 35, 45	11
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
General Education electives	32
Minimum Lower Division Units	**113**

Mechanical Engineering Upper Division Requirements:

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 practice.

Students are encouraged to select elective courses from among the areas of specialization listed below.

Areas of Specialization

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 considerations.

Suggested technical electives:

Aerospace Science and Engineering 130A, 130B, 133, 139
Biological Systems Engineering 114, 165
Applied Science Engineering 115
Engineering 111, 121, 122, 160 (only one unit of credit towards Technical Electives requirement)
Materials Science and Engineering 180, 181, 182
Mechanical Engineering 121, 134, 150B, 151, 152, 161

Suggested Advisers: H.H. Cheng, R.T. Farouki, A.A. Frank, M.R. Hill, M.L. Hull, B. Ravani, S. Velinsky, K. Yamazaki

Biomedical and Engineering Fluid Mechanics. 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 environmental impact. These areas are investigated both experimentally and computationally.

Suggested technical electives:

Aerospace Science and Engineering 138
Engineering 121, 160 (only one unit of credit towards technical requirements); Engineering 180
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, W. Kollmann, B.D. Shaw, C.P. van Dam, A.S. Wexler, B.R. White

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, P. A. Erickson, I.M. Kennedy, W. Kollmann, 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 packages.

Suggested technical electives:

Aeronautical Science and Engineering 138
Engineering 111
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 manufacturing 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:

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 suspension 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.

An Automotive System Dynamics Laboratory is being used for testing components such as engines, transmissions, brakes, and steering systems as well as testing complete vehicles.

Suggested technical electives:

Aerospace Science and Engineering 129, 139, 141
Engineering 121, 122
Mechanical Engineering 121, 134, 152

Suggested Advisers: F.O. Eke, A.A. Frank, R.A. Hess, M. Hubbard, S. Joshi, D.C. Karnopp, D.L. Margolis.

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.

Transportation Systems. As society recognizes the increasing importance of optimizing transportation 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,
Civil and Environmental Engineering 131, 149
Engineering 121, 122, 160 (only one unit of credit towards Technical Electives requirement)
Mechanical Engineering 134, 150B, 161, 162, 163

Suggested Advisers: P.A. Erickson, A.A. Frank, M. Hubbard, J.W. Park, D.C. Karnopp, D.L. Margolis, S. Velinsky

Mechanical Engineering Upper Division Required Courses

Engineering 100, 102, 103, 104, 105 19
Mechanical Engineering 150A and 172; and one course chosen from 185A with 185B (both courses must be taken in consecutive quarters), or Aeronautical Science and Engineering 130A 12
Mechanical Engineering 106, 107A, 107B, 165, 171 18
Engineering 190 3
Select one course from Applied Science Engineering 115; Engineering 180; Mathematics 128C; Statistics 120, 131A 4
Technical electives 24
Sixteen of the 24 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, 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 four units may be selected from project/independent study courses (185A, 185B, 192, 199) not used in satisfaction of core degree requirements. The remaining units may be selected from the technical electives list.

Minimum Upper Division Units 80

Minimum Units Required for Major 193

The Mechanical Engineering/ Materials Science Undergraduate Program

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.

Mechanical Engineering/Materials Science Undergraduate Major

The Mechanical Engineering/Materials Science program is not 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.

Mechanical Engineering/Materials Science and Engineering Lower Division Required Courses

The lower division requirements for this program are identical to those for the Mechanical Engineering program. See Mechanical Engineering Programs Lower Division Requirements:, on page 88.

Mechanical Engineering/Materials Science Upper Division Requirements

Students spend their third year in further study of fundamental courses and in their fourth year they may tailor their studies to their interests by selecting courses in materials science, mechanical design, or manufacturing. Students can either prepare for graduate study or obtain a broad background for entering engineering practice

Mechanical Engineering/Materials Science and Engineering Upper Division Required Courses

Engineering 100, 102, 103, 104, 105 19
Mechanical Engineering 106, 107A, 107B, 150A, 165, 171, 172 26
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; Statistics 120, 131A 4
Engineering 190 3
Technical electives 11
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.
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 188 A & 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 Upper Division Units 89

Minimum Units Required for Major 202

The Graduate Program in Mechanical and Aeronautical Engineering

M.S., M.Engr., D.Engr. and Ph.D.
Professional Certificate
Designated Ph.D. emphasis available in Biotechnology
(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, biomechanics, aerostructures, sensors, combustion, and energy systems. Graduate students acquire skills to address both fundamental issues in these areas and to design complex, multicomponent systems. The highly collaborative environment fosters multidisciplinary research while drawing on the study of mathematics, electrical engineering, materials science, bioengineering 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 important, as is the cross-disciplinary, collaborative culture that is unique to UC Davis.

Research Highlights:

- Aeronautics and Aerostructures
- Space Systems
- Flight Dynamics and Control
- Computational Fluid Dynamics
- Dynamic Systems and Controls
- Reacting Flows
- Heat Transfer
- Automotive System Dynamics
- Biofluid Mechanics
- Biosensors/Microelectromechanical Systems (MEMS)
- Biosolid Mechanics
- Manufacturing and Mechanical Design
- Sports Biomechanics
- Energy Systems/Fuel Cell/Hybrid Vehicle Technology
- Robotics
- 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/*.

English

Changes to the English major requirements

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 20
English 3 or University Writing Program 1 4
One course from English 40, 43, 44, 45 .. 4
English 10A, 10B, 10C 12

Depth Subject Matter 44
English 110A or 110B 4
Please note that English 110A or 110B is a prerequisite for advanced study in the major.

Historical Distribution 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:
Before 1500
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/STS 164, 171A, 171B, 173, 175, 180, 182, 183, 184
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
One upper division English elective
Two advanced courses, one of which can be a seminar:
English 149, 153, 159, 163, 165, 177, 187A, 188A, 189, 194H, 195H
Creative Writing
Three sections of English 100F, 100P, 100NF, 100FA, 100PA
Total Units for the Major 64

English Majors. Up to four upper division units in a national literature other than English or American, or in Comparative Literature, may count toward the requirements of the major.

Evolution and Ecology

Changes to the Evolution and Ecology major requirements

B.S. Major Requirements:

UNITS

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 12
*Mathematics 16A-16B-16C accepted to fulfill this requirement only for transfer students admitted prior to fall 2013.

Depth Subject Matter 49
Biological Sciences 101, 105 (or 102 + 103), 104 10-13
Evolution and Ecology 100, 101 8
Statistics 100, 102 or 130A-130B 4-8
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 fieldwork 20-27
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, 181.
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 Major 104-114

French

Changes to the French Honors Program

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 French.

Human Development

Changes to the Human Development major requirements

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 39-46
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 4
Two courses from Philosophy 5, 30, 31, 32, or 38 8
One course from: Neurobiology, Physiology, and Behavior 10, 101, or Psychology 101 4-5
Psychology 1 4
One course from: Psychology 41 or Sociology 46A and 46B, or Statistics 10 or 13 4-8

Depth Subject Matter 50-55
Life Span: Human Development 100A, 100B, 100C 12
Research Methods: Human Development 120 4

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).

Biological Processes: one course from: Biological Sciences 101†, Human Development 117, Nutrition 111AV, or Psychology 121 3-5
Social-Cultural Processes: one course from Human Development 102, 110, 130, 160, or 162 4
Cognitive Processes: one course from Human Development 101, 103, 132, 161 or 163 4
Practicum: one course from Human Development 140-140L, or 141 or 142 or 143 4-6

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
In addition to the College English Composition requirements, choose one from University Writing Program 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 102H, 104A, 104B, 104C, 104D, 104E, 104F 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. L. Harper

Human Rights

New minor in Human Rights

(College of Letters and Science)

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:

UNITS

Human Rights 20
Religious Studies 90 or 134 4
Choose two core courses from the following*: 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

International Relations

Changes to the International Relations major requirements.

A.B. Major Requirements:

UNITS

Preparatory Subject Matter..... 24-54

Economics 1A or Anthropology 2 4
Economics 1B 4
History 4C or 10C 4
International Relations 1 or Political Science 3 4
Statistics 13 or Sociology 46B 4
Political Science 51 4
Note: Preparatory Subject Matter does not 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 30
or Chinese 1A, 4, 5, 6 30
or Chinese 1CN, 2CN, 3CN 15
or Chinese 1BL, 2BL, 3BL 15
French 1, 2, 3, 21, 22 25
German 1, 2, 3, 20, 21 23
Hebrew 1, 2, 3, 21, 22, 23..... 30
Hindi/Urdu 1, 2, 3, 21, 22, 23 30
Italian 1, 2, 3, 4, 5 21
or Italian 1, 2, 3, 8A, 8B 21
Japanese 1, 2, 3, 4, 5, 6..... 30
or Japanese 1A, 4, 5, 6..... 30
Portuguese 1, 2, 3, 21, 22 25
Russian 1, 2, 3, 4, 5 23
Spanish 1, 2, 3, 21, 22..... 25
or Spanish 31, 32, 33..... 15
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 123..... 20
Two courses selected from Group A..... 8
One course selected from Group B..... 4
Four courses to fulfill Area Studies Requirement 16
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 16
Group A courses (Advanced Industrialized Countries):
Agricultural and Resource Economics 138, Anthropology 127, Community and Regional Development 118, 141, Economics 102, 110B, International Relations 104, Political Science 130, 140A, 140B, Sociology 138, 139, 141, 183
Group B courses (Developing Countries):
Anthropology 122A, 122B, 123BN, 126A, 126B, 127, 135, 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 132 20
Three additional courses from at least two departments selected from Anthropology 123BN, 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 Studies 102 12
Four courses to fulfill Area Studies Requirement 16

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 additional prerequisites.
Economics 162..... 4
Anthropology 101 4
Political Science 123..... 4
Environmental Science and Policy 161 or 162 4
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 160 7-8
Select two from one of the following groups.....9-12
Atmospheric 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 Requirement.....16

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 8
Select one course each from three of the following four groups 12
The Mixing of Peoples: Anthropology 123BN, 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 170; Sociology 146
Development and its Impact on Social Cleavages: Anthropology 122B, 126A, 126B; Political Science 124, 142A; Sociology 145A, 145B
Four courses to fulfill Area Studies Requirement.....16
Education/Internship Abroad for a minimum 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 if course offerings within the region of choice are insufficient. 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, 133, 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: History 138B, 138C, 143
Social Analysis: Political Science 144A, 144B
Culture and Literature: Russian 123, 129, 130

Jewish Studies

Changes to the Jewish Studies minor requirements

Minor Program Requirements:

UNITS

Jewish Studies 20

One course from Jewish Studies 10 or Religious Studies 21 or 23 4
4 upper division courses selected from the following: Comparative Literature 147, English 171A, German 116, 117, 141, Hebrew 100A, 100B, 100C, History 112A, 112B, 112C, 113, 142A, 142B, Jewish Studies 101, 110, 111, 112, 120, 121, Political Science 135, 136, Sociology 174 16

Advising. Jewish Studies Program office (530) 752-1640 or 754-7007

Molecular and Cellular Biology

Changes to the Biochemistry and Molecular Biology major requirements

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 49-53

Biological Sciences 2A-2B-2C 14
Chemistry 2A-2B-2C or 2AH-2BH-2CH ... 15
Mathematics 17A-17B-17C or 21A-21B (21C recommended) 8-12
Physics 7A-7B-7C 12

Depth Subject Matter 57-62

Biological Sciences 101, 102, 103, 104 13
Chemistry 118A-118B-118C or 128A-128B-128C, 129A-129B 12-13
Chemistry 107A-107B 6
Statistics 100 or 130A-130B 4-8
Molecular and Cellular Biology 120L, 121, 123, 124 16
Restricted Electives 6
6 units of upper division courses in biological sciences or chemistry relevant to the student's interest chosen in consultation with the adviser. Students are encouraged to obtain additional laboratory experience; however, no more than 3 units of 192, 193 or 199 research may be counted toward restricted elective units.

Total Units for the Major 106-115

Changes to the Cell Biology major requirements.

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 55-65

Biological Sciences 2A-2B-2C 14
Chemistry 2A-2B-2C 15
Mathematics 17A-17B-17C or 21A-21B (21C recommended) 8-12
Physics 7A-7B-7C 12
Chemistry 8A-8B or 118A-118B-118C 6-12

Depth Subject Matter 42-43

Biological Sciences 101, 102, 103, 104 13
Statistics 100 or 130A-130B 4-8
Molecular and Cellular Biology 140L 5
Two courses from Molecular and Cellular Biology 143, 144, or 145 6
Molecular and Cellular Biology 121 or 161 3
Molecular and Cellular Biology 150 and 150L, or 163 and 164 5-6
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, 150/150L, 158, 160L, 162, 163, 164, 178, 182, 191; Neurobiology, Physiology, and Behavior 100, 101, 103, 112, 131, 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 category 10

Total Units for the Major 101-116

Changes to the Genetics major requirements.

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 55-65

Biological Sciences 2A-2B-2C 14
Chemistry 2A-2B-2C or 2AH-2BH-2CH 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 12

Depth Subject Matter 48-53

Biological Sciences 101, 102, 103, 104 13
Molecular and Cellular Biology 160L, 164 7
Evolution and Ecology 100 4
One course from Molecular and Cellular Biology 161 (recommended) or 121 3
Two courses from Molecular and Cellular Biology 162, 163, 182 or Evolution and Ecology 102 6-7
Statistics 100 or 130A-130B 4-8
Restricted Electives 11
Upper division courses in genetics 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 used for credit in this category.

Total Units for the Major 103-118

Nutrition Science

Changes to the Nutrition Science major requirements

B.S. Major Requirements:

UNITS

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 129A 21-23
Nutrition 10 3
Plant Sciences 120 4
Sociology 46A or Psychology 41 4
The remaining preparatory subject matter is based on which major option you choose.

Nutritional Biology option:
Anthropology 2 or Psychology 1 or Sociology 1 or 3 4-5
Mathematics 16A-16B 6
Physics 1A-1B 6

Nutrition in Public Health option:
Anthropology 2 or Sociology 1 or 3 4-5
Economics 1A-1B 8
Psychology 1 4

Depth Subject Matter 76-85

Biological Sciences 101 4
Food Science and Technology 100A and 100B 8
Microbiology 101 5
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 3
Nutrition 104, 117 10
Nutrition Restricted Electives 15-20
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:
Animal Biology 102, 103 10
Exercise Biology 110 4
Nutrition 118 4
Nutrition Restricted Electives 15-20
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, 110, 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; Food Science and Technology 104, 104L. 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 also Graduate Studies, on page 109.

Performance Studies (A Graduate Group)

Changes to the Performance Studies course designation

Courses in Performance Studies (PFS)

Courses were pending approval at the time of publication. For more information on courses, see *http://theatredance.ucdavis.edu/phd/*

Statistics

Changes to the Statistics major requirements

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 sciences.

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 analysis.

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 research, and education. Some students have entered advanced studies in statistics, economics, psychology, medicine and other professional school programs.

A.B. Major Requirements:

	UNITS
Preparatory Subject Matter	**19-23**
Mathematics 16A, 16B, 16C; or 17A, 17B, 17C; or 21A, 21B, 21C	9-12
Mathematics 22A	3
Computer Science Engineering 30 or Computer Science Engineering 40 (or the equivalent)	4
Statistics 32	3-4
Depth Subject Matter	**45-48**
Statistics 106, 108, 138 or the equivalent	12
Statistics 130A, 130B	8
Statistics 137 or 141	4
Three courses from Statistics 104, 135, 137, 141, 142, 144, 145	12
Related elective courses	9-12
Three upper division courses approved by major adviser; they should follow a coherent sequence in a single discipline in the social sciences where statistical methods and models are applied and should cover the quantitative aspects of the discipline.	
Total Units for the Major	**64-71**

Sustainable Agriculture and Food Systems

New major in 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., Program Director

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 Development, Environmental Science & Policy)*

The Major Program

The Sustainable Agriculture and Food Systems (SAFS) 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 associated 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:

	UNITS
English Composition Requirement	**4-8**
See College requirement, must include Communications 1.	
Core Courses	**24-26**
Plant Sciences 15	4
Community and Regional Development 20	4
Plant Sciences 150	4
Agricultural and Resource Economics 121	4
Plant Sciences 190	2-4
Environmental Science and Policy 191A, 191B	6
Internship Requirement	**12**
Students must complete at least 12 units of internship, 8 of which must be completed off-campus.	
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 41L 2-3
Applied Biological Systems Technology 49 or 52 or 101 or 142 2-3

Track I: Agriculture and Ecology

Focuses on crop and animal production systems, ecology, and practices that mitigate negative impacts while producing environmental and social benefits.

UNITS

Preparatory Subject Matter 59-60

Mathematics 16A, 16B 6
Plant Sciences 120 or Statistics 100 4
Chemistry 2A, 2B 10
Physics 1A 3
Biological Sciences 2A, 2B 9
Plant Sciences 2 4
Animal Sciences 1 or 2 4
Food Science 1 3
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 3 4-5

Depth Subject Matter 34-38

Agricultural and Resource Economics 120 or 147 and Environmental Science and Policy 161 or 169 6-8
Soil Science 100 or Soil Science 109 4-5
Animal Science 129 or Environmental Horticulture 160 or Environmental Science and Policy 100 or Evolution and Ecology 101 or Plant Pathology 117 or Plant Sciences 105 or 142 or Wildlife, Fish, and Conservation Biology 154 4-5
Additional restricted electives chosen in consultation with an advisor 20

Track II: Food and Society

Focuses on issues related to the social, cultural, political and community development aspects of agriculture and food systems.

