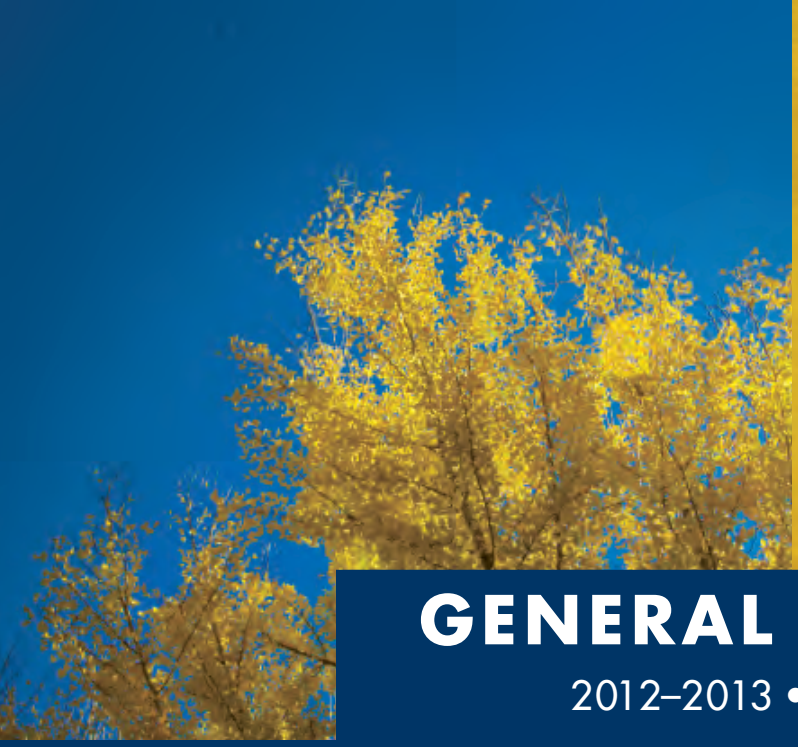
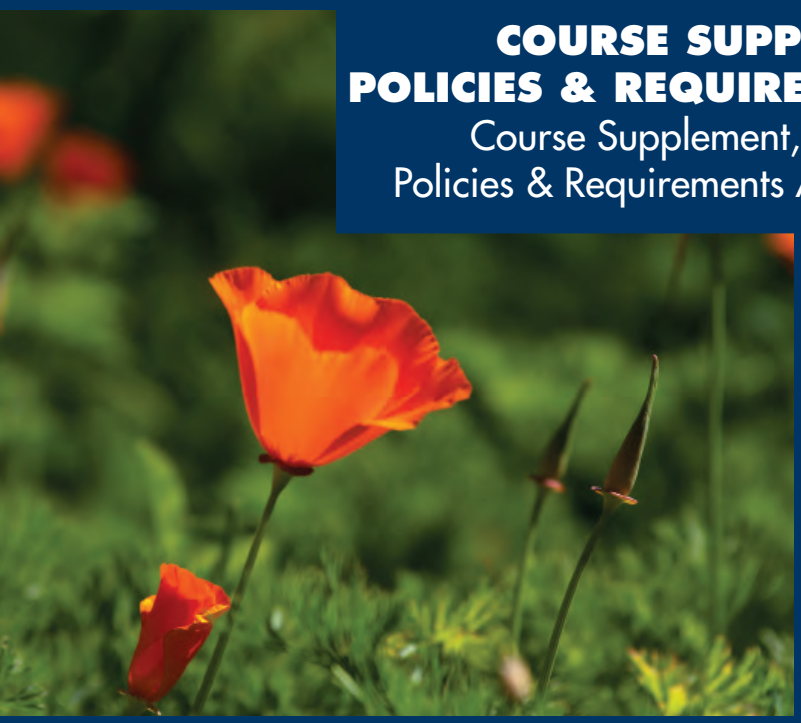


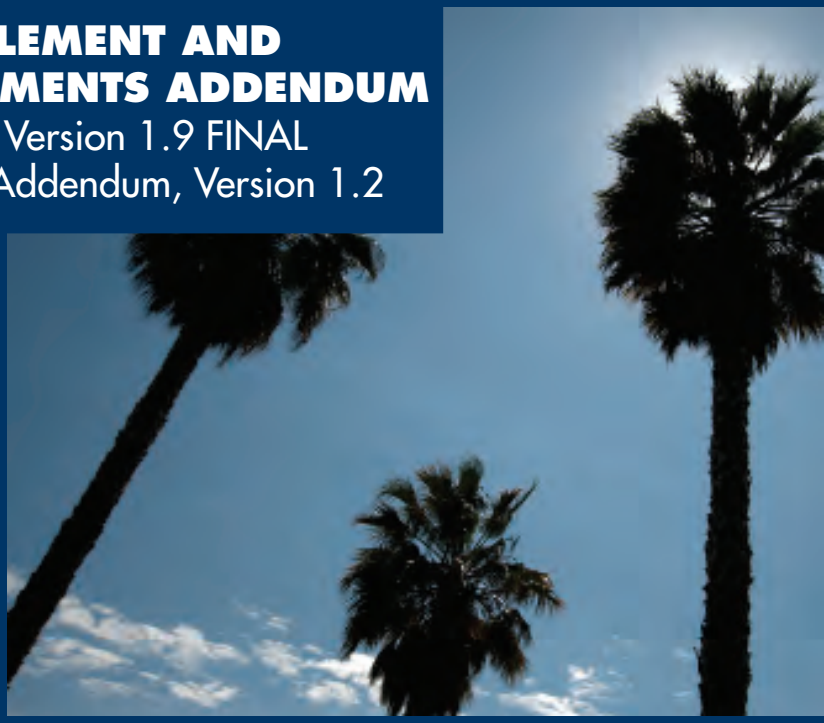
# GENERAL CATALOG

2012–2013 • 2013–2014

## COURSE SUPPLEMENT AND POLICIES & REQUIREMENTS ADDENDUM

Course Supplement, Version 1.9 FINAL
Policies & Requirements Addendum, Version 1.2





UC DAVIS
UNIVERSITY OF CALIFORNIA


***Published by***

Office of the University Registrar
University of California
One Shields Avenue
Davis, CA 95616-8692

***Credits***

**Editorial and production coordination:**
Randall Larson-Maynard,
Office of the University Registrar

**Cover design:**
Office of Public Communications

**Photography:**
Mediaworks

# Version History

The Version History records each version and the changes made for that version. Click on the blue department name to go directly to the department.

## Course Supplement—Version History

**Version 1.0; 6.21.2012**

- African American and African Studies; AAS 155A
- American Studies; AMS 1B, 59
- Animal Science; ANS 17
- Avian Science; AVS 103
- Agricultural and Resource Economics; ARE 256A-B
- Dramatic Art; DRA 5, 121C, 122A, 155A
- Engineering; ENG 35
- Engineering: Biomedical; BIM 117, 143, 152
- Engineering: Chemical; ECH 148A-B, 192
- Engineering: Civil and Environmental; ECI 127, 128, 139, 153, 213, 254, 283
- Engineering: Electrical and Computer; EEC 10
- Engineering: Materials Science and Engineering; EMS 2
- Engineering: Mechanical; EME 97TC, 115, 197TC
- English; ENL 100FA, 100P, 100PA, 189
- Environmental Science and Policy; ESP 166N
- Geography (A Graduate Group); GEO 230, 233
- Geology; GEL 18
- History; HIS 109B
- Landscape Architecture; LDA 200, 205
- Management; MGB 408, 410, 440
- Management; MGP 408, 410, 440, 490
- Management; MGT 440A-B
- Health Informatics; MHI 212
- Medicine, School of; MDS 489C
- Medicine: Family and Community Medicine; FAP 331A, 331B, 368A
- Medicine: Obstetrics and Gynecology; OBG 494A & C
- Medicine: Radiation Oncology; RON 299, 463
- Music; MUS 150
- Native American Studies; NAS 161
- Neurobiology, Physiology, and Behavior; NPB 15, 15V, 100L
- Population Biology; PBG 271
- Psychology; PSC 143
- Religious Studies; RST 10, 45
- Veterinary Medicine: Pathology, Microbiology, and Immunology; PMI 250, 292B
- Viticulture and Enology; VEN 216
- Women's Studies; WMS 165

**Version 1.1; 9.21.2012**

- Agricultural and Resource Economics; ARE 1S, 18, 98, 99, 100A-B, 106, 112, 113, 120S, 121, 130, 132, 135, 136, 138, 139, 140, 142, 143, 144, 145, 147M, 155, 156, 157, 171A, 171B, 190, 192, 194HA-HB, 197T, 198, 199, 252
- African American and African Studies; AAS 10, 12, 18, 51, 100, 107C, 111, 123, 130, 155A, 156, 157, 172, 175B, 176, 177
- American Studies; AMS 155
- Animal Genetics; ANG 101, 105, 107, 111
- Animal Science; ANS 15, 21, 22A-B, 41, 41L, 103, 112, 118, 119, 120L, 125, 126, 127, 128, 129, 131, 136A, 136B, 137, 140, 142, 143, 144, 145, 147, 149, 194HA-HC
- Anthropology; ANT 3, 13, 20, 30, 50, 54, 103, 123AN, 124, 134, 154BN, 154C, 154CL, 156A-B, 157L, 159, 160, 174, 175, 177, 180, 182
- Applied Biological Systems Technology; ABT 15, 16, 17, 49, 52, 98, 99, 101, 110L, 121, 142, 150, 161, 163, 165, 181N, 182, 190C, 192, 197T, 198, 199
- Arabic; ARB 1, 1A, 2, 3, 21, 22, 23, 121, 122, 123
- Art History; AHI 176C, 183D, 190F, 190H
- Art Studio; ART 101, 102A-C, 103A-B, 105-B, 110A-B, 111A-B, 112, 113, 114A-C, 117, 121, 125A–D, 129, 138, 142A-B, 143A-B, 151, 152A-G, 171, 190, 195
- Asian American Studies; ASA 1, 2, 100, 113, 115, 116, 121, 132, 150, 150B-E, 155, 189A-I
- Astronomy; AST 25
- Atmospheric Science; ATM 30, 60, 110, 111, 111L, 115, 116, 120, 121A-B, 124, 128, 133, 149, 150, 158, 160
- Avian Science; AVS 14L, 15L, 16LA-16LC, 100, 103, 115, 121, 123, 149, 150, 160, 170
- Biological Sciences; BIS 2A-C, 102, 102Q, 103, 105, 122, 122P, 124, 132, 133, 134, 181, 194H
- Biotechnology; BIT 150, 160, 161A-B, 171, 188, 194H
- Chemistry; CHE 105, 110A, 115, 125
- Chinese; CHN 111, 111A, 112, 113, 114, 115, 116, 120, 130, 131, 132, 140, 160
- Classics; CLA 15, 30, 31, 101A-D, 120, 125, 150, 194HA-HB, 396
- Communication; CMN 3, 5, 139, 144, 172, 180, 194H
- Community and Regional Development; CRD 156, 165
- Comparative Literature; COM 139, 142, 194H, 195
- Design; DES 115, 134B
- Dramatic Art; DRA 144C, 155A
- Ecology; ECL 201
- Education; EDU 81, 100, 115, 119, 130, 142, 150, 152, 173, 181, 183, 238
- Engineering; ENG 1, 4, 10, 35, 45, 102, 103, 104, 104L, 105, 106, 111, 121, 122, 180, 190, 198
- Engineering: Applied Science—Davis; EAD 2, 108A, 108B, 115, 116, 117A-C, 118, 165, 166, 167, 169, 170, 172
- Engineering: Biological Systems; EBS 1, 90C, 92, 98, 99, 103, 114, 115, 120, 125, 127, 128, 130, 135, 144, 145, 147, 161, 165, 170A-B, 170BL, 170C, 170CL, 175, 189A-G, 190C, 192, 197T, 198, 199
- Engineering: Biomedical; BIM 20, 89A-C, 99, 102, 105, 106, 107, 109, 111, 116, 118, 126, 140, 141, 142, 151, 152, 162, 163, 167, 189A-C, 190A, 192, 198, 199
- Engineering: Chemical; ECH 51, 80, 98, 99, 140, 141, 142, 143, 144, 152A-B, 155A-B, 157, 158A-B, 158C, 160, 161A-C, 161L
- Engineering: Chemical and Materials Science; ECM 5, 6, 194HA-HC
- Engineering: Civil and Environmental; ECI 3, 16, 17, 19, 90X, 92, 98, 99, 114, 119, 125, 126, 127, 128, 130, 131, 132, 135, 136, 137, 138, 139, 140, 140L, 141, 141L, 142, 143, 144, 145, 146, 148A-B, 149, 150, 153, 155, 161, 162, 163, 165, 171, 171L, 173, 175, 179, 189A-J, 190C, 192, 198, 199
- Engineering: Computer Science; ECS 20, 30, 40, 50, 60, 89A-L, 120, 122A-B, 124, 129, 130, 132, 140A-B, 142, 145, 150, 152A-C, 153, 154A-B, 155, 156, 157, 158, 160, 163, 165A-B, 166, 170, 173, 175, 177, 178, 188, 189A-L
- Engineering: Electrical and Computer; EEC 1, 10, 70, 89A-F, 110A-B, 112, 116, 119A-B, 130A-B, 132A-C, 133, 136A-B, 140A_B, 146A-B, 150A-B, 151, 152, 157A-B, 158, 160, 161, 165, 170, 171, 172, 173A-B, 180A-B, 181A-B, 183, 189, 189A-V, 192, 193A-B, 194A-C, 195A-B, 196, 198, 237
- Engineering: Materials Science and Engineering; EMS 147, 160, 162, 162L, 164, 172, 172L, 174, 174L, 180, 181, 188B
- Engineering: Mechanical; EME 115
- English; ENL 5F, 5P, 10A-C, 40, 42, 43, 44, 45, 46A-C, 110A, 110B, 115, 123, 125, 130, 133, 137N, 138, 142, 143, 144, 146N, 147, 149, 150A-B, 153, 155A-C, 158A-B, 159, 164, 165, 166, 167, 168, 177, 178, 181A-B, 183, 185A-B, 186, 189, 194H, 195H
- Entomology; ENT 1, 105, 116, 156L
- Environmental Horticulture; ENH 6, 100, 101, 102, 105, 120, 125, 129, 130, 133, 150, 160, 160L
- Environmental Science and Management; ESM 6, 47, 108, 140, 141, 144, 186, 186L, 194H, 195
- Environmental Science and Policy; ESP 1, 10, 100, 110, 111, 116N, 123, 124, 127, 150A-C, 151, 151L, 152, 155, 155L, 160, 162, 163, 164, 166N, 167, 168A-B, 170, 171, 173, 178, 179, 179L, 190, 191A-B
- Environmental Toxicology; ETX 92, 99, 101, 102A-B, 103A-B, 104, 110, 111, 120, 130, 131, 138, 190, 190C, 190S, 192, 194HA-HC, 197T, 198, 199
- Evolution and Ecology; EVE 10, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 110, 111, 114, 115, 119, 147, 149, 150, 180A-B, 181, 189, 190, 194HA, 194HB, 194HC, 197T, 199
- Exercise Biology; EXB 90X, 101, 103, 104L, 110, 111, 112, 116, 124, 125, 148, 148L, 179, 194H, 198
- Film Studies; FMS 189, 195H, 196H
- Fiber and Polymer Science; FPS 100, 150, 161, 161L, 180A-B
- Food Science and Technology; FST 1, 47, 50, 100A-B, 101A-B, 102A-B, 103, 104, 104L, 107, 108, 109, 110A-B, 117, 119, 123, 123L, 127, 131, 151, 159, 160, 190, 192, 198, 199
- French; FRE 21, 22, 23, 53, 100, 109, 140, 141, 160, 161, 162, 194H, 195H
- Geography (A Graduate Group); GEO 281
- Genetics (A Graduate Group); GGG 201C, 290A
- Geology; GEL 2G, 3G, 3L, 12, 17, 20, 25, 50, 50L, 60, 62, 81, 91, 92, 98, 99, 101L, 103, 107, 107L, 109L, 116N, 129, 130, 131, 136, 139, 141, 141L, 142, 144, 146, 147, 148, 150A-C, 152, 156, 160, 161, 162, 163, 175, 181, 182, 183, 190, 192, 194A-B, 194HA-HB, 198, 199
- German; GER 1, 2, 3, 6, 20, 21, 22, 103
- Greek; GRK 1, 2, 2NT, 3, 3NT, 100, 105, 121, 130
- Hebrew; HEB 1, 1A, 2, 3, 100AN-CN
- Hindi; HIN 1, 2, 3, 21, 22, 23
- History; HIS 4A-C, 8, 9A-B, 10B-C, 11, 15, 17A-B, 72A-B, 85, 102S, 110A, 111A-C, 112A-C, 113, 115A-F, 116, 120, 121A-C, 122, 125, 130A-C, 131A-C, 132, 133, 134A, 135A-B, 136, 138A-C, 140, 141, 142A-B, 143, 144A-B, 145, 146A-B, 148A-C, 151A-D, 159, 160, 162, 163A-B, 164, 165, 166A-B, 167, 168, 169A-B, 170A-C, 171A-B, 171BF, 171D, 172, 173, 174A-D, 175, 176A-B, 178A, 179, 180AN-BN, 181, 182, 183A-B, 184, 185A-B, 188, 189, 190D, 191A-F, 194A-E, 195B, 196A-B
- Human Development; HDE 12, 103
- Humanities; HUM 1, 3, 9D, 15
- Hydrology; HYD 47, 103N, 110, 124, 134, 141, 142, 143, 144, 146, 147, 150, 151, 182
- Hydrologic Science (A Graduate Group); HYD 274
- International Agricultural Development; IAD 160
- International Commercial Law (A Graduate Group); ICL 201A-B, 205A-B, 228A, 228AS, 289, 291C
- International Relations; IRE 1, 192, 194HA-HB
- Italian; ITA 101, 101S, 104, 104S, 107, 107S, 108, 108S, 145, 190X, 194H, 195H
- Japanese; JPN 15S, 98, 131, 132, 133, 134, 135, 136, 151, 198, 199
- Landscape Architecture; LDA 1, 2, 21, 30, 60, 70, 102, 141, 150, 160, 170, 171, 180, 180F, 180G, 180J, 180K, 181F
- Latin; LAT 1, 2, 3, 118, 119, 120, 121, 130

- Linguistics; LIN 5, 103A-B, 111, 112, 121, 131, 141, 151, 152, 165, 166, 173, 177, 180
- Law; LAW 257B, 298A, 440, 440A-B, 498
- Management; MGB 409
- Management; MGP 409, 411
- Management; MGT 252, 498
- Mathematics; MAT 12, 21AL-CL, 21D, 22A, 22AL, 22B, 25, 108, 111, 114, 115A-B, 116, 118A-C, 119A-B, 124, 125A-B, 128A-C, 129, 133, 135A-B, 141, 145, 146, 147, 148, 150A-C, 160, 165, 167, 168, 180, 185A-B, 189, 194, 199
- Medicine, School of; MDS 468, 493QA-QB
- Medicine: Biological Chemistry; BCM 410A
- Medicine: Family and Community Medicine; FAP 252A, 331B
- Medicine: Internal Medicine; IMD 462
- Medicine: Internal Medicine—General Medicine; GMD 470
- Medicine: Orthopaedic Surgery; OSU 421
- Microbiology; MIC 91, 101, 104, 104L, 105, 105L, 115, 120, 140, 150, 162, 170, 191
- Middle East/South Asia Studies; MSA 100, 180
- Molecular and Cellular Biology; MCB 99, 120L, 123, 124, 126, 138, 140L, 142, 143, 144, 145, 148, 150, 158, 160L, 190C, 191, 192, 193, 194H, 197T, 198, 199
- Music; MUS 2A-C, 3A-B, 6A-C, 7A-C, 16A-C, 17A-C, 24A-C, 28, 98, 99, 101A-B, 102, 103, 107A-B, 108A-B, 113, 114, 121, 122, 124B, 126, 127, 132, 141, 142, 143, 144, 145, 146, 147, 148, 149, 192, 194HA-HB, 195, 198, 199
- Native American Studies; NAS 12, 33, 34, 98, 99, 101, 108, 110A-D, 118, 119, 122, 133B, 135, 146, 157, 161, 180, 181C, 184, 185, 188, 192
- Nematology; NEM 100, 110
- Neurobiology, Physiology, and Behavior; NPB 15V, 101, 159, 161
- Nursing, School of; NRS 470, 493A-B
- Nutrition; NUT 99, 104, 105, 111AV, 112, 116A, 116AL, 116B, 116BL, 117, 118, 122, 123, 124, 129, 130, 190, 190C, 199
- Performance Studies; PFS 200, 259, 265A-D, 298, 299, 299D
- Personal Accountancy; ACC 201, 211, 241, 271
- Philosophy; PHI 120
- Physics; PHY 1A-B, 7A-C, 9A-D, 9HA-HE, 12, 49, 90X, 98, 99, 102, 104B, 105A-C, 108, 108L, 110A-C, 112, 115A-B, 116A-C, 122A-B, 123, 129A-B, 130A-B, 140A-B, 150, 151, 152, 153, 154, 155, 156, 157, 190, 194HA-HB, 195, 197T, 198, 199
- Plant Biology; PLB 102, 119, 143
- Plant Pathology; PLP 148
- Plant Sciences; PLS 1, 2, 5, 15, 21, 49, 100A-C, 100AL-CL, 101, 102, 105, 112, 113, 114, 131, 140, 144, 147, 147L, 150, 152, 153, 154, 157, 158, 160, 162, 170A-B, 171, 172, 173, 174, 176, 178, 180, 188, 190, 194H, 196
- Political Science; POL 4, 51, 112, 113, 114, 115, 116, 117, 118A-C, 119, 193, 193W, 194HA-HB, 195, 196A-E
- Portuguese; POR 100, 159, 161, 162, 163, 198
- Religious Studies; RST 1E, 1H, 10, 45, 67, 80, 90, 100, 110, 122, 125, 131, 132, 134, 140, 145, 150, 170
- Russian; RUS 1, 2, 3, 4, 5, 6, 101A-C, 105, 124, 192
- Science and Technology Studies; STS 98, 164, 175, 176
- Sociology; SOC 46A-B, 90X, 100, 102, 103, 104, 106, 118, 120, 122, 123, 124, 126, 127, 128, 129, 130, 133, 134, 135, 137, 138, 139, 140, 141, 143A-B, 144, 145A-B, 147, 148, 149, 150, 151, 152, 153, 154, 155, 157, 158, 159, 160, 171, 172, 173, 174, 175, 176, 180A-B, 181, 183, 185, 188, 189, 191, 193, 194HB, 195
- Soil Science; SSC 100, 102, 105, 107, 109, 111, 112, 118, 120
- Spanish; SPA 100, 100S, 111N, 112N, 113, 114N, 115, 115S, 116, 118, 130, 131N, 132, 133N, 134A-B, 135N, 136N, 137N, 138N, 140N, 142, 150N, 151, 151N, 153, 154, 155, 156, 157, 158, 159, 159S, 171, 171S, 180, 181, 182, 194H, 198, 199
- Statistics; STA 130A-B, 131A-C, 133, 135, 137, 141, 142, 145, 194HA-HB
- Study of Religion (A Graduate Group); REL 298, 299, 299D
- Technocultural Studies; TCS 5, 155
- Textiles and Clothing; TXC 7, 162L, 163, 163L, 164, 165, 171, 173, 180A-B
- Transportation Technology and Policy; TTP 200
- UC Davis Washington Center; WAS 193
- University Writing Program; UWP 1, 11, 18, 19, 98, 99, 101, 102A-L, 104A-F, I, & T, 111A-C, 192, 197T, 197TC, 198, 199
- Viticulture and Enology; VEN 101C, 110, 111, 111L, 115, 118, 123, 123L, 124, 124L, 125, 125L, 126, 126L, 128, 128L, 135, 140, 181, 190X, 192, 199
- Wildlife, Fish, and Conservation Biology; WFC 100, 101, 111, 141, 154, 157, 195
- Women's Studies; WMS 20, 102, 103, 104, 139, 182, 185, 189, 190, 191, 193, 194HA-HB

**Version 1.2; 10.29.2012**

- Agricultural and Resource Economics; ARE 106, 146, 190, 197T
- Anthropology; ANT 157L
- Biological Sciences; BIS 2A
- Cinema & Technocultural Studies; CTS 174
- Dramatic Art; DRA 174
- Engineering: Applied Science—Davis; EAD 265B
- Engineering: Biomedical; BIM 118
- Engineering: Electrical and Computer; EEC 147, 237B
- Geography (A Graduate Group); GEO 236
- Geology; GEL 120
- International Commercial Law (A Graduate Group); ICL 201A
- Japanese; JPN 106
- Management; MGB 414
- Management; MGP 414
- Management; MGT 414
- Medicine: Biological Chemistry; BCM 405
- Medicine: Family and Community Medicine; FAP 358B
- Medicine: Human Physiology; HPH 405
- Medicine: Internal Medicine; IMD 405
- Medicine: Obstetrics and Gynecology; OBG 405
- Medicine: Pharmacology and Toxicology; PHA 208
- Science and Society; SAS 025V
- Transportation Technology and Policy; TTP 220

**Version 1.3; 1.28.2013**

- Agricultural and Resource Economics; ARE 112, 115A
- American Studies; AMS 139, 158
- Animal Science; ANS 49K
- Anthropology; ANT 105
- Art History; AHI 172A-B, 173, 175
- Art Studio; ART 24, 148, 190
- Atmospheric Science; ATM 149
- Classics; CLA 172A-B, 173, 175
- Communication; CMN 135
- Comparative Literature; COM 138, 141
- Critical Theory; CRI 101
- Design; DES 1, 14, 15, 16, 21, 31, 40A-C, 50, 60, 70, 77, 107, 115, 116, 117, 127A-B, 131, 132A-B, 134A-B, 135A-B, 136A-B, 137A-B, 143, 144, 145, 150A-B, 151, 154, 155A, 157, 159, 160, 161, 170, 171, 177, 179, 180A-B, 185, 186, 187, 194HA-HB
- Dramatic Art; DRA 120, 121A-B, 122B-C, 140A, 180A-B, D-G
- Ecology; ECL 210N
- Economics; ECN 115A-B
- Engineering; ENG 6, 160
- Engineering: Aerospace Science and Engineering; EAE 141, 189A-B, 190C
- Engineering: Biological Systems; EBS 103, 144
- Engineering: Chemical and Materials Science; ECM 189A-R
- Engineering: Civil and Environmental; ECI 149
- Engineering: Electrical and Computer; EEC 147, 190C
- Engineering: Materials Science and Engineering; EMS 182
- Environmental Science and Policy; ESP 105
- English; ENL 106
- Evolution and Ecology; EVE 120, 161, 180A-B
- Exercise Biology; EXB 120
- Film Studies; FMS 129
- Food Science and Technology; FST 159, 203
- German; GER 116
- Hydrology; HYD 10, 103N, 144
- International Commercial Law (A Graduate Group); ICL 205AS, 212S
- Italian; ITA 5S, 141
- Jewish Studies; JST 116
- Law; LAW 209AT, 219, 221, 222, 248B, 254T, 264A, 269AT, 274T, 275, 293AT, 414A
- Linguistics; LIN 106
- Management; MGB 252, 412, 413
- Medicine: Family and Community Medicine; FAP 354B
- Medicine: Obstetrics and Gynecology; OBG 472
- Medicine: Radiation Oncology; RAL 299
- Molecular and Cellular Biology; MCB 110V
- Music; MUS 210C
- Native American Studies; 125, 133A, 162, 191
- Neurobiology, Physiology, and Behavior; NPB 124, 160
- Neuroscience; NSC 160
- Personal Accountancy; ACC 203, 205, 213, 215, 217, 219, 231, 243, 251, 253, 261
- Philosophy; PHI 7
- Physical Education; PHE 160
- Physics; PHY 160
- Plant Biology; PLB 148
- Plant Pathology; PLP 148
- Plant Sciences; PLS 12
- Psychology; PSC 124, 221
- Religious Studies; RST 7V, 21, 120
- Russian; RUS 129
- Science and Society; SAS 10, 12
- Science and Technology Studies; STS 120
- Spanish; SPA 2V, 2VL, 2Y, 3V, 3VL, 3Y, 22V
- Technocultural Studies; TCS 158
- Women's Studies; WMS 139, 189

**Version 1.4; 5.6.2013**

- Arabic; ARB 140
- Art History; AHI 183D
- Biological Sciences; BIS 2C, 103
- Chemistry; CHE 245
- Chicana/Chicano Studies; CHI 184, 184S
- Cinema & Technocultural Studies; CTS 20, 146A
- Clinical Research; CLH 233
- Davis Honors Challenge; HNR 94
- Design; DES 138
- Dramatic Art; DRA 1, 5, 10, 24, 115, 124A-D, 130, 154, 170
- Economics; ECN 192W
- Education; EDU 183
- Engineering; ENG 35, 45, 45Y, 103, 122, 180, 189
- Engineering: Aerospace Science and Engineering; EAE 126, 130A, 135, 138
- Engineering: Biological Systems; EBS 145, 175
- Engineering: Biomedical; BIM 20, 102, 105, 106, 107, 109, 110A-B, 111, 116, 140, 141, 143, 161L, 162, 163
- Engineering: Chemical; ECH 158A, 161A, 161C, 162, 166
- Engineering: Civil and Environmental; ECI 114, 130, 131, 132, 135, 136, 137, 138, 139, 140, 141, 142, 145, 146, 148, 148A, 153, 155, 161, 162, 165, 171, 173, 175, 179, 267
- Engineering: Computer Science; ECS 15, 30, 40, 132, 152A, 155, 156, 157, 158, 163, 166, 170, 193A
- Engineering: Electrical and Computer; EEC 146A, 150A, 157A, 161, 172, 173A, 180B, 195A
- Engineering: Materials Science and Engineering; EMS 160, 162, 164, 170, 172, 174, 180, 181, 182
- Engineering: Mechanical; EME 50, 106, 107A-B, 115, 121, 134, 150A-B, 151, 152, 154, 161, 163, 165, 171, 172, 185A
- English; ENL 43, 44, 45, 110B, 111, 115, 123, 125, 137N, 146N, 147, 150A-B, 168, 189
- Entomology; ENT 105
- French; FRE 162

- Geography (A Graduate Group); GEO 212, 214
- Geology; 17, 101, 101L, 149, 183
- Italian; ITA 120A
- Landscape Architecture; LDA 140, 142
- Latin; LAT 119
- Law; LAW 218TB, 219, 220T, 221, 224, 243A, 250BT, 274BT, 277, 280AT, 285TA, 286, 440A-B, 486
- Linguistics; LIN 21, 22, 23, 180, 300
- Management; MGB 415
- Management; MGP 268
- Management; MGT 268, 409
- Medicine, School of; MDS 493QC
- Medicine: Emergency Medicine; EMR 480
- Medicine: Family and Community Medicine; FAP 300D, 354C, 358D, 430FA-FC
- Medicine: Internal Medicine; IMD 430FA-FC
- Medicine: Internal Medicine—Gastroenterology; GAS 460
- Medicine: Internal Medicine—Pulmonary Medicine; PUL
- Medicine: Orthopaedic Surgery; OSU 465
- Medicine: Pathology; PMD 407, 410A
- Medicine: Psychiatry; PSY 430FA-FC
- Medicine: Radiology—Diagnostic; RDI 461
- Middle East/South Asia Studies; MSA 111A, 121A, 131A, 151A
- Native American Studies; NAS 115
- Neurobiology, Physiology, and Behavior; NPB 493C
- Nutritional Biology (A Graduate Group); NUB 290C, 298, 299
- Performance Studies; PFS 290
- Physics; PHY 270
- Plant Biology; PLB 396
- Plant Sciences; PLS 180
- Population Biology; PBG 296
- Psychology; PSC 157
- Religious Studies; RST 1A-F, 15Y
- Soil Science; SSC 112, 209, 216, 218
- Spanish; SPA 203
- University Writing Program; UWP 1V, 1Y, 21, 22, 23
- Veterinary Medicine: Pathology, Microbiology, and Immunology; PMI 129Y
- Veterinary Medicine: Population Health and Reproduction; PHR 251

**Version 1.5; 6.19.2013**

- Art History; AHI 1DV, 1DY
- Atmospheric Science; ATM 111L, 111LY
- Biological Sciences; BIS 102, 105
- Cinema & Technocultural Studies; CTS 124E
- Dramatic Art; DRA 11, 111, 124E, 125, 180L
- Ecology; ECL 271
- Economics; ECN 125
- Education; EDU 275, 275A-B
- Engineering; ENG 20
- Engineering: Aerospace Science and Engineering; EAE 140
- Engineering: Biomedical; BIM 110L
- Engineering: Chemical and Materials Science; ECM 189P
- Engineering: Civil and Environmental; ECI 127, 150, 190
- Engineering: Computer Science; ECS 120, 150, 154A-B, 171
- Engineering: Electrical and Computer; EEC 145, 267
- English; ENL 5F, 5P
- Entomology; ENT 180A-B
- Evolution and Ecology; EVE 10, EVE 180A-B
- Food Science and Technology; FST 151, 151Y
- Health Informatics; MHI 211, 211V
- History; HIS 11, 193C
- International Commercial Law (A Graduate Group); ICL 201A, 202A-B, 205AS, 212S, 228A, 228AS, 292, 292S
- Italian; ITA 1, 1S, 2, 2S, 3, 3S
- Law; LAW 285, 430, 440
- Molecular and Cellular Biology; MCB 220L
- Management; MGB 401, 410, 413
- Management; MGP 224, 252, 410, 413
- Management; MGT 011A-B, 224, 410
- Medicine: Radiology—Diagnostic; RDI 461
- Microbiology; MIC 101
- Middle East/South Asia Studies; MSA 123A, 181B-C, 182C
- Plant Sciences; PLS 222
- Population Biology; PBG 271
- Religious Studies; RST 11, 42, 60, 69, 70, 143, 144, 150
- Science and Society; SAS 110, 121
- Science and Technology Studies; STS 160
- Sociology; SOC 161
- Spanish; SPA 21V, 21Y, 22V, 22Y, 116, 116S
- Statistics; STA 13V, 13Y
- Study of Religion (A Graduate Group); REL 210A-C, 230A-F
- Sustainable Agriculture and Food Systems; SAF SAF 92, 98, 99, 192, 197T. 197TC, 198, 199
- Technocultural Studies; TCS 160
- University Writing Program; UWP 10, 102M, 121, 280
- Women's Studies; WMS 60, 138, 145, 146, 148, 160, 178A-E