UNITS

Preparatory Subject Matter 57-63

Philosophy 5 or 31 4
Philosophy 14 or 15 or 24 4
Sociology 46B or Statistics 13 4
Community and Regional Development 151 or Applied Biological Systems Technology 180 or Landscape Architecture 150 or Statistics 103 or Sociology 106 3-6
Chemistry 2A 5
Biological Sciences 2A or 10 4
Plant Sciences 2 4
Evolution and Ecology 2 or 11 or Biological Sciences 2B or Environmental Science and Policy 1 or 30 or Wildlife, Fish, and Conservation Biology 10 or 11 3-5
Food Science 1 3
Soil Science 10 3
Economics 1A 4
Political Science 4 4
Anthropology 2 or Sociology 1 or Sociology 3 4-5
Community and Regional Development 1, 2 8

Depth Subject Matter 43-44

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 179 3-4
Anthropology 101 or 102 or Community and Regional Development 142 or 152 or International Agricultural Development 103 or Sociology 139 or 144 or 145A or 145B 12
American Studies 101C or 155 or History 172 or Nature and Culture 120 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
Chemistry 2A 5
Biological Sciences 2A or 10 4
Plant Sciences 2 4
Evolution and Ecology 2 or 11 or Biological Sciences 2B or Environmental Science and Policy 1 or 30 or Wildlife, Fish, and Conservation Biology 10 or 11 3-5
Food Science 1 3
Soil Science 10 3
Economics 1A, 1B 8
Political Science 4 4
Anthropology 2 or Sociology 1 or Sociology 3 4-5
Community and Regional Development 1 4
Philosophy 14 or 15 or 24 4

Depth Subject Matter 43-44

Agricultural and Resource Economics 112 or 150 or 157 4
Agricultural and Resource Economics 120 or 130 or 147 or 176 or Environmental Science 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 International Agricultural Development 103 or Sociology 139 or 144 or 145A or 145B 8
Additional restricted electives chosen in consultation with an advisor 20

Total units for the major 139-162

Major Adviser. Thomas P. Tomich *(Human & Community Development, Environmental Science & Policy)*

Advising Center for the major is located in 143 Robbins Hall, Agricultural Sustainability Institute; (530) 752-3915

New or Revised General Education (GE) Requirement Course Supplement—Fall 2011

New or changed courses that have Revised General Education requirements approved before Feb 6, 2012.

All courses effective Fall 2011, unless otherwise noted.

African American and African Studies

Revised General Education courses in African American and African Studies (AAS)

10. African-American Culture and Society (4)
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: ACGH, DD, WE.—I. (I.) Harrison

(change in existing course—eff. winter 12)

Lower Division Courses

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: AH or SS, WC, WE.—II. (II.) Adebanwi, Adejunmobi

(change in existing course—eff. winter 12)

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: ACGH, AH, DD.—II. (II.) Harrison, Osumare

(change in existing course—eff. winter 12)

16. Verbal and Performance Arts in Africa (4)
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: AH, VL, WC.—II. (II.) Adejunmobi

(change in existing course—eff. winter 12)

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: SS, WC, WE.—I. (I.) Adejunmobi

(change in existing course—eff. winter 12)

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: ACGH, AH, DD, VL, WE.—III. (III.) Acham

(change in existing course—eff. winter 12)

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: DD, VL.—III. (III.) Osumare

(change in existing course—eff. spring 12)

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: AH, WC.—II. (II.)

(change in existing course—eff. winter 12)

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

(change in existing course—eff. winter 12)

107A. African Descent Communities and Culture in the Caribbean and Latin America (4)
Lecture/discussion—4 hours. Prerequisite: upper 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: WC.—I. (I.) Ng'weno

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: AH or SS, WC.—II. (II.) Ng'weno

(change in existing course—eff. winter 12)

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: SS, WC.—I. (I.) Adebanwi, Adejunmobi

(change in existing course—eff. winter 12)

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: AH or SS, WC.— (II.) Adebanwi, Adejunmobi

(change in existing course—eff. winter 12)

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: ACGH, DD, SS.—III. (III.) Acham

(change in existing course—eff. winter 12)

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: ACGH, DD, SS.—III, IV. (III, IV.) Harrison

(change in existing course—eff. winter 12)

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.—(III.) Harrison, Osumare

(change in existing course—eff. winter 12)

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.—(III.) Harrison, Ng'weno, Osumare

(change in existing course—eff. winter 12)

152. Major Voices in Black World Literature (4)
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: AH, DD, WC, WE.—(II.) Adejunmobi

(change in existing course—eff. winter 12)

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: AH, WC, WE.—III. (III.) Adejunmobi

(new course—eff. spring 12)

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: AH, DD, WC.—III. (III.) Adejunmobi

(change in existing course—eff. winter 12)

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: AH, WC, WE.—(II.) Adejunmobi

(change in existing course—eff. winter 12)

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: AH, WC, WE.—III. (III.)

(change in existing course—eff. winter 12)

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: AH, WC, WE.—III. (III.)

165. Afro-Christianity and the Black Church (4)

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: ACGH, DD, SS.—(II.) Harrison

(change in existing course—eff. winter 12)

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: AH, DD, VL, WC.—IV. (IV.) 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: 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 Africa 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: AH, VL, WC.—(II.)

(change in existing course—eff. spring 12)

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: 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: 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: DD.—II, III. Acham

(change in existing course—eff. winter 12)

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

(change in existing course—eff. winter 12)

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

(change in existing course—eff. winter 12)

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: SS, WC, WE.—II. (II.) Ng'weno

(change in existing course—eff. winter 12)

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

(change in existing course—eff. spring 12)

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: AH, DD, VL.—II. (II.) Acham

Agricultural and Resource Economics

Revised General Education 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: SS.

1S. 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, WC.—Alston

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: SS, WC, WE.—III. (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, III. (I, II, III.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. Restricted to lower division students. (P/NP grading only.) GE credit: SS.

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, III.)

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: SS, WC.—I, II, III. (I, II, 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: SS, WC.—II, III. (II, III.)

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: ACGH, SS.—III. (III.) Alston

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.—Alston

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.) Mérel

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.—II. (II.)

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, III.) C. Carter, Williams

140. Farm Management (5)
Lecture—5 hours. Prerequisite: Economics 1A. Farm organization and resources; economic and technological principles in decision making; analytical techniques and management control; problems in organizing and managing the farm business. GE credit: SS.

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, II, III. (I, II, 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: SS.—II. (II.)

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: ACGH, SS.—III. (III.)

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: SS.

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: ACGH, DD, SS, WE.—I. (I.) Martin

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: QL, SS.—I. (I.)

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, III. (I, II, III.)

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 short-term 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 (4)
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.—II, III. (II, III.) Smith

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: SS.—III. (III.) Lin

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: SS.—I. (I.) Farzin, Larson

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. Prerequisite: 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.

American Studies

Revised General Education 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 interaction of that system with other cultural systems including religion, social thought, art, architecture, literature, music, and common sense. GE credit: ACGH, DD, WE.—I.

1C. American Lives Through Autobiography (4)
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: ACGH, AH, DD, SS, WE.—II.

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, WE.—III. Smith, Sze

(change in existing course—eff. spring 12)

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: AH, 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: ACGH, AH, DD, SS, WE.—III. Biltekoff, Wang

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 such as toys, furnishings, the built environment) as text for understanding everyday lives (gender, social class, ethnicity, region, age); collecting and displaying material culture; commodity capitalism) of individuals and communities in the United States. Offered in alternate years. GE credit: ACGH, AH, DD, WE.—III. de la Peña

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: ACGH, AH, DD, SS, WE.—I. (I.) de la Pena

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: ACGH, AH, DD, SS, WE.—(I.) Kelman, 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: ACGH, AH, DD, SS, WE.—II. (II.) Biltekoff

Upper Division Courses

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: ACGH, AH, DD, SS, 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: ACGH, AH, DD, SS, WE.—III. (III.)

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: ACGH, AH, DD, SS, WE.—II. (II.) Kelman, 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: 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: ACGH, AH, DD, SS, 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: ACGH, AH, DD, SS, WE.—III. (III.) Smith

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: ACGH, AH, DD, SS, WE.—II. (II.) Kelman, Wang

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: ACGH, AH, DD, SS, WE.—I. (I.) Mechling

155. Symbols and Rituals in American Life (4)
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: ACGH, AH, DD, SS, 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: ACGH, AH, DD, SS, 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: ACGH, AH, DD, SS, WE.—III. 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: AH.—I, III. de la Pena

Animal Genetics

Revised General Education courses in Animal Genetics (ANG)

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 cytogenetics applied to animal systems; chromosome harvest techniques, analysis of mitosis and meiosis, karyotyping, chromosome banding, cytogenetic mapping, chromosome structure and function, comparative 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.) Famula

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, Williamson

Animal Science

Revised General Education 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: SE, WE.—I. (I.) Famula

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. (II.) Roser

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: OL, QL, SE, SL, 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.) Van 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: QL, SE, SL, WE.—II. (II.) Oberbauer

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 (3)
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: OL, SE.—II. (II.) Tucker

(change in existing course—eff. winter 12)

105. Domestic Animal Behavior (2)
(cancelled course—eff. winter 12)

106. Domestic Animal Behavior Laboratory (2)
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: 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

(new course—eff. spring 12)

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: 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: 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: OL, QL, SE, VL, WE.—III. (III.) Sainz

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: 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.) GE credit: SE.

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, UV/visible and atomic absorption spectrophotometry, thin-layer and gas-liquid chromatography, commercial chemical kits. Attention to safety. GE credit: QL, SE, SL.—I. (I.) Hung

140. Management of Laboratory Animals (4)
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: 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, Neurobiology, 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

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: SE.—(II.)

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: 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: OL, QL, SS, WE.—III. (III.)

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.—III. (III.)

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: SL, SS, WE.—III. (III.) Mench

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.

Anthropology

Revised General Education 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: SE, SL, WE.—I, II, III. (I, II, III.) Marshall, McElreath, Weaver

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: ACGH, DD, SS, WC, WE.—I, II, III. (I, II, III.) Yengoyan

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: SS, Div.—I, II, III. (I, II, III) Bettinger, Darwent Steele

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: SE, SL.

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: SS, WC, WE.—Isbell

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: OL, SE, VL, WE.—McElreath

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: 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: ACGH, AH, DD, SS, WC, WE.—Sawyer

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 large-scale complex societies or "civilizations." Lectures emphasize use of archaeology in reconstructing the past. GE credit: SS, WC, WE.—Darwent, Eerkens

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: SS, WC, WE.—Eerkens

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, DD, SS, WC.—Donham

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: SS, VL, WE—Dumit

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: 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: SE, SL, WE.—Winterhalder

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.—Isbell

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: SS, WE.—I (I.) Donham

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: SS, WC, WE.—Borgerhoff, Mulder

102. Cultural Ecology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one lower division course in the social sciences, upper division standing. Comparative survey of the interaction between diverse human cultural systems and the environment. Primary emphasis given to people in rural and relatively undeveloped environments as a basis for interpreting complex environments. Not open for credit to students who have completed course 133. (Same course as Environmental Science and Policy 102.) GE credit: SS, WC, WE.—III. (III.) Orlove

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.—Borgerhoff, Mulder

104N. Cultural Politics of the Environment (4)
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: ACGH, DD, SS, WC, WE.—Sawyer

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 stu-

dents 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: QL, SS, WC, WE.—McElreath

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 Studies 109.) GE credit: SS, VL, WE.—Dumit

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: SS, WC, WE.—Shibamoto Smith

117. Language and Society (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 4, or Linguistics 1 and course 2. Consideration 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: SS, WC, WE.—Shibamoto Smith

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: ACGH, DD, SS, WC, WE.—Yengoyan

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, WE.

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: ACGH, DD, SS, WC, WE.—McElreath

122B. Anthropology and Political Economy (4)
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: 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.—Srinivas

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: AH, WC, WE.—Srinivas

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 linguistic universals and to the philosophical basis of relativism in the social sciences. (Former course 125.) GE credit: SS, WC, WE.—Yengoyan

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: SS, WC, WE.—Yengoyan

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: SS, WC, WE.—J. Smith

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: 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: SS, WC, WE.—Zhang

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: SS, WC, WE.—Winterhalder

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: 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.—II. (II.) Dumit
(change in existing course—eff. fall 12)

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: SS, WC, WE.—J. Smith

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: SS, WC, WE.

132. Psychological Anthropology(4)
Lecture/discussion—3 hours. Prerequisite: course 2 or Science and Technology Studies 1. History of the relationship between anthropology and psychoanalysis. 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: SS, WC, WE.—Giordano

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: AH, SS, WC, WE.—Klima

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: SS, VL, WC, WE.—Klima

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: SS, WC, WE.—de la Cadena

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: ACGH, DD, SS, WC, WE.—de la Cadena

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: ACGH, DD, SS, WC, WE.—Choy

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: 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: SS, WC, WE.—J. Smith

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: ACGH, DD, SS, WE.—Bettinger

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: SS, WC, WE.—Joseph

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: SS, WC, WE.—Yengoyan

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: SS, WC, WE.—de la Cadena

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 movements, modernity, body-cultures, identity, gender, and diasporas. GE credit: AH, SS, WC, WE.—Srinivas

146N. Topics in the Anthropology of Europe (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Recent ethnographies of different nation-states 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, multiculturalism, and post/socialisms. Offered in alternate years. GE credit: SocSci, Div, Wrt | SS, WC, WE.

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: SS, WC, WE.—Zhang

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: 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 rural-urban cultural continuities and contrasts, class relations, political and economic systems, kinship, sex/gender systems, contemporary religious beliefs and behavior, conflict, consensus, and cultural stereotypes. GE credit: SS, WC, WE.—Shibamoto 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: SE, WE.—Isbell

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: SE, WE.—Weaver

153. Human Biological Variation (5)
Lecture—3 hours; discussion—1 hour; term paper. 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: QL, SE, WE.—D.G. Smith

154A. The Evolution of Primate Behavior (5)
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: SE, VL, WE.—Isbell

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: QL, SE, VL, WE.—Marshall

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.—Isbell

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.—Weaver

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.—Weaver

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: QL, SE.—II. 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 immunoelectrophoresis on agarase. (P/NP grading only.) GE credit: 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 understanding the interrelationship between biological processes and cultural construction of gender roles. GE credit: 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. 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 particular emphasis on the basic dependence of the latter on the former. Stress is on historical development of archaeology in the New World. GE credit: 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: SS, WC, WE.

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: 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: 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: 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 (9)
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: 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: OL, QL, SE, WE.—Steele

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: SS, WE.—Eerkens

194H. Special Study for Honors Students (1-5)
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.

Applied Biological Systems Technology

Revised General Education 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: ACGH, 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 equipment. (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.) Zhang

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 180/Plant Sciences 180 or Applied Biological Systems Technology 181N. (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

175. Introduction to Global Positioning System (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Science and Society 18 or course 180. Principles of position measurement. Differential and RTK GPS. Sources of Error, Datum, projection and mapping. Application of GPS-surveying, navigation, recreation, guidance, and precision agriculture. Offered in alternate years. GE credit: SE, SL, VL.—I. Upadhyaya

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.

Arabic

Revised General Education 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 1 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)
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

Art History

Revised General Education 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: AH, VL, WC.—I. (I.) Roller

1B. Medieval and Renaissance Art (4)
Lecture—3 hours; discussion—1 hour. Christian, Barbarian, Moslem, and Classical traditions in European Art from the fourth through the sixteenth centuries. GE credit: AH, VL, WC.
.—II. (II.) Ruda

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: 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: 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: 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: AH, VL, WC.—(I.) Watenpaugh

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: 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 architectural history with a focus on issues in Western architecture. Emphasis on nineteenth and twentieth centuries. GE credit: AH, VL, WC, WE.—(III.)

Upper Division Courses

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: 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: 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: 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: 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: AH, VL, WC.

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: 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: 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: AH, VL, WC, WE.—Burnett

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: 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: 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: 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: AH, VL, WE.

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: AH, VL, WC.—II. Roller

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: 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: 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: 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: 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: 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: AH, VL, WC, WE.

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: 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: AH, VL, WC, WE.—Ruda

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: 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: 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: 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: 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: AH, VL, WC, WE.—II.

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: AH, VL, WC, WE.—II. (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: AH, VL, WC, WE.—IV. (IV.) Macleod

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.

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: 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-gardism. Offered in alternate years. GE credit: AH, VL, WC.—Stimson

186. Art After Modernism, 1948–Present (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 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: 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: 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: AH, VL.—Strazdes

188B. Architecture of the United States (4)
Lecture—3 hours; discussion—1 hour. Major movements 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: AH.—I. Strazdes

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: AH, VL.—(II.) 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: 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.)

Art Studio

Revised General Education courses in Art Studio (ART)

Lower Division Courses

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: AH, VL.

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: AH, VL.—(I.) Martin

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: AH, VL.—II. (I.)

Upper Division Courses

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 students. 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. Pass1 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. Pass1 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. Pass1 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. Pass1 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. Pass1 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. Pass1 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. Pass1 restricted Art Studio majors. GE credit: AH, VL.—Geiger, Suh

110B. Intermediate Photography: Digital Imaging (4)
Studio—6 hours. Prerequisite: course 9. Comprehensive introduction to all elements of digital photography, including scanning, imaging software and printing. Pass1 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. Pass1 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. Pass1 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. Pass1 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. Pass1 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. Pass1 restricted Art Studio majors. GE credit: AH, VL.—Martin

117. Advanced Video and Electronic Arts (4)
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. Pass1 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. Pass1 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. Pass1 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. Pass1 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. Pass1 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. Pass1 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. Pass1 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. Pass1 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. Pass1 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. Pass1 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. Pass1 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. Pass1 restricted Art Studio majors. GE credit: AH, VL.—Rosen

147. Theory and Criticism of Photography (4)
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
(change in existing course—eff. fall 12)

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: 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: 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: AH, Wrt. GE credit: 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, Puls

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. Pass1 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 three-dimensional expression. May be repeated for credit one time. Pass1 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. Pass1 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. Pass1 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. Pass1 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. Pass1 restricted Art Studio majors. GE credit: AH, VL.

152G. Advanced Sculpture: The Miniature and Gigantic (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. Pass1 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. Pass1 restricted Art Studio majors. GE credit: AH, VL.—I, II, III. (I, II, III.) Hill, Puls, Rosen, Werfel

Asian American Studies

Revised General Education courses in Asian American Studies (ASA)

Lower Division Courses

1. Historical Experience of Asian Americans (4)
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: SS, Div, Wrt.—I, II, III. (I, II, 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: ACGH, AH, DD, SS, VL, WC, WE.—I, II, III. (I, II, III.)

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: ACGH, DD, SS.—I, II, III. (I, II, III.) Zane, Sue

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: ACGH, AH, DD, OL, VL, WE.—III. (I.) Hamamoto, Ho, Min

Upper Division Courses

110. Theoretical Perspectives in Asian American Studies (4)
Lecture/discussion—4 hours. Prerequisite: course 1 or 2; upper division standing. Theories of race and ethnic relations as tools for understanding the Asian American experience with the society as the unit of analysis. GE credit: ACGH, AH, DD, SS, WE.—I, II. (I, II.) Hamamoto, 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: ACGH, AH, DD, SS, VL, WC, WE.—I. (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, DD, SS, WC, WE.—II. (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: ACGH, DD, SS, WC.—III. (III.) 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: ACGH, DD, OL, SS, WC, WE.—I. Kieu Linh 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: ACGH, AH, DD, OL, SS, WE.—I. Maira, Parreñas

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.—Min

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: ACGH, AH, DD, OL, WE.—II. Ho, Min

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: ACGH, DD, SS.—II. (II.) Sue, Zane

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

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: ACGH, AH, DD, OL, SS, 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.—(I.)

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: ACGH, AH, DD, SS, 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: ACGH, AH, DD, SS, 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: ACGH, AH, DD, SS, 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: ACGH, AH, DD, OL, SS, 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: ACGH, AH, DD, OL, SS, WE.—I. (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, SS.

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, DD, OL, SS, WE.

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, SS.

189I. 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, DD, OL, SS, WE.

Astronomy

Revised General Education 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: SE, SL, VL.—I, III. (I, 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: SE, VL.—I, III. (I, III.)

10S. 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: SE, SL, VL.—II, III. (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.—I. (I.) Fassnacht, Lubin

Atmospheric Science

Revised General Education courses in Atmospheric Science (ATM)

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: QL, SE, SL, VL.—II. (II.) 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: 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: QL, SE, SL, VL.—I, III. (I, III.) Grotjahn, Reck

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

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. GE 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

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 (3)
Lecture—3 hours. Prerequisite: course 60. 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.) Reck

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; cloud nucleation, cloud growth by condensation and collision, cloud models. GE credit: QL, SE, VL.—I. (I.) Weare

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 (4)
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.) Reck

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 (4)
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

Avian Sciences

Revised General Education 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: 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: 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, marketing, 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, agricultural 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.)

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-ovipositional 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.—II. (II.)

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. Millam

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.) Millam

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.—(III.)

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, II, 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 life-history 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.

Biological Sciences

Revised General Education 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 students who have completed course 1A with a grade of C- or better. GE credit: SE.—I, II, III. (I, II, III.) Roth

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 evolu-

tionary 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

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 laboratories 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: OL, QL, SE, SL, SS, VL.—I, II, III. (I, II, III.) Shaffer

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: SE, SL, WE.—III. (III.) Westerdahl

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: QL, SE, SL.—I, II, III. (I, II, III.) Brady, Chan, Draper, Dvorak, Engebrecht, Heyer, Kliebenstein, Langley, O'Neill, Rodriguez, Sanders, Turelli

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 students who have completed Biological Sciences 105 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 fundamental 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: 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. (III.) 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

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, VL, 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: 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 credit: 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

(new course—eff. spring 13)

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

(new course—eff. spring 12)

194H. Research Honors (2)

Independent study—6 hours. Prerequisite: senior standing. Students 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.

Biotechnology

Revised General Education courses in Biotechnology (BIT)

Lower Division Course

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: SE.—III. (III.) Dandekar, Yoder

Lower 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.—I. (I.) Dubcovsky, Neale

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.) Yoder, 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: OL, SE, WE.—III. (III.) Kliebenstein

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/NP grading only.) GE credit: SE, WE.

Cell Biology and Human Anatomy

Revised General Education 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 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 Exercise Biology 106.) GE credit: 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.) GE credit: SE.—II. (II.) Gross

Chemistry

Revised General Education courses in Chemistry (CHE)

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: QL, SE.—I, II. (I, II.)

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: QL, SE.—II, III. (II, III.)

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 compounds, application of principles to chemical reactions. Laboratory experiments in selected analytical methods and syntheses. GE credit: QL, SE.—I, III. (I, III.)

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: SE, SL.—I. (I.)

Upper Division Courses

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.)

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.)

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: QL, SE, WE.—I, II. (I, II.)

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: QL, SE, WE.—II, III. (II, III.)

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: SE, WE.—III. (III.)

Chicana/Chicano Studies

Revised General Education 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. GE credit: ACGH, AH, DD, OL, SS, 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: OL, WE.—Flores, de la Torre

21S. 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: 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: 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: 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: 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: 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: ACGH, AH, DD, WC, WE.—I, III. Chabram, de la Mora

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: 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: 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: ACGH, AH, DD, VL, WC, WE.—I. Jackson, 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

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, Chavez-Garcia

110. Sociology of the Chicana/o Experience (4)
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: ACGH, DD, OL, SS, WE.—I.

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: ACGH, DD, SS, WE.—Flores

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: ACGH, DD, OL, SS, WE.

120. Chicana/o Psychology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 21; introductory psychology course recommended. 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. GE credit: ACGH, DD, OL, SS, WE.—Flores

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: 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

122S. 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: 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: ACGH, DD, SS, WE.—I. Chabram, Chávez-García, de la Torre

131. Chicanas in Politics and Public Policy (4)
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: ACGH, DD, OL, SS, WE.—II.

131S. 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: 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: ACGH, DD, QL, SE.

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

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: ACGH, AH, DD, SS, WC, WE.—III.

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: ACGH, AH, DD, OL, WC, WE.—Chabram

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.) Chabram

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.) GE credit: ACGH, AH, DD, OL, WC, WE.—(III.) Chabram

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: AH, VL, WC, WE.—II. de la Mora

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

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

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: ACGH, AH, DD, SS, 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: AH or SS, Div, Wrt.—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.) 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.

Chinese

Revised General Education courses in Chinese (CHN)

Lower Division Courses

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.)

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. GE credit: 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: AH, WC.—I. (I.) Halperin

Lower Division Course

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

(change in existing course—eff. fall 12)

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

(change in existing course—eff. spring 12)

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: AH, VL, WC.—III. (III.) Chen

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: 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: 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: 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: 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: AH, WC.—I. (I.) Yeh

107. Traditional Chinese Fiction (in English) (4)
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 representative works such as The Story of the Stone and famous Ming-Qing short stories. GE credit: GE credit: AH, WC.—II. (II.) Halperin

(change in existing course—eff. winter 12)

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: 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: 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 Preparation 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: 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 third-year 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: AH, 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. (I.) 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. GE credit: AH.—II. (II.) Halperin

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, II, III. (I, II, III.)

130. Readings in Traditional Chinese Fiction (4)
Lecture—1 hour; discussion—3 hours. Prerequisite: course 112 or the equivalent; course 114 recommended. 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 (4)
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. (II.) Yeh

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, III. (II, III.)

Classics

Revised General Education 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: AH, WC, WE.—(II.) Bulman

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: AH, WC, WE.—II. (II.) Watanabe

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: 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: AH, VL, WC.—I, II, III. (I, II, III.) Rundin, Stem, Watanabe

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: 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: ACGH, AH, WE.—Albu, Watanabe

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, Bulman, 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: AH, WC, WE.

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: ACGH, 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: 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: 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 years.—Seal

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—3 hours; term paper. Prerequisite: course 4A or 10 or Comparative Literature 1. Reading of Iliad, dyssey, and Aeneid in English. Discussion of Homer's and Vergil's techniques of composition, the beliefs and values of their respective societies and the influence of Homer on Vergil. Offered in alternate years. GE credit: AH, WC, WE.—(II.) Bulman, Schein, Seal

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: AH, WE.—Bulman

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: AH, WC, WE.—Schein, Watanabe

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: AH, WE.—Bulman

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: 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: AH, VL, WE.—Roller

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: 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: 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: 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: AH, VL, WC, WE.—(II.) Roller

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: 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.

Communication

Revised General Education courses in Communication (CMN)

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: 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

(new course—eff. spring 12)

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: SS.—I, II, III, IV. (I, II, III, IV.) Feng

102. Empirical Methods in Communication (4)
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: SS.—I, II, III. (I, II, III.) Bell, Jenkins, Motley, Palomares, Yegiyan

103. Gender Differences in Communication (4)
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: 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: 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: 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. GE 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: 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 (4)
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: 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: 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: 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: ACGH, SS, Wrt.—I, II, 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. GE 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 advocacy campaigns. Not open for credit to students who have completed course 160. GE credit: 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: 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

(change in existing course—eff. fall 12)

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

(change in existing course—eff. fall 12)

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: 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: 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: SS, WE.—III. Berger, Feng, Jenkins, Palomares

189B. Proseminar in Mass Communication (4)
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: 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: 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: SS, WE.—III. Barnett

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.

Consumer Science

Revised General Education courses in Consumer Science (CNS)

Lower Division Course

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: SS, WE.

Community and Regional Development

Revised General Education 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: ACGH, DD, OL, SS, VL, WE.—I, II, III. (I, II, III.) 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: ACGH, DD, SS, 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: OL, VL, SS, Wrt.—I. (I.) Galt

Upper Division Courses

118. Technology and Society (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 18 or consent of instructor. Impact of technology on labor relations, employment, industrial development and international relations. The internal relations of technology development and deployment. GE credit: SS, WC.—I. (I.) Kenney

140. Dynamics of Regional Development (4)
Lecture—4 hours. Prerequisite: one undergraduate social science course or consent of instructor. Political economy of domestic regional development. Technology, labor relations and interfirm linkages. California and other regions as case studies. GE credit: SS.—II. (II.) Kenney

141. Organization of Economic Space (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. The globalization of economic activity focusing on new spatial patterns of production and circulation and their implications for particular countries and regions. GE credit: SS, WC, WE.—I. (I.) Benner

142. Rural Change in the Industrialized World (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Geography of rural environment with special emphasis on rural restructuring. The regional focus is on the developed world and comparisons are drawn between Europe (Eastern and Western) and North America. GE credit: 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: 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: DD, OL, SS, VL, WE.—III. London

151. Community Field Research: Theory and Analysis (4)
Lecture—4 hours; extensive writing; project. Prerequisite: course 1 and any upper division Community and Regional Development course are recommended. Emphasis on the design and analysis of community research considering the relationship between theory and practice. Study of community research methods, including structural analysis, elite interviewing, and ethnographic approaches. GE credit: 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: 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: 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: SS, WC.—Hirtz

154. Social Theory and Community Change (4)
Lecture—4 hours. Prerequisite: course 1, Sociology 1, or Anthropology 2. A 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, and methodological individualism. GE credit: ACGH, DD, OL, SS, VL, WC, WE.—II. (II.) 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 (4)
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: ACGH, DD, SS, WE.—II. Smith

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

176. Comparative Ethnicity (4)
Lecture—4 hours. Prerequisite: upper division standing, 8 units of sociology or anthropology or combination. Exploration of the role of ethnicity in shaping social systems and interaction. Examination of analytical approaches to and issues arising from the study of ethnicity, through utilization of data from a range of different societies. GE credit: 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 Anthropology 2, or Sociology 1. The effects of grassroots, nonstate, 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: SS, WC, WE.—III. (III.) Guarnizo

Comparative Literature

Revised General Education courses in Comparative Literature (COM)

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: 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 developments in this period. GE credit: 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: AH, WC, WE.—I, II, III. (I, II, III.)

4. Major Books of the Contemporary World (4)
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: AH, VL, WC, WE.—I, II, III. (I, II, III.)

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: 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: AH, WC, WE.—I, II. (I, II.) Schein, 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: AH, WC, WE.—II, III. (II, III.)

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: 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: AH, WC, WE.—(III.)

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: 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: AH, WC, WE.—II. Finney

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 linguistic, national, and cultural traditions. Offered in alternate years. GE credit: 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: 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: AH, WC, WE.—II. (II.) Schiesari
(change in existing course—eff. fall 12)

25. Ethnic Minority Writers in World Literature (4)
Lecture—3 hours; term paper. 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: AH, WC, WE.—(I.) 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: AH, WC, WE.

53B. Literature of India and Southeast Asia (3)
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: AH, OL, 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

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: 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: 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: 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: 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: AH, WC, WE.—II. (II.) Schiesari

139. Shakespeare and the Classical World (4)
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.) Schein

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: 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: AH, WC, WE.—III. (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: 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 include public and private space, memory, and gender. Offered in alternate years. GE credit: 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: 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: 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: AH, WC, WE.—I. Venkatesan

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: 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: AH, WC, WE.—I. (I.) Larsen

152S. 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

(change in existing course—eff. spring 12)

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: 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: AH, WC, WE.—III. (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: 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: 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: 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: AH, WC, WE.—I. Cannon

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: 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: AH, WC, WE.—III. (III.)

160B. The Modern Drama (4)
Lecture/discussion—3 hours; term paper. Readings in representative authors such as Ibsen, Strindberg, Chekhov, Pirandello and Brecht. GE credit: 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: AH, WC, WE.

161B. Comedy (4)
Lecture/discussion—3 hours; term paper. Comic attitudes towards life in literary works of different ages. GE credit: 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: 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: 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: 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: AH, WC, 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 eighteenth-century philosophical ideas and literary forms on modern political, social, and aesthetic culture. Offered in alternate years. GE credit: 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: 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: AH, WC, WE.—II. (II.)

166. Literatures of the Modern Middle East (4)
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: AH, WC, WE.—I. (I.) Radwan, Sharlet

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. GE credit: AH, WC, WE.—(I.) Schein

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: AH, WC, WE.—II. (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: 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: 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: AH, WC, WE.—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: 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: AH, WC, WE.

180. Selected Topics in Comparative Literature (4)
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: 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: AH, WC, WE.—IV. (IV.)

194H. Special Study for Honors Students (1-5)
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: junior standing and major in Comparative Literature, or consent of instructor. Advanced comparative study of selected topics and texts, with explicit emphasis on the theoretical and interpretive approaches that define Comparative Literature as a discipline and distinguish it from other literary disciplines. May be repeated one time for credit when topic differs. Offered in alternate years. GE credit: AH, WE.—(III.)

Design

Revised General Education courses in Design (DES)

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.—IV. (IV.)

14. Design Drawing (4)
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.—IV. (IV.)

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.—IV. (IV.)

16. 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: VL.—I, II, III, IV. (I, II, 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.—IV. (IV.)

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 communication) 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: AH, VL, WE.—II. (II.) Housefield

50. Model Making (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 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: VL.—IV.(IV.) Kessler

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, IV. (II, IV.)

Upper Division Courses

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 meaning through the addition of text. GE credit: AH, VL.—I, II, IV. (I, II, IV) Sylva

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. (I, II, III, IV.) Verba

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, IV) 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, IV) Drew

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. GE credit: AH, VL.—I. (I.) Avila

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, IV. (II., IV.) Kang, 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.—III. (III.)

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

(change in existing course—eff. spring 12)

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, IV. (I, II, IV.)

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. GE credit: AH, VL.—III. (III.)

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 motion-based, 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.—I. (I.) Drew

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.—II, III, IV. (II, III, IV.) 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 traditional graphic media. GE credit: VL.—II, III, IV. (II, III, IV.) Sylva, 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, (I, 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, sequencing, 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.—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.—II, IV. (II, IV.) Avila

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.—III. (III.) Avila

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.—I. (I.) Kang, 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.—II. (II.) Kang, 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, IV. (II, IV.) 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. (III.) McNeil

Dramatic Art

Revised General Education 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: ACGH, AH, DD, Wrt.—I, II, III, IV. (I, II, III, IV.) Bogad, Hunter, Rossini

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.)
(change in existing course—eff. fall 12)

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.)
(change in existing course—eff. spring 12)

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.)
(change in existing course—eff. fall 12)

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.)
(change in existing course—eff. fall 12)

Upper Division Courses

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: VL.

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

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.
(change in existing course—eff. fall 12)

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.

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.)
(change in existing course—eff. fall 12)

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: 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: AH, SS.—I, II, III, IV. (I, II, III, IV.) Hunter

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

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.)
(change in existing course—eff. spring 12)

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: AH.—IV. (IV.)

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.—Bogad
(change in existing course—eff. fall 12)

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: AH, WC, WE.—Hunter

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: AH, WE.—Rossini

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: AH, WC, WE.—II, IV. (II, IV.) Hunter

158. Performance Studies Undergraduate Seminar (4)
Seminar—4 hours. Prerequisite: course 156AN, 156BN, or 156CN 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. Offered irregularly. GE credit: WE.—I, II, III, IV. (I, II, III, IV.)

160A. Principles of Playwriting (4-4)
Lecture/discussion—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.—II. (II.)
(change in existing course—eff. winter 12)

160B. Principles of Playwriting (4-4)
Lecture—4 hours. Prerequisite: two courses in Dramatic Art or related courses in other departments; course 160A or consent of instructor. Analysis of dramatic structure; preparation of scenarios; the composition of plays. GE credit: WE.—II. (II.)
(change in existing course—eff. winter 12)

Economics

Revised General Education 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 systems. GE credit: 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: ACGH, QL, SS.—I, II, III. (I, II, III.)

Upper Division Courses

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.)

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: SS.—II. (II.)

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: SS.—I, III. (I, III.)

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: SS.—I, III. (I, III.)

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: SS.—II. (II.)

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.

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.—I, III. (I, 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: SS, WC.—I, II, III. (I, II, III.)

Education

Revised General Education courses in Education (EDU)

Lower Division Course

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, III.)

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: 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: 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: 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 alternate years. GE credit: 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: 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 large-group 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

(new course—eff. winter 12)

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, OL, SS, WE.—III. (III.)