**Version 1.6; 9.23.2013**

- Agricultural and Resource Economics; ARE 119, 138, 139
- Animal Science; ANS 146
- Art Studio; ART 142A-B
- Avian Science; AVS 203
- Chemistry; CHE 130C
- Chicana/Chicano Studies; CHI 113, 114, 157
- Chinese; CHN 101
- Cinema & Technocultural Studies; CTS 12, 116, 147A
- Community and Regional Development; CRD 197T, 240, 244, 246, 248
- Cultural Studies; CST 210
- Design; DES 31, 113, 134B, 144, 225
- Dramatic Art; DRA 116, 257
- Ecology; ECL 233
- Education; EDU 180, 180T, 185, 342B
- Engineering: Aerospace Science and Engineering; EAE 189C
- Engineering: Civil and Environmental; ECI 115, 130, 163
- Engineering: Computer Science; ECS 10, 12, 20, 50, 60, 122A-B, 124, 130, 140A-B, 142, 145, 152B, 160, 165A-B, 173, 175, 177, 178, 188, 221
- Engineering: Electrical and Computer; EEC 249
- Engineering: Mechanical; EME 185A
- English; ENL 107, 130, 133, 137, 138, 140, 141, 142, 143, 144, 146, 186
- Environmental Science and Management; ESM 186, 186L
- Environmental Science and Policy; ESP 163, 165N
- Epidemiology; EPI 210A-B
- Evolution and Ecology; EVE 10
- Forensic Science; FOR 207, 263, 277
- French; FRE 1, 1A, 1S, 2, 2S, 3, 3S, 21, 21S, 22S, 23, 23S, 105S, 107S, 125S, 128S, 141S
- Genetics (A Graduate Group); GGG 292
- Geography (A Graduate Group); GEO 240, 244, 246, 248
- Geology; GEL 25
- Human Rights; HMR 200A-B
- Japanese; JPN 7S, 117S
- Latin; LAT 120
- Law; LAW 280
- Management; MGB 268, 416
- Management; MGP 416
- Management; MGT 416
- Medicine: Dermatology; DER 420
- Medicine: Family and Community Medicine; FAP 430TA-TC
- Medicine: Internal Medicine; IMD 420C-D, 430TA-TC
- Medicine: Internal Medicine—Hematology-Oncology; HON 420
- Medicine: Medical Microbiology; MMI 210A
- Medicine: Obstetrics and Gynecology; OBG 430F
- Medicine: Pediatrics; PED 430F
- Medicine: Psychiatry; PSY 430TA-TC
- Medicine: Surgery; SUR 430F
- Molecular and Cellular Biology; MCB 163
- Music; MUS 127, 129A, 150
- Nursing, School of; NRS 204
- Physics; PHY 185
- Political Science; POL 284
- Population Biology; PBG 233
- Religious Studies; RST 30
- Russian; RUS 142
- Spanish; SPA 171
- Study of Religion (A Graduate Group); REL 200A-D, 231E
- University Writing Program; UWP 11, 110, 255, 271
- Wildlife, Fish, and Conservation Biology; WFC 134, 134L
- Women's Studies; WMS 50, 102, 175, 182, 193, 195E

**Version 1.7; 10.21.2013**

- Chinese; CHN 133, 134.
- Community and Regional Development; CRD 245
- Dramatic Art; DRA 43B, 144B-C, 150
- Education; EDU 180, 1890A-C.
- Engineering: Mechanical; EME 161
- English; ENL 106
- Geography (A Graduate Group); GEO 245, 252, 270, 271
- Geology; GEL 50L
- Landscape Architecture; LDA 260
- Linguistics; LIN 106
- University Writing Program; UWP 106

**Version 1.8; 1.24.2014**

- African American and African Studies; AAS 182
- Art Studio; ART 4.
- Chemistry; CHE 108
- Classics; CLA 140
- Communication; CMN 203
- Critical Theory; CRI 200A-C
- Cultural Studies; CST 204
- Design; DES 13, 37, 113, 149
- Dramatic Art; DRA 156BN-CN, 156D, 180C, 229
- Economics; ECN 192
- Education Abroad Program; EAP 180
- Engineering: Applied Science—Davis; EAD 1, 2, 90C, 98, 99, 108A-B, 108L, 115, 116, 117A-C, 137, 161A-B, 165, 166, 167, 169, 170, 172, 190C, 192, 198, 199
- Engineering: Biological Systems; EBS 216, 268
- Engineering: Biomedical; BIM 223
- Engineering: Chemical and Materials Science; ECM 1, 5, 229
- Engineering: Civil and Environmental; ECI 281B
- Engineering: Computer Science; ECS 156
- Engineering: Electrical and Computer; EEC 151, 158, 194A-C, 243
- Engineering: Mechanical and Aerospace; MAE 217, 228, 237
- Entomology; ENT 123
- Environmental Science and Policy; ESP 197T
- Epidemiology; EPI 202, 203, 204, 205B, 207, 228, 277
- Evolution and Ecology; EVE 134, 134F, 134L
- French; FRE 198S
- Geology; GEL 390
- Human Rights; HMR 131, 134, 198, 199
- International Commercial Law (A Graduate Group); ICL 202AS-BS, 283, 283S
- International Relations; IRE 131
- Japanese; JPN 137
- Law; LAW 208A, 210B, 216A, 216T, 219, 221, 228C, 236, 241T, 242, 247, 248T, 260AT, 264, 271T, 285F, 285T, 290T, 293T, 296T
- Management; MGT 417
- Medicine, School of; MDS 406, 420
- Medicine: Family and Community Medicine; FAP 252B
- Medicine: Internal Medicine; IMD 164
- Medicine: Medical Microbiology; MMI 10, 115, 116, 210B
- Molecular and Cellular Biology; MCB 110V, 252
- Molecular, Cellular, and Integrative Physiology; MCP 210L
- Nutritional Biology (A Graduate Group); NUB 210A, 210C
- Nursing, School of; NRS 210Y, 291D, 298, 298V
- Physics; PHY 122A-B, 157
- Plant Biology; PLB 123
- Plant Pathology; PLP 123
- Psychology; PSC 100Y, 103B, 125, 129, 137, 204A, 204C-D, 205E-F
- Religious Studies; RST 131, 134
- Russian; RUS 197T, 396
- Spanish; SPA 220
- Statistics; STA 201, 206, 207, 208
- University Writing Program; UWP 390
- Veterinary Medicine; VMD 92, 192, 298, 299

- Veterinary Medicine: Molecular Biosciences; VMB 101Y
- Veterinary Medicine: Pathology, Microbiology, and Immunology; PMI 201, 202, 203, 275, 283, 285, 287
- Veterinary Medicine: Population Health and Reproduction; PHR 277
- Wildlife, Fish, and Conservation Biology; WFC 120L

**Final Version 1.9; 5.5.2014**

- Agricultural and Resource Economics; ARE 155, 157, 202C, 255, 276
- Animal Science; ANS 12, 104, 125, 126, 127
- Anthropology; ANT 1Y, 26, 132, 179
- Arabic; ARB 101A, 299, 396
- Art History; AHI 1C, 100, 110, 120A, 130, 148, 153, 173, 177B, 178A, 188C & E, 190I-L
- Dramatic Art; ART 148
- Atmospheric Science; ATM 30
- Biological Sciences; BIS 10, 105
- Chinese; CHN 1BL, 2BL, 4A, 6, 111, 113, 396
- Cinema & Technocultural Studies; CTS 150, 162
- Classics; CLA 30, 173
- Communication; CMN 134, 137, 145, 148, 161
- Community and Regional Development; CRD 249
- Design; DES 40A-C, 155A, 292, 299D
- Dramatic Art; DRA 2, 28, 40A-B, 42A-B, 43A, 55, 56A-C, 122C, 126, 141, 143, 144A, 156B-C, 159, 195
- Engineering; ENG 17, 100
- Engineering: Applied Science—Davis; EAD 205A-B, 225, 229, 255, 265A-B, 267, 270A-B, 271, 273, 280A-C
- Engineering: Biological Systems; EBS 218
- Engineering: Biomedical; BIM 110A, 143, 163
- Engineering: Chemical; ECH 145A-B, 155, 161A
- Engineering: Civil and Environmental; ECI 241
- Engineering: Computer Science; ECS 127, 152C, 197T
- Engineering: Electrical and Computer; EEC 110A, 112, 116, 119A-B, 134A-B, 136A-B, 152, 171, 180A, 181A-B, 193A-B, 195A-B, 237B
- Engineering: Mechanical; EME 150A
- English; ENL 120, 143, 185C
- Environmental Science and Management; ESM 6
- Epidemiology; EPI 206
- Geography (A Graduate Group); GEO 286
- Genetics (A Graduate Group); GGG 296
- German; GER 143
- History; HIS 12, 108, 110A, 191G-H, 191J
- Human Development; HDE 162, 206, 217, 231
- Human Rights; HMR 120A, 130
- Hydrologic Science (A Graduate Group); HYD 286
- International Agricultural Development; IAD 162
- Japanese; JPN 1, 1A, 1AS, 2, 3, 4, 5, 6, 7S, 15S, 25, 112, 113, 117S
- Latin; LAT 100
- Law; LAW 211, 216T, 218TC, 220B, 221, 228, 231A, 232T, 237, 241T, 243A, 266A, 269, 270T, 280BT, 285, 285A, 400D, 400S, 490T
- Linguistics; LIN 1Y, 127
- Management; MGB 239, 409, 415, 417
- Management; MGP 239, 409, 415, 417
- Management; MGT 239, 409, 415, 418
- Mathematics; MAT 17A, 17C, 115B, 147
- Medicine, School of; MDS 493B
- Medicine: Family and Community Medicine; FAP 430FA-FC
- Medicine: Internal Medicine; IMD 430FA-FC
- Medicine: Medical Microbiology MMI 210, 280
- Medicine: Obstetrics and Gynecology; OBG 472
- Medicine: Pharmacology and Toxicology; PHA 205
- Medicine: Psychiatry; PSY 430FA-FC
- Medicine: Radiology—Diagnostic; RDI 461, 473, 474, 475, 476, 477, 478
- Microbiology; MIC 10
- Molecular and Cellular Biology; MCB 221B
- Music; MUS 116, 151
- Neurobiology, Physiology, and Behavior; NPB 163
- Nursing, School of; NRS 400, 401, 410A-F, 440, 450A-E, 451, 452, 453, 454, 455, 456, 459, 471, 475, 480, 490
- Political Science; POL 140D-E, 142C
- Portuguese; POR 1A, 98, 111, 130, 132, 134, 141, 199
- Philosophy; PHI 11, 24, 129, 136
- Physicians Assistant Studies; PAS 440
- Physical Education; PHE 300
- Plant Pathology; PLP 189D
- Plant Sciences; PLS 110B
- Psychology; PSC 135
- Religious Studies; RST 161B
- Russian; RUS 45, 123, 128, 299
- Sociology; SOC 124, 174, 194H, 207A-B, 242B, 292B
- Soil Science; SSC 298
- Science and Technology Studies; STS 151, 162
- University Writing Program; UWP 100
- Wildlife, Fish, and Conservation Biology; WFC 130, 150
- Veterinary Medicine: Anatomy, Physiology and Cell Biology; APC 92, 285
- Veterinary Medicine: Medicine and Epidemiology; VME 219, 290C
- Veterinary Medicine: Pathology, Microbiology, and Immunology; PMI 293B, 296
- Veterinary Medicine: Population Health and Reproduction; PHR 290A, 292
- Veterinary Medicine: Surgical and Radiological Sciences; VSR 250

## Policies and Requirements Addendum—Version History

**Version 1.0; 6.21.2012**

- Exercise Biology
- Medieval and Early Modern Studies

**Version 1.1; 9.21.2012**

- Biological Sciences
- Chemistry
- Communication
- Engineering: Chemical Engineering and Materials Science
- Engineering: Mechanical and Aerospace Engineering
- Human Development
- Managerial Economics
- Mathematics
- Medieval and Early Modern Studies
- Sociology
- Wildlife, Fish, and Conservation Biology

**General Catalog Update; 6.19.2013**

- Appendix
- Art Studio
- Asian American Studies
- Biological Sciences
- Biological Sciences, College of
- Communication
- East Asian Languages and Cultures
- Engineering
- Engineering: Applied Science
- Engineering: Biological and Agricultural
- Engineering: Biomedical
- Engineering: Chemical Engineering and Materials Science
- Engineering: Civil and Environmental
- Engineering: Computer Science
- Engineering: Electrical and Computer Engineering
- Engineering: Mechanical and Aerospace Engineering
- Entomology and Nematology
- Environmental Policy Analysis and Planning
- Exercise Biology
- Letters and Science, College of
- Mathematics
- Microbiology and Molecular Genetics
- Music
- Neurobiology, Physiology, and Behavior
- Psychology
- Physics

**Version 1.2; Final; 9.23.2013**

- Academic Calendar
- Asian American Studies
- Biological Sciences, College of
- Coaching Principles and Methods
- Earth and Planetary Sciences
- Human Ecology
- Mathematics
- Medicine, School of
- Neurobiology, Physiology, and Behavior
- Repeating Courses
- Statistics
- Wildlife, Fish, and Conservation Biology

# Table of Contents

The 2012-2014 UC Davis General Catalog Supplement contains updated information regarding requirements and courses for the 2012-2014 academic years. Use this document in conjunction with the *2012-2014 UC Davis General Catalog*. If a department is not listed in this document, there are no changes to that department's programs.

# Introduction

The 2012-2014 General Catalog Course Supplement and Policies & Requirements Addendum addresses important changes to the *UC Davis 2012-2014 General Catalog*. Changes are contained in two sections; the Course Supplement and Policies & Requirements Addendum.

Additionally, the *2013 General Catalog Update* combines all the changes from the Course Supplement and Policies & Requirements Addendum up to Summer 2013.

### Course Supplement

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

### 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.

# Course Supplement

## African American and African Studies

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

### Lower Division

**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: SocSci, Div | ACGH, DD, SS, WE.—I. (I.) Acham, Harrison
*(change in existing course—eff. winter 13)*

**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 or SocSci, Div, Wrt | AH or SS, WC, WE.—II. (II.) Adebanwi, Adejunmobi
*(change in existing course—eff. winter 13)*

**18. Introduction to Caribbean Studies (4)**
Lecture—3 hours; discussion—1 hour. Introduction to the contemporary culture, peoples, politics, and societies of the Caribbean. Topics include movements of people, goods and ideas across the Atlantic world and creative productions within the Caribbean. GE credit: ArtHum or SocSci | AH or SS, WC.—I. (I.) Ng'weno
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, DD, VL.—III. (III.) Osumare
*(change in existing course—eff. winter 13)*

### Upper Division

**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: ArtHum | ACGH, AH, DD.—II. (II.) Harrison, Osumare
*(change in existing course—eff. winter 13)*

**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 or SocSci, Div, Wrt | AH or SS, WC.—II. (II.) Ng'weno
*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Div, Wrt | AH or SS, WC.—(II.) Adebanwi, Adejunmobi
*(change in existing course—eff. winter 13)*

**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 or SocSci, Div | ACGH, DD, SS.—III. (III.) Acham
*(change in existing course—eff. winter 13)*

**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: SocSci | DD, SS.—I. (I.) Turner
*(change in existing course—eff. winter 13)*

**155A. African-American Dance and Culture in the United States, Brazil and the Caribbean (4)**
Lecture/discussion—4 hours. Comparative study of the African American dance forms in the U.S.A., Brazil, Haiti, Cuba, Jamaica, Barbados, and Trinidad. Examination of ritual, folk, and popular dance forms and the socio/historical factors that have influenced these forms. (Same course as Dramatic Art 155A.) GE credit: ArtHum | AH, VL, WC.—II. (II.) Osumare
*(change in existing course—eff. winter 13)*

**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: ArtHum, Div | AH, DD, WC.—III. (III.) Adejunmobi
*(change in existing course—eff. winter 13)*

**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: ArtHum, Div, Wrt | AH, WC, WE.—(II.) Adejunmobi
*(change in existing course—eff. winter 13)*

**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: SocSci, Div, Wrt | ACGH, DD, SS, WE.—II. (II.) Ng'weno
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, DD.—II, III. Acham
*(change in existing course—eff. winter 13)*

**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: SocSci | SS, WC.—III. (III.) Adebanwi
*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci | AH or SS, WC.—(II.) Adebanwi
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, DD, VL.—III. (III.) Osumare
*(change in existing course—eff. winter 13)*

**182. Hip Hop Culture & Globalization (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 181 preferable, not required. Investigation of hip-hop youth cultures outside the United States using globalization and Cultural Studies theories. Analysis of international hip-hop sites in Africa, Asia, Europe, South America, and the Middle East through reading, discussion, and visiting virtual sites. Offered in alternate years. GE credit: ArtHum, Div | AH, WC.—III. (III.) Osumare
*(new course—eff. spring 14)*

# Agricultural and Resource Economics

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

### Lower Division

**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: SocSci | SS, WC.
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.—I, II. (I, II.)
*(change in existing course—eff. winter 13)*

**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.
*(change in existing course—eff. winter 13)*

### Upper Division

**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: SocSci | QL, SS.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

**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: SocSci | QL, SS.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

**106. Econometric Theory and Applications (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A, Statistics 103. Pass one open to Managerial Economics majors; pass two open to majors in the College of Agricultural and Environmental Sciences. Statistical methods for analyzing data to solve problems in managerial economics. Topics include the linear regression model, methods to resolve data problems, and the economic interpretation of results. Not open for credit to students who have enrolled in or completed Economics 140. GE credit: SocSci | QL, SS.—I, II, III, IV. (I, II, III, IV.)
*(change in existing course—eff. fall 12)*

**112. Fundamentals of Organization Management (4)**
Lecture—4 hours. Prerequisite: upper division standing or consent of instructor. Pass One open to majors in the College of Agricultural and Environmental Sciences. Role of organizational design and behavior in business and public agencies. Principles of planning, decision making, individual behavior, management, leadership, informal groups, conflict and change in the organization. GE credit: SocSci | SS.—I, III, IV. (I, III, IV.)
*(change in existing course—eff. spring 13)*

**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: SocSci | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci, Div | SS, WC.—I, III. (I, III.)
*(change in existing course—eff. fall 11)*

**115B. Economic Development (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A and 1B. Macroeconomic issues of developing countries. Issues include problems in generating capital, conduct of monetary and fiscal policies, foreign aid and investment. Important issues of policy concerning international borrowing and external debt of developing countries. (Same course as Economics 115B.) GE credit: SocSci | SS, WC.—II, III. (II, III.)
*(change in existing course—eff. fall 11)*

**119. Intermediate Managerial Accounting (4)**
Lecture—4 hours; extensive problem solving—8 hours. Prerequisite: Management 11A and 11B. Pass One open to majors in the College of Agricultural and Environmental Sciences. Use of accounting information by mangers in decision making, planning, directing and controlling operations. Focuses on managerial/cost accounting theory and practice. Covers costing systems, budgeting, and financial statement analysis. GE credit: SocSci | SS.—III. (III.)
*(new course—eff. fall 13)*

**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: SocSci | SS, WC.
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.—III. (III.)
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.—II. (II.)
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.
*(change in existing course—eff. winter 13)*

**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.
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.—II, III. (II, III.)
*(change in existing course—eff. winter 13)*

**138. International Commodity and Resource Markets (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A and 100B; Economics 100. Pass One open to majors in the College of Agricultural and Environmental Sciences. 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: SocSci | SS.—II. (II.)
*(change in existing course—eff. winter 14)*

**139. Futures and Options Markets (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A; Statistics 103. Pass One open to majors in the College of Agricultural and Environmental Sciences. 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: SocSci | SS.—I, III. (I, III.)
*(change in existing course—eff. winter 14)*

**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: SocSci | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.—I, III. (I, III.)
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.—II. (II.)
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.—III. (III.)
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.—II. (II.)
*(change in existing course—eff. winter 13)*

**146. Business, Government Regulation, and Society (3)**
Lecture—3 hours. Prerequisite: course 100A or the equivalent. Pass one open to majors in the College of Agricultural and Environmental Sciences. Variety, nature and impact of government regulation: antitrust laws and economic and social regulation. Nature of the legislative process, promulgation of regulations, and their impact, especially as analyzed by economists. GE credit: SocSci | ACGH, SS.—I. (I.)
*(change in existing course—eff. fall 12)*

**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: SocSci | SS.
*(change in existing course—eff. winter 13)*

**155. Operations Research and Management Science (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A; Statistics 103. Pass One open to Managerial Economics majors; Pass Two open to majors in the College of Agricultural and Environmental Sciences. Introduction to quantitative methods used to analyze business and economic processes: decision analysis for management, mathematical programming, competitive analysis, and other methods. GE credit: SocSci | SS, QL. —I, II, III, IV. (I, II, III, IV.)
*(change in existing course—eff. fall 14)*

**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: SocSci | QL, SS.
*(change in existing course—eff. winter 13)*

**157. Analysis for Operations and Production Management (4)**
Lecture—4 hours. Prerequisite: course 100A; Statistics 103. Pass One open to majors in the College of Agricultural and Environmental Sciences; Pass Two open to all majors. Application of economic theory and quantitative methods to analyze operations and production management problems including process strategy, quality management, location and plant layout, and inventory management. GE credit: SocSci | SS. —I, II. (I, II.)
*(change in existing course—eff. fall 14)*

**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: SocSci | QL, SS.—I, II. (I, II.)
*(change in existing course—eff. winter 13)*

**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: SocSci | QL, SS.—II, III. (II, III.)
*(change in existing course—eff. winter 13)*

**190. Topics in Managerial Economics (3)**
Lecture—3 hours. Prerequisite: passing grades in course 100A and Statistics 103; consent of instructor. Selected topics in managerial economics, focusing on current research. May be repeated four times for credit when topic differs. Not offered every year. GE credit: SocSci | SS.
*(change in existing course—eff. fall 12)*

**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.
*(change in existing course—eff. winter 13)*

**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: SocSci | QL, SS, WE.—I, II. (I, II.)
*(change in existing course—eff. winter 13)*

**197T. Tutoring in Managerial Economics (1-3)**
Prerequisite: senior standing in Managerial Economics and consent of Department Chairperson. Undergraduates assist the instructor by tutoring students in one of the department's regularly scheduled courses. (P/NP grading only.) GE credit: SS.—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. (P/NP grading only.) GE credit: SS.
*(change in existing course—eff. winter 13)*

**199. Special Study for Advanced Undergraduates (1-5)**
Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SS.
*(change in existing course—eff. winter 13)*

### Graduate

**202C. Research Design for Applied Microeconomics (3)**
Lecture/Discussion—3 hours. Prerequisite: courses 240A and 202B. Third of three courses in the Ph.D level applied microeconomics sequence. Examines the design of empirical research and the application of econometric theory.—III. (III.)
*(change in existing course—eff. fall 14)*

**253. Optimization Techniques with Economic Applications (4)**
Lecture—3 hours; discussion—1 hour. Microeconomic topics in the framework of mathematical programming.—II. (II.) Paris
*(change in existing course—eff. winter 13)*

**255. Applied Dynamic Structural Econometric Modeling (4)**
Lecture—4 hours. Prerequisite: course 254. Course covers structural econometric models of static games of incomplete information, single-agent dynamic optimization problems and multi-agent dynamic games, with a focus on applications to issues relevant to the environment, energy, natural resources, agriculture, and development.—II. (II.)
*(change in existing course—eff. fall 14)*

**256A. Applied Econometrics I (4)**
Lecture—4 hours. Prerequisite: course 106 or Economics 140; or consent of instructor. First of two courses in the Masters-level econometrics sequence. The linear regression model and generalizations are applied to topics in agricultural and resource economics. Tools for empirical research for problems requiring more sophisticated tools than standard regression models are emphasized.—I. (I.)
*(new course—eff. fall 12)*

**256B. Applied Econometrics II (4)**
Lecture—4 hours. Prerequisite: course 256A or consent of instructor. Second of two courses in the Masters-level econometrics sequence. The linear regression model and generalizations are applied to topics in agricultural and resource economics. Tools for empirical research for problems requiring more sophisticated tools than standard regression models are emphasized.—II. (II.)
*(new course—eff. fall 12)*

**276. Environmental Economics (4)**
*(cancelled course—eff. spring14)*

# American Studies

## New and changed courses in American Studies (AMS)

### Lower Division

**1B. Religion in American Lives (4)**
Lecture—3 hours; discussion—1 hour. Religions and spiritual practices in the United States, and their interrelationships with other aspects of U.S. history, society and culture; indigenous and imported faiths, and the impact of immigration, colonization and culture contact on religious systems. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.—I. (I.) Kelman
*(change in existing course—eff. fall 11)*

**59. Music and American Culture (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: completed Subject A requirement. An examination of music and American culture. Studies will explore music in its cultural contexts, which may include examinations of recording and broadcasting, of race, class, and gender, the role of technology, and relationships between musical production, consumption and listening. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.—I. (I.) Wang
*(change in existing course—eff. fall 11)*

### Upper Division

**139. Feminist Cultural Studies (4)**
Lecture/discussion—4 hours. Prerequisite: one course in Women's Studies or American Studies. The histories, theories, and practices of feminist traditions within cultural studies. (Same course as Women's Studies 139.) GE credit: SocSci, Div, Wrt | ACGH, AH, DD, SS, VL, WE.—III. (III.)
*(change in existing course—eff. fall 11)*

**155. Eating in America (4)**
Lecture—3 hours; fieldwork. Prerequisite: course 1. Interdisciplinary examination of the culture of food in America. Exploration of eating as a richly symbolic event integral to how Americans express and negotiate values, politics and identity. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt. | ACGH, AH, DD, WE.—III. (III.) Biltekoff
*(change in existing course—eff. winter 13)*

**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: GE credit: ArtHum | ACGH, AH, WE.—I, III. de la Pena
*(change in existing course—eff. fall 11)*

# Animal Genetics

## New and changed courses in Animal Genetics (ANG)

### Upper Division

**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: SciEng | SE.
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—III. (III.) Famula
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. (I.) Medrano
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL, VL, WE.—I. (I.) Kueltz, Murray
*(change in existing course—eff. winter 13)*

# Animal Science

## New and changed courses in Animal Science (ANS)

### Lower Division

**12. Animal Science: Basic Principles and Application (3)**
Lecture—3 hours. Overview of domestic and global animal industries. Exploration of production systems, animal biology, genetics, anatomy, physiology, reproduction, health, behavior, research, biotechnology and welfare. GE credit: SciEng | SE.—IV. (IV.)
*(new course—eff. fall 14)*

**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: SciEng | QL, SE, VL.—II. (II.) Roser
*(change in existing course—eff. winter 13)*

**17. Canine Behavior: Learning and Cognition (3)**
Lecture—3 hours. Domestic dog behavior from basic principles of learning to complex cognitive behaviors; interaction between learning and cognition including how these processes contribute to interactions with humans; basic genetic correlates of learning and cognition.—IV. (IV.)
*(new course—eff. summer 12)*

**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: SciEng | OL, SE.—III. (III.) Van Liew
*(change in existing course—eff. winter 13)*

**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
*(change in existing course—eff. winter 13)*

**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

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. (I.) Mitloehner

*(change in existing course—eff. winter 13)*

**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

*(change in existing course—eff. winter 13)*

**49A-K. Animal Management Practices (2)**
Discussion—1 hour; laboratory—3 hours. The application of the principles of elementary biology to the management of a specific animal species. Among the topics offered: (A) Aquaculture, (B) Beef, (C) Dairy, (D) Goats, (E) Horses, (F) Laboratory Animals, (G) Meats, (H) Poultry, (I) Sheep, (J) Swine, (K) Captive and Companion Avian. Up to four different topics may be taken. (P/NP grading only.)—I, II, III. (I, II, III.)

*(new course—eff. winter 13)*

## Upper Division

**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: SciEng | SE, SL.—I. (I.) Mench

*(change in existing course—eff. winter 13)*

**104. Principles and Applications of Domestic Animal Behavior (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or Biological Sciences 2B. Basic principles of animal behavior as applied to domesticated species. Emphasis placed on application of the principles of animal behavior. GE credit: SciEng | SE.—II. (II.) Tucker

*(change in existing course—eff. fall 14)*

**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: SciEng or SocSci | OL, QL, SE or SS.—III. (III.) Kebreab

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.) Doroshov

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.

*(change in existing course—eff. winter 13)*

**125. Equine Exercise Physiology (3)**
Lecture—3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101. Basic and applied physiology of the exercising horse. Includes physiological systems, gait analysis, lameness, pharmacology, sports medicine; sport horse performance evaluation and conditioning. Offered in alternate years. GE credit: SciEng | SE.—III.

*(change in existing course—eff. fall 14)*

**126. Equine Nutrition (3)**
Lecture—3 hours. Prerequisite: course 15, Nutrition 115. Equine digestion, digestive physiology, diet development and evaluation, and the relationship of the topics to recommended feeding practices and nutritional portfolios. Offered in alternate years. GE credit: SciEng | SE.—III.

*(change in existing course—eff. fall 14)*

**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). 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: SciEng | SE, WE.—III. (III.) Roser

*(change in existing course—eff. fall 14)*

**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: SciEng | QL, SE, SL.—II. (II.) Fadel

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—II. Meyer

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, WE.—III. (III.) Doroshov

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL, VL, WE.—I. (I.) Hung

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL, VL, WE.—III. (III.) Hung

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL.—I, III. (I, III.) Hung

*(change in existing course—eff. winter 13*

**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: SciEng | SE.—I. (I.)

*(change in existing course—eff. winter 13)*

**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: SciEng | OL, QL, SE, SL, VL, WE.—I. (I.) Oberbauer

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—(I.) King

*(change in existing course—eff. winter 13)*

**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: SciEng | OL, QL, SE, SL, VL, WE.—III. (III.) Sainz, Zinn

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—(II.)

*(change in existing course—eff. winter 13)*

**146. Dairy Cattle Production (5)**
Lecture—3 hours; laboratory—3 hours; fieldwork—1 hour; discussion—1 hour. 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. Mandatory Saturday field-trip. GE credit: SciEng, Wrt | OL, QL, SE, SL, VL, WE.—III. (III.) DePeters

*(change in existing course—eff. winter 14)*

**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: SciEng | SE.

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.

*(change in existing course—eff. winter 13)*

**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: SciEng | OL, SE.

*(change in existing course—eff. winter 13*

**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: SciEng | SE, VL.

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, WE.

*(change in existing course—eff. winter 13)*

# Anthropology

## New and changed courses in Anthropology (ANT)

## Lower Division

**1Y. Human Evolutionary Biology (4)**
Web virtual lecture—2 hours; lecture/discussion—1 hour; laboratory/discussion—1 hour. Evolutionary theory and mechanisms of evolution; basic population and quantitative genetics; primatology; biological and cultural diversity within Homo sapiens; paleoanthropology. Students may not take both course 1 and course 1Y for credit. GE credit: SE, WE.—I, II, III, IV. (I, II, III, IV.) Marshall, Weaver

*(new course—eff. spring 14)*

**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: SciEng or SocSci, Div | SE, SL.

*(change in existing course—eff. winter 13)*

**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: SciEng or SocSci, Wrt | OL, SE, VL, WE.

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Div | ACGH, AH or SS, DD, WC, WE.

*(change in existing course—eff. winter 13)*

**26. Mummies of the Ancient World (2)**
Lecture—2 hours. Archaeological approaches for studying mummies and the process of mummification in the ancient world. Analytical techniques used, environmental factors promoting mummification, and archaeological conservation of mummified bodies. Offered in alternate years. GE credit: SS, WC.—I. Eerkens

*(new course—eff. fall 14)*

**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: ArtHum or SocSci, Div | ACGH, AH or SS, DD, WC.

*(change in existing course—eff. winter 13)*

**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: SciEng or SocSci, Div, Wrt | SE or SS, SL, WE.

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL, WE.

*(change in existing course—eff. winter 13)*

## Upper Division

**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: SocSci | ACGH, DD, OL, SS, WC, WE.

*(change in existing course—eff. winter 13)*

**105. Evolution of Societies and Cultures (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or 2 or Environmental Science and Policy 30 or Evolution and Ecology 100 or Biological Sciences 101. Interdisciplinary study of social and cultural evolution in humans. Culture as a system of inheritance, psychology of cultural learning, culture as an adaptive system, evolution of maladaptations, evolution of technology and institutions, evolutionary transitions in human history, coevolution of genetic and cultural variation. Only two units of credit to students who have completed Environmental Science and Policy 101 or course 101 prior to fall 2004. (Same course as Environmental Science and Policy 105.) GE credit: SocSci, Wrt | QL, SS, WC, WE.

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

**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: SocSci | SS, WC, WE.

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**132. Psychological Anthropology (4)**
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 2 or Science & Technology Studies 1. History of the relationship between anthropology and psychoanalysis. Exploration of anthropology of emotions, colonial psychology, contemporary ethno-psychiatry, studies on personhood, possession, magic, altered states, subjectivity, and definitions of the normal and the pathological in different contexts and cultures. GE credit: SocSci, Div, Wrt | SS, WC, WE.
*(change in existing course—eff. fall 14)*

**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: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**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: SciEng, Wrt | QL, SE, VL, WE.
*(change in existing course—eff. winter 13)*

**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
*(change in existing course—eff. winter 13)*

**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: SciEng | OL, SE, WE.—Isbell
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.
*(change in existing course—eff. winter 13)*

**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.
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—D. G. Smith
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—Weaver
*(change in existing course—eff. winter 13)*

**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: SocSci | SS, WC, WE.—Steele
*(change in existing course—eff. winter 13)*

**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: SocSci | SS, WC, WE.—Eerkens
*(change in existing course—eff. winter 13)*

**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: SocSci | SS, WC, WE.—Steele
*(change in existing course—eff. winter 13)*

**179. Asian Prehistory (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 or consent of instructor. Survey of the prehistory of Asia from the earliest human occupations to the rise of complex societies. Special focus on fossil and archeological records. Offered in alternate years. GE credit: SocSci.—Zwyns
*(change in existing course—eff. fall 14)*

**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: SciEng | SE.—Darwent, Steele
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, VL, WE. Offered in alternate years.—Eerkens
*(change in existing course—eff. winter 13)*

# Applied Biological Systems Technology

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

### Lower Division

**15. Wood Properties and Fabrication (2)**
Lecture/discussion—1 hour; laboratory—3 hours. Study of wood properties and techniques for fabrication with wood. Gain experience working with various woods and woodworking tools for specific applications. (P/NP grading only.) GE credit: OL, QL, SE, VL.—II. (II.) Grismer, Shafii
*(change in existing course—eff. winter 13)*

**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
*(change in existing course—eff. winter 13)*

**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.)
*(change in existing course—eff. winter 13)*

**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
*(change in existing course—eff. winter 13)*

**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
*(change in existing course—eff. winter 13)*

**98. Directed Group Study (1-5)**
Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.
*(change in existing course—eff. winter 13)*

**99. Special Study for Lower Division Students (1-5)**
(P/NP grading only.) GE credit: SE.
*(change in existing course—eff. winter 13)*

### Upper Division

**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: SciEng | QL, SE, VL.—II. (II.) Rosa
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, VL, WE.—III. (III.) Singh
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—(II.) Zhang
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, VL.—III. (III.) Perkins
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, VL.—I. (I.) Greco, Upadhyaya
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL, VL.—II. Piedrahita
*(change in existing course—eff. winter 13)*

**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: SciEng | OL, QL, SE, SL, VL, WE.—III. Piedrahita
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, VL.—II. (II.) Delwiche, Grismer
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, VL.—I. (I.) Plant
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL, VL.—II. Plant
*(change in existing course—eff. winter 13)*

**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. (Same course as Hydrologic Science 182.) GE credit: SciEng | QL, SE, SL, VL.—III. Zhang
*(change in existing course—eff. winter 13)*

**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.)
*(change in existing course—eff. winter 13)*

**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.
*(change in existing course—eff. winter 13)*

**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.
*(change in existing course—eff. winter 13)*

**198. Directed Group Study (1-5)**
Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.
*(change in existing course—eff. winter 13)*

**199. Special Study for Advanced Undergraduates (1-5)**
(P/NP grading only.) GE credit: SE.
*(change in existing course—eff. winter 13)*

# Arabic

## New and changed courses in Animal Arabic (ARB)

### Lower Division

**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: ArtHum | AH.—Hassouna
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—IV. (IV.)
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—II. (II.) Hassouna
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—III. (III.) Hassouna

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—I. (I.) Hassouna

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—II. (II.) Hassouna

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—III. (III.) Hassouna

*(change in existing course—eff. winter 13)*

## Upper Division

**101A. Readings in Arabic: 600-1850 (4)**
Discussion—3 hours; extensive writing. Prerequisite: course 123 or the equivalent; students who have not completed course 123 should contact the instructor in advance to seek permission to take the course. Readings in Arabic. Poetry, prose literature, and selections from texts on religion, history, politics, science, philosophy and mysticism. Students can repeat the course one time if the instructor decides that they would benefit from additional practice working on the different selections from the same texts or if 50% or more of the texts are different. Offered irregularly. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, OL, WC, WE.—Hassouna, Radwan, Sharlet

*(new course—eff. fall 14)*

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: ArtHum | AH, WC.—I. (I.) Sharlet

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—II. (II.) Radwan

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—III. (III.) Radwan

*(change in existing course—eff. winter 13)*

**140. A Story for a Life: The Arabian Nights (4)**
Lecture/discussion—3 hours; term paper. In-depth investigation of the best-known work of pre-modern Arabic literature, taught in translation. Not open for credit to students who have taken Middle East/South Asia Studies 121A. (Same course as Middle East/South Asia Studies 121A.) Offered in alternate years. GE credit: ArtHum | AH, OL, WC, WE.—(I.) Sharlet

*(new course—eff. fall 13)*

## Graduate

**299. Individual Study (1-12)**
Prerequisite: graduate standing. Restricted to Graduate students. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

*(new course—eff. fall 13)*

## Professional

**396. Teaching Assistant Training Practicum (1-4)**
Prerequisite: graduate standing. Restricted to Graduate students. May be repeated 18 times for credit. (S/U grading only.)—I, II, III. (I, II, III.)

*(new course—eff. winter 14)*

# Art History

## New and changed courses in Art History (AHI)

## Lower Division

**1C. Baroque to Modern Art (4)**
Lecture—3 hours; 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 Baroqueg period through modernism to the present. May be repeated for credit. GE credit: ArtHum, Div | ACGH, AH, DD, VL, WC.—III. (III.)

*(change in existing course—eff. fall 14)*

**1DV. Arts of Asia (Virtual) (5)**

*(cancelled course—eff. winter 14)*

**1DY. Arts of Asia (5)**
Web virtual lecture—2.5 hours; discussion—1 hour; lecture/discussion—1.5 hours. Introduction to major forms and trends in the arts and material culture of Asia from the Neolithic to the contemporary, emphasizing the visual manifestation of secular and religious ideas and ideals. Not open for credit to students who have completed course 1D. GE credit: ArtHum, Div | AH, VL, WC, WE.—I. (I.) Burnett

*(change in existing course—eff. spring 14)*

## Upper Division

**100. Methods of Art History (4)**
Extensive writing or discussion—3 hours; term paper. Prerequisite: two upper-division Art History courses; intended primarily for junior and senior students in Art History. Methods of art historical research and analysis, and general issues in critical thought. Writing skills appropriate to a range of art-historical exposition. Offered irregularly. GE credit: ArtHum, Wrt | VL.—II. Ruda

*(change in existing course—eff. fall 14)*

**110. Cultural History of Museums (4)**
Lecture/discussion—3 hours; term paper. 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 continuing philosophical dilemmas. Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WE.—I. Strazdes

*(change in existing course—eff. fall 14)*

**120A. Art, Architecture, and Human Rights (4)**
Lecture/discussion—4 hours. Study of human rights as they relate to art, architecture, and cultural heritage. Examines museums, art collections, and cultural-heritage management, their relation to the cultural prerogatives of communities and indigenous groups, and protection of cultural heritage during war and conflict. (Same course as Human Rights 120A.) Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, DD, VL WC, WE.—III. Watenpaugh

*(new course—eff. fall 14)*

**130. Landscape, Nature, and Art (4)**
Lecture—3 hours; term paper. Interpretation of the natural world in the western world 1600-1900, with perspectives on the present; landscape painting, ideology of picturesque and sublime, landscape art and travel, reshaping the land as art; dialogues between art and science; nature as national identity. GE credit: ArtHum | AH, VL, WC, WE.—II, IV. (II, IV.)

*(new course—eff. fall 14)*

**148. Theory and Criticism: Painting & Sculpture (4)**
Lecture—3 hours; term paper. Prerequisite: Art Studio 5 or 7 recommended. Study of forms and symbols in historic and contemporary masterpieces. (Same course as Art Studio 148.) Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WE.—II, III. Hearne, Pardee

*(new course—eff. fall 14)*

**153. Art, Storytelling and Cultural Identity in the Pacific (4)**

*(cancelled course—eff. winter 14)*

**172A. Early Greek Art and Architecture (4)**
Lecture—3 hours; term paper. Examination of the origin and development of the major monuments of Greek art and architecture from the eighth century to the mid-fifth century B.C. Not open for credit to students who have completed course 154A. (Same course as Classics 172A.) Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WC, WE.—II. Roller

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

**172B. Later Greek Art and Architecture (4)**
Lecture—3 hours; term paper. Study of the art and architecture of later Classical and Hellenistic Greece, from the mid-fifth century to the first century B.C. Not open for credit to students who have completed Art History 154B. (Same course as Art History 172B.) Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WC, WE.—(II.) Roller

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

**173. Roman Art and Architecture (4)**
Lecture—3 hours; term paper. Art and architecture of Rome and the Roman Empire, from the founding of Rome through the fourth century C.E. (Same course as Classics 173.) Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WE.—III. Roller
*(change in existing course—eff. fall 14)*

**175. Architecture and Urbanism in Mediterranean Antiquity (4)**
Lecture—3 hours; extensive writing. Prerequisite: a lower division Classics course (except 30, 31); course 1A recommended. Architecture and urban development in the ancient Near East, Greece, and Rome. Special emphasis on the social structure of the ancient city as expressed in its architecture, and on the interaction between local traditions and the impact of Greco-Roman urbanism. (Same course as Classics 175.) Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.—(II.) Roller
*(change in existing course—eff. fall 11)*

**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: ArtHum | AH, VL, WC, WE.
*(change in existing course—eff. winter 13)*

**177B. Northern European Art (4)**
*(cancelled course—eff. winter 14)*

**178A. Italian Renaissance Art (4)**
*(cancelled course—eff. winter 14)*

**183D. Modern Sculpture (4)**
*(cancelled course—eff. fall 97)*

**188C. American Art to 1910 (4)**
Lecture/discussion—4 hours; term paper. Major movements in American art from the 17th-century English speaking colonies to the onset of World War I. Offered in alternate years. GE credit: ArtHum | ACGH, AH, VL, WE.—I, II, III. Strazdes
*(new course—eff. fall 14)*

**188E. American Painting and Sculpture from the Civil War to World War II (4)**
*(cancelled course—eff. winter 14)*

**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: ArtHum | AH, OL, VL, WC, WE.; (G) Japanese Art and Material Culture; (H) Late Modern Art and Theory, GE credit: ArtHum | ACGH, AH, DD, OL, VL, WC, WE. May be repeated one time for credit when topic differs.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

**190I. Undergraduate Seminar in Art History (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: Art History major, minor, or other significant training in Art History recommended. Class size limited to 25; for majors, minors, other advanced students. Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing. Subject areas: A)Mediterranean Antiquity, B)Medieval, C)Renaissance, D)American, E)Gendering of Culture, F)Chinese, G)Japanese, H)Contemporary, I)17th-18th Century, J) Islamic, K)19th Century, L)Architecture &Heritage. May be repeated two times for credit when topic differs. GE credit: ArtHum | AH, OL, VL.—I, II, III. (I, II, III.)
*(new course—eff. fall 14)*

**190J. Undergraduate Seminar in Art History (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: Art History major, minor, or other significant training in Art History recommended. Class size limited to 25; for majors, minors, other advanced students. Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing. Topics: A)Mediterranean Antiquity, B)Medieval, C)Renaissance, D)American, E)Gendering of Culture, F)Chinese, G)Japanese, H)Contemporary, I)17th-18th Century, J)Islamic, K)19th Century, L)Architecture & Heritage. May be repeated two times for credit when topic differs. GE credit: ArtHum | AH, OL, VL, WE.—I, II, III. (I, II, III.)
*(new course—eff. fall 14)*

**190K. Undergraduate Seminar in Art History (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: Art History major, minor, or other significant training in Art History recommended. Class size limited to 25; for majors, minors, other advanced students. Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing. Subject areas: A)Mediterranean Antiquity, B)Medieval, C)Renaissance, D)American, E)Gendering of Culture, F)Chinese, G)Japanese, H)Modern-Contemporary, I)17th-18th Century, J)Islamic, K)19th Century, L)Architecture & Heritage. May be repeated two times for credit when topic differs. GE credit: ArtHum | AH, OL, VL, WE.—I, II, III. (I, II, III.)
*(new course—eff. fall 14)*

**190L. Undergraduate Seminar in Art History (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: Art History major, minor, or other significant training in Art History recommended. Class size limited to 25; for majors, minors, other advanced students. Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing. Subject areas: A)Mediterranean Antiquity, B)Medieval, C)Renaissance, D)American, E)Gendering of Culture, F)Chinese, G)Japanese, H)Modern-Contemporary, I)17th-18th Century, J)Islamic, K)19th Century, L)Architecture & Heritage. May be repeated two times for credit when topic differs. GE credit: ArtHum | AH, OL, VL, WE.—I, II, III. (I, II, III.)
*(new course—eff. fall 14)*

# Art Studio

## New and changed courses in Art Studio (ART)

### Lower Division

**24. Introduction to Experimental Video and Film (4)**
Lecture—3 hours; discussion—1 hour; term paper. Evolution of moving image technologies. Shifts within avant-garde artistic practices. Conceptual and historical differences between film and video. Offered in alternate years. GE credit: ArtHum | AH, VL, WE.—(I.) Martin
*(change in existing course—eff. spring 13)*

**26. Photospectacle (4)**
*(cancelled course—eff. winter 12)*

### Upper Division

**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: ArtHum | AH, VL.—Henderson, Hollowell, Pardee, Werfel
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.—Henderson, Hollowell, Iliatova, Pardee, Werfel
*(change in existing course—eff. winter 13)*

**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: ArtHum | 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: ArtHum | AH, VL.—Henderson, Hollowell, Pardee, Werfel
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.—Henderson, Hollowell, Pardee, Werfel
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.—Henderson, Hollowell, Pardee, Werfel
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.—Henderson, Hollowell, Pardee, Werfel
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.—Henderson, Hollowell, Pardee, Werfel
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.—Geiger, Suh
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.—Geiger, Suh
*(change in existing course—eff. winter 13)*

**111A. Advanced Photography: Special Topics (4)**
Studio—6 hours. Prerequisite: course 9; course 110A or 110B. Pass One open to Art Studio majors. Special topics related to photography and contemporary art practice. Multiple projects in a variety of approaches. May be repeated two times for credit when topic differs. GE credit: ArtHum | AH, VL.—Geiger, Suh
*(change in existing course—eff. fall 13)*

**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: ArtHum | AH, VL.—Geiger, Suh
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—Martin
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.—Geiger, Hill, Martin, Puls, Suh
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.—Martin
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.—Martin
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.—Martin
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.—Martin
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.—Pardee, Werfel
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.—Berry
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.—Berry
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.—Geiger, Hill, Suh
*(change in existing course—eff. winter 13)*

**142A. Intermediate Ceramic Sculpture: Mold Work (4)**
Studio—6 hours. Prerequisite: course 8. Pass One open to Art Studio majors. Creation of ceramic sculpture employing moldworking processes such as: slip casting, hump molds, and sprigging. May be repeated one time for credit. GE credit: ArtHum | AH, VL.—Rosen
*(change in existing course—eff. winter 14)*

**142B. Intermediate Ceramic Sculpture: Clay, Glaze, and Kiln (4)**
Studio—6 hours. Prerequisite: course 8. Pass One open to Art Studio majors. Study and practice of glaze formation. Concentration on the use of color in ceramic sculpture. Practical experience with kiln firing. May be repeated one time for credit. GE credit: ArtHum | AH, VL.—Rosen
*(change in existing course—eff. winter 14)*

**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: ArtHum | AH, VL.—Rosen
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.—Rosen
*(change in existing course—eff. winter 13)*

**148. Theory and Criticism: Painting and Sculpture (4)**
Lecture—3 hours; term paper. Prerequisite: course 5 or 7 recommended. Study of forms and symbols in historic and contemporary masterpieces. (Same course as Art History 148.) Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WE.—II. Pardee
*(change in existing course—eff. fall 14)*

**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 two times for credit when topic differs. GE credit: ArtHum | AH, VL.—I, II, III. (I, II, III.) Bills, Hill, Puls
*(change in existing course—eff. fall 13)*

**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: ArtHum | AH, VL.—Bills, Hill, Puls
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.—Puls

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.—Puls

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.—Bills

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.—Hill

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.—III. (III.)

*(change in existing course—eff. winter 13)*

**190. Seminar in Art Practice (4)**
Studio—6 hours. Prerequisite: upper division standing Art Studio major. Pass One restricted Art Studio majors. 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. GE credit: ArtHum | AH, VL, WE.—I, II, III. (I, II, III.) Hill, Puls, Rosen, Werfel

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

**195. Expanded Field: Artist Lecture Series (1)**
Lecture/discussion—3 hours. Prerequisite: consent of instructor. Exploration of the expanded field of practice, theory and criticism in the visual arts. Presentations and discussions with professional practitioners in the field. May be repeated up to 12 units for credit when topic differs. (P/NP grading only.)—I, II, III. (I, II, III.) Hill

*(new course—eff. fall 12)*

# Asian American Studies

## New and changed courses in Asian American Studies (ASA)

## Lower Division

**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: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, VL, WC, WE.—I, III.

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, VL, WC, WE.—I, II, III.

*(change in existing course—eff. winter 13)*

## Upper Division

**100. Asian American Communities (4)**
Lecture/discussion—4 hours. Prerequisite: course 1, 2, or 3, or consent of instructor. Survey and analysis of Asian American communities within both historical and contemporary contexts. Presentation of the analytical skills, theories, and concepts needed to describe, explain, and understand the diversity of Asian American communities within the larger, dominant society. GE credit: ArtHum or SocSci, Div | ACGH, AH or SS, DD, WE.—III. Hamamoto, Kim, Maira

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, | ACGH, AH or SS, DD, WC, WE.—II. Hamamoto

*(change in existing course—eff. winter 13)*

**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: SocSci, Div | ACGH, DD, OL, SS, WC, WE.—Valverde

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Div | ACGH, AH or SS, DD, OL, WE.—Maira

*(change in existing course—eff. winter 13)*

**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: ArtHum | ACGH, AH, DD, OL, WE.—II. Min, See

*(change in existing course—eff. winter 13)*

**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: SocSci | SS.—Chen

*(change in existing course—eff. winter 13)*

**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: SocSci | ACGH, DD, SS, WC.—III. Rodriguez

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, VL, WC, WE.—II. Hamamoto

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Div | ACGH, AH or SS, DD, VL, WC.—Ho

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Div | ACGH, AH or SS, DD, WC.—Kim

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Div | ACGH, AH or SS, DD, OL, WC, WE.—III. Valverde

*(change in existing course—eff. winter 13)*

**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: SocSci | ACGH, DD, SS.—(II.)

*(change in existing course—eff. winter 13)*

**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: SocSci | ACGH, DD, SS, WC.

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci | AH or SS.

*(change in existing course—eff. winter 13)*

**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: SocSci | SS.

*(change in existing course—eff. winter 13)*

**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: SocSci | ACGH, DD, SS.

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci | ACGH, AH or SS, DD, OL, WE.

*(change in existing course—eff. winter 13)*

**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: SocSci | SS.

*(change in existing course—eff. winter 13)*

**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: SocSci | SS.

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci | AH or SS.

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci | ACGH, AH or SS, DD, OL, WE.

*(change in existing course—eff. winter 13)*

# Astronomy

## New and changed courses in Astronomy (AST)

### Lower Division

**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: SciEng | SE, SL, VL.—I. (I.) Fassnacht, Lubin

*(change in existing course—eff. winter 13)*

# Atmospheric Science

## New and changed courses in Atmospheric Science (ATM)

### Lower Division

**30. Issues in Atmospheric Science (2)**
*(cancelled course—eff. winter 14)*

**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: SciEng | QL, SE, VL.—I. (I.) Faloona

*(change in existing course—eff. winter 13)*

### Upper Division

**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: SciEng | OL, QL, SE, VL.—III. (III.) Chen

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, VL.—II. (II.) Grotjahn

*(change in existing course—eff. winter 13)*

**111L. Weather Analysis and Prediction Laboratory (2)**
*(cancelled course—eff. spring 14)*

**111LY. Weather Analysis and Prediction Laboratory (2)**
Laboratory—2 hours; web virtual 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: SciEng | OL, QL, SE, VL.—II. (II.) Grotjahn

*(new course—eff. fall 13)*

**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: SciEng | SE, SL.—III. (III.)

*(change in existing course—eff. winter 13)*

**116. Climate Change (4)**
Lecture—3 hours; extensive writing. Prerequisite: University Writing Program 1; consent of instructor. Climate trends and patterns spanning the recent past and the future. Emphasis on natural processes that produce climate variations and human influence on these processes. Evidence of climate change and the role of global climate models in understanding climate variability. GE credit: SciEng | QL, SE, WE.—III. (III.)

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, VL.—I. (I.) Faloona

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—II. (II.) Nathan

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—III. (III.) Chen

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL, VL.—I. (I.) Paw U
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, VL.—II. (II.) Nathan
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL, VL.—II. (II.) Paw U, Snyder
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL.—I. (I.) Cappa
*(change in existing course—eff. winter 13)*

**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
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, VL.—III. (III.) Faloona
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL, VL.—II. (II.) Anastasio
*(change in existing course—eff. winter 13)*

# Avian Science

## New and changed courses in Avian Science (AVS)

### Lower Division

**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: SciEng | SE.
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. (I.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.)
*(change in existing course—eff. winter 13)*

### Upper Division

**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: SciEng | SE.
*(change in existing course—eff. winter 13)*

**103. Avian Development and Genomics (3)**
Lecture—3 hours. Prerequisite: Biological Sciences 1A and 1B, or Biological Sciences 2B. Unique features of avian development and genomics: Incubation; Staging; Egg Structure/Function; Fertilization; Pre-oviposital; Oviposition, Cold Torpor; Post-oviposital Development; Organogenesis, Growth; Sexual Differentiation; Extraembryonic Membranes; Mortality/Hatching; Genome Organization; Comparative Avian Genomics; Telomere Biology; Sex Chromosomes/Sex Determination; Advanced Technologies; Genome Manipulation; Mutations. GE credit: SciEng | SE.—I, (I.) Delany
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—II.
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL, WE.—(II.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.
*(change in existing course—eff. winter 13)*

**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, SciEng | SE.—(III.) Klasing
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.
*(change in existing course—eff. winter 13)*

### Graduate

**203. Advanced Avian Development and Genomics (1)**
Discussion—1 hour. Prerequisite: graduate standing; concurrent enrollment in course 103. In consultation with the instructor, students develop a lecture and associated instructional materials, i.e., lesson plan, including justification, reading and presentation and evaluation aids. The topic must complement a topic covered in Avian Sciences 103 (Avian Development and Genomics).—I. (I.) Delany
*(new course—eff. fall 13)*

# Biological Sciences

## New and changed courses in Biological Sciences (BIS)

### Lower Division

**2A. Introduction to Biology: Essentials of Life on Earth (5)**
Lecture—3 hours; discussion—2 hours. 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: SciEng | SE.—I, II, III. (I, II, III.) Britt, Comai, Facciotti, Kopp, Roth, Singer
*(change in existing course—eff. winter 13)*

**2B. Introduction to Biology: Principles of Ecology and Evolution (5)**
Lecture—3 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: grade of C- in course 1A or 2A. Introduction to basic principles of ecology and evolutionary biology, focusing on the fundamental mechanisms that generate and maintain biological diversity across scales ranging from molecules and genes to global processes and patterns. Not open for credit for student who have completed Biological Sciences 1B with a grade of C- or better. GE credit: SciEng | QL, SE, SL, VL.—I, II, III. (I, II, III.) Grosberg, Keen, Rosenheim, Stachowicz, Strauss
*(change in existing course—eff. winter 13)*

**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. 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: SciEng | OL, QL, SE, SL, VL.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

**10. General Biology (4)**
Lecture/discussion—4 hours. Concepts and issues in biology. Emphasis on composition and structure of organisms; regulation and signaling; heredity, evolution and the interaction and interdependence among life forms and their environments. Designed for students not specializing in biology. Not open for credit to students who have completed course 1A, 2A or 10V. GE credit: SciEng | SE.—III. (III.)
*(change in existing course—eff. fall 14)*

### Upper Division

**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 Animal Biology 102 & 1.5 units of credit for students who have completed Biological Science 105. GE credit: SciEng | QL, SE.—I, II, III. (I, II, III.) Cheng, Etzler, Gasser, Hilt, Leary
*(change in existing course—eff. winter 14)*

**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: SciEng | QL, SE.—Hilt, Theg
*(change in existing course—eff. winter 13)*

**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. 1.5 units of credit for student who has completed course 105; 1 unit of credit if students who has completed Animal Biology 103. GE credit: SciEng | SE.—I, II, III. (I, II, III.) Callis, Etzler, Fiehn, Gasser, Hilt, Inoue, Leary
*(change in existing course—eff. winter 13)*

**105. Biomolecules and Metabolism (3)**
Lecture—3 hours. Prerequisite: courses 1A, 1B, and 1C, or 2A, 2B, and 2C; 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. GE credit: SciEng | SE, QL.—I, II, III. (I, II, III.) Fiehn, Hilt, Murphy, Theg
*(change in existing course—eff. fall 14)*

**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: SciEng | OL, QL, SE, SL, VL, WE.—III. (III.) Morgan
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, VL, WE.—III. (III.) Chang, Cherr, Morgan
*(change in existing course—eff. winter 13)*

**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: SciEng | OL, QL, SE, VL, WE.—IV. (IV.) Gaylord, Hill, Largier, Morgan, Sanford
*(change in existing course—eff. winter 13)*

**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: SciEng, Wrt | QL, SE, SL, VL, WE.—I. (I.) Hom
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL, VL, WE.—I, II, III. (I, II, III.) Grosberg, Schreiber
*(change in existing course—eff. winter 13)*

**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: SciEng | OL, QL, SE, VL.—III. (II.) Brady
*(change in existing course—eff. winter 13)*

**180L. Genomics Laboratory (5)**
Lecture—2 hours; laboratory—6 hours; discussion—1 hour. Prerequisite: 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
*(change in existing course—eff. spring 13)*

**181. Comparative Genomics (3)**
Lecture—3 hours. Prerequisite: course 101. Comparison of genomes at the population and species level. Genomic techniques for mapping disease (and other) genes, reconstruction of evolutionary history and migration patterns, determination of gene function, prediction of organismal traits, and metagenomics: determination of community composition and function. GE credit: SciEng | QL, SE, SL.—I. (I.) Dawson, Maloof
*(change in existing course—eff. winter 13)*

**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.

*(change in existing course—eff. winter 13)*

# Biotechnology

## New and changed courses in Biotechnology (BIT)

### Upper Division

**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: SciEng | SE, VL.

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.) Dandekar

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.) Beckles

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—III. (III.) Bennett, Blumwald

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL, WE.—I, II, III. (I, II, III.) Bennett, Bradford, Yoder

*(change in existing course—eff. winter 13)*

**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: SciEng, Wrt | OL, SE, WE.—III. (III.) Kliebenstein

*(change in existing course—eff. winter 13)*

**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.

*(change in existing course—eff. winter 13)*

# Chemistry

## New and changed courses in Chemistry (CHE)

### Upper Division

**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: SciEng | QL, SE.—I, III. (I, III.)

*(change in existing course—eff. winter 13)*

**108. Molecular Biochemistry (3)**
Lecture—3 hours. Prerequisite: course 128C. Pass One open to Chemistry majors. Chemical principles and experimental methods applied to the biological sciences to understand the molecular structure and function of proteins, nucleic acids, carbohydrates, and membrane lipids.—III. (III.) Ames, Fisher

*(change in existing course—eff. spring 14)*

**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: SciEng | QL, SE.—I, III. (I, III.)

*(change in existing course—eff. winter 13)*

**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: SciEng, Wrt | QL, SE, WE.—I, II. (I, II.)

*(change in existing course—eff. winter 13)*

**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: SciEng, Wrt | QL, SE, WE.—II, III. (II, III.)

*(change in existing course—eff. winter 13)*

**130C. Case Studies in Pharmaceutical Chemistry (1)**
Seminar—2 hours; independent study. Prerequisite: courses 130A and 130B concurrently. Seminar. Exploration of medicinal and pharmaceutical chemistry topics through seminars presented by professional chemists (and allied professionals). Designed to highlight career opportunities for students with a degree in pharmaceutical chemistry. (P/NP grading only.)—III. (III.)

*(new course—eff. fall 13)*

### Graduate

**245. Mechanistic Enzymology (3)**
Lecture—3 hours. Advanced topics in chemical kinetics relevant to enzymes, enzyme kinetics, theory of enzyme catalysis, and the analysis of a selection of organic enzyme reaction mechanisms by the tools introduced in the first part of the course.—I. (I.) Toney

*(new course—eff. fall 13)*

# Chicana/Chicano Studies

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

### Upper Division

**113. Latin American Women's Engagement in Social Movements (4)**
Lecture/discussion—3 hours; term paper. Examination of how women of different racial/ethnic and class backgrounds in Latin America challenge their marginalization. Exploration of US foreign policy, its effects on Latin American's institutions and on Latin American citizens. Using Chicana feminist perspective. Offered in alternate years. GE credit: SocSci | ACGH, DD, SS, WC, WE.—III. Deeb-Sossa

*(new course—eff. fall 13)*

**114. Women of Color Reproductive Health and Reproductive Politics in a Global Perspective (4)**
Lecture/discussion—3 hours; term paper. Study contemporary issues in reproductive health and reproductive politics, both globally and in the U.S., for women of color. Offered in alternate years. GE credit: SocSci | ACGH, DD, SS, WC, WE.—III. Deeb-Sossa

*(new course—eff. fall 13)*

**157. Chicana and Chicano Narrative (4)**
Lecture/discussion—3 hours; term paper. Exploration of contemporary forms of the Chicana and Chicano narrative, encompassing visual art, fiction, poetry, film, theater, and creative nonfiction. Exposure to a variety of artists and scholars whose work shapes our evolving understanding of the Chicana/o experience. GE credit: ArtHum | ACGH, AH, DD, VL, WC. WE.—II, III. (II, III.) Montoya

*(new course—eff. fall 13)*

**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: ArtHum | AH, VL.—III. Jackson, M. Montoya
*(change in existing course—eff. winter 13)*

**184. Latino Youth Gangs in Global Perspective (4)**
Lecture—3 hours; term paper. Comparative analysis of Latino youth gangs in Europe, Latin America, and the United States. Social, economic, political, and cultural factors leading to youth gangs as well as the responses are considered within a global perspective. Not open for credit to students who have completed course 184S. Offered in alternate years. GE credit: SocSci | ACGH, DD, OL, SS, WC, WE.—(II.) Chavez-Garcia
*(new course—eff. fall 13)*

**184S. Latino Youth Gangs in Global Perspective (4)**
Lecture—12 hours. Comparative analysis of Latino youth gangs in Europe, Latin America, and the United States. Social, economic, political, and cultural factors leading to youth gangs as well as the responses to the youths are considered within a global perspective. Not open for credit to students who have completed course 184. Offered irregularly. GE credit: SocSci | ACGH, DD, OL, SS, WC, WE.—IV. (IV.) Chavez-Garcia
*(new course—eff. summer 13)*

# Chinese

## New and changed courses in Chinese (CHN)

### Lower Division

**1BL. Accelerated Written Chinese I (5)**
Lecture—5 hours. Prerequisite: ability to understand and speak Mandarin Chinese at an elementary level. Trainings on all the communicative skills of listening, speaking, reading, and writing for students who already have elementary level ability to understand or speak Mandarin Chinese. Emphases on standard Mandarin pronunciation, Chinese characters, and discourse level conversations. Not open for credit to students who have completed course 8. GE credit: ArtHum | AH, OL, WC.—I. (I.)
*(change in existing course—eff. fall 14)*

**2BL. Accelerated Written Chinese II (5)**
Lecture—5 hours. Prerequisite: course 1BL or advanced placement with Chinese Placement Exam. Further trainings on all the communicative skills of listening, speaking, reading, and writing for students that already have elementary level ability to understand or speak Mandarin Chinese. Emphases on standard Mandarin pronunciation, Chinese characters, and discourse level conversations. Not open for credit to students who have completed course 18. GE credit: ArtHum | AH, OL, WC.—II. (II.)
*(change in existing course—eff. fall 14)*

**4A. Accelerated Intensive Intermediate Chinese (15)**
Prerequisite: course 3 or 1A or placement exam. Special nine-week accelerated, intensive summer session course that combines the work of courses 4, 5, and 6. Intermediate-level training in spoken and written Chinese in cultural and communicative contexts, based on language skills developed in course 3 or 1A. Not open to students who have completed course 4, 5, or 6. GE credit: ArtHum | AH, OL, WC.—IV. (IV.)
*(change in existing course—eff. summer 14)*

**6. Intermediate Chinese (5)**
Lecture/discussion—5 hours. Prerequisite: course 5 or the equivalent. Intermediate-level training in spoken and written Chinese in cultural contexts, based on language skills developed in course 5. GE credit: ArtHum | AH, OL, WC.—I, II, III. (I, II, III.)
*(change in existing course—eff. fall 14)*

### Upper Division

**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. (Same course as Cinema & Technocultural Studies 147A.) GE credit: ArtHum, Div | AH, VL, WC.—III. (III.) Chen
*(change in existing course—eff. winter 14)*

**111. Modern Chinese: Reading and Discussion (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 6 or the equivalent. Building on Chinese 6/3BL, further development of communication skills in Modern Standard Mandarin-speaking environments. Reading of dialogues/articles pertaining to contemporary China. GE credit: ArtHum | AH, OL, WC.—I. (I.)
*(change in existing course—eff. fall 14)*

**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: ArtHum | AH, OL, WC.—IV. (IV.)
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—II. (II.)
*(change in existing course—eff. winter 13)*

**113. Modern Chinese: Reading and Discussion (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 112. Continuation of CHN 112, further developing communication skills in Modern Standard Mandarin-speaking environments. Read dialogues/articles pertaining to contemporary China issues and discuss ethical, moral, aesthetic, social, and cultural concerns. Study strategies for moving between simplified and traditional Chinese characters. GE credit: ArtHum | AH, OL, WC.—III. (III.)
*(change in existing course—eff. fall 14)*

**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: ArtHum | AH.—I. (I.) Halperin
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—II. (II.) Halperin
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—III. (III.) Halperin
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—II. (II.)
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—I. (I.) Yeh
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—II. (II.) Yeh
*(change in existing course—eff. winter 13)*

**133. Readings in Modern Chinese Prose and Drama (4)**
Lecture—4 hours. Prerequisite: course 113 or equivalent language proficiency based on placement exam. Literary works and scholarly essays on selected topics of Chinese prose and drama, development of a deep understanding of Chinese culture and society through sophisticated reading materials of these two important genres of the modern period. Conducted in Chinese. May be repeated two times for credit when topic differs. GE credit: ArtHum | AH, WC.—IV. (IV.)
*(new course—eff. fall 13)*

**134. Chinese Film in Chinese Language (4)**
Lecture—3 hours; film viewing—3 hours. Prerequisite: course 120 or fourth level Chinese placement exam. Chinese film and scholarly essays on Chinese cinema and film history. Develop a deep understanding of Chinese culture and society through viewing

and studying Chinese films in the Chinese language. GE credit: ArtHum or SocSci | AH or SS, OL, VL, WC.—IV. (IV.) Chen

*(new course—eff. fall 13)*

**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: ArtHum | AH.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—II, III. (II, III.)

*(change in existing course—eff. winter 13)*

### Professional

**396. Teaching Assistant Training Practicum (1-4)**

Prerequisite: graduate standing. Any course taught by a graduate student under the direction of the Director. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.) Chu

*(new course—eff. fall 14)*

# Cinema & Technocultural Studies

## New and changed courses in Cinema & Technocultural Studies (CTS)

### Lower Division

**12. Introduction to Media Computation (4)**

Lecture—3 hours; discussion/laboratory—1 hour. Introduction to key computational ideas necessary to understand and produce digital media. Fundamentals of programming are covered as well as analysis of how media are represented and transmitted in digital form. Aimed primarily at non-computer science students. (Same course as Engineering: Computer Science 012.) GE credit: ArtHum or SciEng | AH or SE, VL.—II. (II.) Neff

*(new course—eff. fall 13)*

**20. Filmmaking Foundations (5)**

Lecture—3 hours; laboratory—3 hours; film viewing—2 hours; project. Prerequisite: recommended: course 5/Technocultural Studies 5 and/or Film Studies 1. Introduction to filmmaking concepts, principles, and methods. Hands-on exercises build critical and creative capacities. Emphasis on form, content and the historical dialectic between classical narrative filmmaking conventions and artists' challenges to these conventions. Weekly Lab, Lab Preparation, and Evening Screening. GE credit: ArtHum | AH, VL.—I. (I.) Wyman

*(new course—eff. fall 13)*

### Upper Division

**116. Design on Screen (4)**

Lecture/discussion—3 hours; film viewing—2 hours. Analysis of the contribution of outstanding designers for cinema, television and filmed entertainment. Study of diverse aesthetic theories of production design and art direction, costume design, or cinematography. Introductory principles and practice, history. May be repeated two times for credit when topic differs. (Same course as Dramatic Art 116.) Offered irregularly. GE credit: ArtHum | AH, VL.—Iacovelli, Morgan

*(new course—eff. spring 13)*

**124E. Costume Design for Film (4)**

Lecture/discussion—4 hours. Prerequisite: for Dramatic Art majors; Dramatic Art 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. (Same course as Dramatic Art 124E.) GE credit: ArtHum | AH, OL, VL.—II. (II.) Morgan

*(new course—eff. winter 14)*

**146A. Modern Iranian Cinema (4)**

Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: upper-division standing, or consent of instructor. Iranian cinema of the 20th century in the context of profound cultural and social changes in Iran especially since the Iranian Revolution. Productions by representative directors such as Kiarostami, Makhmalbaf, Bahram Beizaie are included. Knowledge of Persian not required. Offered in alternate years. (Same course as Middle East/South Asia Studies 131A.) GE credit: ArtHum, Div, Wrt | AH, OL, VL, WC, WE.—(III.)