173. Language Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Linguistics 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, Uchikoshi

181. Teaching in Science and Mathematics (2)
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

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.) Stevenson

Engineering

Revised General Education courses in Engineering (ENG)

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: 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: 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: 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: SE, SS.—I, II. Baldis, Orel, Parikh

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: SE, VL.—I, III. (I, III.)

35. Statics (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: 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, II, III. (I, II, III.)

45. Properties of Materials (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 16C or 21C and Chemistry 2A. Introductory course on the properties of engineering materials and their relation to the internal structure of materials. GE credit: QL, SE, SL, WE.—I, II, III. (I, II, III.)

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. Students who have completed Electrical and Computer Engineering 100 may receive only 1.5 units of credit. GE credit: SE, VL.—II, III. (II, III.)

102. Dynamics (4)
Lecture—4 hours. Prerequisite: course 35, Mathematics 22B; open to College of Engineering students only. Kinematics and kinetics of particles, of systems of particles, and of rigid bodies applied to engineering problems. Only 2 units of credit allowed to students who have previously taken Engineering 36. GE credit: QL, SE, VL.—I, II, III. (I, II, III.) Farouki, Hess, Hull

103. Fluid Mechanics (4)
Lecture—4 hours. Prerequisite: course 102 (may be taken concurrently). Open to majors in hydrology or the College of Engineering. 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.) Aldredge, Chattot, R. Davis

104. Mechanics of Materials (4)
Lecture—4 hours. Prerequisite: course 35, Mathematics 22B. Open to Engineering majors only. 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: QL, SE.—I, II, III. (I, II, III.)

104L. Mechanics of Materials Laboratory (1)
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: Mathematics 22B and Physics 9B. Open to Engineering majors 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.) Delplanque, D'Souza, Aldredge

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: 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. GE credit: QL, SE, VL, WE.—I. (II.) Delwiche Hartsough

121. Fluid Power Actuators and Systems (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 100, 102, 104 and either 103 or Biological Systems Engineering 103. 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. GE credit: QL, SE, SL, VL, WE.—(II.) Rosa

122. Introduction to Mechanical Vibrations (4)
Lecture—4 hours. Prerequisite: course 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

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 problems; 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.) Hwang

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.)
(change in existing course—eff. winter 13)

198. Directed Group Study (1-5)
May be repeated for credit up to 3 times. (P/NP grading only.) GE credit: SE.

Engineering: Applied Science-Davis

Revised General Education courses in Engineering: Applied Science-Davis (EAD)

Lower Division Course

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.)

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

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 management, networking, and information flow; managing relationships among computer architecture, software, and algorithms. GE credit: SE.—II. (II.) Miller, Orel, Laub, McCurdy, Rodrigue

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; atom-photon interactions; line broadening, Einstein coefficients; strong field interactions; photon bunching and anti-bunching; photoelectric counting distributions 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

Engineering: Biological Systems

Revised General Education 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; Physics 9C (may be taken concurrently). Properties of typical biological materials; composition 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: QL, SE, SL, VL, WE.—II. (II.) Jeoh, Slaughter

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 problems. (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.) Rosa

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, Mathematics 22B. 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.—Grismer

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
(new course—eff. spring 12)

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.

Engineering: Biomedical

Revised General Education courses in Biomedical Engineering (BIM)

Lower Division Courses

1. Introduction to Biomedical Engineering (2)
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
(change in existing course—eff. fall 12)

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
(change in existing course—eff. fall 12)

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.
(new course—eff. spring 12)

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.
(new course—eff. spring 12)

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.
(new course—eff. spring 12)

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

(change in existing course—eff. fall 12)

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

(change in existing course—eff. fall 12)

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

(change in existing course—eff. fall 12)

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.) Qi

(change in existing course—eff. fall 12)

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

(change in existing course—eff. fall 12)

110A. Biomedical Engineering Senior Design Experience (3)
Lecture/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: OL, SE, SL, VL.—II. (II.)

(change in existing course—eff. winter 13)

110B. Biomedical Engineering Senior Design Experience (3)
Lecture/discussion—1 hour; laboratory—6 hours. Prerequisite: course 110A. 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: OL, SE, SL, VL.—III. (III.)

(change in existing course—eff. spring 13)

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.)

(new course—eff. fall 12)

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

(change in existing course—eff. fall 12)

116. Physiology for Biomedical Engineers (5)
Lecture—2 hours; discussion—3 hours. Prerequisite: Biological Sciences 2A, Mathematics 22B, Physics 9C. Basic human physiology for the nervous, musculoskeletal, cardiovascular, respiratory, gastrointestinal, 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.) Louie

(change in existing course—eff. spring 13)

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. GE credit: QL, SE, SL, VL.—III. (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-electromechanical 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

(change in existing course—eff. winter 12)

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

(change in existing course—eff. fall 12)

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

(change in existing course—eff. fall 12)

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 x-ray imaging, computed tomography, magnetic resonance imaging, ultrasound and nuclear imaging. GE credit: QL, SE, SL, VL.—III. (III.) Ferrara

(change in existing course—eff. fall 12)

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

(change in existing course—eff. fall 12)

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 engineering 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

(change in existing course—eff. fall 12)

161L. Biomolecular Engineering Laboratory (3)
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. GE credit: QL, SE, SL.—II. (II.) Yokobayashi

161S. 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

(change in existing course—eff. summer 12)

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 biomechanics 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

(change in existing course—eff. spring 12)

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

(change in existing course—eff. fall 12)

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 students who have completed Mechanical Engineering 167C. GE credit: QL, SE.

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

(change in existing course—eff. fall 12)

189A-C. Topics in Biomedical Engineering (1-5)
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 (1-12)
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.)

(change in existing course—eff. fall 12)

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 credit: SE.

(change in existing course—eff. fall 12)

Engineering: Aerospace Science and Engineering

Revised General Education courses in Aerospace Science and Engineering (EAE)

Upper Division Courses

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.—I. (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. Specialization 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

(change in existing course—eff. winter 12)

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, SL, VL, WE.—III. (III.) van Dam

(change in existing course—eff. spring 12)

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

(change in existing course—eff. winter 12)

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.) Sarigul-Klijn

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, subsystem 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.)

Engineering: Chemical

Revised General Education courses in Engineering: Chemical (ECH)

Lower Division Course

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.)
(change in existing course—eff. fall 12)

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 engineering to contemporary issues. GE credit: SE, SS.—III. (III.)

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.)
(change in existing course—eff. spring 12)

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.)
(change in existing course—eff. spring 12)

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.)
(change in existing course—eff. fall 12)

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. (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.)
(change in existing course—eff. fall 12)

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: 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 Engineering, Biomedical Engineering, Food Engineering, and Biosystems Engineering. Continuation of course 155A. Laboratory experiments in transport phenomena, chemical kinetics, and thermodynamics. GE credit: 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 estimation. Profitability analysis techniques. Optimization of process flowsheets. 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, SE.—II. (II.)
(change in existing course—eff. fall 12)

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.)
(change in existing course—eff. fall 12)

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 (4)
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 oxygen mass transfer coefficients in bioreactors and ion exchange chromatography. GE credit: 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: SE.—II. (II.) Gates
(change in existing course—eff. winter 12)

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: SE.—III. (III.) Stroeve
(change in existing course—eff. spring 12)

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.)
(change in existing course—eff. spring 12)

198. Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SciEng | SE.—I, II, III. (I, II, III.)
(change in existing course—eff. spring 12)

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.)
(change in existing course—eff. spring 12)

Engineering: Chemical and Materials Science

Revised General Education courses in Engineering: Chemical and Materials Science (ECM)

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.)

Upper Division Courses

194HA. Special Study for Honors Students (2)
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 (1-5)
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 (1-5)
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, III.)

Engineering: Civil and Environmental

Revised General Education 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: 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 space-available 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. Non-majors accommodated on a space-available basis. Theory behind and description of modern methods of land surveying in Civil Engineering. GE credit: SE.—III. (III.)

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 problem solving techniques for Civil and Environmental Engineering applications using structured C programming. Algorithm design applied to realistic problems. GE credit: SE.—II. (II.) 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.) GE credit: SE.

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.—(III.) 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: 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.) Kendall, Loge

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.—I, IV. (I, IV.) 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.

132. Structural Design: Metallic Elements (4)
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 cross-section. 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, SS, VL, WE.—III. (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 Systems (3)
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 (1)
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.—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.—III. (III.) Younis

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: 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
(change in existing course—eff. winter 12)

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, SE, 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 (4)
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: QL, SE, SL.—II. (II.) Cappa

153. Deterministic Optimization and Design (4)
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: QL, SE, SL, SS, WE.—(III.) Lund

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.) Zhang

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: 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: QL, SE, SS.—(I.) Sperling

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, soil-water-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; consoli-

dation 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 (4)

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 (1-5)

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.) 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)

Prerequisite: senior standing in engineering and at least a B average. (P/NP grading only.) GE credit: SE.

Engineering: Computer Science

Revised General Education courses in Engineering: Computer Science (ECS)

Lower Division Courses

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: QL, SE, SL.—I, II, III. (I, II, III.) Amenta, Gertz, Ludaescher

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: QL, SE, SL.—I, II, III. (I, II, III.) Liu

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

(change in existing course—eff. spring 12)

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.)

(change in existing course—eff. spring 12)

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. (I, II, III.)

(change in existing course—eff. spring 12)

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 languages 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) Software Engineering; (F) Databases; (G) Artificial 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.)

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. GE 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 (4)

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. (I.) 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 MATLAB 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 fea-

tures 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, Su

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: SE.—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. IS0 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 Engineering 170; and course 110. Hardwired and microprogrammed CPU design. Memory hierarchies. Uniprocessor performance analysis under varying program mixes. Introduction to pipelining and multiprocessors. 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; calculus-based 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 (4)
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.—III. (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 (4)
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 engineering 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, Ludaescher

165B. Database Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 165A. Advanced database systems: object-oriented 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 (4)
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, Levitt

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. (II.) 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 computer-simulated 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 (4)
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 techno-

logical change. The social context of work in computer science and engineering. GE credit: Wrt | SS, WE.—I, II, III. (I, II, III.)

(change in existing course—eff. spring 12)

189A-M. 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) Computer Security. May be repeated for credit when topic differs. GE credit: SE.—I, II, III. (I, II, III.)

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: 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 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: SE.—II, III. (II, III.) Davidson, Joy

Engineering: Electrical and Computer

Revised General Education courses in Engineering: Electrical and Computer (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. (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. (I, II.) Akella, Al-Asaad, Chuah, Wilken

89A-F. Special Topics in Electromagnetics (1-5)
Prerequisite(s): 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: SE.

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: 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, III.) Amirtharajah, Hurst, Lewis, O'Driscoll, Spencer

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, Spencer

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: 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. (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 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.—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, Yankelevich

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 systems. 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. (I.) 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: 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. (III.) Knoesen

(change in existing course—eff. fall 13)

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.—III. (III.)

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 transis-

tors, bipolar junction transistor fundamentals. GE credit: SE, SL.—I, II. (I, II.) Fink, Hunt, Islam, Kiehl, Yankelevich

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, wet 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 Electrical, 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.—II. (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. Introduction 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
(change in existing course—eff. winter 13)

152. Digital Signal Processing (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: courses 70 and 150B. Theory and practice of real-time digital signal processing. Fundamentals of real-time 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 (4)
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. Prerequisites: 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 (4)
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
(change in existing course—eff. fall 12)

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
(change in existing course—eff. spring 12)

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. (II.) 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. IS0 seven-layer model. Physical aspects of data transmission. Data-link 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 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 and 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-programmable 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.—II, III. (II, 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 computer-engineering 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 computer-engineering 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
(change in existing course—eff. spring 12)

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.)—I, II, III. (I, II, III.)

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.)
(change in existing course—eff. fall 12)

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, III.)

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
(change in existing course—eff. fall 12)

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.) Spencer

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.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. May be repeated three times for credit. (P/NP grading only.) GE credit: SE.

Engineering: Materials Science and Engineering

Revised General Education courses in Materials Science and Engineering (EMS)

Lower Division Course

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: SE.—I. (I.) Risbud
(new course—eff. fall 10)

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
(change in existing course—eff. spring 12)

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.)
(change in existing course—eff. winter 12)

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: 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, VL.—II. (II.)
(change in existing course—eff. winter 12)

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: 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: 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: 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: OL, SE, SL, VL, WE.—III. (III.)

(change in existing course—eff. spring 12)

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 structure-property relationship. Fundamentals of the manufacturing processes for electronic, optical, functional and structural materials. GE credit: OL, SE, VL, WE.—II. (II.)

(change in existing course—eff. winter 12)

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

(change in existing course—eff. winter 13)

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

(change in existing course—eff. spring 13)

Engineering: Mechanical

Revised General Education courses in Engineering: Mechanical (EME)

Lower Division Courses

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

Lower Division Courses

106. Thermo-Fluid Dynamics (4)
Lecture—4 hours. Prerequisite: Engineering 103 and 105. Restricted to Mechanical Engineering, Aeronautical Engineering and Mechanical Engineering/Materials Science Engineering majors. Inviscid incompressible flow, compressible flow, thermodynamic relations, ideal gas mixtures, psychrometrics, reacting mixtures and combustion. GE credit: SE.—I, II, III. (I, II, III.) Delplanque, Park, Shaw

107A. Experimental Methods (3)
Lecture—2 hours; laboratory—1.5 hours. Prerequisite: course 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; Experiments involving thermodynamic cycles, combustion, compressible and incompressible flows. Two units of credit for students who have previously taken Chemical and Materials Science Engineering 155A. One unit of credit for students who have taken Chemical and Materials Science Engineering 155B. Two units of credit for students who have taken Civil and Environmental Engineering 141L. GE credit: QL, SE, VL.—I, II, III. (I, II, III.) Erickson, Kennedy, Park, Shaw

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 and 104; Mechanical Engineering 50 (may be taken concurrently). 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.) Hill, Hull, 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.) Cheng

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: course 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.) Shaw

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

(change in existing course—eff. spring 13)

165. Heat Transfer (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 5 or Engineering 6, 103 and 105. 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, III. (I, III.) Aldredge, Kennedy, 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 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.—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.)

(change in existing course—eff. winter 12)

189B. Selected Topics in Mechanical Engineering (1-5)
Prerequisite: consent of instructor. Directed group study of selected topics in separate sections in Engineering Controls. May be repeated for credit when the topic is different. GE credit: SE.

English

Revised General Education 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: AH, WE.—I, II, III. (I, II, III.)

(change in existing course—eff. winter 12)

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: AH, WE.

5F. Introduction to Creative Writing: Fiction (4)
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: AH, WE.—I, II, III. (I, II, III.)

5P. Introduction to Creative Writing: Poetry (4)
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. (I, II, III.)

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: 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: ACGH, AH, WE.

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: 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: 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: AH, WE.—I.

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: AH, WE.—III.

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: AH, WE.—II.

46A. 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 to 1640. History of literary conventions and backgrounds in religious thought, intellectual and social history, and related art forms. GE credit: 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: 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: AH, WC, WE.

Upper Division Courses

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: 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: AH, WE.

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: 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: AH, WE.—I, II, III.

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: AH, WE.

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: AH, WC, WE.—I, II, III. (I, II, III.)

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: AH, WC, WE.—I, II, III. (I, II, III.)

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's work. GE credit: AH, WC, WE.—I, II, III. (I, II, 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: AH, WC, WE.—I, II, III.

122. Milton (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Selected major works, including Paradise Lost. GE credit: 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: AH, WC, WE.—III. (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: AH, WC, WE.—II.

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: AH, WC, WE.—I, 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: AH, WC, WE.—III.

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: AH, WC, WE.—III.

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: AH, WC, WE.

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 organized 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: AH, WC, WE.—II.

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: 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: ACGH, AH, WE.—I, II.

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: ACGH, AH, WE.

146N. American Literature: 1900-1945 (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 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: ACGH, AH, WE.

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: ACGH, AH, WE.—I, II.

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: AH, WE.—I, II.

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: 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 anglophone drama from 1800 to the present. May be repeated for credit when topic differs. GE credit: 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: AH, WE.

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: 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: AH, WC, WE.—I.

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: 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: AH, WE.—II, III.

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: ACGH, AH, WE.

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: ACGH, AH, WE.—I.

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: 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: AH, VL.—I.

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: AH, VL.—III.

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: 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: 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: 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: AH, SL, WE.—II. 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: AH, WE.

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: 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: 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: ACGH, AH, WE.—III.

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: AH, WC, WE.

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: 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: 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: ACGH, AH, WE.

177. Study of an Individual Author (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Survey of the works of an individual author other than Chaucer, Shakespeare, or Milton. May be repeated for credit when a different author is studied. GE credit: AH, WE.

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: AH, WE.—III.

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: ACGH, AH, DD, WE.

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: AH, WE.—I.

181A. African American Literature to 1900 (4)
Lecture/discussion—3 hours; term paper. Prerequisite: 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: ACGH, AH, DD, WE.

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: ACGH, AH, DD, WE.

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: ACGH, AH, WE.—I.

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.

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: AH, WE.—II.

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: AH, WE.—I.

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: AH, WE.—II.

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.

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: AH, WE.—I.

189. Seminar in a Major Writer (4)
Seminar—3 hours; term paper. Prerequisite: junior or senior standing; a major in English or consent of instructor. One major writer's artistic development with attention to intellectual and literary milieu. Limited enrollment. GE credit: AH, WE.—II, III.

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.

Entomology

Revised General Education 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 entomology and art. GE credit: AH, OL, SE, SS, VL, WE.—I. (I.) Ullman

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 Evolution and Ecology 2.) GE credit: SE, SL, WE.—I. (I.)

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: SE, SL.—II. (II.) Kaya, Ullman

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: WC.—I, III. (I, III.) 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: VL.—I. (I.) Kimsey

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: SE, WE.—II. (II.) Hammock, Leal

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: 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: 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: SE, WE.—II. (II.) Zalom

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

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: 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: OL, VL, WE.—III. (III.)

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 arthropod-borne diseases and principles of their control. Relationships of arthropods to human health. GE credit: 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: 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: 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: WC.—III. (III.) R. Kimsey

Environmental Horticulture

Revised General Education courses in Environmental Horticulture (ENH)

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 sustainable, low maintenance landscape systems will be presented. Career opportunities will be discussed. GE credit: SE, SL, WE.—I. (I.) Burger

6. Introduction to Environmental Plants (4)
Lecture—1 hour; discussion—2 hours; laboratory—3 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: SE, VL.—I. (I.) Harding

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: SE, VL.—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 landscape, 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.—III. (III.) Chetelat, Jasieniuk

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 restoration 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.) Eviner

Environmental Science and Management

Revised General Education 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: 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: SE, SL, WC.—II, III. (II, 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 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) Grismer

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-plant-atmosphere 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: 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

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 management. Not open to students who have successfully completed Environmental and Resource Sciences 121. (Formerly Environmental and Resource Sciences 121.) GE credit: QL, SE, SL.—I. (I.) Silk

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.) GE 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

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 (2)
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

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.)

Environmental Science and Policy

Revised General Education 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

(change in existing course—eff. fall 12)

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: SE, SL, SS, 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: SE, SL, WC.—II, III. (II, III

30G. The Global Ecosystem: Laboratory/ Discussion (2)
(cancelled course—eff. winter 12)

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: SS, WC, WE.—II. (II.)

102. Cultural Ecology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one lower division course in the social sciences, upper division standing. Comparative survey of the interaction between diverse human cultural systems and the environment. Primary emphasis given to people in rural and relatively undeveloped environments as a basis for interpreting complex environments. Not open for credit to students who have completed course 133. (Former course 133.) (Same course as Anthropology 102.) GE credit: SS, WC, WE.—III. (III.)

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: 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: QL, SE, SL.—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.) Baskett

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. Hands-on 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; 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 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.— III. (III.) C. Goldman

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.—III. (III.) C. Goldman

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 environ-

mental 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.—II. (II.)

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: 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: 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.) Sabatier

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, benefit-cost 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. GE credit: SS.

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: 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: ACGH, SS.—III. (III.) Lubell

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: 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.)

179L. Environmental Impact Reporting Using Geographic Information (2)
Laboratory/discussion—2 hours; laboratory—4 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 stakeholders. GE credit: SE.—II. (II.) Tomich

Environmental Toxicology

Revised General Education 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: SE, SL.—I. (I.) Tjeerdema

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 | SE, SL, VL.—II. (II.) Kanthaswamy
(change in existing course—eff. spring 12)

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: 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.) GE 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. Offered in alternate years. GE credit: OL, SE, SL, WE.—II. (II.) Rice

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: 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: 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: 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.) Alexeeff

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: 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.)—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.

Evolution and Ecology

Revised General Education 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: 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: OL, SE, SL, WE.—Toft

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: SE, SL, WE.—III. Williams

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. (I, II, III.) Begun, Coop, Kopp, Langley, Turelli

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

102. Population and Quantitative Genetics (4)
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

(change in existing course—eff. winter 12)

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.—I. 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

(change in existing course—eff. fall 13)

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

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

119. 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.) GE credit: SE.—III. (III.) Rejmanek

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: SE, SL, WE.—III. Shapiro

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: 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: QL, 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
(change in existing course—eff. winter 13)

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.

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, 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 3 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-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: SE.—I, II, III. (I, II, III.) Shapiro

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.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.) GE credit: SE.

Exercise Biology

Revised General Education courses in Exercise Biology (EXB)

Lower Division Courses

10. Exercise and Fitness: Principles and Practice (3)
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 students who have completed an upper division Exercise Biology course. GE credit: SE, SL.—I, II. (I, II.) Salitsky, Shaffrath

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.

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 environmental 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.) Bodine, Shaffrath

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: 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: 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 recommended. 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: 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: 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.—II. (II.) 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.) Harris

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: SE.—III. (III.) Salitsky, Shaffrath

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: 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: 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: SS.—I, IV. (I, IV.) Salitsky

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.—I. (I.) 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: SE.—Bodine

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: 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.) GE 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.

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.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor and chairperson. (P/NP grading only.) GE credit: SE.

Fiber and Polymer Science

Revised General Education 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: SE, SL, SS, WE.

150. Polymer Syntheses and Reactions (3)
Lecture—3 hours. Prerequisite: Chemistry 128B or 8B, and Chemistry 107A. Organic and physical chemistry aspects of polymer syntheses and reactions including polymerization mechanisms, kinetics and thermodynamics for major types of organic high polymers. GE credit: OL, QL, SE, SL, VL, WE.—III. (III.) Hsieh

161. Structure and Properties of Fibers (3)
Lecture—3 hours. Prerequisite: Textiles and Clothing 6 and Chemistry 8B. The structure, properties and reactions of natural- and man-made fibers; the relations between molecular structure of fibers and their physical properties; interactions of fibers and detergents. GE credit: OL, QL, SE, SL, VL, WE.—I. (I.) Hsieh

161L. Textile Chemical Analysis Laboratory (1)
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, II, III.)

Film Studies

Revised General Education 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: AH, OL, VL, WC, WE.—I, II, III. (I, II, III.)

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

(new course—eff. fall 12)

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: ACGH, AH, DD, OL, VL, WC, WE.—III. (III.) Heyer-Caput, Schiesari

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 Italian 121.) GE credit: AH, OL, VL, WC, WE.—III. Heyer-Caput

121S. 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: 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: ACGH, AH, DD, OL, VL, WE.—III. (III.) Clover, Fisher, Simmon

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: AH, OL, VL, WE.—II. (II.) Clover, Constable, McConnell, 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: AH, OL, VL, WC, WE.—III. (III.) Constable

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 German 142) GE credit: 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 German 176A.) GE credit: 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: 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: AH, OL, VL, WE.—I, III. (I, III.) Clover, Constable, Fisher, Heyer-Caput, Lu, Simmon, Smoodin

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.)

Food Science and Technology

Revised General Education 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: 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: 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 credit: SE.—III. (III.)

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
(change in existing course—eff. fall 12)

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.) German

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. (II.) 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. (III.) Bamforth

103. Physical and Chemical Methods for Food Analysis (4)
Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: Chemistry 2C, 8B, Biological Sciences or Animal Biology 102 (may be taken concurrently), 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 food-

borne 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 corrosion, 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.) K. McCarthy

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 nonparametric 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. Rosenberg

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.) GE credit: 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 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. Smith

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.) Guinard

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: 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 (2)
Lecture/discussion—2 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). Course will familiarize students with initial stages of food product development, including definition and articulation of a problem, generation of ideas to solve the problem, screening of ideas, and the formal presentation of a new product concept. GE credit: AH, OL, SS, WE.

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 presentation of a new product development. GE credit: OL, SE, VL.—II. (II.)

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, III. (II, III.) Shoemaker, Seiber

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.

French

Revised General Education courses in French (FRE)

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.) Anderson

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: 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: AH, WC, WE.—II. (II.) Fort, Guynn

52. France and the French-Speaking World (4)
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 French-speaking world, with particular attention to mass media. GE credit: 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: AH, OL, WC, WE.—(II.) Russell Webb

Upper Division 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, WE.—I, II, III. (I, II, III.) Asquith

101. Introduction to French Poetry (4)
Lecture—3 hours; short papers. 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: AH, WC, WE.—II. (I.) Asquith

102. Introduction to French Drama (4)
Lecture—3 hours; short papers. 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: 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: WC.—III. (III.) Simon

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: WC.—II. (II.) Russell Webb

106. French in Business and the Professions (4)
Lecture—1 hour; discussion—2 hours; frequent written assignments. 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 non-literary composition. Technical terminology in such diverse fields as government and world business. GE credit: WC.—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: WC.—(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: WC.—Peureux, 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. (II.) Russell Webb

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, Aucassin et Nicolette, selected fabliaux and farces. Offered in alternate years. GE credit: 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. Offered in alternate years. GE credit: AH, WC, WE.—(III.) Peureux

117A. Baroque and Preclassicism (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. The literature and intellectual culture of the period between the Renaissance and French classicism. Offered in alternate years. GE credit: AH, WC, WE.—(II.) Peureux

117B. The Classical Moment (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. 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: AH, WC, WE.—(III.) Guynn, Peureux

118A. The Age of Reason and Revolution (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. 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: WC.—(II.) Simon

118B. Private Lives and Public Secrets: The Early French Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 103. 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: WC.—II. Simon

119A. The Romantic Imaginary (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. 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: WC.—II.

119B. Realism, History and the Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. Investigation of the 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: WC.—(III.)

119C. From Baudelaire to Surrealism (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101. 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. GE credit: AH, WC, WE.—(I.) Asquith

120. Modern French Thought (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. 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: AH, WC, WE.—(I.) Fort

121. Twentieth Century French Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 103. 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: 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: AH, VL, WC, WE.—(I.) Fort

124. Post-Colonialist and Francophone Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. Introduction to 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 syncretism, theories of post-colonialism. May be repeated one time for credit when topic differs. Offered in alternate years. GE credit: AH, WC, WE.—(III.) Adejunmobi

125. French Literature and Other Arts (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. The 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: WC.—II. Guynn

127. Paris: Modernity and Metropolitan Culture (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. Study of the 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: AH, WC.—(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: WC.—Guynn, Simon

130. From Page to Stage: Theatre and Theatricality (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 102. French theater as literature and performance. May be repeated one time for credit when topic differs. Offered in alternate years. GE credit: AH, WC, WE.—I. Guynn, Peureux

133. Gender and Politics in French Literature and Culture (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. Examination of the 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: AH, WC, WE.—I.

140. Study of a Major Writer (4)
Lecture—3 hours; term paper. Prerequisite: course 100 and course 101, 102, or 103 as appropriate to selected topic, or consent of instructor. Concentrated study of works of a single author. May be repeated one time for credit as author-subject changes. GE credit: AH, WC, WE.—II. (II.)

141. Selected Topics in French Literature (4)
Lecture—3 hours; term paper or short papers. Prerequisite: courses 100 and 101 or 102 or 103 as appropriate to the selected topic or 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, 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, 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, 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: AH, SS, WC, WE.—II. (II.) Russell Webb

194H. Special Study for Honors Students (4)
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, III.)

Geology

Revised General Education 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: SE, SL, WE.—I, II, III. (I, II, III.) Osleger, Verosub

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: 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: SE.—I. (I.)

3. History of Life (3)
Lecture—3 hours. Prerequisite: course 1 recommended. The history of life during the three and one-half 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: SE.—II. (II.) Motani

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: 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. GE credit: SE, SL, WE.—I. (I.) Vermeij

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: 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: SE, SL.—II. III. (II, III.) Hill, Spero

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: 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, III. (I, 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: 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: 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: 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: 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: 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: 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 equivalent may receive only 2 units for course 50. GE credit: SE, SL.—I. II. (I, II.) Billen, Zierenberg

50L. Physical Geology Laboratory (2)
Laboratory—6 hours; one or two one-day field trips. Prerequisite: course 50 (preferably taken concurrently). Introduction to classification and recognition of minerals and rocks and to interpretation of topographic and geologic maps and aerial photographs. Students with credit for course 1L or the equivalent may receive only 1 unit for course 50L. GE credit: SE.—I. II. (I, II.) Billen, Zierenberg

60. Earth Materials: Introduction (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Chemistry 2A; Mathematics 16A or 21A; course 1 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.) Rustad

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, Rustad

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 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.—I, II, III. (I, II, III.) 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: QL, SE.—II. (II.) Cowgill

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; field-mapping projects; interpretation of topographic and geologic maps; tectonic analysis of convergent and collisional terranes. GE credit: SE, VL.—II. (II.) Cowgill

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: SE, WE.—II. (II.) Cooper, Lesher

106. Earth Materials: Metamorphic Rocks (4)
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: 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, populations, and communities of fossil organisms in field and laboratory. GE credit: SE.—III. (III.) Carlson, Motani

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: SE, SL, WE.—III. (III.) Montañez, Spero

109. Earth History: Sediments and Strata (2)
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: 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. Identification of major sediment and sedimentary rock types. Outcrop and subsurface analysis of sedimentary basins. GE credit: SE, WE.—II. (II.) Sumner

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: SE, VL, WE.—IV. (IV.) McClain

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: 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; integrated 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. (III.) Rustad

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

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: SE, WE.—II. (II.) Rustad

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: 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 processes, 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

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.) Motani

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 petroleum 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: 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. 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: SE.—(II.) Day

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. (I.) Day, 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 contemporary 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, hydrocarbon 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 (2)
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.) Day, Passmore

182. 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. 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: SE.—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, WE.

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.

German

Revised General Education courses in German (GER)

Lower Division Courses

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 1A. GE credit: AH, WC.—I, II, III. (I, II, III.) 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, II.) Arnett

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
(new course—eff. fall 12)

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) (4)
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
(new course—eff. fall 12)

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: AH, WC, WE.—I. (I.)

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: 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: AH.—II. (II.)

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, WE.

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: AH, OL, WC, WE.—I. (I.) Arnett

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: 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: AH, WC, WE.—II, III. Bernd

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: 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: AH, WC, WE.—I. (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 Jewish Studies 116.) GE credit: 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: 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) (4)
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: 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: 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: WC, WE.—I. McConnell

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: 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: 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: 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: AH.—II. McConnell

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: AH, WC, WE.—I. Bernd

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: AH, WC, WE.—I. Bernd

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 troubadours, 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: 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-de-siècle period and representative of various prose styles and cultural currents. Offered in alternate years. GE credit: 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: 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: 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: 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: 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 representative authors from Goethe to Kafka. Offered in alternate years. GE credit: AH, WC, WE.—I. Bernd

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: AH, OL, WC, WE.—(III.)

134. Topics in German Intellectual History (4)
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: AH, WC, WE.—I, III. (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: 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: 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: AH, OL, WC, WE.—II. (II.) Arnett

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: WC, WE.—I. McConnell

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: AH, OL, VL, WC, WE.—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: 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: AH, WC, WE.—II. Bernd

Greek

Revised General Education 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.) Bulman

2. Elementary Greek (5)
Lecture—5 hours. Prerequisite: course 1. Continuation of course 1. GE credit: AH.—II. (II.) Bulman

2NT. Elementary New Testament Greek (1)
Lecture—1 hour. Prerequisite: course 2 (concurrently). Supplementary study of New Testament Greek. GE credit: AH.—II. (II.) Bulman

3. Intermediate Greek (5)
Lecture—5 hours. Prerequisite: course 2. Continuation of course 2. Selected readings from Greek authors. GE credit: AH.—III. (III.) Bulman

3NT. Elementary New Testament Greek (1)
Lecture—1 hour. Prerequisite: course 3 (concurrently). Supplementary study of New Testament Greek. GE credit: AH.—III. (III.) Bulman

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: AH, WE.—(II.) Seal

102. Euripides (4)
Lecture—3 hours; term paper. Prerequisite: course 101. GE credit: AH, WE.—III. Bulman

103A. Homer: Iliad (4)
Recitation—3 hours; term paper. Prerequisite: course 3. GE credit: AH, WE.—(II.) Schein, Traill

103B. Homer: Odyssey (4)
Recitation—3 hours; term paper. Prerequisite: course 3. GE credit: AH, WE.—(II.) Schein, Traill

104. Menander (4)
Lecture—3 hours; term paper. Prerequisite: course 3. GE credit: 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.—Watanabe

111. Sophocles (4)
Lecture—3 hours; term paper. Prerequisite: course 103. GE credit: AH, WE.—(III.) Schein

112. Aristophanes (4)
Lecture—3 hours; term paper. Prerequisite: course 103. GE credit: AH, WE.

113. Thucydides (4)
Lecture—3 hours; term paper. Prerequisite: course 103. Offered in alternate years. GE credit: AH, WE.—Watanabe

114. Lyric Poetry (4)
Lecture—3 hours; term paper. Prerequisite: course 103. Offered in alternate years. GE credit: AH, WE.—Bulman

115. Aeschylus (4)
Lecture—3 hours; term paper. Prerequisite: course 103. Offered in alternate years. GE credit: AH, WE.—Schein

116. Herodotus (4)
Lecture—3 hours; term paper. Prerequisite: course 103. Offered in alternate years. GE credit: AH, WE.—Stem, Watanabe

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.—Traill
(new course—eff. fall 12)

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.—Watanabe
(new course—eff. fall 12)

Hebrew

Revised General Education 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.) Raab

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.—IV. (IV.)

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.) Raab

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.) Raab

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.) Raab

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.)

Hindi

Revised General Education 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.) Good

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.) Good

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.) Good

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.) Good

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.) Good

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.) Good

History

Revised General Education 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: AH, 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: AH, SS, WC, WE.—I. (I.)

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: AH, SS, WC, WE.—I, II, III. (I, II, III.)

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: AH, SS, WC, WE.—I, II. (I, II.)

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: AH, SS, WC, WE.—I. Anooshahr, El Shakry, 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: AH, SS, WC, WE.—I. (I.)

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: AH, SS, WC, WE.—II. (II.)

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 revolu-

tion and reform movements, cultural and ethnic issues, U.S.-Latin American relations, neo-liberal restructuring. GE credit: AH, SS, WC, WE.—III. (III.)

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: AH, SS, WC, WE.—III. (III.) 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: AH, SS, WC, WE.—II, III. (II, III.)

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: AH, SS, WC, WE.—I. (I.)

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: AH, SS, WC, WE.—I. Lawrance

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: AH, SS, WC, WE.—II.

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: AH, SS, WC, WE.—III. (III.)

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: AH, SS, WC, WE.—I. (I.) Decker, Lawrance

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. GE credit: AH, VL, WC, WE.—I. (I.) Miller

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: ACGH, AH, DD, SS, WE.—I, II. (I, II.)

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: ACGH, AH, DD, SS, 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: ACGH, AH, DD, SS, WE.—I. (I.) 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: ACGH, AH, DD, SS, WE.—II. (II.) 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: AH, SS, WE.