*(new course—eff. fall 13)*

**147A. 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. (Same course as Chinese 101.) GE credit: ArtHum, Div | AH, VL, WC.—III. (III.) Chen

*(new course—eff. winter 14)*

**150. Media Theory (5)**

Lecture—2 hours; discussion—1 hour; film viewing—3 hours; extensive writing. Critical and theoretical approaches to the emergence of new technologies since the invention of photography. Examine various approaches to media (formalist, semiotic, structuralist, Frankfurt School, cybernetics, visual and gamer theory). (Same course as Science and Technology Studies 151.) GE credit: AH or SS, OL, VL, WE.

*(new course—eff. fall 14)*

**162. Surveillance Technologies and Social Media (4)**

Lecture—3 hours; film viewing—3 hours; term paper. Prerequisite: Technocultural Studies 1 or Science & Technology Studies 20. Study of the ubiquitous presence of CCTV, face recognition software, global tracking systems, biosensors, and data mining practices that have made surveillance part of our daily life. Study boundaries between security and control, information and spying. (Same course as Science & Technology Studies 162.) Offered in alternate years. GE credit: ACGH, AH or SS, Div, OL, VL, WE.—Ravetto

*(new course—eff. winter 15)*

**174. Acting for Camera (4)**

Lecture/laboratory—6 hours. Prerequisite: consent of instructor. Analysis and practice of acting skills required for camera work and digital media. May be repeated eight times for credit when different instructor is assigned. (Same course as Dramatic Art 174.)—III. (III.) Anderson, Merlin

*(new course—eff. spring 13)*

# Classics

## New and changed courses in Classics (CLA)

### Lower Division

**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: ArtHum | AH, VL, WC, WE.—Seal

*(change in existing course—eff. winter 13)*

**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. Not open for credit to students who have completed course 30F. GE credit: ArtHum | AH.—I, II, III, IV. (I, II, III, IV.) Albu, Popescu, Rundin

*(change in existing course—eff. fall 14)*

**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: ArtHum | AH.

*(change in existing course—eff. winter 13)*

### Upper Division

**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: ArtHum | AH, WC, WE.—Albu

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC, WE.—Albu

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC, WE.—Albu

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC, WE.—III. Albu

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC, WE. Offered in alternate years.—Seal

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC, WE. Offered in alternate years.—Seal

*(change in existing course—eff. winter 13)*

**140. Homer and Ancient Epic (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: course 10 or Comparative Literature 1. Reading of the classical epics of Homer (Iliad, Odyssey) and Virgil (Aeneid) in English. Discussion of techniques of composition, the beliefs and values of their respective societies, and the generic tradition of ancient epic. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC, WE.—Popescu

*(change in existing course—eff. winter 14)*

**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: ArtHum | AH, WC, WE.—Seal

*(change in existing course—eff. winter 13)*

**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. credit: ArtHum, Wrt | AH, VL, WC, WE.—Roller

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

**172B. Later Greek Art and Architecture (4)**
Lecture—3 hours; term paper. Study of the art and architecture of later Classical and Hellenistic Greece, from the mid-fifth century to the first century B.C. Not open for credit to students who have completed Art History 154B. (Same course as Art History 172B.) Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WC, WE.—(II.) Roller

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

**173. Roman Art and Architecture (4)**
Lecture—3 hours; term paper. Art and architecture of Rome and the Roman Empire, from the founding of Rome through the fourth century C.E. (Same course as Art History 173.) Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WE.—III. (III.) Roller

*(change in existing course—eff. fall 14)*

**175. Architecture and Urbanism in Mediterranean Antiquity (4)**
Lecture—3 hours; extensive writing. Prerequisite: a lower division course (except 30, 31); Art History 1A recommended. Architecture and urban development in the ancient Near East, Greece, and Rome. Special emphasis on the social structure of the ancient city as expressed in its architecture, and on the interaction between local traditions and the impact of Greco-Roman urbanism. (Same course as Art History 175.) Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.—(II.) Roller

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

**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.

*(change in existing course—eff. winter 13)*

### Professional

**396. Teaching Assistant Training Practicum (1-4)**
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

*(new course—eff. fall 12)*

# Clinical Research

## New and changed courses in Clinical Research (CLH)

### Graduate

**233. Molecular Mechanisms of Disease: Cancer (3)**
Lecture/discussion—2 hours; project—3 hours. Prerequisite: consent of instructor. Restricted to students pursuing the designated emphasis in Translational Research; graduate standing. Cutting edge of research on underlying mechanisms of cancer development, progression and prevention - clinical trials/drug development, signaling pathways and molecular mechanisms of cancer development, recent basic research on cancer stem cells, genetics and epigenetic events and animal models used.—II. (II.) Goldkorn

*(new course—eff. fall 13)*

# Communication

## New and changed courses in Communication (CMN)

### Lower Division

**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: SocSci | SS.—I, II, III. (I, II, III.) Hamilton

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci | AH or SS, OL. WC.—II. (II.) Farrell, Feng, Ramanathan

*(change in existing course—eff. winter 13)*

### Upper Division

**134. Interpersonal Communication (4)**
Lecture—4 hours. Prerequisite: course 101 and course 102 or equivalent are required. Pass One open to Communication majors only. Communication between individuals in social and task settings. One-to-one communication, verbal and nonverbal, in developing relationships. Consideration of theory and research on relevant variables such as shyness, selfdisclosure, reciprocity, games, and conflict. GE credit: SocSci | SS.—I, II, III. (I, II, III.) Feng, Jenkins

*(change in existing course—eff. fall 14)*

**135. Nonverbal Communication (4)**
Lecture—4 hours.Prerequisite: course 101 and 102 (or equivalent course in research methods). Pass One open to Communication majors only. Examination of the interaction between nonverbal communication and verbal communication channels in influencing outcomes in interpersonal and mediated communication contexts. Underlying functions served by nonverbal communication also considered. GE credit: SocSci | SS.—II, III. (II, III.) Berger

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

**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: SocSci | SS, DD.—III. (III.) Feng

*(change in existing course—eff. fall 14)*

**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: SocSci | SS, WE.—III. (III.) Barnett

*(change in existing course—eff. winter 13)*

**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: SocSci | SS, WE.—III. (III.) Taylor

*(change in existing course—eff. winter 13)*

**145. Political Communication (4)**
Lecture/discussion—4 hours. Prerequisite: course 101 and 102 or equivalent course in research methods. Pass One open to Communication majors only. Discussion of theories and research on the relationships among the mass media, citizens, and politics, production of political news, campaign strategies, and citizens' attitudes and behaviors Provides frameworks for mediated politics, the news, and elite discourse and campaign messages. Offered irregularly. GE credit: SocSci | ACGH, SS.—Cho

*(new course—eff. spring 14)*

**148. Contemporary Trends In Media (4)**
Lecture/discussion—4 hours. Prerequisite: course 101 and 102 (or equivalent course in research methods). Pass One open to Communication majors only.

Global trends in media, including media and globalization, impacts of the new media economy, media and security, and effects of ownership on media content and culture. Offered irregularly. GE credit: SocSci | SS.—Barnett, Theobald

*(new course—eff. fall 14)*

**161. Health Communication (4)**
Lecture/discussion—4 hours. 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 14)*

**172. Computer-Mediated Communication (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: course 101 and 102 (or equivalent course in research methods). Pass one open to Communication majors only. Uses and impacts of computer-mediated communication. Theories and research findings pertaining to how computer-mediation affects various aspects of human interaction including impression formation, development of personal relationships, group decision making, collaborative work, and community building. GE credit: SocSci | SS.—III. (III.)

*(change in existing course—eff. winter 13)*

**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: SocSci | SS.—III. (III.)

*(change in existing course—eff. winter 13)*

**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: SocSci | SS, WE.

*(change in existing course—eff. winter 13)*

# Community and Regional Development

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

## Upper Division

**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: SocSci | QL, SS, WE.—II. (II.) Benner

*(change in existing course—eff. winter 13)*

**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: SocSci | ACGH, DD, OL, SS, VL, WE.—II. (II.) Hirtz

*(change in existing course—eff. winter 13)*

**197T. Tutoring in Community and Regional Development (1-5)**
Tutorial—3-15 hours. Prerequisite: upper division standing; completion of course to be tutored; consent of instructor. Assisting instructor in one of the Community and Regional Development's regular courses by tutoring individual students or small groups of students in a laboratory, in voluntary discussion groups, or other voluntary activities. May be repeated up to 10 units for credit. Offered irregularly. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.)

*(new course—eff. fall 13)*

## Graduate

**203. Scientific Methods for Communication (4)**
Seminar—3 hours; term paper. Prerequisite: 201, 202, Psychology 204A, 204B 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.—IV. Palomares, Yegiyan

*(new course—eff. winter 14)*

**240. Community Development Theory (4)**
Lecture/discussion—4 hours. Introduction to theories of community development and different concepts of community, poverty, and development. Emphasis on building theory, linking applied development techniques to theory, evaluating development policy, and examining case studies of community development organizations and projects. (Same course as Geography 240.)—I. (I.)

*(change in existing course—eff. winter 14)*

**244. Political Ecology of Community Development (4)**
Lecture—4 hours. Prerequisite: graduate standing. Community development from the perspective of geographical political ecology. Social and environmental outcomes of the dynamic relationship between communities and land-based resources, and between social groups. Cases of community conservation and development in developing and industrialized countries. (Same course as Geography 254.)—II. (II.) Galt

*(change in existing course—eff. winter 14)*

**245. The Political Economy of Urban and Regional Development (4)**
Lecture—4 hours. Prerequisite: course 157, 244, or the equivalent. How global, political and economic restructuring and national and state policies are mediated by community politics; social production of urban form; role of the state in uneven development; dynamics of urban growth and decline; regional development in California. (Same course as Geography 245.)—III. (III.)

*(change in existing course—eff. spring 14)*

**246. The Political Economy of Transnational Migration (4)**
Lecture—4 hours. Prerequisite: graduate standing. Theoretical perspectives and empirical research on social, cultural, political, and economic processes of transnational migration to the U.S. Discussion of conventional theories will precede contemporary comparative perspectives on class, race, ethnicity, citizenship, and the ethnic economy. (Same course as Geography 246.)—II. (II.) Guarnizo

*(change in existing course—eff. winter 14)*

**248. Social Policy, Welfare Theories and Communities (4)**
Seminar—4 hours. Prerequisite: graduate standing. Theories and comparative histories of modern welfare states and social policy in relation to legal/normative, organizational, and administrative aspects. Analysis of specific social issues within the U.S./California context. Not open for credit to students having completed Community & Regional Development 248A and 248B. (Same course as Geography 248.) Offered in alternate years.—(III.) Hirtz

*(change in existing course—eff. fall 13)*

**249. Media Innovation and Community Development (4)**
Seminar—4 hours. Restricted to Graduate Students. Role of innovative media in communities and social change. Studies historical, practical and theoretical issues involving media in community organizing, social justice movements, democracy initiatives, and economic justice.—III. (III.)

*(new course—eff. fall 14)*

# Comparative Literature

## New and changed courses in Comparative Literature (COM)

## Upper Division

**138. Gender and Interpretation in the Renaissance (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: completion of Subject A requirement, at least one course in literature, or consent of instructor. Critical analysis of Renaissance texts with primary focus on issues such as human dignity, education and gender politics; "high" and "low" culture and its relation to literary practices. (Same course as Italian 141.) GE credit: ArtHum, Div, Wrt | AH, WC, WE.—II. (II.) Schiesari

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

**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: ArtHum | AH, WC, WE.—(II.)

*(change in existing course—eff. winter 13)*

**141. Introduction to Comparative Critical Theory (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: one upper division literature course or consent of instructor. Introduction to comparative critical theory and its use for interpreting literary texts, film, and media forms in global culture. (Same course as Critical Theory 101.) GE credit: ArtHum, Wrt | AH, WC, WE.—III. (III.) Larsen

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

**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: ArtHum | AH, WC, WE.

*(change in existing course—eff. winter 13)*

**192. Internship in Comparative Literature (1-12)**
Internship—1-12 hours. Prerequisite: completion of 84 units; consent of instructor. Restricted to Comparative Literature majors. Internships in fields where

students can practice their skills. May be repeated up to 12 units for credit. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.)

*(new course—eff. fall 13)*

**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.

*(change in existing course—eff. winter 13)*

**195. Seminar in Comparative Literature (4)**
Seminar—3 hours; term paper. Prerequisite: senior standing as a Comparative Literature major or minor or consent of instructor. Open only to Comparative Literature majors or minors in or consent of instructor. Advanced study of selected topics and texts in Comparative Literature, with explicit emphasis on the theoretical and interpretive approaches that define Comparative Literature as a discipline and distinguish it from other literary disciplines. Required for the major. GE credit: ArtHum | AH, WE.—III. (III.)

*(change in existing course—eff. winter 13)*

# Critical Theory

## New and changed courses in Critical Theory (CRI)

### Upper Division

**101. Introduction to Critical Theoretical Approaches to Literature and Culture (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: one upper division literature course or consent of instructor. Introduction to critical theory and its use for interpreting literary texts, film, and media forms in our present global culture. (Same course as Comparative Literature 141.) GE credit: ArtHum, Wrt | AH, WC, WE.—III. (III.)

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

### Graduate

**200A. Approaches to Critical Theory (4)**
Seminar—3 hours; term paper. Prerequisite: graduate standing in a participating program. Restricted to Graduate students. Critical overview of modern theoretical texts; e.g., semiotics, hermeneutics, deconstruction, social and cultural critique, feminist theory, psychoanalysis.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 14)*

**200B. Problems in Critical Theory (4)**
Seminar—3 hours; term paper. Restricted to Graduate students. Focused study of a particular critical theoretical approach, school or perspective. Topics may include but are not limited to: critical approaches to the study of literature, culture, film, historiography, visual culture, the body, and aesthetics. May be repeated for credit with consent of instructor.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 14)*

**200C. History of Critical Theory (4)**
Seminar—3 hours; term paper. Restricted to Graduate students. Critical analysis and discussion of pretwentieth century theories of literary and cultural criticism. Topics may include but are not limited to: ancient and early modern philosophy; nature and culture in the Renaissance; theories of Mimesis from antiquity to the Renaissance. May be repeated for credit when topic differs and with consent of instructor.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 14)*

# Cultural Studies

## New and changed courses in Cultural Studies (CST)

### Graduate

**204. History and Theory of Sexualities (4)**
Lecture/discussion—4 hours. Prerequisite: course 200A (may be taken concurrently) or consent of instructor. Studies of sexuality in feminist, literary, historical, and cultural studies research, specifically examining the emergence of "sexuality" as a field of research and the relationship of sexuality studies to cultural forms, subjectivity, and social relations generally. May be repeated two times for credit. Offered irregularly.—I. (I.)

*(change in existing course—eff. spring 14)*

**210. Memory, Culture, and Human Rights (4)**
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Restricted to graduate students. Explores the multiple convergences among memory, culture, and human rights. Discusses diverse approaches to how societal actors in different historical, cultural, and national settings, construct meanings of past political violence, intergroup conflicts, and human rights struggles. (Same course as Human Rights 200B.) Offered in alternate years.—I. Lazzara

*(new course—eff. fall 13)*

# Davis Honors Challenge

## New and changed courses in Davis Honors Challenge (HNR)

### Lower Division

**94. Honors Seminar (4)**
Seminar—4 hours. Open to students in the Davis Honors Challenge. Collaborative, multidisciplinary exploration of complex contemporary problem. Focus on critical thinking and analytical interpretation, on oral and written communication, and on the use of electronic media in gathering information. May be repeated for credit. GE credit: Wrt | WE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

# Design

## New and changed courses in Design (DES)

### Lower Division

**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: ArtHum | AH, VL.—I. (I.) Housefield

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

**13. Photography for Designers (4)**
*(cancelled course—eff. winter 14)*

**14. Design Drawing (4)**
Studio—4 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: ArtHum | AH, VL.—IV. (IV.)

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

**15. Form and Color (4)**
Studio—4 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. Design principles and elements. Gestalt theory. Explores a variety of materials, media and presentation techniques. GE credit: ArtHum | AH, VL.—I, IV. (I, IV.)

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

**16. Graphic Design and Computer Technology (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1. Priority given to Design students. Introduction to digital tools with emphasis on graphic design including theory, practice and technology. Includes principles of color, resolution, pixels, vectors, image enhancement, layout, visual organization, visual hierarchy, typography. GE credit: ArtHum | AH, VL.—I, II, III, IV. (I, II, III, IV.)

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

**21. Drafting and Perspective (4)**
Studio—4 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: ArtHum | AH, VL.—I, IV. (I, IV.)

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

**31. Photography for Designers (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1, 14, 15, 16 or consent of instructor. Pass One priority given to Design majors. Visual communication and digital imaging techniques using black and white, and color. Critical analysis of photographs and the role of photography in society combining theoretical perspectives with practical applications. Explore use and meaning of single, sequence, and single composite images. GE credit: ArtHum | AH, VL.—II, III. (II, III.) Drew

*(change in existing course—eff. winter 14)*

**37. Coding for Designers (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1, 14, 15, and 16 or consent of instructor. Pass One priority to Design majors. Programming concepts and skills as applied for visual design. Algorithm-based design and development, flowcharts, pseudo-code, entry level scripting or programming. Principles of coding, logic, syntax, structure. Analysis of historical examples of code-based design. Development, iteration, presentation of design projects. GE credit: VL.—I, IV. (I, IV.) Drew

*(new course—eff. fall 13)*

**40A. Energy, Materials, and Design Over Time (4)**
Lecture—3 hours; discussion—1 hour. Priority to Design majors. Global history of design across time, viewed through the lens of the effects of the creation and discovery of new energy sources, processes and materials on design. Not open for credit to students who have taken course 40 or 140. GE credit: ArtHum | AH, DD, VL, WE.—II. (II.) Cogdell

*(change in existing course—eff. spring 14)*

**40B. Ideologies of Design (4)**
Lecture—3 hours; discussion—1 hour. Priority to Design majors. Introduction to the history and theory of design in particular relation to political, philosophical, cultural, economic, and environmental debates and objectives. GE credit: ArtHum | AH, WE.—III. (III.) Sadler

*(change in existing course—eff. spring 14)*

**40C. Design for Aesthetics and Experience (4)**
Lecture—3 hours; discussion—1 hour. Priority to Design majors. Global historical survey of design's engagement with changing notions of aesthetics and experience. Relates transformations in the theory, production, and reception of all aspects of design (objects, landscapes, architectures, etc.) to larger cultural, social, and political contexts. Not open for credit to students who have taken course 40 or 140. GE credit: ArtHum | AH, DD, WE.—III. (III.) Housefield

*(change in existing course—eff. spring 14)*

**50. Introduction to Three-Dimensional Design (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1; course 16 recommended or consent of instructor. Priority given to Design majors. Design concept development and detailing as it relates to the making of objects, structures and models using form, scale and materials. Product design and rapid prototyping methods using a range of techniques for advancing the design process. GE credit: ArtHum | AH, VL.—IV. (IV.) Kessler

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

**60. Introduction to Surface Design (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1, 14, 15, 16 or consent of instructor. Priority to Design majors. Introduction to diverse methods for creating imagery, patterns, and textures on cloth. Explorations and experimentation with dyes and pigments, mechanical resists, color removing, and physical and chemical alterations of textile surfaces and structures. Offered irregularly. GE credit: ArtHum | AH, VL.—Avila

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

**70. Introduction to Textile Design Structures (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1, 14, 15, 16 or consent of instructor. Priority to Design majors. Introduction to diverse methods for creating textile structures. Exploration of the creative potential of hand-constructed textiles, manipulation of fabric to create dimensional surfaces, and the basics of building and joining fabric structures. Only two units of credit to students who have completed courses 23 or 24. Not open for credit for students who have completed both 23 and 24. GE credit: ArtHum | AH, VL.—I. (I.) Savageau

*(change in existing course—eff. fall 13)*

**77. Introduction to Structural Design for Fashion (4)**
Studio—4 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: ArtHum | AH, VL.—II. (II.)

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

## Upper Division

**107. Advanced Structural Design for Fashion (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1, 14, 15, 16; course 77 recommended or consent of instructor. Priority to Design majors. Advanced study and practice of designing clothing for the human body through pattern development and structural joining. Emphasis on draping techniques and advanced conceptualization for fashion design. Not open for credit to students who have taken course 77B. GE credit: ArtHum | AH, VL.—III. (III.)

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

**113. Visual Communication: Digital Imaging (4)**
*(cancelled course—eff. winter 14)*

**115. Letterforms and Typography (4)**
Studio—4 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, grid systems, and the integration of type and image. Not available for credit to students who have completed course 22. GE credit: ArtHum | AH, VL.—I, II, III, IV. (I, II, III, IV.) Verba

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

**116. Visual Communication: Graphic Design Studio (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 31, 115 or consent of instructor. Priority given to Design majors. Multiple, conceptually-linked assignments focusing on the fundamental choices designers make in translating concepts into effective graphic form. Problem finding and analysis of audience needs. Design process from research and initial concepts to project prototypes. Not open for credit to students who have completed course 152 or 152A. GE credit: ArtHum | AH, VL.—II, III, IV. (II, III, IV.) Verba

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

**117. Interactive Media I (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1, 14, 15, 16; 115 recommended, or consent of instructor. Priority to Design majors. Practice of creating interactive visual media for network-based applications and principles of human computer interaction. Responsive design. Usercentered research, information architecture, interface and interaction. Analysis of usability. Development and presentation of design production materials and completed interactive projects. GE credit: ArtHum | AH, VL.—II, IV. (II, IV.) Drew

*(change in existing course—eff. fall 13)*

**127A. Sustainable Design (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Priority to Design majors. Principles, practice and materials of contemporary sustainable design in the context of environmental crisis. History of sustainable design in relation to the fields of textiles, visual communication, interior architecture, exhibition design and lighting. GE credit: ArtHum | AH.—II. (II.) Savageau

*(change in existing course—eff. fall 13)*

**127B. Studio Practice in Sustainable Design (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 127A or consent of instructor. Priority to Design majors. Analysis and practice of sustainable design within studio context. Design project that incorporate the reuse of post consumer waste; standard materials vs. sustainable materials; Cradle to Cradle philosophy and practice. Field trips required. GE credit: ArtHum | AH, VL.—III. (III.) Savageau

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

**131. Global Fashion and Product Design (4)**
Studio—4 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: ArtHum | AH, VL.—Avila

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

**132A. Textile Design: Woven Structures (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1, 14, 15, 16; course 60 recommended or consent of instructor. Priority given to Design majors. Foundation course in handwoven textile structure and design, emphasizing yarn identification, basic drafting, basic weaves and their derivatives explored in context of original color effects and yarn combinations. May be repeated one time for credit with consent of instructor. Offered irregularly. GE credit: ArtHum | AH, VL.—Avila

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

**132B. Loom-Constructed Textile Design (4)**
Studio—4 hours, lecture/discussion—2 hours. Prerequisite: course 1, 14, 15, 16; course 132A recommended or consent of instructor. Priority to Design majors. Intermediate level study of complex fabric structure with emphasis on pattern in relation to surface, dimension, and material. May be repeated one time for credit with consent of instructor. Offered irregularly. GE credit: ArtHum | AH, VL.—Avila

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

**134A. Introduction to Interior Design—Residential (4)**
Studio—4 hours, lecture/discussion—2 hours. Prerequisite: course 1 and 21; courses 14, 15, 16 recommended or consent of instructor. Priority to Design majors. Introduction to the theory and practice of interior design with focus on residential spaces. Basic methods of design conceptualization, development, and presentation. GE credit: ArtHum | AH, VL.—I. (I.) Kessler

*(change in existing course—eff. fall 13)*

**134B. Introduction to Interior Design—Commercial and Technical Spaces (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1 and 21; 14, 15, 16 recommended or consent of instructor. Pass One 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: ArtHum | AH, VL.—I, II. (I, II.) Kessler

*(change in existing course—eff. winter 14)*

**135A. Furniture Design and Detailing (4)**
Studio—4 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: ArtHum | AH, VL.—II. (II.) Kessler

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

**135B. Furniture Design and Prototyping (4)**
Studio—4 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. Offered irregularly. GE credit: ArtHum | AH, VL.

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

**136A. Lighting Technology and Design (4)**
Laboratory—4 hours; lecture/discussion—2 hours. Prerequisite: course 1, 14, 15, 16; course 21 recommended or consent of instructor. Priority to Design majors. Introduction to lighting design and technology. Understanding the role of lighting and vision in the development of functional and aesthetically pleasing environments. GE credit: ArtHum | AH, VL—I. (I.) Siminovitch

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

**136B. Designing with Light—Industrial Design (4)**
Laboratory—4 hours; lecture/discussion—2 hours. Prerequisite: course 1, 14, 15, 16, 136A; course 21 recommended or consent of instructor. Priority to Design majors. Design and manipulation of light sources, luminaires, and lighting controls to enhance the functional and aesthetic impact of interior and exterior spaces. Industrial design projects explore lighting effects, light distribution characteristics, and luminaire design. GE credit: ArtHum | AH, VL.—II. (II.) Siminovitch

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

**137A. Daylighting and Interior Design (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1, 14, 15, 16; course 21 recommended or consent of instructor. Priority to Design majors. Emphasis on understanding the effect of daylight on the perception of interior designs as well as on vision, luminous and thermal comfort, health and energy efficiency. GE credit: ArtHum | AH, VL.—III. (III.) Papamichael

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

**137B. Daylighting Design Studio (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1, 14, 15, 16; course 21 and 137A recommended or consent of instructor. Priority to Design majors. Introduction to daylighting through observation of its effects on interior designs using scale models of interior designs of choice and photographing them outdoors and in CLTC's Heliodon to understand year-round performance. GE credit: ArtHum | AH, VL.—I. (I.) Papamichael

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

**138. Materials and Methods in Interior Design (4)**
Lecture/discussion—3 hours; project—1 hour. Prerequisite: course 1, 14, 15, 16 or consent of instructor. Priority to Design majors. Introduction to the finish materials used for interior design with special emphasis on sustainable and recycled products. Performance factors, relative costs and energy impacts, installation conditions and construction details, and design potential for a full range of interior materials. Offered in alternate years. GE credit: ArtHum | AH, VL, WE.

*(change in existing course—eff. fall 13)*

**143. History of Fashion (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1; Art History 1A, 1B or 1C recommended or consent of instructor. Priority to Design majors. Social context, aesthetics, stylistic developments and methods significant in western hemisphere textiles. Emphasis on the Middle East, Europe, and the Americas up to contemporary times. Two field trips required. GE credit: ArtHum | AH, VL, WE.—II. (II.) Avila

*(change in existing course—eff. fall 13)*

**144. History of Interior Architecture (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Pass One priority to Design majors. Thematic survey of interior architecture. Emphasis on dwellings in their cultural settings and development of modern interior design theories. Interiors considered in relation to buildings' exteriors, sites, and uses. Offered in alternate years. GE credit: ArtHum | AH, WE.—(III.) Housefield

*(change in existing course—eff. winter 14)*

**145. History of Visual Communication (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1; course 40A or 40B recommended. Priority to Design majors. Historical developments of visual communication, concentrating on the technological and aesthetic development of graphic design; origins and manifestations of current issues in visual communication; provide framework for analysis of current and future trends in visual communication. GE credit: ArtHum | AH, VL, WE.— I. (I.) Drew

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

**149. Information Design: Principles and Practice (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing or consent of instructor. Restricted to students with upper division standing. Design principles and visual strategies for effective information display; analysis of contemporary and historical examples of visual representations and visual narratives in science, humanities, and the arts; emergence of digital methods for interactive data presentation. GE credit: AH, VL.—III. (III.) Verba

*(new course—eff. winter 14)*

**150A. Computer-Assisted Drawing for Designers (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: courses 1 and 21; 14, 15, 16 recommended or consent of instructor. Priority given to Design majors. Computer assisted drawing and modeling using a mid-level, multi-use 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: ArtHum | AH, VL.—I, II. (I, II.)

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

**150B. Computer-Assisted Presentations for Interior Architecture (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1 and course 21; 14, 15, 16 recommended or consent of instructor. Priority given to Design majors. Computer-assisted architectural presentation including the development of complex 3D models, techniques of photo-realistic rendering and computer simulation of movement through architectural and interior space. Offered irregularly. GE credit: ArtHum | AH, VL.

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

**151. Type in Motion (4)**
Studio—4 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: ArtHum | AH, VL.—I. (I.) Drew

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

**154. Visual Communication: Message Campaign Design (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 115, course 116 or consent of instructor. Priority given to Design majors. Principles and application of visual design strategies for projects that address a broad public audience. Emphasis on design for social awareness/interaction/benefit. Creation of public visual-media campaign. Not open for credit to students who have completed course 152B. GE credit: ArtHum | AH, VL.—II, III, IV. (II, III, IV.) Verba

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

**155A. Pattern, Form and Surface (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 31, 115 or consent of instructor. Priority given to Design majors. Experimental approaches to form-making through an examination of pattern, form, and surface in historical and contemporary contexts. Explorations of alternative design processes, methods, and materials that open up new possibilities for content creation and invention in design practice. GE credit: VL.—II, III, IV. (II, III. IV.) Verba

*(change in existing course—eff. spring 14)*

**157. Interactive Media II (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1, 14, 15, 16, 117; course 115 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: ArtHum | AH, VL.—III. (III.) Drew

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

**159. Design for Understanding (4)**
Studio—4 hours; lecture/discussion—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 in alternate years. GE credit: ArtHum | AH, VL.—III. Verba

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

**160. Textile Surface Design: Patterns and Resists (4)**
Studio—4 hours; lecture/discussion—2 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: ArtHum | AH, VL.—II. (II.) Avila

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

**161. Textile Surface Design: Screen and Digital Printing (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1, 14, 15, 16; course 60 or 70 recommended or consent of instructor. Priority to Design majors. Design of textiles and screen printing on fabrics; soft-product development; integration of hand-produced and digitally generated imagery on cloth. GE credit: ArtHum | AH, VL.—IV. (IV.) Avila

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

**170. Experimental Fashion & Textile Design (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1, 14, 15, 16; course 77, 107 recommended or consent of instructor. Priority to Design majors. Experimental approaches to fashion and textile design. Emphasis on developing conceptual ideas and translating them into one-of-a-kind garments and soft products. Exploration of a variety of current topics including sustainability, pattern design, new technologies, and social activism. May be repeated one time for credit with consent of instructor. GE credit: ArtHum | AH, VL.—III. (III.) Avila

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

**171. Fashion Drawing: Technical and Illustration (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1, 14, 15, 16; course 77 recommended or consent of instructor. Priority to Design majors. Exploration of fashion design processes for industry within the social and physical context. Emphasis on two-dimensional conceptualization of ideas, garment construction, and ideation processes utilizing commercial textiles. Field trip required. GE credit: ArtHum | AH, VL.—I. (I.) Avila
*(change in existing course—eff. spring 13)*

**177. Computer-Assisted Fashion Design (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 77 or consent of instructor. Priority 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: ArtHum | AH, VL.—III. (III.) Avila
*(change in existing course—eff. spring 13)*

**179. Fashion Design: Signature Collection (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 77, 107, 170 or 177 or consent of instructor. Priority to Design majors. Advanced exploration of fashion design with an emphasis on professional portfolio development and presentation. Emphasis on conceptualizing, designing, and fabricating a cohesive line of wearable garments suitable for presenting in a public fashion show. Not open for credit to students who have taken more than 8 units of course 191A. May be repeated one time for credit. GE credit: ArtHum | AH, VL.—II. (II.) Avila
*(change in existing course—eff. spring 13)*

**180A. Advanced Interior Design: Institutional Spaces (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1 and 21; 14, 15, 16 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: ArtHum | AH, VL.—II. (II.) Kessler
*(change in existing course—eff. spring 13)*

**180B. Advanced Interior Architecture (4)**
Studio—4 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: ArtHum | AH, VL.—III. (III.) Kessler
*(change in existing course—eff. spring 13)*

**185. Exhibition Design (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1, 14, 15, 16; courses 50, 115, 150A recommended or consent of instructor. Priority to Design majors. Design of cultural and commercial exhibition environments, including exhibition development and object selection, spatial planning and architectural finishes, object placement and staging, interpretive strategies, exhibition and promotional graphics. GE credit: ArtHum | AH, VL.—I. (I.) McNeil
*(change in existing course—eff. spring 13)*

**186. Environmental Graphic Design (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1, 14, 15, 16; course 115 recommended or consent of instructor. Priority 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: ArtHum | AH, VL.—II, IV. (II, IV.) McNeil
*(change in existing course—eff. spring 13)*

**187. Narrative Environments (4)**
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 185 or 186 or consent of instructor. Priority to Design majors. Design of storytelling 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: ArtHum | AH, VL.—III. (III.) McNeil
*(change in existing course—eff. spring 13)*

**194HA. Special Study for Honors Students (3)**
Independent study—9 hours. Prerequisite: qualification for Letters and Science Honors Program; senior standing; approval of Design Honors Program proposal by the Curriculum Committee and major adviser. Limited enrollment. Preparation and presentation of a culminating project. Supervision of an instructor in one of the creative or scholarly areas of Design. (Deferred grading only, pending completion of sequence.)—II. (II.)
*(new course—eff. spring 13)*

**194HB. Special Study for Honors Students (3)**
Independent study—9 hours. Prerequisite: course 194HA; qualification for Letters and Science Honors Program; senior standing; consent of instructor. Limited enrollment. Preparation and presentation of a culminating project. Supervision of an instructor in one of the creative or scholarly areas of Design. (Deferred grading only, pending completion of sequence.)—III. (III.)
*(new course—eff. spring 13)*

### Graduate

**225. Studio Practice in Design (4)**
Studio—3s hours. Prerequisite: course 221. Class size limited to graduate standing in Design or consent of instructor. Students work together on a collective project to experience the multiple phases of design through an iterative process. Design projects will be geared towards relevance in contemporary social, cultural and political contexts. Credit limited to 12 units. May be repeated two times for credit.—II. (II.)
*(new course—eff. winter 14)*

**292. Practicum in Design (1-12)**
Prerequisite: graduate standing in Design or consent of instructor. Interaction with a working professional in the student's field of interest to apply theories and concepts to working practice. (S/U grading only.)
*(change in existing course—eff. fall 14)*

# Dramatic Art

## New and changed courses in Dramatic Art (DRA)

### Lower Division

**1. Theatre, Performance and Culture (4)**
Lecture—3 hours; discussion—1 hour. Introductory investigation of the nature of performance, moving from performance theory to consideration of various manifestations of performance including theatre, film and media, performance art, dance, sports, rituals, political and religious events, and other "occasions." Not open to students who have completed course 1S. GE credit: ArtHum, Div, Wrt | AH, DD, VL, WE.—I, II, III, IV. (I, II, III, IV.) Bogad, Hunter, Rossini
*(change in existing course—eff. fall 13)*

**2. Acting: The Basics: History and Practice (4)**
Lecture—3 hours; discussion—1 hour. Introduction to the historical evolution of the actor—from ancient Greece & Asia to the Hollywood icon & postdramatic performer—and the practical foundations of acting for stage and screen. Onstage opportunities within lecture course structure. GE credit: AH, OL, VL.—I, II, III. (I, II, III.)
*(new course—eff. winter 15)*

**5. Understanding Performance: Appreciation of Modern Theatre, Dance, Film and Performance Art (4)**
Lecture/discussion—2 hours; discussion—5 hours; tutorial—1 hour. Relevance of theatre and performance to modern culture and society. Approaches to theatre/dance/media/performance art, integrated into Mondavi Centre for the Arts and Theatre and Dance Department programs. GE credit: ArtHum, Div | AH, DD, OL, VL, WC.—I, II, III. (I, II, III.)
*(change in existing course—eff. fall 13)*

**10. Introduction to Acting (3)**
Laboratory/discussion—4 hours; term paper. Fundamentals of movement, speech, theatre games, and improvisation. Selected reading and viewing of theatre productions. Intended for students not specializing in Dramatic Art. GE credit: OL, VL.—I, II, III. (I, II, III.)
*(change in existing course—eff. fall 13)*

**11. Introduction to Presentation Skills (2)**
Lecture/laboratory—4 hours. Class size limited to 20 students. Development of clear oral and physical communication skills that build confidence, presentational style and clarity for students whose command of English is at a basic level.—I, III. (I, III.)
*(new course—eff. spring 13)*

**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, VL, WC, WE.—I, II, III, IV. (I, II, III, IV.)
*(change in existing course—eff. fall 13)*

**24. Visual Aspects of Dramatic Art (4)**
Laboratory/discussion—4 hours. Understanding and appreciation of the visual aspects of dramatic art: theatre architecture, scenery, lighting, costume, and makeup. GE credit: ArtHum | AH, VL.—Iacovelli, Morgan, Munn
*(change in existing course—eff. fall 13)*

**28. Entertainment Engineering and Management: Stagecraft to Stage (4)**
Lecture/discussion—4 hours. Introduction to technical production and management in theatre and dance. Topics include stage management, theatrical mechanics, backstage protocols, scenic construction, properties, lighting, basic shop tools, costume shop use and construction, basic make-up, sound equipment, graphics and robotics for theatre. GE credit: ArtHum | AH.—I, II, III. (I, II, III.)
*(new course—eff. spring15)*

**40A. Beginning Modern Dance (2)**
Laboratory/discussion—4 hours. Prerequisite: course 14 or consent of instructor. Fundamentals of modern dance focusing primarily on the development of techniques and creative problem solving. Basic anatomy, dance terminology, and a general overview of modern dance history. May be repeated two times for credit. Non-dance majors can only

repeat the course once. Dance majors may apply to the dance faculty adviser for permission to repeat more times. Dance is a repetitive practice that involves constant reiteration and demands this for improvement and better understanding of the somatic and proprioceptive skills. GE credit: AH, VL.—I, II, III, IV. (I, II, III, IV.)