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: WC.—III. (III.)

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: AH, 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: WC.

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: WC.—I. (I.) Oropeza

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: WC.—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: WC.—III.

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: AH, SS.—II. (II.) 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: SE, SL, SS.—III. (III.) 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: AH, 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. GE credit: AH, VL, WC, WE.—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: AH, SS, WC, WE.—II. (II.) 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: AH, SS, WC, WE.—III. (III.) 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: AH, 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: AH, SS, WC, WE.—I. (I.)

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: AH, SS, WC, WE.—III. (III.)

112C. History of Jews in the Muslim World (4)
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: WC, WE.—II. (II.) 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: AH, SS, WC, WE.—II. (II.) 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: AH, SS, WC, WE.—Lawrance

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: AH, SS, WC, WE.—Decker, Lawrance

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: AH, SS, WC, WE.—Decker, Lawrance

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: AH, SS, WC, WE.—I. (I.)

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: AH, SS, WC, WE.—III. (III.) Lawrance

115F. History of Modern North Africa, 1800 to the Present (4)
Lecture—3 hours; term paper. History of Morocco, Algeria, Tunisia and Libya (the Maghrib), 1800 to the present. Topics include conquest and pacification, reform movements, the rise of nationalism, decolonization, state capitalism, economic liberalization, Islamism, democratization and human rights, the interplay of history and memory. GE credit: AH, SS, WC, WE.—II. (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: AH, 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: 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: AH, SS, WC, WE.—I. (I.)

121B. Medieval History (4)
Lecture/discussion and panel presentations—3 hours. European history from Charlemagne to the twelfth century. GE credit: AH, SS, WC, WE.—III. (III.) McKee

121C. Medieval History (4)
Lecture/discussion and panel presentations—3 hours. European history from the Crusades to the Renaissance. GE credit: AH, SS, WC, WE.—I. (I.) McKee

122. Selected Themes in Medieval History (4)
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: AH, SS, WC, WE.—III. (III.)

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: AH, SS, WC, WE.—III. (III.)

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: AH, SS, WC, WE.—II. (II.)

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: AH, SS, WC, WE.—II. (II.) 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: AH, SS, WC, WE.

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: AH, 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: AH, SS, WC, WE.—II. (II.) Stuart

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: AH, SS, WC, WE.—II. (II.) 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: AH, SS, WC, WE.—II. (II.) Stuart

133. The Age of Ideas (4)
Lecture—3 hours; written reports. The Enlightenment and its background in the seventeenth century. GE credit: AH, SS, WC, WE.—Stolzenberg

134A. The Age of Revolution (4)
Lecture—3 hours; written reports. Ideas and institutions during the French Revolution and the Napoleonic era. GE credit: AH, SS, WE.—I. (I.)

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: AH, 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: AH, SS, WC, WE.—I. (I.)

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: AH, SS, WC, WE.—III. (III.) 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: AH, SS, WC, WE.—II. (II.)

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: AH, SS, WC, WE.—I. (I.)

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: AH, SS, WC, WE.—III. (III.)

139A. Medieval and Renaissance Medicine (4)
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: AH, 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: AH, SS, WC, WE.—(III.) Kudlick

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: AH, SS, WC, WE.—III.

141. France Since 1815 (4)
Lecture—3 hours; term paper. GE credit: AH, SS, WC, WE.—II. (II.)

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: AH, SS, WC, WE.—I. Biale

142B. The Memory of the Holocaust (4)
Lecture—3 hours; term paper. Prerequisite: upper 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: AH, SS, WC, WE.—II. 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: AH, SS, WC, WE.—II. (II.)

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, SS, WC, WE.—III. (III.) Stuart

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: AH, SS, WC, WE.II. (II.)

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: AH, SS, WC, WE.—III. (III.)

146A. Europe in the Twentieth Century (4)
Lecture—3 hours; term paper. Survey of the history of Europe from 1919 to 1939. GE credit: AH, SS, WC, WE.—II. (II.) Dickinson

146B. Europe in the Twentieth Century (4)
Lecture—3 hours; term paper. Survey of the history of Europe since 1939. GE credit: AH, SS, WC, WE.—III. (III.) 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: AH, SS, WC, WE.—II. (II.) 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: AH, SS, WC, WE.—II. (II.) 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: AH, SS, WC, WE.—III. (III.) 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: AH, SS, WC, WE.—II. (II.) Kudlick

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: AH, SS, WC, WE.—II. (II.) Kudlick

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 movements, such as World War I, fascism, Soviet communism, World War II, the welfare state, feminism, and mass culture. GE credit: AH, SS, WC, WE.—III. (III.)

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: AH, SS, WC, WE.—II.

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: AH, SS, WC, WE.—III. (III.)

151B. England: The Early Modern Centuries (4)
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: AH, 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 revolution. GE credit: AH, SS, WC, WE.—I. (I.) Landau

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: AH, 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 categories. Introduction to the theoretical premises of women's and gender history. GE credit: AH, SS, WC, WE.—III. (III.) 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: AH, 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: AH, SS, WC, WE.—III. (III.) C. Walker

163A. History of Brazil (4)
Lecture—3 hours; written reports. The history of colonial and imperial Brazil from 1500 to 1889. GE credit: AH, SS, WC, WE.—III.

163B. History of Brazil (4)
Lecture—3 hours; written reports. The history of the Brazilian republic from 1889 to the present. GE credit: AH, SS, WC, WE.—III.

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: AH, SS, WC, WE.—III.

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: AH, SS, WC, WE.—II. (II.)

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: AH, SS, WC, WE.—(III.) Reséndez

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: AH, SS, WC, WE.—I. (I.) Reséndez

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: AH, SS, WC, WE.—I. C. 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: AH, SS, WC, WE.—III. (III.)

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: AH, SS, WC, WE.—II. (II.) 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: ACGH, AH, DD, SS, WE.—I. (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: ACGH, AH, SS, WE.—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: ACGH, AH, SS, WE.—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: ACGH, AH, DD, SS, WE.—III. (III.)

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: ACGH, AH, DD, SS, WE.—II. (II.) 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: ACGH, AH, DD, SS, WE.—III. (III.)

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, SS.—II, III. (II, III.)

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: ACGH, AH, SS, WE.—III.

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; environmental movement. Offered in alternate years. GE credit: ACGH, AH, SS, WE.—III. Warren

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: ACGH, AH, DD, SS, WE.—(III.) 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: ACGH, AH, DD, SS, WE.—I. Rauchway

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: ACGH, AH, DD, SS, WE.—II. Olmsted, Rauchway

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: ACGH, AH, DD, SS, WE.—III. (III.) Olmsted, Oropeza

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: ACGH, AH, SS, WE.—(II.)

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: ACGH, AH, SS, WE.—I. 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: ACGH, AH, SS, WE.—I. (I.)

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: ACGH, AH, DD, SS, WE.—III. (III.)

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: ACGH, AH, DD, SS, WE.—I. (I.) 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: ACGH, AH, DD, SS, WE.—II. (II.) 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: ACGH, AH, DD, SS, WE.—III. 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: ACGH, AH, DD, SS, 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: ACGH, AH, DD, SS, WE.—Tsu

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: ACGH, AH, SS, WE.—II.

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: ACGH, AH, SS, WE.—III. (III.) Rauchway, Olmsted

181. Religion in American History to 1890 (4)
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: ACGH, AH, SS, WE.—III. 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, DD, SS, 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: ACGH, AH, SS, WE.—I. (I.) Taylor

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: ACGH, AH, SS, WE.—II. (II.) 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: ACGH, AH, DD, SS, WE.—I. 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: AH, 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: AH, 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.—I, II, III, IV. (I, II, III, IV.) Kelman

189. California History (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing. California history from the pre-colonial period to the present including dispossession 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: ACGH, AH, DD, SS, WE.—II. Warren, Tsu

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: AH, SS, WC, WE.—(I.) Tezcan

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: AH, SS, WC, WE.—(I.) 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: AH, SS, WC, WE.—(II.) 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

(change in existing course—eff. fall 12)

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: AH, SS, WC, WE.—I, II. (I, II.)

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: AH, SS, WC, WE.—II. (II.) 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 Opium War. Readings include primary sources and novels portraying elite ethos as well as popular culture. GE credit: AH, SS, WC, WE.—I.

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: AH, SS, WC, WE.—I. (I.) Bossler

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: AH, SS, WC, WE.—II. (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: AH, SS, WC, WE.—(III.)

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: AH, SS, VL, WC, WE.—II. El Shakry

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: AH, SS, VL, WC, WE.—III. 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: AH, SS.—II. (II.) 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: AH, SS, VL, WC, WE.—III. (III.) 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: AH, SS, WC, WE.—(II.)

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: AH, SS, WC, WE.—I. (I.) 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: AH, SS, WC, WE.—III. (III.) Kim

194D. Business and Labor in Modern Japan (4)
Lecture—3 hours; term paper or papers. Survey of labor and management relations in Japan from the mid-eighteenth century to the present. Offered in alternate years. GE credit: AH, SS, WC, WE.—I.

194E. Education and Technology in Modern Japan (4)
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: AH, SS, WC, WE.—I.

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: AH, SS, WC, WE.—II. 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 Hinduism and Islam and on the changing nature of the state. GE credit: AH, SS, WC, WE.—I. (I.) 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: AH, SS, WC, WE.—Sen

Human Development

Revised General Education courses in Human Development (HDE)

Lower Division Course

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: ACGH, DD, SS.—I, III. (I, II, III.)

Upper Division Courses

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: WC.—I, II, III. (I, II, III.) Chen, Gibbs, Goodman, Graf Ester, 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, self-understanding, sex-role identity, and antisocial behavior. Emphasis on the interface between biological and social factors. (Same course as Psychology 142.) GE credit: SS, WE.—I, II, III. (I, II, III.) Conger, Gibbs, Lagattuta, Rivera, Robins

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: ACGH, DD, SS, WC.—I. (III.)

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: 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: SS, WE.—I, III. (I, III.) Nishina

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: SS, WE.—III. (I.) Miller

Humanities

Revised General Education 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: 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. GE credit: 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: 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: AH, 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: 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: AH, WE.—I.

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: 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: 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: 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. E 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: 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: AH, SS, WE.

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: 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: AH, WE.

Upper Division Courses

144. Marx, Nietzsche, Freud (4)
Lecture/discussion—3 hours; term paper. Study of major texts of these thinkers, 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. GE credit: AH, WC.

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: AH, WE.

Hydrologic Science

Revised General Education courses in Hydrologic Science (HYD)

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: SE, SL, SS.—III. (III.) Fogg

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

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.) Wallender

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.—III. (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 (3)
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: QL, 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.) Marino

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 pumping 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, SE, 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. GE credit: QL, SE, 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.—III. Zhang

Integrated Studies

Revised General Education courses in Integrated Studies (IST)

Lower Division Courses

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: SE, SL.—I, II, III. (I, II, III.)

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: 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: SS.—I, II, III. (I, II, III.)

International Agricultural Development

Revised General Education courses in International Agricultural Development (IAD)

Lower Division Course

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: SS, WC, WE.—II. (II.) Brush

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: SS, WE.—III. (III.) Brush

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: SE, WC, WE.—IV. (IV.)

International Relations

Revised General Education courses in International Relations (IRE)

Lower Division Course

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.—II. (II.)

Upper Division Courses

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: WC.

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: WC.

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, II. (I, II.)

Italian

Revised General Education courses in Italian (ITA)

Lower Division Courses

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.)

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.)

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.)

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.)

4S. 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.)
(change in existing course—eff. spring 12)

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.)

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.)

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.) Cannon

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.)
(change in existing course—eff. spring 12)

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. AH, WC, WE.—II. (II.)

Upper Division Courses

101. Advanced Conversation, Composition, and Grammar (4)
Lecture—3 hours; weekly essays. Prerequisite: course 9 or consent of instructor. GE credit: AH, OL, WC, WE.—I. (I.) Heyer-Caput, Cannon

101S. 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; two research papers; 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.) Cannon

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. GE credit: AH, OL, WC.—II. (II.) 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: 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: AH, OL, SS, VL, WC, WE.—III. (III.) Foscarini

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: AH, OL, SS, VL, WC, WE.—III. (III.)

107ST. Survey of Italian Culture and Institutions (4)
Lecture/discussion—3 hours; term paper. Assessment of the impact of regional autonomy on Italian cultural life from the Middle Ages to the present. Special emphasis on achievements in literature, the arts, philosophy, and socio-political institutions. Taught in English. This course is taught abroad. Not open for credit to students who have completed course 107. GE credit: 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: 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: AH, OL, SS, VL, WC, WE.—III. (III.)

108ST. 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 is taught abroad. Not open for credit to students who have completed course 108. GE credit: AH, OL, SS, VL, WC, WE.—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: 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: 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: 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: 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: OL.—III. (III.) Schiesari

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: 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: WC.—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: 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: AH, OL, WC, WE.—II. (II.) Heyer-Caput

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: AH, WC, WE.—I. (I.) Cannon, 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: AH, OL, VL, WC, WE.—III. Heyer-Caput

121S. 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: 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: 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: AH, OL, WC, 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: 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: 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: AH, WC, WE.—III. Cannon

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: AH, OL, VL, WC, WE.—I, II, III. (I, II, 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 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: 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: AH, VL, WC, WE.—II. (II.) Cannon

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.)

194H. Special Study for Honors Students (3)
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.

Japanese

Revised General Education courses in Japanese (JPN)

Lower Division Courses

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: 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

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

(change in existing course—eff. fall 12)

98. Directed Group Study (1-5)
(P/NP grading only.) GE credit: AH.

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.—I. (I.) Sorensen

(change in existing course—eff. winter 12)

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.—II. (II.) Sorensen

(change in existing course—eff. winter 12)

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: 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: 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: 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: AH, VL, WC.—II. (II.) Chang, Gundry, Sorensen

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: AH, WC.—I. Chang

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 Chinese 108.) GE credit: AH, WC.—I, II. Gundry

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. Emphasis on the major forms of twentieth-century popular culture, including genre films, popular theater, TV manga (cartoons), animation and science fiction. GE credit: 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. (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.)

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.) Chang

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

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: 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: 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: AH, VL, WC, WE.—(III.) Sorensen

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.

Jewish Studies

Revised General Education 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: 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: AH, WC, WE.—II. (II.)

110. Selected Topics in Jewish Literature (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: 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: 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: 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: AH, WC, WE.—I.

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: 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: SS.—III.

Landscape Architecture

Revised General Education 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: 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 site-specific case studies of both historical and contemporary communities. GE credit: 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
(change in existing course—eff. spring 12)

21. Landscape Drafting and Visualization (4)
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

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: 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: SE, VL, WE.—III. (III.) Greco

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

Upper Division Courses

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 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

170. Field Studio in Landscape Architecture (5)
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.)

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

180I. 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

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. Greco

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

181I. Regenerative Landscape Systems Design and Planning Studio (3)
Studio—6 hours; one field trip required. Prerequisite: course 170; course 180I concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180I. 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

181K. Social Factors in Landscape Architecture Design and Planning Studio (3)
Studio—6 hours. Prerequisite: Psychology 155, course 170, 180K concurrently. Priority to Landscape Architecture majors. Application of design theory and methods to real-world projects. Familiarize students with the major concepts in environmental psychology as they relate to landscape architecture; to discuss the needs of various user groups; and post occupancy evaluations. Offered in alternate years. GE credit: DD, OL, VL.—I. Owens

Latin

Revised General Education 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.) Bulman, Rundin

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

Upper Division Courses

100N. Readings in Latin Prose (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3. Review of basic forms, grammar, and vocabulary. Readings in prose authors, including Julius Caesar. Not open for credit to students who have completed course 110. GE credit: AH, WE.—I. (I.) Stem

101. Livy (4)
Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: AH, WE.—(III.) Stem

102. Roman Comedy (5)
Lecture—4 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: AH, WE.—(II.) Albu

103. Vergil: Aeneid (4)
Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: AH, WE.—II. Albu, Seal

104. Sallust (4)
Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: AH, WE.—III. Stem

105. Catullus (4)
Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: AH, WE.—(III.) Seal, Watanabe

106. Horace: Odes and Epodes (4)
Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: 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: AH, WE.

109. Roman Elegy (4)
Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: 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: AH, WC, WE.—Albu

111. Silver Age Latin (4)
Lecture—3 hours; term paper. Prerequisite: course 3. Selections from Tacitus, Pliny, Petronius, Juvenal, Martial, and other writers of the Silver Age. Offered in alternate years. GE credit: AH, WE.—Albu, Seal, Stem

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: AH, WE.—Stem

114. Cicero: Philosophical Works (4)
Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: AH, WE.—Stem

115. Lucretius (4)
Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: AH, WE.—(II.)

116. Vergil: Eclogues and Georgics. (4)
Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: 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, WE.—Seal

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 (4)
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.—Watanabe
(change in existing course—eff. winter 12)

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: AH, WE.—(I.) Albu, Traill

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.—Watanabe

Linguistics

Revised General Education 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. GE credit: AH, SS.—I, II, III. (I, II, III.)

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
(new course—eff. spring 12)

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: ACGH, DD, SS, WE.—II. Bayley, Ramanathan

Lower 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 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 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

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: 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.—II. Orgun

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: AH.—I. Ojeda

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: AH, 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.—Hawkins

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: 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: 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: 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 language-related 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: 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: SS.—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: 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: 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 perspectives 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: 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 educational and sociopolitical policies surrounding multilingualism; acquisition of multilingualism; discursive practices of multilinguals. Limited enrollment. GE credit: GE credit: SS, WC, WE.—III. Ramanathan, Timm

Mathematics

Revised General Education courses in Mathematics (MAT)

Lower Division Courses

12. Precalculus (3)
Lecture—3 hours. Prerequisite: two years of high school algebra, plane geometry, plane trigonometry; 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.)
(change in existing course—eff. winter 12)

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.)
(change in existing course—eff. winter 12)

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.—I, II, III. (I, II, III.)
(change in existing course—eff. winter 12)

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.)
(change in existing course—eff. winter 12)

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: 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 equations, 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.)
(change in existing course—eff. winter 12)

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: 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.)
(change in existing course—eff. winter 12)

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: 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.)
(change in existing course—eff. winter 12)

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: 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.)

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: QL, SE, SL.—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: 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: 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, II, III.)

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, III. (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.)

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: SE.—I, II. (I, II.)

Upper Division Courses

108. Introduction to Abstract Mathematics (4)
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: SE.—I, II. (I, II.)

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; self-adjoint 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. Prerequisite: 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. (I, 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.
(change in existing course—eff. winter 12)

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. (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 (4)
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: OL, QL, SE, WE.—II.

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.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.) GE credit: SE.—I, II, III. (I, II, III.)

Medieval Studies

Revised General Education 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 (5)
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.)

(change in existing course—eff. fall 12)

20C. The Late Medieval and Early Modern Period (4)
Lecture—3 hours; discussion—1 hour. The 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: AH, WC, WE.—II. (II.)

Upper Division Courses

130A. Special Themes in Medieval Cultures (4)
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: 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: 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.

Microbiology

Revised General Education courses in Microbiology (MIC)

Lower Division Courses

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

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 mechanisms 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

104. General Microbiology (4)
Lecture—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

(new course—eff. fall 12)

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

(new course—eff. fall 12)

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

(change in existing course—eff. winter 13)

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

(change in existing course—eff. winter 13)

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 characteristics 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. GE credit: SE.—I. (I.) Meeks, Singer

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. GE credit: SE.—II. (II.) Stewart

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.) Shiozaki

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.) Lin, Xu

Middle East/South Asia Studies

Revised General Education courses in Middle East/South Asia Studies (MSA)

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: AH, SS, WC, WE.

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: AH, SS, WC, WE.—I, II, III. (I, II, III.)

180A. 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.
(new course—eff. spring 12)

Molecular and Cellular Biology

Revised General Education 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: 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: SE.

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.)
(change in existing course—eff. fall 12)

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: 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 107B, 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. (I, III.) 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

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
(change in existing course—eff. fall 12)

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
(change in existing course—eff. fall 12)

150L. Laboratory in Developmental Biology (1)
(cancelled course—eff. winter 12)

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.) GE 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
(change in existing course—eff. fall 12)

161. Molecular Genetics (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101, Biological Sciences 102 may be taken concurrently. Molecular mechanisms for propagation and expression of the genome in eukaryotic and prokaryotic model organisms. How genetic and molecular tools, both classical and modern, are applied to the study of gene structure, function, and regulation. Not open for credit to students who have completed course 121. GE credit: QL, SE, SL.—II. (II.) Harmer, Powers

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: 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: SE, SL.—III. (III.) Burgess

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: 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 disciplines on research in the biological sciences. Social impacts of genomic research. GE credit: SE.—II. (II.) Burtis, Korf

190C. Undergraduate Research Conference (1)
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: SE.

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: SE.

Music

Revised General Education 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.) GE 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.) Triest

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; recital—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; discussion/laboratory—3 hours. Prerequisite: completion of course 3A or permission of the instructor. Development of melodic and harmonic writing skills. Basic analysis training. 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. (I.) Rohde

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.) Rohde

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.) Rohde

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.)

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.) Nichols

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.) Nichols

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.) Levy, Pelo, Reynolds
(change in existing course—eff. fall 12)

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: 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: AH, VL, WE.—II. Busse Berger

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: AH, VL, WE.—III. Busse Berger

24C. Introduction to the History of Music III (3)
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: AH, VL, WE.—I. Reynolds

28. Introduction to African American Music (4)
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: ACGH, AH, DD, VL, WE.—III. (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.) San Martin

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 non-majors. GE credit: 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 non-majors. GE credit: 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 instrumental combinations. GE credit: AH, VL.—II-III. (II-III.) Ortiz

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: 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: 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: 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: 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: 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: ACGH, AH, DD, VL, WE.—(III.)

110G. Music of a Major Composer—Handel (4)
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: 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. Derthick, Slabaugh

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.

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: 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.—I, 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, III.)

124B. History of Western Music: 1600-1750 (3)
Lecture—3 hours. Prerequisite: course 124A. Historical survey of composers and musical styles from the late 1500s to the mid-18th century. GE credit: AH, VL, WE.—III. Nutter

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: ACGH, AH, DD, WE.—(II.) Levy
(change in existing course—eff. winter 12)

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: 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: 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: AH, VL, WC, WE.—Spiller

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: AH, VL, WC, WE.—Graham

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.

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.) Nutter

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.) Granger

147. University Wind Ensemble (2)
Rehearsal—4 hours. Prerequisite: consent of instructor. Open to students in any major. 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

154. University Gospel Choir (2)
Rehearsal—4 hours. Prerequisite: consent of instructor; open to any student in the university. Rehearsal, study, and performance of Gospel music. May be repeated for credit. (Same course as African American and African Studies 154.) (P/NP grading only.) GE credit: AH.—I, II, III. (I, II, III.) Lymos

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. (I, II, III.)

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.

Native American Studies

Revised General Education 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: ACGH, DD, SS, WC, WE.—I, II, III. (I, II, III.) Coates, Crum, Middleton, Montejo

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: 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: AH, DD, SS, WC, WE.—I, II, III, IV. (I, II, III, IV.) Hernandez-Avila, Marci, 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, DD, SS, VL, WC, WE.—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

Upper Division Courses

108. Indigenous Languages of California (4)

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

(change in existing course—eff. fall 12)

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.—Mendoza

(change in existing course—eff. spring 12)

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

(change in existing course—eff. fall 12)

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

(change in existing course—eff. fall 12)

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

(change in existing course—eff. fall 12)

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, WC, WE.—III.

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, WE.—III. (III.) Middleton

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.—I. Coates

(change in existing course—eff. fall 12)

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: 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: 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: ACGH, DD, WE.—III. (III.) Crum

133B. Ethnohistory of Native Peoples of Mexico and Central America 1500 to 2000 (4)

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: AH, OL, SS, WE.—(III.) Montejo

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.) Coates

(new course—eff. fall 12)

146. Orientation to Research in Native American Studies (4)

Lecture/discussion—4 hours; term paper. Prerequisite: Native American Studies major or minor, or 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. GE credit: AH, OL, WE.—(II.) Hernández-Ávila, Montejo

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.)

(change in existing course—eff. fall 12)

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: 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: AH, DD, OL, WE.—II. (II.) Hernandez-Avila, Montejo

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, imagery, styles and performances; biographies of and influences on the Native writers themselves. Offered irregularly. GE credit: AH, OL, SS, 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: AH, DD, OL, WE.—III, IV. (III, IV.) Hernández-Ávila

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

Nematology

Revised General Education 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: 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: SE.—I. (I.)
Ferris

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

Neurobiology, Physiology, and Behavior

Revised General Education courses in Neurobiology, Physiology, and Behavior (NPB)

Lower Division Course

14. Illusions: Fooling the Brain (3)
Lecture—3 hours. Introduction to perceptual processing in the human nervous system; illusions. GE credit: QL, SE, SL.—II. (II.) Ditterich
(change in existing course—eff. winter 12)

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.) Chapman, Cheng, Mulloney, Sutter

100Q. Quantitative Foundations of Neurobiology (1)
Autotutorial—0.5 hours; extensive problem solving—0.5 hours. Prerequisite: course 100 (may be taken concurrently). Computational methods and mathematical models used to study phenomena in neurobiology. GE credit: QL, VL.—III. (III.) Chapman, Cheng, Mulloney, 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, Furlow, Ishida, Goldberg, Fuller, Usrey, Weidner, Wingfield

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.) Hahn, Nevitt

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 experiments 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.

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

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

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

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

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.) Adams

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: QL, SE.—(III.)

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: WC.—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, Cherr

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, SE.—III.

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 pathways, 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

161. Developmental Neurobiology (3)
Lecture—3 hours. Prerequisite: course 100 or 101. Issues, 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: SE.—III. (III.) McAllister, Zito

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.) Miller

166. Math Tools for Neuroscience (4)
Lecture—4 hours. Prerequisite: course 100 or permission 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.—I. 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, caffeine, 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.—III.

Nutrition

Revised General Education courses in Nutrition (NUT)

Lower Division Courses

10. Discoveries and Concepts in Nutrition (3)
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: 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: 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.) 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

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.)

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: 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: 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.) Steinberg, Stern, Clifford

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.) Hudson

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, Steinberg, Stern

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: SE, WE.—I. (I.) Clifford

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.) Dewey

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: 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: 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

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: 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, WE.—III. (III.) Stern

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.) Zidenberg-Cherr

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: SE.—I, II, III. (I, II, III.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.) GE credit: SE.

Philosophy

Revised General Education 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: 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: WC.

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: AH, WE.

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: 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

(new course—eff. fall 12)

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: 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 relationships, allocation of medical resources, experimentation on human subjects. GE credit: 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: 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: AH, 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: 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: AH, WE.—Oshana

30. Introduction to Philosophy of Science (4)
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: AH, 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: AH, 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: AH, SE, WE.—Griesemer

38. Introduction to Philosophy of Biology (4)
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: AH, SE, SL, WE.—Griesemer, Millstein

Upper Division Courses

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: AH, WE.—Gilmore

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: 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: AH, WE.—Molyneux

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: 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. GE credit: 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: AH, 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: AH, SE, SL, WE.—Griesemer, Millstein

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: AH, SS, 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: WC.—Mattey

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: 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: 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: 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
(new course—eff. fall 12)

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: 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: 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 ethical, epistemological and metaphysical questions and their interconnectedness. GE credit: AH, WE.—Szaif

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: AH, WE.—Mattey

156. Contemporary Analytic Philosophy (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one course in philosophy. Consideration of central issues such as meaning/reference, analytic/synthetic, reductionism, formal and ordinary lan-

guage, 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: 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, WE.

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.—Mattey

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.—Mattey

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, substance, 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: WC.

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.

189I. 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, 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.

Physics

Revised General Education courses in Physics (PHY)

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.—I, 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: SE.—I. (I.)

9HB. Honors Physics (5)
Lecture—3 hours; discussion/laboratory—4 hours. Prerequisite: Physics 9HA or 9A, Mathematics 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.)

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: 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. GE credit: SE.

98. Directed Group Study (1-5)
Prerequisite: consent of instructor; primarily for lower division students. (P/NP grading only.) GE credit: SE.

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.) Fong

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.)

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.

108. Optics (3)
Lecture—3 hours. Prerequisite: course 9 or 7 sequence and Mathematics 21 sequence or consent of instructor. The phenomena of diffraction, interference, and polarization of light, with applications to current problems in astrophysics, material science, and atmospheric science. Study of modern optical instrumentation. Open to non-majors. GE credit: SE.—III. (III.)

108L. Optics Laboratory (1)
Laboratory—3 hours. Prerequisite: course 108 concurrently. The laboratory will consist of one major project pursued throughout the quarter, based on modern applications of optical techniques. GE credit: SE.—III. (III.)

110A-110B-110C. Electricity and Magnetism (4-4-4)
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; prerequisite for 110B is courses 110A and 104A passed with a grade of C– or better or consent of department; prerequisite for course 110C is courses 110B and 104B passed with a grade of C– or better, or consent of department. Theory of electrostatics, electromagnetism, Maxwell's equations, electromagnetic waves. GE credit: SE.—II-III-I. (II-III-I.)

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 (4)
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 (4)
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. (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.) Pellett

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.) Pellett

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.) Pellett

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 difficulty. Individual work is stressed. Thorough write-ups of the experiments are required. GE credit: SE, WE.—II. (II.)

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. (II.)

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. GE credit: SE.—II. (II.) Tyson

129A. Introduction to Nuclear Physics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 115A passed with a grade of C- or better or consent of instructor. Survey of basic nuclear properties and concepts requiring introductory knowledge of quantum mechanics: nuclear models and forces, radioactive decay and detecting nuclear radiation and nuclear reaction products, alpha, beta and gamma decay. GE credit: SE.—III. (III.)

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. Not offered every year. 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. (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. (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. (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 astrophysical 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. (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.—II. (II.) 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.—III. (III.) Albrecht

157. Astronomy Instrumentation and Data Analysis Laboratory (4)
Lecture—2 hours; laboratory—6 hours; project. Prerequisite: 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. (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: 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.

Plant Biology

Revised General Education courses in Plant Biology (PLB)

Upper Division Courses

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.) Potter

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: SE.—I. (I.) O'Neill

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: QL, SE, SL.—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

119. 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

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: SE, SL, SS, WE.—III. (III.) Gepts

Plant Pathology

Revised General Education courses in Plant Pathology (PLP)

Upper Division Courses

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: SL.—III. (III.) Bruening, Newell-McGloughin, Williamson

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

Plant Sciences

Revised General Education courses in Plant Sciences (PLS)

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

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: Div, SE or SS, Wrt. GE credit: SE, SS, WE.—I, II, III. (I, II, III.) Fischer, Jasieniuk, Nevins, 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: SE, Wrt. GE credit: SE, SL.—I. (I.) 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

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.) Laca, Lieth, Saltveit

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

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.) Blumwald

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.) 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.) Blumwald

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, Shackel

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.) Phillips

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.)

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: 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

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. (Formerly Environmental and Resource Science or Plant Biology 140.) GE credit: SE.—III. (III.) Saltveit

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: VL, SE.—I. (I.) Berry, Dahlgren, Rice

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: VL, SE.—III. (III.) Young

(new course—eff. spring 12)

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: SS, VL.—III. (III.) Young

(new course—eff. spring 12)

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.—I. (I.) Beckles

153. Plant, Cell, Tissue and Organ Culture (4)

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: SE.

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 credit: SE.

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

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.) Negre-Zakharov, Saltveit

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. (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. (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 software-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: OL, SE, WE.III. (III.) Kliebenstein

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

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, WE.

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

Political Science

Revised General Education 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: ACGH, SS, WE.—I, II, III.

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: SS, WC, WE.—I, III.

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: SS, WC, WE.—I, II, III. (I, II, III.)

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: AH, SS, WC, WE.—I.

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: ACGH, SS, WE.—II.

7. Contemporary Issues in Law and Politics (4)
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: ACGH, SS, WE.—III.

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: AH, QL, SE, SS, VL, WE.—I, II, III. (I, II, III.) Jackman

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: ACGH, SS, WE.—Huckfeldt

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: ACGH, DD, QL, SS, WE.

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: ACGH, SS, WE.—Huckfeldt

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: 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: 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: 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: ACGH, QL, SS, WE.—Huckfeldt

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: 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: QL, SS, WE.—Huckfeldt

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: AH, SS, WE.—Huckfeldt

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: ACGH, AH, SS, WE.—Scott

114. Quantitative Analysis of Political Data (4)
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: AH, QL, SE, SS, 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: AH, 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, SS, WC, WE.—Peterman

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 (4)
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, SS, WC, WE.—Peterman

118B. History of Political Theory: Early Modern (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 4. Critical analysis of the works of early modern political philosophers such as Machiavelli, Montaigne, Hobbes, Locke and Hume. GE credit: SocSci, Wrt | AH, SS, WC, WE.—Scott

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, Toc SocSci, Wrt | queville, Mill, Marx and Nietzsche. GE credit: AH, SS, WC, WE.—Scott

119. Contemporary Political Thought (4)
Lecture—3 hours; term paper or discussion—1 hour. 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, SS, WC, WE.—Peterman

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.—Gartner

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—1 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 (4)
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, WE.—II.

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, WE.

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.—Maoz

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.—Maoz

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.—Scheiner

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.—Adams, Andrews

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.—Andrews

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, WE.—Jackman

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.—Jackman

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.—Huckfeldt

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.—Huckfeldt

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.—Andrews

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.—Andrews

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, Democratization, Human Rights, HIV/AIDS, African Peacekeeping, Terrorism, Religious and Ethnic Conflict, Debt and Stalled Development. Offered in alternate years. GE credit: SocSci, Div, Wrt | SS, WC, WE.—Huckfeldt

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.—Huckfeldt

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: SS, WC, WE.—Money

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: SS, WC, WE.—Adams

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: SS, WC, WE.—Adams

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: SS, WC, WE.—Adams

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: SS, WC, WE.—Montinola

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: SS, WC, WE.—Scheiner

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: SS, WC, WE.—Montinola

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: ACGH, DD, SS, WE.—Gates

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: ACGH, DD, SS, WE.—Gates

152. The Constitutional Politics of Equality (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: courses1 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: ACGH, DD, SS, WE.—Gates

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: ACGH, DD, SS, WE.—Huckfeldt

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: SS, WE.—Huckfeldt

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: 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: ACGH, DD, QL, WE.—Huckfeldt

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: ACGH, DD, SS, WE.—Huckfeldt

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: ACGH, DD, SS, WE.—Huckfeldt

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: 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 (censor-

ship, secrecy, freedom of the press, government regulation); the media in election campaigns. GE credit: 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: 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: 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, stereotypes, heuristics, affect, identity, group dynamics) help us understand how citizens think about politics. GE credit: 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: 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 relations. GE credit: 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: 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: 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: ACGH, DD, SS, WE.

179. Special Studies in Comparative Politics (4)
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: 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: 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: ACGH, SS, WE.—Huckfeldt

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: SS, WE.—III. (III.) Hill

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: SS, WE.

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: 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: 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.—I, II, III.

193W. Washington Center Research Seminar (4)
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: OL, SS, WE.—I, II, III.

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.—I, II.

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. —I.

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.—I, II, III.

196C. Seminar in International Relations (4)
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, EU, 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.—I, II, III.

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.—I, II, III.

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.—I, II, III.

Portuguese

Revised General Education 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. (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.)