*(change in existing course—eff. fall 14)*

**40B. Intermediate Modern Dance (2)**
Laboratory/discussion—4 hours. Prerequisite: course 40A. Open to students who have completed 14 and 40A, unless there is consent of instructor. Modern dance techniques. Basic anatomy, dance terminology and a general overview of modern dance history. May be repeated once for credit. For Dance majors, further repeats may be negotiated with faculty adviser in dance. GE credit: ArtHum | AH, VL.—I, II, III, IV. (I, II, III, IV.)

*(change in existing course—eff. fall 14)*

**42A. Beginning Ballet (2)**
Laboratory/discussion—4 hours. Prerequisite: course 14 or consent of instructor. Fundamentals of ballet, focusing on the development of technique through proper alignment, quality, and rhythm. Basic anatomy, ballet terminology, and dance history. May be repeated for credit with consent of instructor. GE credit: AH, VL.—I, II, III, IV. (I, II, III, IV.)

*(change in existing course—eff. fall 14)*

**42B. Intermediate Ballet (2)**
Laboratory/discussion—4 hours. Prerequisite: courses 14 and 42A or consent of instructor. Barre and center work at the intermediate level. Development and refinement of technique through proper alignment, rhythmic, and qualitative understanding. Anatomy, ballet terminology, and dance history. May be repeated for credit with consent of instructor. GE credit: AH, VL.—I, II, III, IV. (I, II, III, IV.)

*(change in existing course—eff. fall 14)*

**43A. Contact Improvisation Dance (2)**
Lecture/laboratory—4 hours. Fundamentals of contact improvisation and its applications to all forms of dance, performance, sports, physical safety and health. Solo improvisation, safety, communication, alignment, basic lifting and weight-sharing, intuition, developing relaxed readiness and personal expression. May be repeated two times for credit. Offered irregularly. GE credit: AH, VL.—I, II, III, IV.

*(change in existing course—eff. fall 14)*

**43B. Intermediate Contact Improvisation (2)**
Lecture/laboratory—4 hours. Prerequisite: course 43A. Building on the fundamentals. Reviewing basics, extended improvising, skillfully working with partners of different sizes and abilities, advanced lifting, advanced safety practices, embracing risk and disorientation, subtle nuances of communication. May be repeated two times for credit. GE credit: ArtHum | AH, VL.—I, II, III, IV. (I, II, III, IV.)

*(change in existing course—eff. winter 14)*

**55. Contemporary Local, National and Global Theatre, Dance and Performance (4)**
Lecture/discussion—4 hours. Introduction a range of contemporary theatre, dance and performance in local, national and international settings. Training in critical approaches to and aesthetic appreciation of these forms. Emphasis varies based on instructor. GE credit: ArtHum | AH, DD, VL, WC.—I, II, III. (I, II, III.)

*(new course—eff. fall 15)*

**56A. History of Theatre and Dance I: Myth, Magic and Madness (4)**
Lecture/discussion—4 hours. Exploration of aesthetic movements in various disciplines of theatre and dance from the origins to 1550. Examination of Greek, Roman, Sanskrit, Kathakali, Chinese, Japanese, Mesoamerican, Medieval European, and Indigenous theatre and dance including oral, ritual and shamanic performance. GE credit: ArtHum | AH, VL, WC.—I, II, III. (I, II, III.)

*(new course—eff. fall 14)*

**56B. History of Theatre and Dance II: Romance, Revenge and Rebellion (4)**
Lecture/discussion—4 hours. Exploration of aesthetic movements in various disciplines of theatre and dance from 1550 to 1850. Examination of genres related to romance, revenge and rebellion using European, North and South American, and Asian examples. GE credit: ArtHum | AH, VL, WC.—I, II, III. (I, II, III.)

*(new course—eff. winter 15)*

**56C. History of Theatre and Dance III: Sex, Society and the State (4)**
Lecture/discussion—4 hours. Exploration of aesthetic movements in various disciplines of theatre and dance from 1850-1968. Examination of melodrama, popular theatre, naturalism, psychological realism, and the avant-garde using European, North and South American, Asian, and African examples. GE credit: ArtHum | AH, VL, WC.—I, II, III. (I, II, III.)

*(new course—eff. spring 15)*

## Upper Division

**111. Advanced Presentation Skills (2)**
Lecture/laboratory—4 hours. Class size limited to 20 students. Development of clear oral and physical communication skills that build confidence, presentational style and clarity for students whose command of English is at a competent to fluent level. GE credit: OL.—I, III. (I, III.)

*(new course—eff. spring 13)*

**115. Advanced Study of Major Film Makers (4)**
Lecture/discussion—3 hours; film viewing—2 hours. Prerequisite: course 15. Analysis of the contribution of some outstanding film creators. Study of diverse aesthetic theories of the cinema and their application to selected films. GE credit: VL.—II. (II.)

*(change in existing course—eff. fall 13)*

**116. Design on Screen (4)**
Lecture/discussion—3 hours; film viewing—3 hours. Analysis of the contribution of outstanding designers for cinema, television and filmed entertainment. Study of diverse aesthetic theories of production design and art direction, costume design, or cinematography. Introductory principles and practice, history. May be repeated two times for credit when topic differs. (Same course as Cinema and Technocultural Studies 116.) Offered irregularly. GE credit: ArtHum | AH, VL.—Iacovelli, Morgan

*(new course—eff. fall 13)*

**120. Intermediate Acting/Gateway: The Actor's Toolkit (4)**
Lecture/laboratory—6 hours. Prerequisite: course 21A or consent of instructor. Limited enrollment. Implementation of acting tools drawn predominantly from Stanislavsky's 'system'. Gateway into the Advanced Acting courses. GE credit: OL, VL.—I. (I.) Leavy, Merlin

*(new course—eff. spring 13)*

**121A. Advanced Acting: Scene Study and Script Analysis (4)**
Lecture/laboratory—6 hours. Prerequisite: course 120 and consent of instructor. Limited enrollment. In-depth study, analysis and performance of texts from different eras, genres and styles. Implementation of tools to undertake independent preparation of character creation. May be repeated up to eight units for credit. Since acting requires repetition to habituate the body and imagination to new practices, this course may be taken twice. New scripts and scenes must be undertaken in the repetition. Offered in alternate years. GE credit: OL, VL.—(I.) Merlin

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

**121B. Advanced Acting: Rehearsal Processes and Practices (4)**
Lecture/laboratory—6 hours. Prerequisite: course 120 and consent of instructor. Limited enrollment. Development of rehearsal practice and etiquette, using a variety of scenes from different eras and genres. May be repeated up to eight units for credit. The course has been established to enable visiting artists in residence to undertake the instruction, as well as faculty. Therefore, this course may be taken twice, as students will be exposed to different professional practitioners' working processes. New etudes, scripts and scenes must be undertaken in the repetition. Offered irregularly. GE credit: OL, VL.—II.

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

**121C. Advanced Acting: Character and Style (4)**
Lecture/laboratory—6 hours. Prerequisite: course 120 and consent of instructor. Limited enrollment. Study of psycho-physical techniques to create characters with an emphasis on non-realistic styles. May be repeated up to eight units for credit. Since acting requires repetition to habituate the body and imagination to new practices, this course may be taken twice. New scripts and scenes must be undertaken in the repetition. Offered in alternate years. GE credit: ArtHum | OL, VL.—II.

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

**122A. Advanced Acting: Devising and Collaboration (4)**
Lecture/laboratory—6 hours. Prerequisite: course 120; consent of instructor. Study and practice of various devising techniques, to collaborate on and produce a series of short etudes and dramatic scenes/short plays. May be repeated up to eight units for credit. Since acting requires repetition to habituate the body and imagination to new practices, this course may be taken twice. New scripts and scenes must be undertaken in the repetition. Limited enrollment. GE credit: OL, VL.—III. (III.)

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

**122B. Advanced Acting: Shakespeare and His Contemporaries (4)**
Lecture/laboratory—6 hours. Prerequisite: course 120 and consent of instructor. Limited enrollment. Study and performance of classical texts (monologues and dialogues), with a focus on Shakespeare and the Elizabethan world view. May be repeated up to eight units for credit. Since acting requires repetition to habituate the body and imagination to new practices, this course may be taken twice. New monologues and scenes must be undertaken in the repetition. Offered in alternate years. GE credit: OL, VL.—(I.)

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

**122C. Advanced Acting: Special Topics in Acting (4)**
Lecture/laboratory—6 hours. Prerequisite: course 120 and/or consent of instructor. Dramatic Arts majors. Restricted to Dramatic Arts majors; limited enrollment. Intensive study and practical exploration of a specialized area (for example, World Theatre, Social Theatre, Physical Theatre, Musical Theatre, the Ancient Greeks, etc). May be repeated up to eight units for credit. Offered irregularly. GE credit: AH, OL, VL.—III.

*(change in existing course—eff. spring 14)*

**124A. Principles of Theatrical Design: Scenery (4)**
Lecture/discussion—4 hours. Prerequisite: course 24 or consent of instructor. Scene design processes, working drawings, sketching techniques, scale models, methods and materials of scenery construction. GE credit: ArtHum | AH, VL.—I. (I.) Iacovelli

*(change in existing course—eff. fall 13)*

**124B. Principles of Theatrical Design: Scenery (4)**
Lecture/discussion—4 hours. Prerequisite: course 24 or consent of instructor. Analysis of plays in terms of scene design, elements of design, execution of designs for modern and period plays. GE credit: ArtHum | AH, VL.—II. (II.) Iacovelli
*(change in existing course—eff. fall 13)*

**124C. Principles of Theatrical Design: Lighting (4)**
Lecture/discussion—4 hours. Prerequisite: course 24 or consent of instructor. Theories of lighting the stage, equipment and control systems, execution of lighting plots. GE credit: ArtHum | AH, VL.—III. (III.) Munn
*(change in existing course—eff. fall 13)*

**124D. Principles of Theatrical Design: Costume (4)**
Lecture/discussion—4 hours. Prerequisite: course 24 or consent of instructor. Source materials for theatrical costuming, selecting fabrics, elements of design, analysis of plays in terms of costume design, execution of designs for modern and period plays. GE credit: ArtHum | AH, OL, VL.—I. (I.) Morgan
*(change in existing course—eff. fall 13)*

**124E. Costume Design for Film (4)**
Lecture/discussion—4 hours. Prerequisite: for Dramatic Art majors; course 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. (Same course as Cinema and Technocultural Studies 124E.) GE credit: ArtHum | AH, OL, VL.—II. (II.) Morgan
*(change in existing course—eff. winter 14)*

**125. Scenic Painting: Studio (4)**
Lecture—2 hours; studio—1 hour; laboratory—3 hours. Prerequisite: upper division standing in Dramatic Art, Art Studio, or Design; or course 24 or 25, or consent of instructor. Scene painting techniques, practices and materials including color mixing and matching, wood graining, faux painting techniques, glazing, creating foliage, stone and brick. May be repeated one time with consent of instructor. Offered irregularly. GE credit: ArtHum | AH, VL.—Iacovelli, Munn
*(change in existing course—eff. winter 14)*

**126. Principles of Performing Arts Stage Management (4)**
Lecture/discussion—3 hours; laboratory—3 hours. Stage management principles for theatre, dance, musical theatre, music, and concerts. The dynamical role of the stage manager in the performing arts, upper-management team.—II. (II.)
*(change in existing course—eff. fall 14)*

**130. Approaches to Theatrical Design: Practice and Theory (4)**
Seminar—2 hours; studio—4 hours. Prerequisite: upper division standing in Dramatic Art, Art Studio or Design; any class from course 124 series or consent of instructor. Advanced design study in specific areas including but not limited to: research, design styles and concepts, new materials and techniques, scenery, lighting, costume, makeup, photography, projections, computer technology, spectacle and special effects, and alternative theatre forms and genres. May be repeated three times for credit when topic differs; when instructor differs. Offered irregularly. GE credit: ArtHum | AH, VL.
*(change in existing course—eff. fall 13)*

**140A. Dance Composition (4)**
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 40A, 41A, and 42A, or consent of instructor. Introduction to the craft of choreography. Compose phrases and present movement studies based on the elements of choreography: motivation, space, time, force/energy. GE credit: VL.—II. (II.) Davidson
*(change in existing course—eff. spring 13)*

**141. Introduction to the Fundamentals of Movement (4)**
Lecture/discussion—4 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 various body mind specialists including Laban, Feldenkrais, Bartenieff and Sweigard as well as the eastern discipline of Yoga. GE credit: VL.—I, II, III. (I, II, III.)
*(change in existing course—eff. fall 14)*

**143. Dance and Movement Studio (1-4)**
Laboratory/discussion—2-8 hours. Prerequisite: course 14 or consent of instructor. Special studies in dance and movement such as African, Balinese, Baroque, Chinese, European, and stage combat. Offered as needed for stage productions. May be repeated up to eight units for credit. GE credit: AH, VL.—I, II, III, IV. (I, II, III, IV.)
*(change in existing course—eff. spring 14)*

**144A. Introduction to Traditional Chinese Embodied Culture (4)**
Laboratory/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 or SS, DD, VL, WC.—Hunter
*(new course—eff. winter 14)*

**144B. Traditional Chinese Physical Culture (4)**
Lecture/discussion—4 hours. Prerequisite: course 144A. Traditional Chinese Wushu practices, explored through practical work in dance laboratory conditions. Integration of practice with conceptual analysis; contemporary social, educational and artistic applications. May be repeated two times for credit when content and instructor varies and if student progression is required. GE credit: ArtHum or SocSci, Div | AH or SS, DD, VL, WC.—I, II, III, IV. (I, II, III, IV.) Hunter
*(change in existing course—eff. winter 14)*

**144C. Daoist Philosophy in Traditional Chinese Movement Culture (4)**
Lecture/discussion—4 hours. Prerequisite: 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: ArtHum | AH, DD, VL, WC.—I, II, III, IV. (I, II, III, IV.) Hunter
*(change in existing course—eff. winter 14)*

**150. American Theatre and Drama (4)**
Lecture—4 hours. The history of the theatre from Colonial times to the present. Readings of selected plays. Offered in alternate years. GE credit: ArtHum, Div, Wrt | ACGH, AH, DD, VL, WE.—(III.)
*(change in existing course—eff. winter 14)*

**154. Asian Theatre and Drama: Contexts and Forms (4)**
Lecture/discussion—4 hours. Prerequisite: upper division standing. Selected Asian plays and performance forms in their cultural and artistic contexts; myth, ritual and the theatre; performance training, visual presentation of the text; political theatre; intercultural performance-the fusion of Asian and Western traditions. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—(II.)
*(change in existing course—eff. fall 13)*

**155A. African American Dance and Culture in the United States, Brazil and the Caribbean (4)**
Lecture/discussion—4 hours. Comparative study of the African American dance forms in the U.S.A., Brazil, Haiti, Cuba, Jamaica, Barbados, and Trinidad. Examination of ritual, folk, and popular dance forms and the socio/historical factors that have influenced these forms. (Same course as African American and African Studies 155A.) Offered in alternate years. GE credit: ArtHum | AH, VL, WC.—II. (II.)
*(change in existing course—eff. winter 13)*

**156B. Theatre in History and Place: Local, National and Global Conditions for Production (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1, course 20 or consent of instructor. Exploration of local, national and global issues in theatre production, with special attention to historical changes in social and political contexts for performance. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—Hunter
*(new course—eff. fall 14)*

**156BN. Theatre in History and Place: Local, National and Global Conditions for Production (4)**
*(cancelled course—eff. winter 15)*

**156CN. Modern Aesthetic Movements in Performance (4)**
*(cancelled course—eff. winter 15)*

**156C. Modern Aesthetic Movements in Performance (4)**
Laboratory/discussion—3 hours; discussion—1 hour. Prerequisite: course 1, course 20 or consent of instructor. Important movements in performance, especially theatre and dance, from realism to the present. Primary emphasis on Western traditions though others may be studied. GE credit: ArtHum, Div, Wrt | AH, WE.—I, II, III. (I, II, III.)
*(new course—eff. fall 14)*

**156D. Theatre History through Shakespeare (4)**
Lecture—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. ArtHum, Div, Wrt | AH, OL, WC, WE.—II, IV. (II, IV.)
*(change in existing course—eff. spring 14)*

**159. Contemporary Experimental Performance, Theatre and Drama (4)**
Lecture/discussion—3 hours; extensive writing. Evaluation and examination of the "New Theatre;" its experimental and innovative nature since the 1960s. Dance, film, stage, performance art and public acts of a performative nature. May be repeated three times for credit when topic differs. GE credit: AH, DD, VL, WC, WE.—III. (III.)
*(change in existing course—eff. spring 14)*

**170. Media Theatre (4)**
Lecture—1 hour; rehearsal—2 hours; performance instruction—1 hour. Prerequisite: upper division standing in Dramatic Art, Music, Art Studio, Design, Technocultural Studies, Film Studies, Computer Science, or Engineering: Computer Science, or consent of instructor. New media and application of in theatre devising and performance. Emphasis on collaborative process in relationship to integration of emerging technologies and formation of new theatrical works. Development of collaborative performance through lecture, demonstration, improvisation and experimentation. May be repeated one time for credit. GE credit: ArtHum | AH, VL.—III. (III.)
*(change in existing course—eff. fall 13)*

**174. Acting for Camera (4)**
Lecture/laboratory—6 hours. Prerequisite: consent of instructor. Analysis and practice of acting skills required for camera work and digital media. May be repeated eight times for credit when different instructor is assigned. (Same course as Cinema & Technocultural Studies 174.)—III. (III.) Anderson, Merlin
*(new course—eff. spring 13)*

**180A. Theatre Laboratory: Performance (1-5)**
Rehearsal—12 hours. Prerequisite: consent of instructor. Limited enrollment. Rehearsal and performance of a production directed or choreographed by visiting Granada Artists-in-Residence and/or faculty, and/or the UG Edge Festival. May be repeated for credit. Since each production involves different scripts, directions, challenges of rehearsal practices and performance processes, it is possible for students to appear in a variety of productions in the course of their education. Admission by audition.—I, II, III. (I, II, III.)
*(new course—eff. spring 13)*

**180B. Theatre Laboratory: Design (1-4)**
Prerequisite: course 24, 25, 124A, 124B, 124C, 124D and/or 130 or consent of instructor. Limited enrollment. Design-related participation in theatre and dance productions involves research, creation and implementation of design concept in collaboration with the director and other members of the production team. May be repeated for credit. Because each theatrical piece is conceived and produced afresh with new source material, scripts, and production style the challenges and assignments for the designers will be new each and every time they design a show. GE credit: ArtHum | AH, VL.—I, II, III. (I, II, III.)
*(new course—eff. spring 13)*

**180C. Theatre Laboratory: Management, Directing, other Production Team (1-5)**
Prerequisite: consent of instructor. Participation in theatre and dance production in management, direction, choreography, dramaturgy, writing or other production related role; research, creation and implementation of production concept in collaboration with members of the production team and cast. May repeat multiple times but only for a total of five units. Permission to repeat is required from the Dramatic Art department. GE credit: ArtHum | AH, VL.—I, II, III. (I, II, III.)
*(new course—eff. fall 14)*

**180D. Theatre Laboratory: Crew (2-4)**
Laboratory—6-12 hours. Prerequisite: consent of instructor. Participation in theatre and dance productions as backstage running crew which will involve skill development, rehearsal and execution of performance. May be repeated for credit.—I, II, III. (I, II, III.)
*(new course—eff. spring 13)*

**180E. Theatre Laboratory: Scenic (1-4)**
Laboratory—3-12 hours. Prerequisite: consent of instructor. Practical experience working on scenery and properties for theatre and dance department productions. Study and execution of basic scenery and prop engineering, construction, painting, rigging. Study of techniques, materials, tools, and equipment use. Skill development, professional etiquette. Safety training requirement. May be repeated for credit.—I, II, III. (I, II, III.)
*(new course—eff. spring 13)*

**180F. Theatre Laboratory: Costume (1-4)**
Laboratory—3-12 hours. Prerequisite: consent of instructor. Practical experience working on costumes for theatre and dance department productions. Study and execution of basic costume construction techniques and materials, tools, and equipment use. Skills development, professional etiquette. Safety training requirement. May be repeated for credit.—I, II, III. (I, II, III.)
*(new course—eff. spring 13)*

**180G. Theatre Laboratory: Lighting/ Sound/Projection (1-4)**
Laboratory—3-12 hours. Prerequisite: consent of instructor. Practical experience working on lighting, sound or projections for theatre and dance department productions. Study and execution of basic techniques, materials, tools, and equipment use. Skill development, professional etiquette. Safety training requirement. May be repeated for credit.—I, II, III. (I, II, III.)
*(new course—eff. spring 13)*

**195. Senior Capstone Experience (2)**
Project; lecture/discussion—1 hour. Open to Dramatic Art Majors who have completed 135 or more units. Capstone experience for majors. Examination, reflection and synthesis on development. Discussion of professional development and translatable skills. Individual project and development of portfolio. (P/NP grading only.) GE credit: ArtHum | AH, WE.—II, III. (II, III.)
*(new course—eff. spring 15)*

### Graduate

**229. Special Problems in Directing (4)**
Seminar—2 hours; laboratory—2 hours; rehearsal—4 hours. Prerequisite: consent of instructor. Projects in directing scenes selected from plays from ancient Greece to the present. May be repeated two times for credit.—I, II, III. (I, II, III.)
*(change in existing course—eff. spring 14)*

**257. Interdisciplinary Seminar in Theatre, Dance and Performance (1)**
Seminar—1.5 hours; project—1.5 hours. Prerequisite: consent of instructor. Students must be enrolled on the MFA in Dramatic Art. Students taking the PhD in Performance Studies or the DE in Studies in Performance and Practice may apply to join the class. Interdisciplinary seminar for first and second year MFA students in Dramatic Art. Topics range from current practice in dance, theatre, film and performance, to leading edge developments by outstanding practitioners in the field. May be repeated two times for credit.—II. (II.)
*(change in existing course—eff. winter 14)*

# Ecology

## New and changed courses in Ecology (ECL)

### Graduate

**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: SciEng | SE.—II. (II.) Cadenasso, Eviner
*(change in existing course—eff. winter 13)*

**210N. Environmental Policy and Human Ecology (4)**
Lecture—3 hours; term paper. Prerequisite: graduate standing in Anthropology, Ecology, Political Science, Sociology Graduate Groups, or consent of instructor. Principles drawn from social science, ecology and evolution to study of human populations and behavior, emphasizing environmental/resource issues. These principles form a synthetic framework that articulates elements drawn from the social sciences as well as biology. Offered in alternate years.—(II.) Lubell, McElreath
*(new course—eff. spring 13)*

**233. Computational Methods in Population Biology (3)**
Lecture/laboratory—2 hours; discussion/laboratory—1 hour. Prerequisite: A course in theoretical ecology (e.g., course 231 or an equivalent to Environmental Science and Policy 121 from your undergraduate institution) or consent of instructor; no programming experience required. Numerical methods for simulating population dynamics using the computational software package R. Emphasis placed on model formulation and development, theoretical concepts and philosophical principles to guide simulation efforts, model parameterization, and implementing simulations with R. (Same course as Population Biology 233.) Offered in alternate years. (S/U grading only.)—(II.) Baskett, Schreiber
*(new course—eff. fall 13)*

**271. Research Conference in Ecology (1)**
Seminar—1 hour. Prerequisite: consent of instructor. Critical presentation and evaluation of current literature and ongoing research in ecology. Requirements include active participation in weekly discussions and the presentation of a paper or chapter once per quarter. May be repeated for credit. (Same course as Population Biology 271.) (S/U grading only.)—I, II, III. (I, II, III.) Schoener, Schreiber
*(new course—eff. winter 14)*

# Economics

## New and changed courses in Economics (ECN)

### Upper Division

**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 | SS, WC.—I, II. (I, II.) Taylor
*(change in existing course—eff. fall 11)*

**115B. Economic Development (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A and 1B. Major macroeconomic issues of developing countries. Issues include problems in generating capital, conduct of monetary and fiscal policies, foreign aid and investment. Important issues of policy concerning international borrowing and external debt of developing countries. (Same course as Agricultural and Resource Economics 115B.) GE credit: SocSci | SS, WC.—II, III. (II, III.)
*(change in existing course—eff. fall 11)*

**125. Efficiency in Energy Markets (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 models to examine efficiency in energy production and use. Energy and environmental policy, market structure and power, global climate change, optimal regulation, and real-world applications; e.g., California electricity crisis.—II. (II.) Rapson
*(change in existing course—eff. winter 14)*

**192. Internship (1-6)**
Internship—3-18 hours. Prerequisite: upper division standing; consent of instructor. Internship experience off and on campus in all subject areas offered in the Department of Economics. Supervised by a member of the staff. May be repeated for credit. (P/NP grading only.) GE credit: SE.
*(new course—eff. winter 14)*

**192W. Internship in the Davis-in-Washington Program (6-8)**
*(cancelled course—eff. winter 14)*

# Education

## New and changed courses in Education (EDU)

### Lower Division

**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.)
*(change in existing course—eff. winter 13)*

### Upper Division

**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
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.—I, III. (I, III.) Martin
*(change in existing course—eff. winter 13)*

**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: SocSci, Wrt | QL, SS, WE.—III. (III.) Abedi
*(change in existing course—eff. winter 13)*

**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: SocSci | SS, WE.—III. (III) Gonzalez
*(change in existing course—eff. winter 13)*

**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: SocSci | OL, SS.—I. (I.) Ballard
*(change in existing course—eff. winter 13)*

**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: SocSci | SS, DD, WE.—I, II, III. (I, II, III.) Athanases
*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci | AH or SS, OL, WE.—III. (III.)
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.—III. (III.) Tonkovich
*(change in existing course—eff. winter 13)*

**180. Computers in Education (3)**
*(cancelled course—eff. fall 13)*

**180A. Computers in Education (3)**
Lecture/discussion—1 hour; laboratory—2 hours; project—3 hours. Prerequisite: acceptance in Teacher Credential Program. Restricted to Teaching Credential Majors. Applications of computers in education as instructional, intellectual, and communication tools. (Deferred grading only, pending completion of sequence.)—I, II, III. (I, II, III.)
*(new course—eff. fall 13)*

**180B. Computers in Education (3)**
Lecture/discussion—1 hour; laboratory—2 hours; project—3 hours. Prerequisite: acceptance in Teacher Credential Program; successful completion of course 180A. Restricted to Teaching Credential Majors. Applications of computers in education as instructional, intellectual, and communication tools. (Deferred grading only, pending completion of sequence.)—I, II, III. (I, II, III.)
*(new course—eff. fall 13)*

**180C. Computers in Education (3)**
Lecture/discussion—1 hour; laboratory—2 hours; project—3 hours. Prerequisite: acceptance in Teacher Credential Program; successful completion of course 180B. Restricted to Teaching Credential Majors. Applications of computers in education as instructional, intellectual, and communication tools. (Deferred grading only, pending completion of sequence.)—I, II, III. (I, II, III.)
*(new course—eff. fall 13)*

**180T. Computers in Education (3)**
*(cancelled course—eff. fall 14)*

**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
*(change in existing course—eff. winter 13)*

**183. Teaching High School Mathematics and Science (3)**
Lecture/discussion—2 hours; field work. Prerequisite: course 81/Geology 81 or course 181/Geology 181 and major in mathematics science or engineering; or completion of a one-year sequence of science or calculus and consent of the instructor. Limited to 40 students per section. 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. (Same course as Geology 183.) GE credit: SocSci | OL, SS, WE.—I, II, III. (I, II, III.) Passmore, Stevenson
*(change in existing course—eff. spring 13)*

**185. Learning in a Digital Age: Information, Schooling, and Society (4)**
Lecture/discussion—2 hours; lecture/laboratory—2 hours. Focus on the changing nature of learning in a digital age: social media, ubiquitous connectivity, online education, electronic communication, writing, gaming, and youth culture. Readings will be drawn from major recent works detailing fundamental shifts in information, schooling, and society. Offered in alternate years. GE credit: SocSci | OL, VL, SS.—II. Ching
*(new course—eff. fall 13)*

### Graduate

**238. Participatory Action Research (PAR) (4)**
Lecture/discussion—3 hours; fieldwork—1 hour. Prerequisite: minimum of one quarter recommended of an introductory research methods course. Principles and strategies of PAR and related methodologies that emphasize collaborating with those affected by the issue being researched in order to educate, take action or effect social change. Conduct interviews with potential collaborators, case analyses and research proposals.—II. (II.) Ballard
*(new course—eff. winter 13)*

**275. Effective Teaching (4)**
*(cancelled course—eff. winter 14)*

**275A. Effective Instruction: Curriculum and Assessment-Theory, Research, and Practice (2)**
Lecture/discussion—2 hours. Prerequisite: acceptance in Teacher Credential Program. Restricted to Teaching Credential majors. Examination of contemporary theories of curriculum development, research about the relationship among instructional planning, classroom assessment, and student learning to guide teaching practice.—I, II. (I, II.)
*(new course—eff. fall 13)*

**275B. Effective Instruction: English Language Development and Instructing English Language Learners (2)**
Lecture/discussion—2 hours. Prerequisite: acceptance in the Teaching Credential program; successful completion of course 275A. Restricted to Teaching Credential majors. Analysis and application of English language acquisition and development

research to teaching practice. Particular attention to research that enhances learning of English language learners and under-performing students.—I, II. (I, II.)

*(new course—eff. fall 13)*

### Professional

**324B. Methods in Secondary Mathematics II (3)**

Lecture/discussion—3 hours. Prerequisite: admission into a teacher education program or consent of instructor. Expansion of methods and curriculum for teaching mathematics at the secondary level. Intermediate applications of computer technology as instructional, intellectual, and communication tools in mathematics teaching.—II. (II.) Wallace

*(change in existing course—eff. winter 14)*

# Education Abroad Program

## New and changed courses in Education Abroad Program (EAP)

### Upper Division

**180. Education Abroad: Special Topics (1-12)**

Lecture/discussion—3-12 hours; laboratory/discussion—3 hours. Prerequisite: minimum GPA requirement for each study abroad program as specified in the written agreement between UC Davis and the host institution; prerequisites for language courses may also apply. Students who participate in approved international programs take this course up to 12 units while studying abroad. May be repeated for credit; credits will be reviewed by departments and Dean's Office to determine how they fulfill UC Davis requirements. Offered irregularly.—I, II, III, IV. (I, II, III, IV.)

*(new course—eff. winter 14)*

# Engineering

## New and changed courses in Engineering (ENG)

### Lower Division

**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

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, VL.—I, II. (I, II) Schaaf

*(change in existing course—eff. winter 13)*

**6. Engineering Problem Solving (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 16A, 17A or 21A, C- or above; Mathematics 16B, 17B or 21B, C- or above (may be taken concurrently). Methodology for solving engineering problems. Engineering computing and visualization based on MATLAB. Engineering examples and applications. GE credit: SciEng | QL, SE.—I, II, III. (I, II, III.)

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

**10. The Science Behind the Technology in Our Lives (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: high school algebra. Understanding of how the technology in our lives works using only basic concepts and rudimentary mathematics. GE credit: SciEng or SocSci, Wrt | SE or SS.—I, II. Baldis, Orel, Parikh

*(change in existing course—eff. winter 13)*

**17. Circuits I (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 22A (C- or better recommended); Mathematics 22B (C- or better recommended) may be taken concurrently; Physics 9C or 9HD (C- or better recommended). Basic electric circuit analysis techniques, including electrical quantities and elements, resistive circuits, transient and steady-state responses of RLC circuits, sinusoidal excitation and phasors, and complex frequency and network functions. GE credit: SciEng | SE, VL.—I, III. (I, III.)

*(change in existing course—eff. spring 14)*

**20. Introduction to Space Exploration: Understanding the Technological and Environmental Challenges to Our Exploration of the Solar System (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: high school level Algebra, Geometry, General Science (Physics and Chemistry). Introductory overview of the space environment. Discussion of space exploration technology including propulsion, orbital mechanics, and spacecraft engineering. Offered in alternate years. GE credit: SciEng | QL, SE, SL.—III. (III.) Harris, Walter

*(change in existing course—eff. winter 14)*

**35. Statics (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in Physics 9A; Mathematics 21D (may be concurrent). Force systems and equilibrium conditions with emphasis on engineering problems. GE credit: SciEng | SE.—I, II, III. (I, II, III.)

*(change in existing course—eff. fall 13)*

**45. Properties of Materials (4)**

Lecture—3 hours; laboratory—3 hours. Prerequisite: C- or better in Mathematics 16C or 21C, Chemistry 2A, and Physics 9A. Introductory course on the properties of engineering materials and their relation to the internal structure of materials. GE credit: SciEng, Wrt | QL, SE, SL, WE.—I, II, III, IV. (I, II, III, IV.)

*(change in existing course—eff. winter 13)*

**45Y. Properties of Materials (4)**

Web virtual lecture; laboratory. Prerequisite: C- or better in Mathematics 16C or 21C; Chemistry 2A and Physics 9A. Introductory course on the properties of engineering materials and their relation to the internal structure of materials. Not open for credit to students who have taken course 45. GE credit: SciEng | QL, SE, SL.—IV. (IV.)

*(new course—eff. summer 13)*

### Upper Division

**100. Electronic Circuits and Systems (3)**

Laboratory—3 hours; lecture—2 hours. Prerequisite: course 17 (C- or better is recommended). 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: SciEng | SE, VL.—II, III. (II, III.)

*(change in existing course—eff. spring 14)*

**102. Dynamics (4)**

Lecture—4 hours. Prerequisite: grade of C- or better in Engineering 35; grade of C- or better in Mathematics 22B. Open to College of Engineering students only. Kinematics and kinetics of particles, systems of particles, and of rigid bodies; application of these topics are applied to engineering problems. Only two units of credit allowed to students who have previously taken course 36. GE credit: SciEng | QL, SE, VL.—I, II, III. (I, II, III.) Hess, Schaaf, Velinsky

*(change in existing course—eff. winter 13)*

**103. Fluid Mechanics (4)**

Lecture—4 hours. Prerequisite: C- or better in each of the following: Engineering 35 and Mathematics 22B and Physics 9B. Open to students in the College of Engineering and Hydrology majors. Fluid properties, fluid statics, continuity and linear momentum equations for control volumes, flow of incompressible fluids in pipes, dimensional analysis and boundary-layer flows. Not open for credit to students who have completed Chemical Engineering 150A. GE credit: SciEng | SE.—I, II, III. (I, II, III.)

*(change in existing course—eff. fall 13)*

**104. Mechanics of Materials (4)**

Lecture—4 hours. Prerequisite: grade of C- or better in Engineering 35 and Mathematics 22B. Uniaxial loading and deformation. Uniaxial loading and deformation. General concepts of stress-strain-temperature relations and yield criteria. Torsion of shafts. Bending of beams. Deflections due to bending. Introduction to stability and buckling. GE credit: SciEng | QL, SE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II, III. (II, III.)

*(change in existing course—eff. winter 13)*

**105. Thermodynamics (4)**

Lecture—4 hours. Prerequisite: grade of C- or better in Mathematics 22B and Physics 9B. Open to College of Engineering students only. Fundamentals of thermodynamics: heat energy and work, properties of pure substances, First and Second Law for closed and open systems, reversibility, entropy, thermodynamic temperature scales. Applications of thermodynamics to engineering systems. GE credit: SciEng | QL, SE, VL.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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: SciEng or SocSci QL, SE, SL, SS, VL.—II. (II.) Hartsough, Slaughter

*(change in existing course—eff. winter 13)*

**111. Electric Power Equipment (3)**

Lecture—2 hours; laboratory—3 hours. Prerequisite: grade of C- or better in course 17. Principles of AC and DC electric motors and generators, their control systems and power sources. Selection of electric power equipment components based on their construction features and performance characteristics. Offered irregularly. GE credit: SciEng | QL, SE, VL, WE.—Delwiche Hartsough

*(change in existing course—eff. winter 13)*

**121. Fluid Power Actuators and Systems (4)**

Lecture—3 hours; laboratory—3 hours. Prerequisite: grade of C- or better in Engineering 100 and Engineering 102. Hydraulic and pneumatic systems with emphasis on analysis and control of actuators. Design of hydraulic and pneumatic systems, specification and sizing of components, and selection of electro-hydraulics/electro-pneumatics, servo valves,

and closed loop systems to solve basic control problems. Offered in alternate years. GE credit: SciEng | QL, SE, SL, VL, WE.—(III.) Rosa

*(change in existing course—eff. winter 13)*

**122. Introduction to Mechanical Vibrations (4)**
Lecture—4 hours. Prerequisite: C- or better in Engineering 102; C- or better in Engineering 6 or course 5 or Computer Science Engineering 30; ability to program in MATLAB. 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: SciEng | QL, SE.—I. (I.) Hubbard

*(change in existing course—eff. fall 13)*

**160. Environmental Physics and Society (3)**
Lecture—3 hours. Prerequisite: Physics 9D, 5C, or 10 or 1B and Mathematics 16B or the equivalent. Impact of humankind on the environment will be discussed from the point of view of the physical sciences. Calculations based on physical principles will be made, and the resulting policy implications will be considered. (In the College of Engineering, students may receive only one unit of credit towards the Technical Electives requirement.) (Same course as Physics 160.) GE credit: SciEng or SocSci | SE or SL.—I. (I.) Jungerman, Craig

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

**180. Engineering Analysis (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in Mathematics 21D and 22B; C- or better in Engineering 6 or Mechanical Engineering 5 or Computer Science Engineering 30. 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: SciEng | SE.—I. (I.) Hafez

*(change in existing course—eff. fall 13)*

**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: SocSci | 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.

*(change in existing course—eff. winter 13)*

# Engineering: Aerospace Science and Engineering

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

### Upper Division

**126. Theoretical and Computational Aerodynamics (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in course 127; C- or better in Engineering 180 or Applied Science Engineering 115 or Mechanical 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. GE credit: SciEng | SE.—III. (III.) Hafez

*(change in existing course—eff. fall 13)*

**130A. Aircraft Performance and Design (4)**
Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: C- or better in course 127; C- or better in 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: SciEng | SE, QL, VL.—II. (II.) van Dam

*(change in existing course—eff. fall 13)*

**135. Aerospace Structures (4)**
Lecture—4 hours. Prerequisite: C- or better in Engineering 104; course 126 or 127 recommended. 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: SciEng | QL, SE.—II. (II.) La Saponara

*(change in existing course—eff. fall 13)*

**138. Aircraft Propulsion (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in 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: SciEng | QL, SE.—II. (II.) R. Davis

*(change in existing course—eff. fall 13)*

**140. 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. Not open for credit to students who have taken identical course 189A prior to Fall Quarter 2013. GE credit: SciEng | SE.—III, IV. (III, IV.) Hafez

*(new course—eff. fall 13)*

**141. Space Systems Design (4)**
Lecture—2 hours; discussion—2 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: SciEng | SE.—(I.) Joshi

*(change in existing course—eff. fall 13)*

**142. 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. Not open for credit to student who have completed course 189B prior to Fall Quarter 2013. GE credit: SciEng | SE.—III, IV. (III, IV.)

*(new course—eff. fall 13)*

**189A. Rocket Propulsion (4)**
*(cancelled course—eff. summer 13)*

**189B. Orbital Mechanics (4)**
*(cancelled course—eff. summer 13)*

**189C. Flight Simulation and Testing in Design of Aircraft and Spacecraft (4)**
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 102; consent of the instructor. Teaches flight test techniques together with data analysis methods to prepare students for any type of flight testing including fixed wing, rotary wing and launch vehicles. Offered irregularly. GE credit: SciEng | SE.—IV. (IV.) Sarigul-Klijn

*(new course—eff. fall 13)*

# Engineering: Applied Science—Davis

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

### Lower Division

**1. Optical Science and Engineering (4)**
*(cancelled course—eff. fall 14)*

**2. Introduction to Applied Computational Science and Engineering (4)**
*(cancelled course—eff. fall 14)*

**90C. Research Group Conference for Lower Division Students (1)**
*(cancelled course—eff. fall 14)*

**98. Directed Group Study (1-5)**
*(cancelled course—eff. fall 14)*

**99. Special Study for Lower Division Students (1-5)**
*(cancelled course—eff. fall 14)*

### Upper Division

**108A. Optics I (4)**
*(cancelled course—eff. fall 14)*

**108B. Optics II (4)**
*(cancelled course—eff. fall 14)*

**108L. Optics Laboratory (4)**
*(cancelled course—eff. fall 14)*

**115. Numerical Solution of Engineering and Scientific Problems (4)**
*(cancelled course—eff. fall 14)*

**116. Computer Solution of Physical Problems (4)**
*(cancelled course—eff. fall 14)*

**117A. Simulation and Modeling of Deterministic Dynamical Systems (5)**
*(cancelled course—eff. fall 14)*

**117B. Simulation and Modeling of Statistical Systems (5)**
*(cancelled course—eff. fall 14)*

**117C. Topics in Simulation and Modeling (5)**
*(cancelled course—eff. fall 14)*

**118. High Performance Computing (4)**
*(cancelled course—eff. spring 14)*

**119. Applied Computational Linear Algebra (4)**
*(cancelled course—eff. spring 14)*

**137. Nuclear Power, Weapons, and Proliferation (4)**
*(cancelled course—eff. spring 14)*

**161A. Optical Design (4)**
*(cancelled course—eff. spring 14)*

**161B. Optical Design (4)**
*(cancelled course—eff. spring 14)*

**165. Statistical and Quantum Optics (4)**
*(cancelled course—eff. spring 14)*

**166. Lasers and Nonlinear Optics (4)**
*(cancelled course—eff. spring 14)*

**167. Fourier Optics (4)**
*(cancelled course—eff. spring 14)*

**169. Optical Properties of Materials (4)**
*(cancelled course—eff. spring 14)*

**170. Optical Spectroscopy: Concepts and Instrumentation (4)**
*(cancelled course—eff. spring 14)*

**172. Optical Methods for Biological Research (4)**
*(cancelled course—eff. spring 14)*

**190C. Research Group Conference for Advanced Undergraduates (1)**
*(cancelled course—eff. spring 14)*

**192. Internship (1-5)**
*(cancelled course—eff. spring 14)*

**198. Group Study (1-5)**
*(cancelled course—eff. fall 14)*

**199. Special Study for Advanced Undergraduates (1-5)**
*(cancelled course—eff. fall 14)*

### Graduate

**205A. Mathematical Methods (4)**
*(cancelled course—eff. spring 14)*

**205B. Mathematical Methods (3)**
*(cancelled course—eff. winter 14)*

**225. Computational Structures for Signal and Image Processing and Graphics (3)**
Lecture—3 hours. Prerequisite: Computer Science Engineering 40; course 210A. Tools for research in digital media. Relevant computer architectures, algorithms and languages for signal processing, image processing and graphics. Hardware and software issues in parallelism. Programming in SISAL. Parallel C and Parallel Fortran. Parallel algorithms using SISAL on parallel computers. Offered in alternate years.—III. Vemuri
*(change in existing course—eff. fall 11)*

**229. Computational Molecular Modeling (4)**
*(cancelled course—eff. spring 14)*

**255. Biophotonics in Medicine and the Life Sciences (3)**
*(cancelled course—eff. fall 14)*

**265A. Laser Physics I (3)**
*(cancelled course—eff. spring 14)*

**265B. Laser Physics II (4)**
*(cancelled course—eff. spring 14)*

**267. Nonlinear Optics (3)**
*(cancelled course—eff. winter 14)*

**270A. Advanced Laser Plasma Physics (3)**
*(cancelled course—eff. spring 14)*

**270B. Advanced Laser Plasma Physics (3)**
*(cancelled course—eff. spring 14)*

**271. Optical Methods in Biophysics (4)**
*(cancelled course—eff. spring 14)*

**273. X-Ray Spectroscopy and Synchroton Radiation (4)**
*(cancelled course—eff. spring 14)*

**280A. Plasma Physics and Controlled Fusion (3)**
*(cancelled course—eff. winter 15)*

**280B. Plasma Physics and Controlled Fusion (3)**
*(cancelled course—eff. spring 14)*

**280C. Plasma Physics and Controlled Fusion (3)**
*(cancelled course—eff. fall 14)*

# Engineering: Biological Systems

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

### Lower Division

**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: SciEng | OL, QL, SE, SL, VL.—I. (I.) Jenkins, Piedrahita
*(change in existing course—eff. winter 13)*

**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.)
*(change in existing course—eff. winter 13)*

**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.
*(change in existing course—eff. winter 13)*

**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.
*(change in existing course—eff. winter 13)*

**99. Special Study for Lower Division Students (1-5)**
(P/NP grading only.) GE credit: SE.
*(change in existing course—eff. winter 13)*

### Upper Division

**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: SciEng | QL, SE, VL.—II. (II.) Wallender
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, VL, WE.—III. Rosa
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL, VL.—(III.) Hartsough
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL, VL, WE.—I. (I.) Rosa
*(change in existing course—eff. winter 13)*

**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: SciEng | OL, QL, SE, VL, WE.—III. (III.) Fan, Nitin
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, VL, WE.—I. (I.) VanderGheynst, Zicari
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL, VL, WE.—III. (III.) Fathallah
*(change in existing course—eff. winter 13)*

**130. Modeling of Dynamic Processes in Biological Systems (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 75; Engineering 6 or Computer Science & Engineering 30; grade of C- or better in Mathematics 22B required for enrollment eligibility. Techniques for modeling processes through mass and energy balance, rate equations, and equations of state. Computer problem solution of models. Example models include package design, evaporation, respiration heating, thermal processing of foods, and plant growth. GE credit: SciEng | OL, QL, SE, SL, VL.—II. (II.) K. McCarthy, Upadhyaya
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL, VL, WE.—I. (I.) Jenkins, Zhang
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL, VL.—I. (I.) Fogg
*(change in existing course—eff. winter 13)*

**145. Irrigation and Drainage Systems (4)**
Lecture—4 hours. Prerequisite: course 103 or Hydrologic Science 103N. 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. GE credit: SciEng | QL, SE, SL, VL.—II. (II.) Grismer, Wallender
*(change in existing course—eff. fall 13)*

**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: SciEng | QL, SE, SL.—Grismer
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, VL.—II. (II.) Fan, Zicari
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL, VL, WE.—I. (I.) Delwiche, Slaughter
*(change in existing course—eff. winter 13)*

**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: SciEng | OL, QL, SE, SL, VL, WE.—I. (I.) Giles, Zhang
*(change in existing course—eff. winter 13)*

**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: SciEng | OL, QL, SE, SL, VL, WE.—II. (II.) Giles, Zhang
*(change in existing course—eff. winter 13)*

**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: SciEng | OL, QL, SE, SL, VL, WE.—II. (II.)
*(change in existing course—eff. winter 13)*

**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: SciEng | OL, QL, SE, SL, VL, WE.—III. (III.) Giles, Zhang
*(change in existing course—eff. winter 13)*

**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: SciEng | OL, QL, SE, SL, VL, WE.—III. (III.)
*(change in existing course—eff. winter 13)*

**175. Rheology of Biological Materials (3)**
Lecture—3 hours. Prerequisite: course 103 or Engineering 103. 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: SciEng | QL, SE, VL.—II. (II.) McCarthy
*(change in existing course—eff. fall 13)*

**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: SciEng | SE.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

**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.)
*(change in existing course—eff. winter 13)*

**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.
*(change in existing course—eff. winter 13)*

**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.
*(change in existing course—eff. winter 13)*

**198. Directed Group Study (1-5)**
Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.
*(change in existing course—eff. winter 13)*

**199. Special Study for Advanced Undergraduates (1-5)**
(P/NP grading only.) GE credit: SE.
*(change in existing course—eff. winter 13)*

### Graduate

**216. Energy Systems (4)**
Lecture/discussion—4 hours. Prerequisite: course 105. Theory and application of energy systems. System analysis including input-output analysis, energy balances, thermodynamic availability, economics, environmental considerations. Energy conversion systems and devices including cogeneration, heat pump, fuel cell, hydroelectric, wind, photovoltaic, and biomass conversion processes. Offered in alternate years.—II. Jenkins
*(change in existing course—eff. spring 14)*

**218. Solar Thermal Engineering (4)**
Lecture/discussion—4 hours. Prerequisite: course in heat transfer. Analysis and design of solar energy collection systems. Sun-earth geometry and estimation of solar radiation. Steady-state and dynamic models of solar collectors. Modeling of thermal energy storage devices. Computer simulation. Offered in alternate years.—III. Jenkins
*(change in existing course—eff. spring 14)*

**268. Polysaccharides Surface Interactions (3)**
Lecture—3 hours. Prerequisite: graduate students in science or engineering. Study of fundamental surface science theories as applied to physical and chemical interactions of carbohydrates and polysaccharides. Offered in alternate years.—I. Zicari
*(new course—eff. winter 14)*

# Engineering: Biomedical

## New and changed courses in Biomedical Engineering (BIM)

### Lower Division

**20. Fundamentals of Bioengineering (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in Chemistry 2B and Mathematics 21D; Physics 9B. 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: SciEng | QL, SE, VL.—III. (III.) Silva
*(change in existing course—eff. fall 13)*

**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: SciEng | SE.
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.
*(change in existing course—eff. winter 13)*

**99. Special Study for Undergraduates (1-5)**
(P/NP grading only.) GE credit: SE.
*(change in existing course—eff. winter 13)*

## Upper Division

**102. Quantitative Cell Biology (4)**
Lecture/discussion—4 hours. Prerequisite: Biological Sciences 2A; 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: SciEng | QL, SE, VL.—I. (I.) Yamada
*(change in existing course—eff. fall 13)*

**105. Probability and Statistics for Biomedical Engineers (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in Mathematics 21D; Engineering 6 (may be concurrent). Concepts of probability, random variables and processes, and statistical analysis with applications to engineering problems in biomedical sciences. Includes discrete and continuous random variables, probability distributions and models, hypothesis testing, statistical inference and Matlab applications. Emphasis on BME applications. GE credit: SciEng | QL, SE, VL.—I. (I.) Saiz
*(change in existing course—eff. fall 13)*

**106. Biotransport Phenomena (4)**
Lecture—4 hours. Prerequisite: C- or better in course 20; course 116 or Neurobiology, Physiology, and Behavior 101; Physics 9B; Mathematics 22B. 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: SciEng | QL, SE, SL, VL.—II. (II.) Leach
*(change in existing course—eff. fall 13)*

**107. Mathematical Methods for Biological Systems (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in Engineering 6; course 20; Mathematics 22B. 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: SciEng | QL, SE, VL.—II. (II.) Duan
*(change in existing course—eff. fall 13)*

**109. Biomaterials (4)**
Lecture—4 hours. Prerequisite: course 106; Biological Sciences 2A; Chemistry 2C. 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: SciEng | SE, SL, VL.—III. (III.) Revzin
*(change in existing course—eff. fall 13)*

**110A. Biomedical Engineering Senior Design Experience (3)**
Lecture/discussion—1 hour; project—6 hours. Prerequisite: course 110L (may be concurrent); course 111 (may be concurrent); consent of instructor. 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. Continues in course 110B. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE, OL, SL, VL.—II. (II.) Passerini
*(change in existing course—eff. winter 2015)*

**110B. Biomedical Engineering Senior Design Experience (3)**
Lecture/discussion—1 hour; project—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: SciEng | OL, SE, SL, VL.—III. (III.) Louie, Passerini
*(change in existing course—eff. spring 14)*

**110L. Biomedical Engineering Senior Design Lab (2)**
Laboratory—3 hours; laboratory/discussion—2 hours. Prerequisite: courses 105, 108, 109. Restricted to Senior Biomedical Engineering majors. Manufacturing processes, safety, and computer-aided design techniques applied to the fabrication of biomedical devices. Application of bioengineering principles and design theory to a project culminating in completion of a functional prototype that solves a biomedical problem. Continues in 110AB. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE.—I. (I.) Louie, Passerini
*(change in existing course—eff. fall 13)*

**111. Biomedical Instrumentation Laboratory (6)**
Lecture—4 hours; discussion/laboratory—4 hours. Prerequisite: courses 105, 107 and 108; Engineering 100 or Electrical Engineering 100; course 116 or Neurobiology, Physiology, & Behavior 101. 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: SciEng | QL, SE, SL.—II. (II.) Marcu, Pan
*(change in existing course—eff. fall 13)*

**116. Physiology for Biomedical Engineers (5)**
Lecture—2 hours; discussion—3 hours. Prerequisite: C- or better in Biological Sciences 2A; Physics 9C; Mathematics 22B recommended. 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: SciEng | OL, SE, SL, VL, WE.—I. (I.) Louie
*(change in existing course—eff. fall 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. Offered alternate years. GE credit: SciEng | QL, SE, SL, VL.—III. Savageau
*(change in existing course—eff. fall 12)*

**118. Microelectromechanical Systems (4)**
Lecture—2 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: Chemistry 2A; Engineering 100 or Electrical and Computer Engineering 100. Restricted to upper division standing in College of Engineering. 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. (Same course as Electrical and Computer Engineering 147.) GE credit: SciEng | QL, SE.—II. (II.) Pan
*(change in existing course—eff. winter 13)*

**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 Biology 126.) GE credit: SciEng | QL, SE, SL, WE.—II. (II.) Hawkins
*(change in existing course—eff. winter 13)*

**140. Protein Engineering (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 2A. 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: SciEng | QL, SE, SL, VL.—III. Facciotti
*(change in existing course—eff. fall 13)*

**141. Cell and Tissue Mechanics (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: Physics 9B; Engineering 6; Engineering 35. 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: SciEng | QL, SE, VL.—II. (II.) Parikh
*(change in existing course—eff. fall 13)*

**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: SciEng | QL, SE, SL, VL.—III. (III.) Ferrara
*(change in existing course—eff. winter 13)*

**143. Biomolecular Systems Engineering: Synthetic Biology (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 2A; Mathematics 16C or Mathematics 17C or Mathematics 21C. Includes analysis, design, construction and characterization of molecular systems. Process and biological parts standardization, computer aided design, gene synthesis, directed evolution, protein engineering, issues of human practice, biological safety, security, innovation, and ethics are covered. Offered in alternate years. GE credit: SciEng | SE.—III. Facciotti
*(change in existing course—eff. fall 14)*

**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: SciEng | OL, QL, SE.—III. Benham
*(change in existing course—eff. winter 13)*

**152. Molecular Control of Biosystems (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 2A, Physics 9B and Mathematics 22B. Fundamentals of molecular biomedicine covering state-of-the-art methods for quantitative understanding of gene regulation and signal transduction networks at different levels of organization in health and disease. Topics include classic genetic systems, synthetic circuits, networks disrupted in disease and cancer. GE credit: SciEng | OL, SE.—III. (III.) Saiz
*(change in existing course—eff. winter 13)*

**161L. Biomolecular Engineering Laboratory (3)**
Laboratory—4.5 hours; lecture/discussion—1.5 hours. Prerequisite: course 161A or Biological Sciences 101. Introduction to the basic techniques in biomolecular engineering. Lectures, laboratory, and discussion sessions will cover basic techniques in DNA cloning, bacterial cell culture, gene regulation, protein expression, and data analysis. Offered alternate years. GE credit: SciEng |QL, SE, SL.—I. Yokobayashi
*(change in existing course—eff. fall 13)*

**162. Introduction to the Biophysics of Molecules and Cells (4)**
Lecture—4 hours. Prerequisite: C- or better in 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. GE credit: SciEng | QL, SE, SL.—II. (II.) Heinrich
*(change in existing course—eff. fall 13)*

**163. Bioelectricity, Biomechanics, and Signaling Systems (4)**
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: C- or better in Mathematics 22B; course 116 or Neurobiology, Physiology, and Behavior 101. 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: SciEng | SE, QL.—II. (II.) Chen-Izu
*(change in existing course—eff. fall 14)*

**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. Not offered every year. GE credit: SciEng | QL, SE.
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.
*(change in existing course—eff. winter 13)*

**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.
*(change in existing course—eff. winter 13)*

**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. winter 13)*

**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.)
*(change in existing course—eff. winter 13)*

**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. winter 13)*

### Graduate

**233. Soft Tissue Mechanics (4)**
Lecture—4 hours. Presentation of structure and function of musculoskeletal soft tissues: cartilage, tendon, ligament, meniscus, and intervertebral disc. Instruction in engineering principals governing the mechanical behavior of these tissues: viscoelasticity, quasilinear viscoelasticity, and biphasic theory. Offered in alternate years.—II. Christiansen
*(new course—eff. fall 13)*

# Engineering: Chemical

## New and changed courses in Engineering: Chemical (ECH)

### Lower Division

**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: SciEng | SE.—II. (II.)
*(change in existing course—eff. winter 13)*

**80. Chemical Engineering Profession (1)**
Lecture/discussion—1 hours. Professional opportunities and professional responsibilities of chemical engineers. Opportunities and needs for post-baccalaureate education. Relationship of chemical engineering to contemporary issues. GE credit: SciEng or SocSci | SE or SS.—III. (III.)
*(change in existing course—eff. winter 13)*

**98. Directed Group Study (1-5)**
Prerequisite: consent of instructor and lower division standing. (P/NP grading only.) GE credit: SE.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

**99. Special Study for Undergraduates (1-5)**
Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

### Upper Division

**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: SciEng | QL, SE.—I. (I.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—II. (II.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—III. (III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.)
*(change in existing course—eff. winter 13)*

**145A. Chemical Engineering Thermodynamics Laboratory (2)**
Laboratory—3 hours; discussion—1 hour. Prerequisite: courses 152A and (152B may be taken concurrently). Open to majors in Chemical Engineering, Chemical Engineering/Materials Science, & Biochemical Engineering. Laboratory experiments in chemical engineering thermodynamics. GE credit: SciEng | SE.—II. (II.)
*(new course—eff. winter 15)*

**145B. Chemical Engineering Transport Lab (2)**
Laboratory—3 hours; discussion—1 hour. Prerequisite: courses 141 and 145A. Open to majors in Chemical Engineering, Chemical Engineering/Materials Science, & Biochemical Engineering. Laboratory experiments in chemical engineering transport phenomena. GE credit: SciEng | SE.—III. (III.)
*(new course—eff. spring 15)*

**148A. Chemical Kinetics and Reaction Engineering (3)**
Lecture—3 hours. Prerequisite: course 143; course 152B. Ideal chemical reactors. Rate laws and stoichiometry. Design and analysis of isothermal reactors with multiple reactions. Not open for credit to students who have taken course 146. GE credit: SciEng | SE.—I. (I.)
*(new course—eff. fall 12)*

**148B. Chemical Kinetics and Reaction Engineering (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 148A. Design and analysis of non-isothermal reactors. Reactions in packed beds with pressure drop. Adsorption and heterogeneous catalysis. Transport limitations. Not open for credit to students who have taken course 146. GE credit: SciEng | SE.—II. (II.)
*(new course—eff. fall 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: SciEng | SE.—II. (II.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.)
*(change in existing course—eff. winter 13)*

**155. Chemical Engineering Kinetics and Reactor Design Laboratory (4)**
Laboratory—6 hours; discussion—1 hour; term paper. Prerequisite: courses 145B, 148A; (course 148B and 157) may be taken concurrently; satisfaction of the upper division English composition requirement. Open to majors in Chemical Engineering, Chemical Engineering/Materials Science, and Biochemical Engineering. Laboratory experiments in chemical kinetics, reactor design and process control. Not open for credit to students who have taken course 155B. GE credit: SciEng | SE, OL, VL, WE.—II, III. (II, III.)
*(new course—eff. fall14)*

**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: SciEng | Wrt | OL, QL, SE, VL, WE.—I, II. (I, II.)
*(change in existing course—eff. winter 13)*

**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: SciEng, Wrt | QL, SE, VL, WE.—II, III. (II, III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—I. (I.)
*(change in existing course—eff. winter 13)*

**158A. Process Economics and Green Design (4)**
Lecture/discussion—4 hours. Prerequisite: courses 142 and 143; satisfaction of the upper division English composition requirement. Senior design experience in process and product creation and design with multiple realistic constraints. Cost accounting and capital investment estimation. Profitability analysis techniques. Green chemistry, health risk assessment and life cycle assessment concepts. GE credit: SciEng or SocSci | SE or SS, SL, VL.—I. (I.)
*(change in existing course—eff. fall 12)*

**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: SciEng | QL, SE.—II. (II.)
*(change in existing course—eff. winter 13)*

**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: SciEng | OL, QL, SE, SL, VL, WE.—III. (III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, VL.—McDonald
*(change in existing course—eff. winter 13)*

**161A. Biochemical Engineering Fundamentals (4)**
Lecture/discussion—4 hours. Prerequisite: course 148A. Biokinetics; bioreactor design and operation; transport phenomena in bioreactors; microbial, plant, and animal cell cultures. GE credit: SciEng | QL, SE, VL.—II. (II.)
*(change in existing course—eff. fall 14)*

**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: SciEng | QL, SE.—II. (II.)
*(change in existing course—eff. winter 13)*

**161C. Biotechnology Facility Design and Regulatory Compliance (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 161A (co-requisite) and course 161B (co-requisite), or Molecular & Cellular Biology 263 (co-requisite). Design of biotechnology manufacturing facilities. Fermentation and purification equipment, and utility systems. Introduction to current good manufacturing practices, regulatory compliance, and documentation. GE credit: SciEng or SocSci | QL, SE or SS, SL, VL.—II. (II.) Block
*(change in existing course—eff. fall 13)*

**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: SciEng, Wrt | QL, SE, VL, WE.—III.
*(change in existing course—eff. winter 13)*

**166. Catalysis (3)**
Lecture—3 hours. Prerequisite: course 148A; consent of instructor. Principles of catalysis based on an integration of principles of physical, organic, and inorganic chemistry and chemical kinetics and chemical reaction engineering. Catalysis in solution; catalysis by enzymes; catalysis in swellable polymers; catalysis in microscopic cages (zeolites); catalysis on surfaces. GE credit: SciEng | SE.—II. (II.) Gates
*(change in existing course—eff. fall 13)*

**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: SE.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

**192. Internship in Chemical or Biochemical 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 Chemical or Biochemical. May be repeated for credit when project differs. Offered irregularly. (P/NP grading only.) GE credit: SE.—I, II, III, IV. (I, II, III, IV.)
*(new course—eff. fall 12)*

**198. Group Study (1-5)**
Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

**199. Special Study for Advanced Undergraduates (1-5)**
Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

# Engineering: Chemical and Materials Science

## New and changed courses in Engineering: Chemical and Materials Science (ECM)

### Lower Division

**1. Design of Coffee–An Introduction to Chemical Engineering (3)**
Lecture—1 hour; laboratory—2 hours; project—1 hour. Non-mathematical introduction to how chemical engineers think, illustrated by elucidation of the process of roasting and brewing coffee. Qualitative overview of the basic principles of engineering analysis and design. Corresponding experiments testing design choices on the sensory qualities of coffee. Not open for credit to Chemical Engineering and Biochemical Engineering majors or students who have completed Chemical and Materials Science 5. GE credit: SciEng | SE, SL, VL.—III. (III.) Kuhl, Ristenpart
*(new course—eff. fall 13)*

**5. Analysis in Biochemical, Chemical and Materials Engineering (3)**
Lecture—2 hours; laboratory—3 hours. Prerequisite: Mathematics 21A and 21B (concurrently). Analysis of systems of interest to chemical engineers and materials scientists. Applications of differential and integral calculus. Dimensional analysis. GE credit: SciEng | QL, SE.—II. (II.)
*(change in existing course—eff. winter 14)*

**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: SciEng | QL, SE.—III. (III.)
*(change in existing course—eff. winter 13)*

### Upper Division

**189A-R. Special Topics in ECM (1-5)**
Lecture and/or laboratory. Prerequisite: consent of instructor. Special topics in (A) Fluid Mechanics; (B) Nonlinear Analysis and Numerical Methods; (C) Process Control; (D) Chemistry of Catalytic Processes; (E) Biotechnology; (F) Interfacial Engineering; (G) Thermodynamics; (H) Membrane Separations; (I) Novel Experimental Methods; (J) Transport Phenomena; (K) Biomolecular Engineering (L) Electronic Materials; (M) Ceramics and Minerals; (N) Physics and Chemistry of Materials; (O) Materials Processing; (P) Materials Science and Forensics; (Q) Biomaterials; (R) Surface Chemistry of Metal Oxides. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng | SE.—I, II, III. (I, II, III.)
*(new course—eff. winter 13)*

**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: SciEng | SE.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

### Graduate

**229. Computational Molecular Modeling (4)**
Lecture—3 hours; project—1 hour. Prerequisite: familiar with basic programming in either Fortran or C; prior experience with numerical methods and analysis; consent of instructor. Theory and hands-on implementation of algorithms in computational statistical mechanics. Temporal integrators, molecular dynamics, ab-initio methods, force fields, constrained dynamics, Monte Carlo techniques, fluctuationdissipation theorem, and parallel vs. serial computing. Offered in alternate years.—III. Gronbech-Jensen
*(new course—eff. fall 13)*

# Engineering: Civil and Environmental

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

### Lower Division

**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: SciEng | QL, SE.—I. (I.) Darby
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—III. (III.) Fan
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—Jeremic, Kleeman
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.
*(change in existing course—eff. winter 13)*

**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.
*(change in existing course—eff. winter 13)*

**98. Directed Group Study (1-5)**
Prerequisite: consent of instructor and lower division standing. (P/NP grading only.) GE credit: SE.
*(change in existing course—eff. winter 13)*

**99. Special Study for Undergraduates (1-5)**
Prerequisite: consent of instructor; lower division standing. (P/NP grading only.) GE credit: SE.
*(change in existing course—eff. winter 13)*

### Upper Division

**114. Probabilistic Systems Analysis for Civil Engineers (4)**
Lecture—4 hours. Prerequisite: C- or better in 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: SciEng | QL, SE.—I, II. (I, II.) Mokhtarian
*(change in existing course—eff. fall 13)*

**115. Computer Methods in Civil & Environmental Engineering (4)**
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 6 or Computer Science Engineering 30, and Mathematics 22B. Open to Civil Engineering majors only. Presentation, implementation and application of numerical algorithms and computer models for the solution of practical problems in Civil and Environmental Engineering. GE credit: SciEng | SE.—I, III. (I, III.) Younis
*(new course—eff. fall 13)*

**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 clus-

ters. Not open for credit to students who have completed course 119B. Offered in alternate years. GE credit: SciEng | SE.—Kleeman, Jeremic

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.) Modera

*(change in existing course—eff. winter 13)*

**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, a heuristic learning environment, and multiple realistic constraints, an integrated design process will be applied to the planning of a project-based green and sustainable civil system. GE credit: SciEng | SE.—II. (II.) Kendall, Loge

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

**127. Integrated Design for Green Civil Systems: Senior Design Experience (4)**
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 126; consent of instructor. Restricted to senior level standing. Working within multidisciplinary teams and a heuristic, project-based learning environment, a green and sustainable civil system will be designed. Evaluate various design options under architectural, structural, cost and environmental constraints, and present designs through oral and written presentations. GE credit: SciEng | SE.—III. (III.) Kendall, Loge

*(change in existing course—eff. winter 14)*

**128. Integrated Construction for Green Civil Systems (4)**
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 127. Working within multidisciplinary teams, a heuristic learning environment, and multiple realistic constraints, an integrated design process will be applied to the construction of a project-based green and sustainable civil system. Offered irregularly. GE credit: SciEng | SE.—Kendall, Loge

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

**130. Structural Analysis (4)**
Lecture—4 hours. Prerequisite: C- or better in Engineering 104; Mathematics 22A. Open to Civil Engineering majors. Elastic structural analysis of determinate and indeterminate trusses, beams and frames. Plastic bending and limit analysis. GE credit: SciEng | QL, SE.—III. (III.)