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.) Bernucci

159. Special Topics in Luso-Brazilian Literature and Culture (4)
Lecture—3 hours; term paper. Prerequisite: course 3 or 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

161. Luso-Brazilian Literature and Culture (4)
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

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

163. 20th C Masters in Brazilian Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: first year Portuguese or the equivalent. Overview of modern Brazilian literature from early 20th C to the poetry by João Cabral de Melo Neto and the Concretists (1960s), including European avant-garde movements and literary and cultural manifestos leading to a revolutionary body of literature. GE credit: AH, WC, WE.—II. (II.) Bernucci

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

Psychology

Revised General Education 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: SS.—I, II, III. (I, II, III.) Shaver, Johnson, E. Post, Thompson, Tavano-Hall, Traxler

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.)

Upper Division Courses

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.) 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.—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. Topics 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 questionnaire research. Limited enrollment. Not offered every year. GE credit: QL.—Herek

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

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: WC.—I, II, III. (I, II, III) Krubitzer

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: WC.—I, II, III. (II, III.) Long, Swaab, Traxler

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: WC.—Janata

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: WC.—I, II, III. (I, II, 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: SS, WE.—I, II, III. (I, II, III.) Conger, Gibbs, Hastings, Robins, Thompson

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: WC.—II. (III.) Ghetti, Goodman, Rivera

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 144. (Former course 144.) GE credit: SS.—I. (I.) Coss

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: ACGH, DD, SS, WE.—II. (III.) Herek

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: SS, WE.—I, II, III. (I, II, III.) Emmons, Robins, Shaver

168. Abnormal Psychology (4)
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: SS.—I, II, III. (I, II, III.) Emmons, Schepeler, Sue, 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: WC.—II, III. (II, 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: SS, WE.—I, III. (I, III.) Simonton

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: SS, WE.—II. (II.) Simonton

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: WC.

Religious Studies

Revised General Education 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: ACGH, AH, DD, OL, 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: AH, WC, WE.—I, II, III, IV. (I, II, III, IV.)

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: AH, OL, VL, WC, WE.—I, II, III, IV. (I, II, III, IV.)

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: AH, OL, VL, WC, WE.—I, II, III, IV. (I, II, III, IV.)

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: 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: AH, OL, SS, VL, WE.—I, II, III, IV. (I, II, III, IV.)

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, DD, WC, WE.—I, II, III, IV. (I, II, III, IV.)

(change in existing course—eff. summer 12)

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. GE credit: AH, OL, VL, WC, WE.—I, II. (I, II) Janowitz, Lai

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.—Vidas

(new course—eff. winter 12)

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: 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: AH, OL, VL, WC, WE.—Coudert

(new course—eff. fall 12)

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: 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: 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: 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: 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: AH, WC, WE.—I. (I.) Chin

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: AH, WC, WE.—(I.) Tezcan

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: 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: AH, 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: 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.—Venkatesan

(new course—eff. fall 12)

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: 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: AH, SS, WC, WE.—I, II. (I, II.) Watenpaugh

Upper Division Course

100. Study of Religion: Issues and Methods (4)
Lecture—3 hours; term paper. Principal issues and methods of Religious Studies and associated fields. GE credit: AH, 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: 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: AH, WC, WE.—I, II. Chin

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: 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 relationship of established Christian institutions to new Christian movements. Offered irregularly. GE credit: 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.

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. GE credit: 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: 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.)

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: 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: 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: AH, SS, VL, WC, WE.—(I.) Watenpaugh

132. Topics in Mediterranean Ancient Religion (4)
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

(new course—eff. fall 12)

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

(new course—eff. fall 12)

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: 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: 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: AH, WC, WE.—(II.)

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: 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: 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: AH, WC, WE.—II. Tezcan

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: 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: AH, WC, WE.—II. Tezcan

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.

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

(new course—eff. spring 12)

Russian

Revised General Education courses in Russian (RUS)

Lower Division Courses

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.)

2. Elementary Russian (5)
Discussion—5 hours; laboratory—1 hour. Prerequisite: course 1. Continuation of grammar and language 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 language 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: AH, WC, WE.—III. (III.) Stuchebrukhov

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: AH, WC, WE.—II.

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, OL.—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, Chekhov. Offered alternately in English or Russian. GE credit: 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: 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

(new course—eff. spring 12)

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: 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: 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: 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: 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: 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: 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: 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: AH, WC, WE.—I.

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: 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: 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: 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.

Science and Society

Revised General Education 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: SE, SS, WE.—I. (I.) Caswell-Chen

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: 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: 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: 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: 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 espionage; military strategy; genocide; epochal wars; clash of civilizations; nation building; and future global scenarios. GE credit: SE, 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 Environmental and Resource Sciences 8. (Formerly Environmental and Resource Sciences 8.) GE credit: 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: SE, 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 problems. (Same course as Hydrologic Science 10.) GE credit: 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: SE, 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: SE, SS.—I, II, 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.) Leveau

(new course—eff. fall 12)

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: 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: 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: OL, SE, SL, SS, WE.—I, II. (I, II.) Coaker, Cook, Epstein, Ronald

25. Global Climate Change: Convergence of Biological, Geophysical, & Social Sciences (3)
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: OL, QL, SE, SL, SS, VL, WC, WE.—II. (II.) Bloom

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

(new course—eff. spring 12)

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: SE, SS.—I, II. (I, II.) Gilchrist, Gordon, Rizzo

40. Photography: Bridging Art and Science (3)
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: AH, 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: 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: SE, SL, SS.—II. (II.) Harada

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: 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 Africa (4)
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 indigenous plants and animals; weeds; water issues; ecotourism. Weekend and other field trips. Not offered every year. GE credit: SE, SS.—II. Cranston, Gullan

Science and Technology Studies

Revised General Education 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: 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: 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: SS, WE.—I. (I.) Dumit

98. Directed Group Study (1-5)
Prerequisite: consent of instructor (P/NP grading only.) GE credit: SS.

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: 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: SS, VL, WE.—II. Dumit

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
(change in existing course—eff. fall 11)

129. Health and Medicine in a Global Context (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or Anthropology 2. 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 Anthropology 129.) GE credit: SocSci, Div, Wrt | SS, WC, WE.—II. (II.) Dumit
(change in existing course—eff. fall 12)

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.

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: AH, SE, WE.

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: AH, 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: 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: 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: 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: 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: 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: 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 fieldwork, 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

Sociology

Revised General Education 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: ACGH, DD, SS.—I, II, III. (I, II, III.)

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: ACGH, DD, SS.—I, II, III. (I, II, III.)

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: ACGH, DD, SS.—I, II, III. (I, II, III.)

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: ACGH, DD, SS, WC.—I. (I.)

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: ACGH, SS, WC.—III. (III.)

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: SS.—II. (II.)

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: SS, VL.—II, III. (II, III.)

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: ACGH, DD, SS.—I. (I.)

30B. Intercultural Relations in Multicultural Societies (3)
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: ACGH, DD, SS.—II. (II.)

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.—I, II, III. (I, II, III.)

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.—II, III. (II, III.)

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: SS.

Upper Division Courses

100. Origins of Modern Sociological Theory (4)
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: SS.—I, II, III. (I, II, III.)

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, SS.

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.—III. (III.)

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.—II. (II.)

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.—I, III. (I, III.)

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.—I, II, III. (I, II, III.)

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: SS.—I, II. (I, II.)

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.—II. (II.)

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, SS.

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.—I. (I.)

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: SS.—I, II. (I, II.)

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: SS.—I. (I.)

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 death-related behaviors. Particular attention to social psychological aspects of death and dying, to death occupations, and to death rituals in various cultures. GE credit: 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: SS.—III. (III.)

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: ACGH, DD, SS.—I. (I.)

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: ACGH, DD, SS.—I, II. (I, II.)

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: ACGH, DD, SS.—I, II, III. (I, II, III.)

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: ACGH, DD, SS.—I, II, III. (I, II, III.)

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: 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: 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: SS.—II. (II.)

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.—II. (II.)

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, WC.—I, II, III. (I, II, III.)

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.—I, II, III. (I, II, III.)

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.—I, II, III. (I, II, III.)

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 development 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: SS.—II. (II.)

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.—II. (II.)

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: SS.—III.

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.—(I.)

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: SS, WC.—II. (II.)

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 socioeconomic change in the world with particular attention to the family/household context. Offered in alternate years. GE credit: SS, WC.—(II.)

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: SS.—II.

147. Sociological Perspectives on East Asia (4)
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.—(III.)

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 credit: SS.—I. (I.)

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: ACGH, DD, SS.—(III.)

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: ACGH, DD, SS.—I, II, III. (I, III.)

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: ACGH, DD, SS.—II. (II.)

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: ACGH, DD, SS.—I, II, III. (I, II, III.)

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.—I. (I.)

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.—I, III. (II.)

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.—I, III. (I, III.)

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: SS.—II, III. (II, III.)

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.—III. (III.)

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.—I. (I.) Deeb-Sossa

159. Sociology of Work and Employment (4)
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.—I, III. (I, III.) Smith

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.—II. (II.) Beamish

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, socio-psychological factors affecting fertility. GE credit: QL, SS.

171. Sociology of Violence and Inequality (4)
Lecture/discussion—4 hours. Prerequisite: upper-division 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.—II. (II.)

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: ACGH, DD, SS.—I. (I.)

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.—(III.)

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.—I.

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.—I. (III.)

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 sociological 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.—I, III. (I, III.)

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: SS.—III. (III.)

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 Sweden, Japan, Germany, Taiwan, and South Korea. Offered in alternate years. GE credit: ACGH, SS, WC.—I. (I)

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.—I, III. (I, III.)

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.—I.

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.

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.—III. (III.)

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.—I, II, III. (I, II, III.)

194HB. Special Study for Honors Students (4)
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.—I, II. (I, II.)

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.—I, II, III. (I, II, III.)

Soil Science

Revised General Education courses in Soil Science (SSC)

Lower Division Course

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: QL, SE, SL.—I. (I.) Dahlgren

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 (5)
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 decomposition. Role of specific biota, ranging from microorganisms to earthworms. Applications to restoration, remediation, ecosystem science, and agriculture. GE credit: SE, SL.—I. (I.) Jaffee

118. Soils in Land Use and the Environment (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or consent of instructor. Soils are considered as elements in land use planning and environmental 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

Spanish

Revised General Education courses in Spanish (SPA)

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: WC.—III.

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. (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, IV.)

3. 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. 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 comprehension, 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.—I, II, III. (I, II, III.)

21S. 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.—III. (III.)

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)
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.)

22S. 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, III.)

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.—III.

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 completed course 24S. GE credit: WC, WE.—I, II, III. (I, II, III.)

24S. 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.)

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: WC.—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, Ojeda

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, Ojeda

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, SS.—I, II. (I, II.) Blake

115S. History of the Spanish Language (4)
Lecture—3 hours; extensive writing or discussion—1 hour. 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 Spanish-speaking country under the supervision of a UC Davis faculty/lecturer. Not open for credit to students who have completed course 115. GE credit: AH, 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: WC.—(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.) Armistead, 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, avant-garde). 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 (4)
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 Spanish 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: 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. (II.) Altisent

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 manifestations. Introduction to critical reading and textual analysis. Not open for credit to students who have completed course 141S. GE credit: 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: 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: 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: 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: 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: AH, VL, WC.—II. (II.) Martinez-Carazo

148S. 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: AH, VL, WC.—III. (III.) Martínez-Carazo

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: AH, WC, WE.—(III.) Egan

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: AH, 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, Agustini, Mistral, Castellanos, and others. Offered in alternate years. GE credit: AH, WC.—III. (III.) Peluffo

170. Introduction to Latin American Culture (4)
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: 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: 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: 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: 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: 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: 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: 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 America (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, OL, SS, 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, Armistead, 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

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, WE.

198. Directed Group Study (1-5)
Prerequisite: consent of instructor and Department Chairperson. (P/NP grading only.) GE credit: AH, WC, WE.

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.

Statistics

Revised General Education 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: 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: 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: 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: 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: SE, QL.—II, III. (II, III.)

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: 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: 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: QL, SE.—I, II, 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: QL, SE.—(II.)

(change in existing course—eff. winter 12)

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: 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: 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: QL, SE.—I, III. (I, III.) Mueller

130A. Mathematical Statistics: Brief Course (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics16B. 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 (4)
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, goodness-

of-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.—I, II, III. (I, II, III.)

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, confidence 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 (4)
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 T^2; 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 state-space models; Applications to data from economics, engineering, medicine environment using time series software. GE 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: 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, SE.—I. (I.)

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: 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.)

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.

Technocultural Studies

Revised General Education 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: 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: 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: 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: AH, 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: 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 post-production to critique. GE credit: VL.—Drew, Wyman

110. Object-Oriented Programming for Artists (4)
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

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: 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

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: 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: 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.

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: WC.—Jones

Textiles and Clothing

Revised General Education courses in Textiles and Clothing (TXC)

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: 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: AH, 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: SS.—I. (I.) Rucker

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: SS, VL, WE.—I. (I.) Kaiser, Chandler

162. Textile Fabrics (3)
Lecture—3 hours. Prerequisite: course 6. Properties of fabrics as related to serviceability, comfort, and appearance. GE credit: SE, VL.—III. (III.) Pan

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.—II. (II.) Chandler

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. Rucker

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: 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.)

UC Davis Washington Center

Revised General Education 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. 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 Epidemiology and Preventive Medicine 175W.) GE credit: ACGH, OL, SS, WE.—III. Wintemute

193. Washington Center Research Seminar (4)
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: AH, OL, WE.—I, II, III. (I, II, III.) Goldman

University Writing Program

Revised General Education courses in University Writing Program (UWP)

Lower Division Courses

1. Expository Writing (4)
Lecture/discussion—4 hours. Prerequisite: completion of Entry-Level Writing Requirement. Composition, the essay, paragraph structure, diction, and related topics. Frequent writing assignments. GE credit: 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: 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: AH, WE.—I, II. (I, II.)

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. Not open for credit to students who have completed English 101. GE credit: Wrt | AH, WE.—I, II, III, IV. (I, II, III, IV.)

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; restricted to majors or to students concurrently enrolled in an upper division course in a specific academic discipline or interdisciplinary field. Advanced instruction in writing in that discipline and practice in effective styles of communication. May be repeated for credit when topic differs. Not open for credit to students who have completed English 102A or course 102A in the same academic field. Offered irregularly. GE credit: Wrt | AH, WE.

102B. Writing in the Disciplines: Biology (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent; 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; 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. Not open for credit to students who have completed English 102C. 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; upper division standing.Open to majors in international relations or to students concurrently enrolled in an upper division course accepted for the major. Advanced instruction in writing in international relations. Not open for credit to students who have completed English 102D. 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; upper division standing. Open to upper division students 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 the discipline of engineering. Not open for credit to students who have completed English 102E. 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; 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. Not open for credit to students who have completed English 102F. 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; upper division standing; restricted 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 English 102A or course 102A in the same academic field. Not offered every year. 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; restricted 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 English 102A or course 102A in the same academic field. GE credit: Wrt | AH, WE.—I. (I.)

102I. 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; restricted 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 English 102A or course 102A in the same academic field. GE credit: 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; restricted to majors and minors or to students concurrently enrolled in an upper division 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 English 102A or course 102A in the same academic field. GE credit: Wrt | AH, WE.—I, III. (I, III.)

102K. Writing in the Disciplines: Sociology (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing; restricted 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 English 102A or course 102A in the same academic field. GE credit: Wrt | AH, WE.—III. (III.)

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. GE 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.)
(change in existing course—eff. fall 12)

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: 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: 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: AH, WE.—I, II, III. (I, II, III.)

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: 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: AH, WE.—I, II, III. (I, II, III.)

104I. Writing in the Professions: Internships (4)
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 sec-

tors, 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: 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.)
(new course—eff. fall 12)

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: 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: AH, WE.—(II.)

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: 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: 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: AH.

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.

Viticulture and Enology

Revised General Education 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, II, III.) Heymann, Waterhouse, Adams

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)
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: SE.—I. (I.) Williams

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 Rangeland 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 concurrently). Fundamental principles of analytical chemistry as they relate to specific methods used in winemaking. Laboratory exercises demonstrating various chemical, physical and biochemical methods. 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: 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. (I.) Bisson

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.) Heymann

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, microbiology, horticulture, and horticulture and agronomy. 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 (5)
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.

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.) GE credit: SE.

Wildlife, Fish, and Conservation Biology

Revised General Education 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: 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: 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: SE, SL, WE.—II. (II.) Elliott-Fisk

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 vertebrates 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: SE, VL, WE.—I. Eadie, Kelt, Todd, Van Vuren

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. Offered in alternate years. (Deferred grading only, pending completion of projects.) GE credit: SE, WE.—III. Moyle

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 environments, species interactions, management, and conservation. GE credit: SE.—I. (I.) Eadie

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. GE credit: SE, WE.—II. (II.)

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: SE.—II. (II.) Fangue

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

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 ecotoxicology, examples/case histories, philosophical/management considerations. Offered in alternate years. GE credit: 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: SE, VL, WE.—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: 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

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.)

Women's Studies

Revised General Education 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: ACGH, AH, DD, SS, 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: 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: ACGH, AH, DD, SS, 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: ACGH, AH, DD, SS, 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: ACGH, AH, DD, SS, WE.—(I.)

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: AH, 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, DD, SS, 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, DD, SS, 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 family values and the changing family from a feminist perspective. Offered in alternate years. GE credit: ACGH, AH, DD, SS, 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: ACGH, AH, DD, SS, 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: ACGH, AH, DD, SS, 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: AH, 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: ACGH, AH, DD, SS, 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: 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: ACGH, AH, DD, SS, 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: ACGH, AH, DD, VL.—(III.) Mama

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: 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: 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: 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: ACGH, AH, DD, SS, 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: 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: AH, WC, WE.—Constable, Ho, Kuhn

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: 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: AH, 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: 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, 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: ACGH, DD, SS, WE.—(III.) Craig, Nettles-Barcelón

189. Special Topics in Women and Gender Studies (4)
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, DD, SS, 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, DD, SS, WE.—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.—III. (III.) Kaiser

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, DD, SS, 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, 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: ACGH, AH, DD, SS, WE.—III. Constable, Ho, Joseph, Kaiser, Kuhn, Mama, Mena, Nettles-Barcelón, Swain