*(change in existing course—eff. winter 14)*

**131. Matrix Structural Analysis (4)**
Lecture—3 hours; laboratory—3 hours. Prerequisite: C- or better in Engineering 104; Engineering 6. Open 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. Offered irregularly. GE credit: SciEng | SE.—I.

*(change in existing course—eff. fall 13)*

**132. Structural Design: Metallic Elements (4)**
Lecture—4 hours. Prerequisite: course 130. 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: SciEng | SE, VL.—II. (II.) Bolander, Kanvinde

*(change in existing course—eff. fall 13)*

**135. Structural Design: Concrete Elements (4)**
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 130. Restricted to Civil Engineering, Civil Engineering/Materials Science and Engineering, and Materials Science and Engineering majors only. Strength design procedures for columns, rectangular beams, Tbeams and beams of general cross-section. Building code requirements for bending, shear, axial load, combined stresses and bond. Introduction to prestressed concrete. GE credit: SciEng | QL, SE.—I, III. (I, III.) Chai

*(change in existing course—eff. fall 13)*

**136. Building Design: Senior Design Experience (4)**
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 130 or 131; course 135 or 132. Restricted to senior level standing. Design of a building structure for a specific need under the multiple constraints of safety, serviceability, cost and aesthetics. Offered irregularly. GE credit: SciEng | SE.

*(change in existing course—eff. fall 13)*

**137. Construction Principles and Project Management (4)**
Lecture—3 hours; laboratory—3 hours. Restricted to upper division standing in Engineering. 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. Offered irregularly. GE credit: SciEng or SocSci | ACGH, OL, QL, SE or SS, VL, WE.—II. (II.) Harvey

*(change in existing course—eff. fall 13)*

**138. Earthquake Loads on Structures (4)**
Lecture—3 hours; discussion—1 hours. Prerequisite: 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: SciEng | SE.—II. (II.) Kunnath

*(change in existing course—eff. fall 13)*

**139. Advanced Structural Mechanics (4)**
Lecture—4 hours. Prerequisite: C- or better in Engineering 104. Review of stress, strain, equilibrium, compatibility, and elastic material behavior. Plane stress and plane strain problems in elasticity; energy methods. Theories for unsymmetric bending, straight and curved beams. Beams on elastic foundations; stresses in plates and shells; elastic stability. GE credit: SciEng | SE.—I. (I.) Rashid, Sukumar

*(change in existing course—eff. fall 13)*

**140. Environmental Analysis of Aqueous Systems (3)**
Lecture—3 hours. Prerequisite: Chemistry 2B. Introduction to chemical principles underlying current practices in sampling and analysis of water and wastewater. GE credit: SciEng | SE.—I. (I.) Young

*(change in existing course—eff. fall 13)*

**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: SciEng | SE.

*(change in existing course—eff. winter 13)*

**141. Engineering Hydraulics (3)**
Lecture—3 hours. Prerequisite: C- or better in 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: SciEng | SE.—I, III. (I, III.) Bombardelli, Schladow, Younis

*(change in existing course—eff. fall 13)*

**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: SciEng | SE.—I, III. (I, III.) Schladow

*(change in existing course—eff. winter 13)*

**142. Engineering Hydrology (4)**
Lecture—4 hours. Prerequisite: course 141 (may be taken concurrently). Restricted to students in the College of Engineering. 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: SciEng | QL, SE.—I. (I.) Kavvas

*(change in existing course—eff. fall 13)*

**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: SciEng | QL, SE, SL, WE.—I. (I.) Loge

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—Ginn

*(change in existing course—eff. winter 13)*

**145. Hydraulic Structure Design: Senior Design Experience (4)**
Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: C- or better in course 141. Restricted to senior level standing. Project-based course covering the design of an integrated urban drainage system, including consideration of design alternatives, multiple realistic constraints (public safety, economic, environmental, sustainability and health), quantification of hydrologic uncertainty, codes and standards, design drawings and specifications and cost analysis. Offered irregularly. GE credit: SciEng | SE.—Younis

*(change in existing course—eff. fall 13)*

**146. Water Resources Simulation (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103. 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: SciEng, Wrt | SE.—II. (II.) Younis

*(change in existing course—eff. fall 13)*

**148A. Water Quality Management (4)**

Lecture—4 hours. Prerequisite: C- or better in 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: SciEng | SE.—II. (II.) Wuertz, Young

*(change in existing course—eff. fall 13)*

**148B. Water and Wastewater Treatment System Design: Senior Design Experience (4)**

Lecture—3 hours; laboratory—3 hours. Prerequisite: C- or better in Engineering 103 and course 148A. Restricted to senior level standing. Design and evaluation of water and wastewater treatment systems. GE credit: SciEng | QL, SE, VL, WE.—III. (III.) Darby

*(change in existing course—eff. fall 13)*

**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: SciEng | QL, SE, SL.—I. (I.) Cappa

*(change in existing course—eff. winter 13)*

**150. Air Pollution Control System Design: Senior Design Experience (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103, 105, 106; course 149. Restricted to senior level standing. Design and evaluation of air pollution control devices and systems. GE credit: SciEng | SE.—II. (II.) Cappa

*(change in existing course—eff. winter 14)*

**153. Deterministic Optimization and Design (4)**

Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 21C and 22A; computer programming course. Operations research. Optimization techniques such as linear programming, dynamic programming, and non-linear programming. Applications in civil engineering disciplines, including multiple realistic constraints, through computer-based course projects. GE credit: SciEng | QL, SE, SL.—I. (I.) Fan

*(change in existing course—eff. fall 13)*

**155. Water Resources Engineering Planning (4)**

Lecture—4 hours. Prerequisite: Engineering 106 or Economics 1A; course 114. 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: SciEng or SocSci, Wrt | QL, SE or SS, SL, WE.—III. (III.) Lund

*(change in existing course—eff. fall 13)*

**161. Transportation System Operations (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in 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: SciEng | QL, SE.—I. (I.) Zhang

*(change in existing course—eff. fall 13)*

**162. Transportation Land Use Sustainable Design: Senior Design Experience (4)**

Lecture—3 hours; laboratory—3 hours. Prerequisite: C- or better in course 161 or 163. Restricted to senior level standing. Interactions between land use and transportation systems design. Generalized design paradigm; project-based solutions for transportation land use. Students will select from various strategies to satisfy multiple constraints including cost, effectiveness and environmental sustainability. Oral, poster and written presentations required. GE credit: SciEng | SE, SL.—III. (III.) Niemeier

*(change in existing course—eff. fall 13)*

**163. Energy and Environmental Aspects of Transportation (4)**

Lecture—3 hours; extensive writing. Prerequisite: Economics 1A or Engineering 106. 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: SciEng or SocSci, Wrt | SE or SS, SL, WE.—I. Sperling

*(change in existing course—eff. winter 14)*

**165. Transportation Policy (3)**

Lecture—3 hours. 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: SciEng or SocSci, Wrt | QL, SE or SS.—(I.) Sperling

*(change in existing course—eff. fall 13)*

**171. Soil Mechanics (4)**

Lecture—4 hours. Prerequisite: C- or better in Engineering 104; Engineering 103 (may be concurrent); course 171L (co-requisite). 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: SciEng | SE.—I, III. (I, III.) Kutter

*(change in existing course—eff. fall 13)*

**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: SciEng | SE.—I, III. (I, III.) Kutter

*(change in existing course—eff. winter 13)*

**173. Foundation Design: Senior Design Experience (4)**

Lecture—4 hours. Prerequisite: course 171. Restricted to senior level standing. Soil exploration and determination of properties for design; design of shallow and deep foundations for bearing capacity and settlements; design of retaining structures; selection and evaluation of foundation alternatives; excavation support and dewatering; major design experience and design report preparation. GE credit: SciEng | SE.—II. (II.) Boulanger

*(change in existing course—eff. fall 13)*

**175. Geotechnical Earthquake Engineering (4)**

Lecture—4 hours. Prerequisite: C- or better in course 171. 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: SciEng | QL, SE.—I. (I.) Idriss, Kutter

*(change in existing course—eff. fall 13)*

**179. Pavement Engineering (4)**

Lecture—3 hours; discussion/laboratory—3 hours. Prerequisite: C- or better in 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: SciEng | QL, SE, SL, VL.—I. (I.) Harvey

*(change in existing course—eff. fall 13)*

**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: SciEng | SE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**190. The Civil Engineer in Society (2)**

Lecture—1 hours; laboratory—3 hours. Open to upper division Civil Engineering majors. The Civil Engineering profession; introduction to concepts in business, management, public policy and leadership including the importance of professional licensure and a discussion of professional ethical and societal issues related to civil engineering. GE credit: SocSci | SS.—III. (III.) Kunnath

*(new course—eff. fall 13)*

**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.)

*(change in existing course—eff. winter 13)*

**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.

*(change in existing course—eff. winter 13)*

**198. Directed Group Study (1-5)**

Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.

*(change in existing course—eff. winter 13)*

**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.

*(change in existing course—eff. winter 13)*

## Graduate

**213. Analysis of Structures Subjected to Dynamic Loads (4)**

Lecture—4 hours. Prerequisite: course 211 (may be taken concurrently). Analysis of structures subjected to earthquake, wind and blast loading; distributed, consistent and lumped mass techniques; computer implementation; nonlinear response spectrum; fre-

quency and time domain analysis; seismic protection of structures; numerical methods in linear and nonlinear structural dynamics.—I. (I.) Kunnath

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

**241. Environmental Reactive Chemical Transport Modeling (4)**
Lecture—4 hours. Prerequisite: Chemistry 2A, or Chemistry 2B, or course 149, or equivalent. Modeling of reactive chemical transport in air and water including kinetic reactions, equilibrium reactions, and phase partitioning. Emphasis on numerical solution schemes and programming techniques to provide deeper insight into model performance and limitations. Offered in alternate years.—III. Kleeman

*(change in existing course—eff. fall 14)*

**254. Discrete Choice Analysis of Travel Demand (4)**
Lecture—4 hours. Prerequisite: course 114. Behavioral and statistical principles underlying the formulation and estimation of discrete choice models. Practical application of discrete choice models to characterization of choice behavior, hypothesis testing, and forecasting. Emphasis on computer exercises using real-world data sets. (Same course as Geography 279.)—III. (III.) Mokhtarian

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

**267. Water Resource Management (3)**
Lecture—3 hours. Prerequisite: course 114, 141, and 142; course 153 recommended. Engineering, institutional, economic, and social basis for managing local and regional water resources. Examples in the context of California's water development and management. Uses of computer modeling to improve water management. (Same course as Geography 212.)—I. (I.) Lund

*(change in existing course—eff. fall 13)*

**281B. Advanced Soil Mechanics (5)**
Lecture—4 hours; laboratory—3 hours. Prerequisite: course 281A. Site investigation and soil characterization within the context of slope stability analysis.—II. (II.) DeJong

*(change in existing course—eff. spring 14)*

**283. Physico-Chemical Aspects of Soil Behavior (4)**
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 171. Study of the geotechnical behavior of soils considering formation, transport, mineralogy, soil-fluid-electrolyte systems, surface tension, particle mechanics, shape, fabric, and structure. Laboratories demonstrate effects of fundamental interparticle forces (contact, Van Der Waals, capillarity and chemical). Offered in alternate years.—I. Kutter

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

# Engineering: Computer Science

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

### Lower Division

**10. Introduction to Programming (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: two years of high school algebra. A hands-on introduction to computation, through programming and problem solving. GE credit: SciEng | QL, SE, SL.—I, II, III. (I, II, III.) Amenta, Gertz, Ludaescher

*(change in existing course—eff. winter 14)*

**12. Introduction to Media Computation (4)**
Lecture—3 hours; discussion/laboratory—1 hour. Introduction to key computational ideas necessary to understand and produce digital media. Fundamentals of programming are covered as well as analysis of how media are represented and transmitted in digital form. Aimed primarily at non-computer science students. (Same course as Cinema and Technocultural Studies 012.) GE credit: ArtHum or SciEng | AH or SE, VL.—II. (II.) Neff

*(new course—eff. fall 13)*

**15. Introduction to Computers (4)**
Lecture—3 hours; laboratory—3 hours. Not open for credit to students who have completed course 30. Computer uses in modern society. Emphasis on uses in nonscientific disciplines. Includes word processing, spreadsheets, web-page creation, elementary programming, basic computer organization, the Internet, the uses of computers and their influence on society. Course not intended for CS or CSE majors. Only two units of credit allowed to students who have completed Plant Science 21. GE credit: SciEng, Wrt | QL, SE, WE.—I, II, III. (I, II, III.) Liu

*(change in existing course—eff. fall 13)*

**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 mathematics of particular utility to computer science. Proofs by induction. Propositional and first-order logic. Sets, functions, and relations. Big-O and related notations. Recursion and solutions of recurrence relations. Combinatorics. Probability on finite probability spaces. Graph theory. GE credit: SciEng | QL, SE.—I, II, III. (I, II, III.) Bai, Gusfield, Levitt, Martel, Rogaway

*(change in existing course—eff. winter 14)*

**30. 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: SciEng | QL, SE.—I, II, III. (I, II, III.)

*(change in existing course—eff. fall 13)*

**40. 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: SciEng | SE, VL.—I, II, III. (I, II, III.)

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

**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. Introduction to I/O devices and programming. Only one unit of credit allowed for students who have taken Electrical and Computer Engineering 70. GE credit: SciEng | SE.—I, II, III. (I, II, III.) Farrens, Matloff

*(change in existing course—eff. winter 14)*

**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. GE credit: SciEng | QL, SE.—I, II, III. (I, II, III.) Rogaway

*(change in existing course—eff. winter 14)*

**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: SciEng | SE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

### Upper Division

**120. Theory of Computation (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 20 or Mathematics 108. Fundamental ideas in the theory of computation, including formal languages, computability and complexity. Reducibility among computational problems. GE credit: SciEng | QL, SE.—I, II, III. (I, II, III.) Bai, Franklin, Gusfield, Martel, Rogaway

*(change in existing course—eff. winter 14)*

**122A. Algorithm Design and Analysis (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 20, 60. Complexity of algorithms, bounds on complexity, analysis methods. Searching, sorting, pattern matching, graph algorithms. Algorithm design techniques: divide-conquer, greedy, dynamic programming. Approximation methods. NP-complete problems. GE credit: SciEng | SE.—I, II, III. (I, II, III.) Amenta, Filkov, Franklin, Gusfield, Martel, Rogaway

*(change in existing course—eff. winter 14)*

**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. Theoretical analysis, implementation and practical evaluations. Examples from parallel, string, graph, and geometric algorithms. GE credit: SciEng | QL, SE.—I. (I.) Gusfield, Martel, Rogaway

*(change in existing course—eff. winter 14)*

**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 and systems biology; sequence analysis, database search, genome annotation, clustering and classification, functional gene networks, regulatory network inference, phylogenetic trees, applications of common bioinformatics tools in molecular biology and genetics. GE credit: SciEng | SE.—III. (III.) Gusfield, Filkov, Tagkopoulos

*(change in existing course—eff. winter 14)*

**127. Cryptography (4)**
Lecture—3 hours; discussion—1 hour. Introduction to the theory and practice of cryptographic techniques used in computer security. Encryption (secret-key and public-key), message authentication, digital signatures, entity authentication, key distribution, and other cryptographic protocols. The social context of cryptography. GE credit: SciEng | QL, SE, SL.—Franklin, Rogaway

*(new course—eff. spring 14)*

**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. Fun-

damental 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: SciEng | SE.—I. (I.) Koehl

*(change in existing course—eff. winter 13)*

**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 arithmetic, error analysis, data interpolation, least squares data fitting, quadrature, zeros, optimization and matrix eigenvalues and singular values. Parallel computing for matrix operations and essential matrix factorizations. GE credit: SciEng | SE.—III. (III.) Bai, Hamann, Joy

*(change in existing course—eff. winter 14)*

**132. Probability and Statistical Modeling for Computer Science (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: course 40; course 50 or Engineering Electrical and Computer 70; 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: SciEng | QL, SE.—II. (II.) Davidson, Ghosal, Matloff

*(change in existing course—eff. fall 13)*

**140A. Programming Languages (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: course 50 or Electrical Computer Engineering 70; course 60. Syntactic definition of programming languages. Introduction to programming language features including variables, data types, data abstraction, object-orientedness, scoping, parameter disciplines, exception handling. Non-imperative programming languages. Comparative study of several high-level programming languages. GE credit: SciEng | SE.—I, II. (I, II.) Olsson, Pandey, Su

*(change in existing course—eff. winter 14)*

**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); key implementation issues for those paradigms; and programming language semantics. Offered in alternate years. GE credit: SciEng | SE.—(I.) Levitt, Olsson, Pandey

*(change in existing course—eff. winter 14)*

**142. Compilers (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: course 20, 140A; course 120 recommended. Principles and techniques of lexical analysis, parsing, semantic analysis, code generation, and code optimization. Implementation of compilers. GE credit: SciEng | SE.—II. (II.) Pandey, Su

*(change in existing course—eff. winter 14)*

**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 Python and R as prime examples. Applications include networking, data analysis and display, and graphical user interfaces (GUIs). Offered in alternate years. GE credit: SciEng | SE.—III. Matloff

*(change in existing course—eff. winter 14)*

**150. Operating Systems and System Programming (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: course 40; course 50 or Electrical and Computer Engineering 70. 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: SciEng | SE.—I, II, III. (I, II, III.) Levitt, Matloff, Olsson, Wu

*(change in existing course—eff. winter 14)*

**152A. Computer Networks (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: course 60; course 132 or Electrical and Computer Engineering 161 or Mathematics 135A or Statistics 131A, or Statistics 120 or Statistics 32. Overview of computer networks, TCP/IP protocol suite, computer-networking applications and protocols, transport-layer protocols, network architectures, Internet Protocol (IP), routing, link-layer protocols, local area and wireless networks, medium access control, physical aspects of data transmission, and network-performance analysis. Only 2 units of credit for students who have taken course 157. (Same course as Electrical and Computer Engineering 173A.) GE credit: SciEng | SE.—I, II, III. (I, II, III.) Chuah, Ghosal, Liu, Matloff, Mohapatra, Mukherjee

*(change in existing course—eff. fall 13)*

**152B. Computer Networks (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: course 152A or Electrical and Computer Engineering 173A. TCP/IP protocol suite, computer networking applications, clientserver and peer-to-peer architectures, application-layer protocols, transport-layer protocols, transport-layer interfaces, sockets, network programming, remote procedure calls, and network management. GE credit: SciEng | SE.—I, II, III. (I, II, III.) Ghosal, Matloff, Mohapatra, Mukherjee

*(change in existing course—eff. winter 14)*

**152C. Advanced Topics in Computer Networks (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: course 152A or Electrical and Computer Engineering 173A. Advanced topics in computer networks, wireless networks, multimedia networking, traffic analysis and modeling, network design and management, network simulation and performance analysis, and design projects in communication networks. (Same course as Electrical and Computer Engineering 173B.) Offered in alternate years. GE credit: SciEng | SE.—III. Chuah, Liu, Mukherjee, van der Schaar

*(change in existing course—eff. fall 14)*

**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: SciEng | SE.—II, III. (II, III.) Bishop, Chen

*(change in existing course—eff. winter 13)*

**154A. Computer Architecture (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: course 50 or Electrical and Computer Engineering 70. 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. GE credit: SciEng | SE.—I, II, III. (I, II, III.) Farrens, Mukherjee

*(change in existing course—eff. winter 14)*

**154B. Computer Architecture (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: course 154A or both Electrical and Computer Engineering 170 and Electrical and Computer Engineering 180A. Hardwired and microprogrammed CPU design. Memory hierarchies. Uniprocessor performance analysis under varying program mixes. Introduction to pipelining and multiprocessors. GE credit: SciEng | SE.—I, II, III. (I, II, III.) Farrens

*(change in existing course—eff. winter 14)*

**155. Computer Security for Non-Majors (4)**

*(cancelled course—eff. winter 14)*

**156. Discrete-Event Simulation (4)**

*(cancelled course—eff. winter 14)*

**157. Computer Networks for Non-Majors (4)**

*(cancelled course—eff. winter 14)*

**158. Programming on Parallel Architectures (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 150 and 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: SciEng | SE.—III. (III.) Chong, Farrens, Ma, Matloff, Pandey

*(change in existing course—eff. fall 13)*

**160. 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: SciEng | SE.—I, II, III. (I, II, III.) Devanbu, Levitt

*(change in existing course—eff. winter 14)*

**163. Information Interfaces (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: course 60. 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: SciEng | SE, VL.—III. (III.) Amenta, Ma

*(change in existing course—eff. fall 13)*

**165A. Database Systems (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: course 60. Database modeling and design (E/R model, relational model), relational algebra, query languages (SQL), file and index structures, query processing, transaction management. GE credit: SciEng | SE.—II. (II.) Ludaescher

*(change in existing course—eff. winter 14)*

**165B. Database Systems (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: course 165A. Data modeling (object-relational, graph-based, spatiotemporal models). Querying semistructured data (XML). Database theory (normalization, integration, provenance). Database programming (stored procedures, embedded SQL, web programming). Advanced topics (data warehousing, parallel data processing). GE credit: SciEng | SE.—III. (III.) Ludaescher

*(change in existing course—eff. winter 14)*

**166. Scientific Data Management (4)**

*(cancelled course—eff. winter 14)*

**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: SciEng | SE.—II. (II.) Davidson, Levitt

*(change in existing course—eff. winter 13)*

**171. Machine Learning (4)**
Lecture—3 hours; discussion—1 hour. Introduction to machine learning. Supervised and unsupervised learning, including classification, dimensionality reduction, regression and clustering using modern machine learning methods. Applications of machine learning to other fields. GE credit: SciEng | SE.—III. (III.) Davidson, Matloff, Tagkopoulos
*(new course—eff. fall 13)*

**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 detection of objects in various types of images and describing populations of biological specimens appearing in medical imagery. GE credit: SciEng | SE.—II. (II.) Amenta
*(change in existing course—eff. winter 14)*

**175. Computer Graphics (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 60; Mathematics 22A or Mathematics 67. Principles of computer graphics, with a focus on interactive systems. Current graphics hardware, elementary operations in two-and threedimensional space, geometric transformations, camera models and interaction, graphics system design, standard graphics APIs, individual projects. GE credit: SciEng | SE, VL.—I, II. (I, II.) Amenta, Hamann, Joy
*(change in existing course—eff. winter 14)*

**177. Scientific Visualization (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 175. Computer 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: SciEng | SE, VL.—II. (II.) Hamann, Joy, Max, Staadt
*(change in existing course—eff. winter 14)*

**178. 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: SciEng | SE, VL.—I. (I.) Hamann, Joy, Max
*(change in existing course—eff. winter 14)*

**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. Character of technological change. Social context of work in computer science and engineering. GE credit: SocSci, Wrt | SS, SL, WE.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 14)*

**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: SciEng, Wrt | SS, WE.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

**189A-N. Special Topics in Computer Science (1-5)**
Lecture, laboratory or combination. Prerequisite: consent of instructor. Special topics in (A) Computer Science Theory. GE credit: SciEng | SE.; (B) Architecture. GE credit: SciEng | SE.; (C) Programming Languages and Compilers. GE credit: SciEng | SE.; (D) Operating Systems. GE credit: SciEng | SE.; (E) Software Engineering. GE credit: SciEng | SE.; (F) Data Bases. GE credit: SciEng | SE.; (G) Artificial Intelligence. GE credit: SciEng | SE.; (H) Computer Graphics. GE credit: SciEng | SE.; (I) Networks. GE credit: SciEng | SE.; (J) Computer-Aided Design. GE credit: SciEng | SE.; (K) Scientific Computing. GE credit: SciEng | SE.; (L) Computer Science. GE credit: SciEng | SE.; (M) Computer Security; (N) Bioinformatics and Computational Biology. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

**193A. Senior Design Project (2)**
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 160 recommended (may be concurrent) or consent of instructor. Open to Computer Science or Computer Science and Engineering seniors. Team design project involving analysis, design, implementation and evaluation of a large-scale problem involving computer and computational systems. The project is supervised by a faculty member. Students must take course 193A and 193B to receive credit. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE.—II, III. (II, III.) Davidson, Joy, Mohapatra
*(change in existing course—eff. fall 13)*

**197T. Tutoring in Computer Science (1-3)**
Discussion—1 hour; laboratory/discussion—3-6 hours. Prerequisite: consent of instructor. Restricted to upper-division standing. Tutoring in computer science courses, especially introductory courses. (P/NP grading only.)—I, II, III. (I, II, III.)
*(change in existing course—eff. fall 14)*

### Graduate

**221. Computational Methods in Systems and Synthetic Biology (4)**
Lecture—3 hours; discussion—1 hour. Computational methods related to systems and synthetic biology. An overview of machine learning techniques related to the analysis of biological data, biological networks. Predictive modeling and simulation of biological systems. Topics on biological circuit construction.—I. (I.) Tagkopoulos
*(new course—eff. fall 13)*

# Engineering: Electrical and Computer

## New and changed courses in Engineering: Electrical and Computer (EEC)

### Lower Division

**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. winter 13)*

**10. Introduction to Digital and Analog Systems (3)**
Lecture—1 hours; laboratory—3 hours. Prerequisite: Engineering 6 or Mathematics 22AL, Computer Science Engineering 30, Physics 9C and Engineering 17 (concurrent enrollment in Engineering 17 allowed). Open to Electrical and Computer Engineering sophomores. Interactive and practical introduction to fundamental concepts of electrical and computer engineering by implementing electronic systems, which can be digitally controlled and interrogated, with a programmable microcontroller with the ability to program the electrical connections between analog and digital components. GE credit: SciEng | SE.—III. (III.) Knoesen
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I, II. (I, II.) Akella, Al-Asaad, Chuah, Wilken
*(change in existing course—eff. winter 13)*

**89A-F. Special Topics in Electromagnetics (1-5)**
Prerequisite: consent of instructor. Special Topics in (A) Electromagnetics, (B) Physical Electronics, (C) Active and Passive Circuits, (E) Computer Systems and Software, (F) Digital System Design for freshmen and sophomore level students. May be repeated for credit if topic differs. Offered irregularly. GE credit: SciEng | SE.
*(change in existing course—eff. winter 13)*

### Upper Division

**110A. Electronic Circuits I (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100; course 140A recommended. 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: SciEng | SE, VL.—II, III. (II, III.) Amirtharajah, Hurst, Lewis, O'Driscoll
*(change in existing course—eff. spring 14)*

**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: SciEng | SE, VL.—III. (III.) Hurst, Lewis, O'Driscoll
*(change in existing course—eff. winter 13)*

**112. Communication Electronics (4)**
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 110A and 150A; course 110B recommended. 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: SciEng | SE.—II. (II.)
*(change in existing course—eff. spring 14)*

**116. VLSI Design (4)**
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 110A; course 180A recommended. CMOS devices, layout, circuits, and functional units; VLSI fabrication and design methodologies. GE credit: SciEng | SE.—I. (I.) Amirtharajah, Baas
*(change in existing course—eff. spring 14)*

**119A. Integrated Circuit Design Project (3)**
Workshop—1 hour; laboratory—6 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: SciEng | SE.—II. (II.)
*(change in existing course—eff. fall 14)*

**119B. Integrated Circuit Design Project (3)**
Workshop—1 hour; laboratory—6 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: SciEng | SE.—III. (III.)
*(change in existing course—eff. fall 14)*

**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: SciEng | SE.—I, II. (I, II.) Pham, Luhmann, Yankelevich
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.) Knoesen, Pham, Yoo
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. (I.) Branner, Luhmann
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.) Branner, Luhmann
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.) Branner, Luhmann
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. (I.) Pham
*(change in existing course—eff. winter 13)*

**134A. RF/Microwave Systems Design (3)**
Workshop—3 hours; laboratory—6 hours. Prerequisites: course 130B or 110B or 150A. Class size limited to 24 students. Board-level RF design, fabrication, and characterization of an RF/microwave system, including the antenna, RF front-end, baseband, mix-signal circuits, and digital signal processing models. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE.—I. (I.) Liu, Momeni
*(new course—eff. fall 14)*

**134B. RF/Microwave Systems Design (3)**
Workshop—3 hours; laboratory—6 hours. Prerequisites: course 134A. Class size limited to 24 students. Board-level RF design, fabrication, and characterization of an RF/microwave system, including the antenna, RF front-end, baseband, mix-signal circuits, and digital signal processing models. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE.—II. (II.) Liu, Momeni
*(new course—eff. winter 15)*

**136A. Electronic Design Project (3)**
Workshop—1 hour; laboratory—6 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. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE.—I. (I.) Knoesen
*(change in existing course—eff. fall 14)*

**136B. Electronic Design Project (3)**
Workshop—1 hour; laboratory—6 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. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE.—II. (II.) Knoesen
*(change in existing course—eff. fall 14)*

**140A. Principles of Device Physics I (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 17; Physics 9D. Semiconductor device fundamentals, equilibrium and non-equilibrium statistical mechanics, conductivity, diffusion, electrons and holes, p-n and Schottky junctions, first-order metal-oxide-semiconductor (MOS) field effect transistors, bipolar junction transistor fundamentals. GE credit: SE, SL.—I, II. (I, II.) Fink, Hunt, Islam, Kiehl, Yankelevich
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.) Hunt, Islam, Kiehl
*(change in existing course—eff. winter 13)*

**145. Electronic Materials (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 140B, Engineering 45. Electronic and physical properties of materials used in electronics, ICs, optoelectronics and MEMS. Semiconductors, dielectrics, metals, optical materials, organic semiconductive, optical and nonlinear properties, as well as their synthesis and deposition methods. GE credit: SciEng | SE.—I. (I.) Hihath, Hunt, Islam, Kiehl, Seker
*(new course—eff. spring 13)*

**146A. Integrated Circuits Fabrication (3)**
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 140A. 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: SciEng | SE.—I. (I.) Hunt, Islam
*(change in existing course—eff. fall 13)*

**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: SciEng | SE.—II. (II.)
*(change in existing course—eff. winter 13)*

**147. Microelectromechanical Systems (4)**
Lecture—2 hours; laboratory—3 hours. Prerequisite: Chemistry 2A; Engineering 100 or course 100. Restricted to upper division standing in College of Engineering. 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. (Same course as Biomedical Engineering 118.) GE credit: SciEng | QL, SE.—II. (II.) Pan
*(new course—eff. winter 13)*

**150A. Introduction to Signals and Systems I (4)**
Lecture—4 hours. Prerequisite: Engineering 6 or Mathematics 22AL (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: SciEng | QL, SE.—II. (II.) Abdel-Ghaffar, Chang, Levy, Zhao
*(change in existing course—eff. fall 13)*

**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: SciEng | QL, SE.—I. (I.)
*(change in existing course—eff. winter 13)*

**151. Instrumentation Interfacing, Signals and Systems (4)**
*(cancelled course—eff. fall 13)*

**152. Digital Signal Processing (4)**
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 150B; course 70 or Computer Science Engineering 50. 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: SciEng | SE.—III. (III.) Akella, Baas, Ding
*(change in existing course—eff. fall 14)*

**157A. Control Systems (4)**
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 100. 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: SciEng | SE.—I. (I.)

*(change in existing course—eff. fall 13)*

**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: SciEng | SE.—II. (II.) Gundes

*(change in existing course—eff. winter 13)*

**158. Control System Design Methods (4)**

*(cancelled course—eff. winter 14)*

**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

*(change in existing course—eff. winter 13)*

**161. Probabilistic Analysis of Electrical & Computer Systems (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 21C. 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: SciEng | QL, SE.—I, III. (I, III.) Abdel-Ghaffar, Ding, Levy, Scaglione, Zhao

*(change in existing course—eff. fall 13)*

**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: SciEng | SE.—II. (II.) Abdel-Ghaffar, Ding, Ford, Levy

*(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: SciEng | SE.—I. (I.) Owens, Wilken

*(change in existing course—eff. winter 13)*

**171. Parallel Computer Architecture (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: course 170 or Computer Science Engineering 154B. Organization and design of parallel processors including shared memory multiprocessors, cache coherence, memory consistency, snooping protocols, synchronization, scalable multiprocessors, message passing protocols, distributed shared memory and interconnection networks. GE credit: SciEng | SE.—III. (III.) Akella, Wilken

*(change in existing course—eff. fall 14)*

**172. Embedded Systems (4)**

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 170 or Computer Science Engineering 154A. 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: SciEng | SE.—II, III. (II, III.) Akella, Ghiasi, Wilken

*(change in existing course—eff. fall 13)*

**173A. Computer Networks (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: Computer Science Engineering 60; Computer Science and Engineering 132 or Electrical and Computer Engineering 161 or Mathematics 135A or Statistics 131A, or Statistics 120 or Statistics 32. Overview of computer networks, TCP/IP protocol suite, computer-networking applications and protocols, transport-layer protocols, network architectures, Internet Protocol (IP), routing, link-layer protocols, local area and wireless networks, medium access control, physical aspects of data transmission, and network-performance analysis. Only 2 units of credit for students who have taken course 157. (Same course as Computer Science Engineering 152A.) GE credit: SciEng | SE.—I, II, III. (I, II, III.) Chuah, Ghosal, Liu, Matloff, Mohapatra, Mukherjee

*(change in existing course—eff. fall 13)*

**173B. Design Projects in Communication Networks (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: course 173A or Computer Science and Engineering 152A. Advanced topics and design projects in communication networks. Example topics include wireless networks, multimedia networking, network design and management, traffic analysis and modeling, network simulations and performance analysis. Offered in alternate years. (Same course as Computer Science Engineering 152C.) GE credit: SciEng | SE.—III. (III.) Chuah

*(change in existing course—eff. winter 13)*

**180A. Digital Systems I (5)**

Lecture—3 hours; laboratory—6 hours. Prerequisite: Physics 9C or 9HD. 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: SciEng | SE.—I, II. (I, II.) Akella, Al-Asaad, Ghiasi, Wilken

*(change in existing course—eff. spring 14)*

**180B. Digital Systems II (5)**

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 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: SciEng | SE.—III. (III.)

*(change in existing course—eff. fall 13)*

**181A. Digital Systems Design Project (3)**

Workshop—1 hour; laboratory—6 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: SciEng | SE.—II. (II.) Ghiasi

*(change in existing course—eff. fall 14)*

**181B. Digital Systems Design Project (3)**

Workshop—1 hour; laboratory—6 hours. Prerequisite: course 181A. 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: SciEng | SE.—III. (III.) Ghiasi

*(change in existing course—eff. winter 15)*

**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: SciEng | SE.—II. (II.) Al-Asaad

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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.) GE credit: SciEng | SE.—I, II, III. (I, II, III.)

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

**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. winter 13)*

**193A. Senior Design Project (3)**

Workshop—1 hour; laboratory—6 hours. Prerequisite: course 196 (may be taken concurrently); consent of instructor. Restricted to senior standing in Electrical or Computer Engineering. Team design project for seniors in Electrical or Computer Engineering. 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: SciEng | SE.—I, II. (I, II.)

*(change in existing course—eff. fall 14)*

**193B. Senior Design Project (3)**

Workshop—1 hour; laboratory—6 hours. Prerequisite: course 193A. Team design project for seniors in Electrical Engineering or Computer Engineering. 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: SciEng | SE.—II, III. (II, III.)

*(change in existing course—eff. winter 15)*

**194A. Micromouse Design Project (2)**

*(cancelled course—eff. fall 13)*

**194B. Micromouse Design Project (2)**
*(cancelled course—eff. fall 13)*

**194C. Micromouse Design Project (1)**
*(cancelled course—eff. fall 13)*

**195A. Autonomous Vehicle Design Project (3)**
Workshop—1 hour; laboratory—6 hours. Prerequisite: course 180A, Computer Science and Engineering 30, and one of 110B, 157A, 180B, or Computer Science and Engineering 150. Pass One restricted to major. Design and construct an autonomous race car. 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: SciEng | SE.—I. (I.)
*(change in existing course—eff. winter 15)*

**195B. Autonomous Vehicle Design Project (3)**
Workshop—1 hour; laboratory—6 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: SciEng | SE.—II. (II.)
*(change in existing course—eff. winter 15)*

**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: SciEng | SE.—I. (I.)
*(change in existing course—eff. winter 13)*

**198. Directed Group Study (1-5)**
Prerequisite: consent of instructor. May be repeated three times for credit. (P/NP grading only.) GE credit: SE.
*(change in existing course—eff. winter 13)*

### Graduate

**217. Biomedical Electronics (4)**
Lecture—3 hours; project. Prerequisite: course 210 or consent of instructor. Special consideration and accommodation will be made for biomedical or signal processing majors who have not taken 210. Circuit design for medical applications including weak inversion amplifiers; integrated ULF filters; chopper stabilization; electrochemical interfaces; neurostimulation pulse generation; wireless powering of and communication with implantable devices. Electrophysiological signaling and aspects of signal processing for biomedical systems.—III. (III.) O'Driscoll
*(new course—eff. spring 13)*

**237B. Laser Physics II (4)**
Lecture—3 hours; extensive problem solving. Prerequisite: course 237A or Applied Science Engineering 265A. Oscillation threshold. Coupled cavity/atomic rate equations, Linear pulse propagation; dispersion, broadening, compression. Nonlinear pulse propagation. Energy extraction. Optical beams, resonators, eigenmodes, axial/transverse modes. Paraxial ray optics, resonator stability, ABCD matrices. Laser dynamics; transients, spiking, Q-switching, active and passive modelocking. Not open for credit to students who have completed course 226B. Offered in alternate years.—II. Heritage, Kolner
*(change in existing course—eff. fall 14)*

**243. Silicon-on-Insulator (SOI) Technology (3)**
*(cancelled course—eff. winter 14)*

**249. Nanofabrication (3)**
Lecture—3 hours. Prerequisite: graduate standing in Engineering. Theory and practices of nanofabrication used for producing ICs, electronic devices, optoelectronics, sensors, and microstructures. Major topics include electron-, photon-, and ion-beams and their interactions with solids, chemical vapor depositions, plasma processing and micromachining. Offered in alternate years.—III. Hunt, Islam
*(change in existing course—eff. winter 14)*

**267. Mobile Communications (4)**
Lecture/laboratory—3 hours. Prerequisite: courses 260 and 265 (can be taken concurrently). Time-varying multi-path fading channel models and receiver performance in fading channels; multiple access techniques and multiple access receivers design and performance; optimum design and the capacity of wireless channels. Offered in alternate years.—II. Scaglione
*(change in existing course—eff. spring 13)*

# Engineering: Materials Science and Engineering

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

### Lower Division

**2. Stuff: Diversity of Materials in Our Lives (2)**
Lecture/discussion—2 hours. Role of materials in technological societies and their impact on our way of living. Exploration of how materials are extracted from the earth, processed, and shaped into products, including discussion of disposal and re-use of materials. GE credit: SciEng | SE.—I. (I.) Risbud
*(change in existing course—eff. fall 12)*

### Upper Division

**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: SciEng | QL, SE.—II. (II.) Pan
*(change in existing course—eff. winter 13)*

**160. Thermodynamics of Materials Processes and Phase Stability (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in each of the following: Engineering 45, Physics 9B, Mathematics 22B; Chemistry 2C (recommended). Review of thermodynamic principles of interest to materials scientists and engineers. Application of thermodynamics to material processing, phase stability, corrosion. GE credit: SciEng | QL, SE, SL, VL.—I. (I.)
*(change in existing course—eff. fall 13)*

**162. Structure and Characterization of Engineering Materials (4)**
Lecture—4 hours. Prerequisite: C- or better in each of the following: 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: SciEng | QL, SE.—II. (II.)
*(change in existing course—eff. fall 13)*

**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: SciEng, Wrt | QL, SE, SL, VL, WE.—II.
*(change in existing course—eff. winter 13)*

**164. Rate Processes in Materials Science (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in 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: SciEng | QL, SE, SL, VL.—II. (II.)
*(change in existing course—eff. fall 13)*

**170. Sustainable Energy Technologies: Batteries, Fuel Cells, and Photovoltaic Cells (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45. Open to students in Engineering or related fields. Basic principles of future energy devices such as lithium batteries, fuel cells, and photovoltaic cells. Examines the current status of these energy technologies and analyze challenges that still must be overcome. Offered in alternate years. GE credit: SciEng | SE.—(II, IV.) Kim
*(new course—eff. fall 13)*

**172. Electronic, Optical and Magnetic Properties of Materials (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 110A or Physics 9D; Engineering 6 or Chemical and Materials Science 6 or equivalent (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: SciEng | QL, SE, SL, VL.—I. (I.)
*(change in existing course—eff. fall 13)*

**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: SciEng, Wrt | QL, SE, SL, VL, WE.—I.
*(change in existing course—eff. winter 13)*

**174. Mechanical Behavior of Materials (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in Engineering 45; course 162 (recommended). Microscopic and macroscopic aspects of the mechanical behavior of engineering materials, with emphasis on recent development in materials characterization by nondestructive testing. Fundamental aspects of plasticity in engineering materials, strengthening mechanisms and mechanical failure modes of materials systems. GE credit: SciEng, Wrt | QL, SE, SL, VL.—I. (I.)
*(change in existing course—eff. fall 13)*

**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: SciEng, Wrt | QL, SE, SL, VL, WE.—I.
*(change in existing course—eff. winter 13)*

**180. Materials in Engineering Design (4)**
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: C- or better in Engineering 45. Restricted to students with upper division standing. Quantitative treatment of materials selection for engineering applications. Discussion of design and material selection strategy; process and process selection strategy; process economics; life-cycle thinking and eco-design. Use of materials selection software. GE credit: SciEng, Wrt | OL, SE, SL, VL, WE.—III. (III.)
*(change in existing course—eff. fall 13)*

**181. Materials Processing (4)**
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: C- or better in Engineering 45; and Engineering 105 or Chemical Engineering 152B or Electrical & 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: SciEng, Wrt | OL, SE, VL, WE.—II. (II.)
*(change in existing course—eff. fall 13)*

**182. Failure Analysis (4)**
Lecture—3 hours; laboratory—3 hours. Prerequisite: C- or better in Engineering 45; course 174 (recommended). Analysis of the way materials fail. Effects of temperature, mechanical deformation and corrosion on the properties of materials. forensics and methodologies for investigating failures of materials including optical microscopy, x-ray analysis and scanning electron microscopy. Investigation of practical problems. GE credit: SciEng, Wrt | QL, SE, VL, WE.—II. (II.)
*(change in existing course—eff. fall 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: SciEng | OL, SE, SL, VL, WE.—III. (III.) Sen
*(change in existing course—eff. winter 13)*

# Engineering: Mechanical

## New and changed courses in Engineering: Mechanical (EME)

### Lower Division

**50. Manufacturing Processes (4)**
Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: C- or better in: Engineering 4 and Physics 9A. Restricted to Mechanical 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: SciEng | QL, SE, VL.—I, II, III. (I, II, III.) Farouki, Schaaf, Yamazaki
*(change in existing course—eff. fall 13)*

**97TC. Mentoring and Tutoring Engineering in the Community (1-4)**
Prerequisite: consent of instructor. Mentoring, coaching, tutoring and/or supervision of students in K-12 schools in Engineering-related topics. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)
*(new course—eff. fall 12)*

### Upper Division

**106. Thermo-Fluid Dynamics (4)**
Lecture—4 hours. Prerequisite: C- or better in Engineering 103 and 105. Restricted to Mechanical Engineering, Aerospace Science and Engineering, and Mechanical Engineering/Materials Science Engineering majors. Inviscid incompressible flow, compressible flow, ideal gas mixtures, psychrometrics, reacting mixtures and combustion. GE credit: SciEng | SE.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

**107A. Experimental Methods (3)**
Lecture—2 hours; laboratory—1.5 hours. Prerequisite: C- or better in Mechanical Engineering 106. Restricted to Mechanical Engineering, Aerospace Science & Engineering and Mechanical/Materials Science Engineering Majors. 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. GE credit: SciEng | QL, SE, VL.—I, II, III, IV. (I, II, III, IV.) Erickson, Kennedy, Park
*(change in existing course—eff. winter 13)*

**107B. Experimental Methods (3)**
Lecture—2 hours; laboratory—3 hours. Prerequisite: C- or better in Engineering 100 and Engineering 102; Engineering 104 recommended. Restricted to Mechanical Engineering, Aerospace 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: SciEng | QL, SE, VL, WE.—I, II, III. (I, II, III.) Harris, Horsley, La Saponara
*(change in existing course—eff. fall 13)*

**115. Introduction to Numerical Analysis and Methods (4)**
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: C- or better in: Engineering 6 or course 5 or Computer Science Engineering 30 or Chemical and Materials Science Engineering 6; C- or better in: Mathematics 21A, 21B, 21C, 21D, 22A, 22B; C- or better in: Physics 9A, 9B, 9C. Number representation, Taylor expansions, error and stability analysis, roots of nonlinear equations, sets of linear equations, numerical integration, ordinary differential equations. Not open for credit to students who have taken Applied Science Engineering 115. GE credit: SciEng | SE.—II. (II.) Jensen, Niels
*(change in existing course—eff. fall 13)*

**121. Engineering Applications of Dynamics (4)**
Lecture—3 hours; laboratory—3 hours. Prerequisite: C- or better in Engineering 102; C- or better in Engineering 6 or course 5 or Computer Science Engineering 30. Restricted to Mechanical Engineering, Aerospace Science and Engineering, and Mechanical Engineering/Materials Science Engineering majors. 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: SciEng | QL, SE, SL, VL.—III. (III.) Karnopp, Margolis
*(change in existing course—eff. fall 13)*

**134. Vehicle Stability (4)**
Lecture—3 hours; laboratory—3 hours. Prerequisite: C- or better in Engineering 102. Restricted to Mechanical Engineering, Aerospace Science and Engineering, and Mechanical Engineering/Materials Science Engineering majors. 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: SciEng | QL, SE.—III. (III.) Karnopp
*(change in existing course—eff. fall 13)*

**150A. Mechanical Design (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in: Engineering 45 or Engineering 45Y; C- or better in both Engineering 104 and course 50 (may be taken concurrently). Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Materials Science and Engineering majors. 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: SciEng | QL, SE, VL, WE.—I, III, IV. (I, III, IV.) Farouki, Hill, Ravani, Schaaf
*(change in existing course—eff. fall 14)*

**150B. Mechanical Design (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in course 150A. Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Materials Science and Engineering. 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: SciEng | QL, SE, VL.—II. (II.) Farouki, Ravani
*(change in existing course—eff. fall 13)*

**151. Statistical Methods in Design and Manufacturing (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in course 150A. Restricted to Restrictions on Enrollment Text: Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Materials Science and Engineering. 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: SciEng | QL, SE, VL.—II. (II.) Hull
*(change in existing course—eff. fall 13)*

**152. Computer-Aided Mechanism Design (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in Engineering 102; C- or better in course 5 or Engineering 6 or Computer Science

Engineering 30. Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Materials Science and Engineering. 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. Offered in alternate years. GE credit: SciEng | QL, SE, VL.—(II.) Cheng

*(change in existing course—eff. fall 13)*

**154. Mechatronics (4)**

Lecture—3 hours; laboratory—3 hours. Prerequisite: C- or better in each of the following: Engineering 100 and Engineering 102 and course 50. Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Materials Science and Engineering. Mechatronics system concept and overview, control system design ware architecture, microcontroller and interface technology for mechatronics control, sensor for mechatronics systems, actuator drives. GE credit: SciEng | QL, SE, VL.—III. (III.) Yamazaki

*(change in existing course—eff. fall 13)*

**161. Combustion and the Environment (4)**

Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: grade of C- or better in course 106. Introduction to combustion kinetics; the theory of premixed 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. Offered in alternate years. GE credit: SciEng | QL, SE, VL.—III. (III.) Aldredge, Kennedy, Shaw

*(change in existing course—eff. winter 14)*

**163. Internal Combustion Engines and Future Alternatives (4)**

Lecture—3 hours; laboratory—3 hours. Prerequisite: C- or better in course 50 and course 106. Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Materials Science and Engineering. 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: SciEng | QL, SE, VL.—III. Erickson

*(change in existing course—eff. fall 13)*

**165. Heat Transfer (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in course 5 or Engineering 6 or Computer Science Engineering 30; C- or better in Engineering 103 and 105. Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Materials Science and Engineering. 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: SciEng | QL, SE, VL.—I, III. (I, III.) Davis, Kennedy, Shaw

*(change in existing course—eff. fall 13)*

**171. Analysis, Simulation and Design of Mechatronic Systems (4)**

Lecture—3 hours; laboratory—3 hours. Prerequisite: C- or better in Engineering 100 and 102. Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Materials Science and Engineering. 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: SciEng | QL, SE, VL.—I, II. (I, II.) Horsley, Hubbard

*(change in existing course—eff. fall 13)*

**172. Automatic Control of Engineering Systems (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in Engineering 100 and 102. Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Materials Science and Engineering. 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: SciEng | QL, SE, VL.—II, III. (II, III.) Eke, Joshi

*(change in existing course—eff. fall 13)*

**185A. Mechanical Engineering Systems Design Project (4)**

Lecture—1 hour; laboratory—3 hours. Prerequisite: C- or better in: course 150A and course 165 (may be taken concurrently); Communications 1 or 3 recommended; upper division composition recommended. Restricted to Senior standing in Mechanical Engineering (EMEC). 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: SciEng | OL, QL, SE, VL, WE.—I, II. (I, II.) Davis, Velinsky

*(change in existing course—eff. fall 13)*

**185B. Mechanical Engineering Systems Design Project (4)**

Lecture—1 hour; laboratory—3 hours. Prerequisite: course 185A and senior standing in the Department of Mechanical and Aerospace 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: Sci | OL, QL, SE, VL, WE.—II, III. (II, III.) Velinsky, C. Davis

*(change in existing course—eff. winter 14)*

**197TC. Mentoring and Tutoring Engineering in the Community (1-4)**

Prerequisite: upper division standing; consent of instructor. Mentoring, coaching, tutoring and/or supervision of students in K- 12 schools in Engineering-related topics. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

*(new course—eff. fall 12)*

# Engineering: Mechanical and Aerospace

## New and changed courses in Engineering: Mechanical and Aerospace (MAE)

### Graduate

**217. Combustion (4)**

Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: Engineering 103 and 105, Mechanical Engineering 106. Restricted to graduate students. Review of chemical thermodynamics and chemical kinetics. Discussion of reacting flows, their governing equations and transport phenomena; detonations; laminar flame structure and turbulent combustion. Offered in alternate years.—II. Aldredge, Kennedy, Shaw

*(change in existing course—eff. spring 14)*

**228. Introduction to BioMEMS (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: BS engineering discipline or consent of instructor. Ideal for beginning graduate or advanced undergraduate students interested in microelectromechanical systems (MEMS) topics related to biological applications. Covers topics from various disciplines related to BioMEMS: mechanical, electrical, biomedical, chemical engineering, and materials science. Offered in alternate years.—I. Davis

*(new course—eff. winter 14)*

**237. Analysis and Design of Composite Structures (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 104 or equivalent. Modeling and analysis methodology for composite structures including response and failure. Laminated plate bending theory. Introduction to failure processes. Includes discussion of aerospace structural analysis. Offered in alternate years.—(I.) La Saponara

*(change in existing course—eff. winter 14)*

# English

## New and changed courses in English (ENL)

### Lower Division

**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. May be repeated one time for credit. GE credit: ArtHum, Wrt | AH, WE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 14)*

**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. May be repeated one time for credit. GE credit: ArtHum | AH.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 14)*

**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: ArtHum | AH.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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. Emer-

gence and development of key literary genres. Formal experimentation. Modernism as transnational phenomenon. GE credit: ArtHum | AH.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, WE.—II.

*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, WE.

*(change in existing course—eff. winter 13)*

**43. Introductory Topics in Drama (4)**
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or its equivalent. Close reading of, and topics relating to selected works of British and American drama from a range of historical periods. May be repeated two times for credit when content differs. GE credit: ArtHum, Wrt | AH, WE.

*(change in existing course—eff. fall 13)*

**44. Introductory Topics in Fiction (4)**
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or its equivalent. Close reading of, and topics relating to, British and American Fiction: short stories, novellas, novels. Frequent written exercises. May be repeated two times for credit when content differs. GE credit: ArtHum, Wrt | AH, WE.

*(change in existing course—eff. fall 13)*

**45. Introductory Topics in Poetry (4)**
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or its equivalent. Topical study and close reading of selections from English and American poetry. May be repeated two times for credit when content differs. GE credit: ArtHum, Wrt | AH, WE.

*(change in existing course—eff. fall 13)*

**46A. Masterpieces of English Literature (4)**
Lecture—3 hours; discussion—l 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: ArtHum, Wrt | AH, WC, WE.

*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, WC, WE.

*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, WC, WE.

*(change in existing course—eff. winter 13)*

## Upper Division

**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)*

**106. English Grammar (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 or Linguistics 1 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 Linguistics 106 and University Writing Program 106.) GE credit: ArtHum | AH.

*(change in existing course—eff. winter 14)*

**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. GE credit: ArtHum, Wrt | AH, WE.

*(change in existing course—eff. fall 13)*

**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: ArtHum, Wrt | AH, WE.—I.

*(change in existing course—eff. winter 13)*

**110B. Introduction to Modern Literary and Critical Theory (4)**
Lecture—3 hours; extensive writing or 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: ArtHum, Wrt | AH, WE.—I, II, III.

*(change in existing course—eff. winter 13)*

**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. GE credit: ArtHum, Wrt | AH, WC, WE.—I, II.

*(change in existing course—eff. fall 13)*

**115. Topics in Sixteenth and Seventeenth Century Literature (4)**
Lecture/discussion—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1. Historically or thematically focused study of works of the Renaissance. Offered irregularly. GE credit: ArtHum, Wrt | AH, WC, WE.

*(change in existing course—eff. fall 13)*

**120. Law and Literature (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1, or equivalent. Historically, thematically, or generically focused study of the relationship between law and literature. Offered irregularly. GE credit: ArtHum, Wrt | ACGH, AH, DD OL, WE.

*(new course—eff. fall 14)*

**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. GE credit: ArtHum, Wrt | AH, WC, WE.

*(change in existing course—eff. fall 13)*

**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. Intensive study or treatment of special topics relating to the emergence, invention, and re-invention of Irish literature. May be repeated two times for credit when content differs. Offered irregularly. GE credit: ArtHum, Div, Wrt | AH, WC, WE.

*(change in existing course—eff. fall 13)*

**130. British Romantic Literature (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically focused study of works of Romantic English literature. GE credit: ArtHum, Wrt | AH, WC, WE.

*(change in existing course—eff. winter 14)*

**133. 19th-Century British Literature (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically focused study of works of 19th-century English literature. GE credit: ArtHum, Wrt | AH, WC, WE.

*(change in existing course—eff. winter 14)*

**137. British Literature, 1900-1945 (4)**
Lecture—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or the equivalent. 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. GE credit: ArtHum, Wrt | AH, WC, WE.

*(change in existing course—eff. fall 13)*

**137N. British Literature, 1900-1945 (4)**
*(cancelled course—eff. winter 14)*

**138. British Literature: 1945 to Present (4)**
Lecture—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically focused study of works of British literature (drama, poetry, prose fiction) from the period between 1945 and the present. GE credit: ArtHum, Wrt | AH, WC, WE.

*(change in existing course—eff. winter 14)*

**140. Topics in Postcolonial Literatures and Cultures (4)**
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Study of postcolonial literature of Anglophone colonies. Specific emphases may include literature from and about Anglophone India, the Caribbean, the Middle East, South Asia, Africa, and/or South America. Offered irregularly. GE credit: ArtHum, Div, Wrt | AH, WE.
*(change in existing course—eff. winter 14)*

**141. Topics in Diasporic Literatures and Migration (4)**
Lecture/discussion—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Study of literatures, histories, and cultures of one or more diasporic groups. Offered irregularly. GE credit: ArtHum, Div, Wrt | AH, WE.
*(change in existing course—eff. winter 14)*

**142. Early American Literature (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically focused study of American literature of the 17th and 18th centuries. GE credit: ArtHum, Wrt | ACGH, AH, WE.
*(change in existing course—eff. winter 14)*

**143. 19th-Century American Literature to the Civil War (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically focused study of works of 19th-century American literature. GE credit: ArtHum, Wrt | ACGH, AH, DD, WE.
*(change in existing course—eff. fall 14)*

**144. Post-Civil War American Literature (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically focused study of works of post-Civil War American literature. GE credit: ArtHum, Wrt | ACGH, AH, WE.
*(change in existing course—eff. winter 14)*

**146. American Literature 1900-1945 (4)**
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically focused study of American literature (drama, poetry, prose fiction) from the period between 1900 and the end of World War II. GE credit: ArtHum, Wrt | ACGH, AH, WE.
*(change in existing course—eff. fall 13)*

**146N. American Literature: 1900-1945 (4)**
*(cancelled course—eff. winter 14)*

**147. American Literature, 1945 to the Present (4)**
Lecture—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or equivalent. Historically or thematically focused study of American literature (drama, poetry, prose fiction) from the period between 1945 and the present. GE credit: ArtHum, Wrt | ACGH, AH, WE.
*(change in existing course—eff. fall 13)*

**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: ArtHum, Wrt | AH, WE.—II.
*(change in existing course—eff. winter 13)*

**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. GE credit: ArtHum, Wrt | AH, WC, WE.
*(change in existing course—eff. fall 13)*

**150B. Drama from 1800 to the Present (4)**
Lecture/discussion—3 hours; extensive writing or discussion. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically focused study of works of British drama from 1800 to the present. GE credit: ArtHum, Wrt | AH, WC, WE.
*(change in existing course—eff. fall 13)*

**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: ArtHum, Wrt | AH, WE.—I.
*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, WC, WE.—I.
*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, WC, WE.—II.
*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, WC, WE.
*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | ACGH, AH, WE.—III.
*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | ACGH, AH, WE.—III.
*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, WE.—III.
*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, SL, WE.—III. Milburn
*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, WE.—I.
*(change in existing course—eff. winter 13)*

**166. Love and Desire in Contemporary American Poetry (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Close reading of contemporary American poems on the theme of love and desire by poets of diverse ethnicities and of gay, lesbian, and heterosexual orientations. Offered in alternate years. GE credit: Div, ArtHum, Wrt | ACGH, AH, WE.—III.
*(change in existing course—eff. winter 13)*

**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: ArtHum, Div, Wrt | ACGH, AH, WE.
*(change in existing course—eff. winter 13)*

**168. 20th Century American Poetry (4)**
Lecture—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or equivalent. Historical Study of American poetry since 1900, with thematic and formal focus at the instructor's discretion. Offered irregularly. GE credit: ArtHum, Wrt | ACGH, AH, WE.
*(change in existing course—eff. fall 13)*

**177. Study of an Individual Author (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: course 110A or 110B. In-depth study of an author's works; historical context; relation to predecessors and contemporaries; critical reception; influence. May be repeated one time if author differs. GE credit: Wrt | AH, WE.—I, II, III.
*(change in existing course—eff. winter 13)*

**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: ArtHum, Div, Wrt | AH, WE.
*(change in existing course—eff. winter 13)*

**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: ArtHum, Div, Wrt | ACGH, AH, DD, WE.—I.
*(change in existing course—eff. winter 13)*

**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: ArtHum, Div, Wrt | ACGH, AH, DD, WE.—II.
*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, WE.—II.
*(change in existing course—eff. winter 13)*

**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: ArtHum, Div, Wrt | AH, WE.
*(change in existing course—eff. winter 13)*

**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: ArtHum, Div, Wrt | AH, WE.—III.
*(change in existing course—eff. winter 13)*

**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. Offered irregularly. GE credit: Div, Wrt | AH, WE.
*(change in existing course—eff. fall 14)*

**186. Literature, Sexuality, and Gender (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically focused intensive examinations of gender and sexuality in British and American literature. GE credit: ArtHum, Div, Wrt | AH, WE.
*(change in existing course—eff. winter 14)*

**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. GE credit: ArtHum, Wrt | AH, WE.
*(change in existing course—eff. fall 13)*

**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: ArtHum | AH, WE.—II. (II.)
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WE.
*(change in existing course—eff. winter 13)*

# Entomology

## New and changed courses in Entomology (ENT)

### Lower Division

**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: ArtHum or SciEng or SocSci | AH or SE or SS, OL, VL, WE.—I. (I.) Ullman
*(change in existing course—eff. winter 13)*

### Upper Division

**105. Insect Ecology (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: Biological Sciences 2B. Introduction to insect ecology combining fundamental concepts and questions in ecology with ideas, hypotheses and insights from insects. Integrates aspects of individual, population, community and ecosystem ecology. Emphasis on the scientific process: observing nature, asking testable questions, and communication. GE credit: SciEng | OL, SE, SL, WE.—I. (I.) Yang
*(change in existing course—eff. fall 13)*

**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: SciEng | SE, SL.—III. (III.) Lawler
*(change in existing course—eff. winter 13)*

**123. Plant-Virus-Vector Interaction (3)**
Lecture—3 hours. Prerequisite: Biological Sciences 2A, Biological Sciences 101; Plant Biology 105, Plant Pathology 120, and course 100 recommended. Analysis of interactions necessary for viruses to infect plants.Interactions among insect vectors and host plants involved in the plant-virus life cycle. Evolutionary aspects of the molecular components in viral infection and modern approaches to the interdiction of viral movement. (Same course as Plant Biology 123 and Plant Pathology 123.) Offered in alternate years. GE credit: SE, SL, WE.—(I.) Lucas, Gilbertson, Ullman
*(change in existing course—eff. winter 14)*

**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: SciEng, Wrt | SE.—III. (III.) R. Kimsey
*(change in existing course—eff. winter 13)*

**180A. Experimental Ecology and Evolution in the Field (4)**
Lecture/laboratory—3 hours; fieldwork—3 hours. Prerequisite: course 105, or Environmental Science and Policy 100; Evolution and Ecology 100; Evolution and Ecology 101. Experimental design in field ecology. Examination of primary literature, experimental design, independent and collaborative research, analysis of data, development of original research paper based on field experiments. (Same course as Evolution and Ecology 180A.) Offered in alternate years. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | QL, SE, VL.—(II.) Yang
*(new course—eff. winter 14)*

**180B. Experimental Ecology and Evolution in the Field (4)**
Lecture/laboratory—3 hours; fieldwork—3 hours. Prerequisite: Evolution and Ecology or Entomology 180A; Evolution and Ecology 100, Evolution and Ecology 101, or Environmental Science and Policy 100; course 105. Experimental design in field ecology. Examination of primary literature, experimental design, independent and collaborative research, analysis of data, development of original research paper based on field experiments. (Same course as Evolution and Ecology 180B.) Offered in alternate years. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | QL, SE, VL WE.—(III.) Yang
*(new course—eff. winter 14)*

# Environmental Horticulture

## New and changed courses in Environmental Horticulture (ENH)

### Lower Division

**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: SciEng | SE, VL.—I. (I.) Young
*(change in existing course—eff. winter 13)*

### Upper Division

**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: SciEng | SE.—I. (I.) Harding
*(change in existing course—eff. winter 13)*

**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: SciEng | VL, SE.—I. (I.) Harding
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. (I.) Burger
*(change in existing course—eff. winter 13)*

**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: SciEng | VL, SE.—III. (III.) Harding
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, WE.—I. (I.) Evans
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, WE.—II. (II.) Lieth
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.) Durzan
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.) Burger
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.) Berry
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—I. (I.) Neale
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL, WE.—III. (III.) Eviner
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—III. (III.) Eviner
*(change in existing course—eff. winter 13)*

# Environmental Science and Management

## New and changed courses in Environmental Science and Management (ESM)

### Lower Division

**6. Map Reading and Remote Sensing (3)**
*(cancelled course—eff. winter 14)*

**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: SciEng | QL, SE, SL.—IV. (IV) Grismer
*(change in existing course—eff. winter 13)*

### Upper Division

**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: SciEng | SE, SL.—III. (III.) Hopmans
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.) Saltveit
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL, WE.—II. (II.) Latimer
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, VL.—I. (I.) Berry, Dahlgren, Rice
*(change in existing course—eff. winter 13)*

**186. Environmental Remote Sensing (5)**
Lecture—3 hours; laboratory—6 hours. Prerequisite: Mathematics 16B and Physics 7C or 9B; upper division standing; Landscape Architecture 150 recommended. Overview of satellite, airborne, and ground-based remote sensing, building on properties of electromagnetic radiation. Applications include hydrologic processes, weather and climate, ecology and land use, soils, geology, forestry, and agriculture. Computer based analysis and visualization of images and processing techniques. 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: SciEng | QL, SE, VL.—II. (II.) Ustin
*(change in existing course—eff. winter 14)*

**186L. Environmental Remote Sensing Lab (2)**
*(cancelled course—eff. spring 14)*

**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: SciEng | SE, WE.
*(change in existing course—eff. winter 13)*

**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: SciEng or SocSci | SS or SE.—II. (II.)
*(change in existing course—eff. winter 13)*

# Environmental Science and Policy

## New and changed courses in Environmental Science and Policy (ESP)

### Lower Division

**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: SciEng or SocSci | SE or SS, SL.—I. (I.) Baskett, Sanchirico
*(change in existing course—eff. winter 13)*

**10. Current Issues in the Environment (3)**
Lecture—3 hours. Prerequisite: elementary biology recommended. The science behind environmental issues, and policies affecting our ability to solve domestic and international environmental problems. Resources, environmental quality, regulation, environmental perception and conservation. Integrative case studies. Not open for credit to students who have completed course 1. GE credit: SciEng | SE or SS, SL., WE.—II. (II.) Holyoak
*(change in existing course—eff. winter 13)*

### Upper Division

**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: SciEng | SE, SL.—I, II. (I, II.) Cornell, Sih
*(change in existing course—eff. winter 13)*

**105. Evolution of Societies and Cultures (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: Anthropology 1 or 2 or course 30 or Evolution and Ecology 100 or Biological Sciences 101. Interdisciplinary study of social and cultural evolution in humans. Culture as a system of inheritance, psychology of cultural learning, culture as an adaptive system, evolution of maladaptations, evolution of technology and institutions, evolutionary transitions in human history, coevolution of genetic and cultural variation. Only 2 units of credit to students who have completed course 101 or Anthropology 101 prior to fall 2004. (Same course as Anthropology 105.) GE credit: SocSci, Wrt | QL, SS, WC, WE.—III. (III.)
*(change in existing course—eff. fall 11)*

**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: SciEng | QL, SE, SL.—II. (II.) Largier
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—IV. (IV.) Gaylord, Largier, Morgan, Sanford
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—II. (II.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—(III.) Grosholz
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—IV. (IV.) Morgan
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—II. (II.) Harrison
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—I. (I.) McClain, Spero, Largier
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.) McClain
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—IV. (IV.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.
*(change in existing course—eff. winter 13)*

**152. Coastal Oceanography (3)**
Lecture—2 hours; discussion—1 hour; laboratory—3 hours; fieldwork—3 hours. Prerequisite: upper division standing or consent of the instructor; physics (Physics 9B), calculus (Mathematics 21B) and exposure to physical and chemical oceanography

(Geology/Environmental Science and Policy 150A) are recommended; residence at or near Bodega Marine Laboratory required. Student must complete the application available at http://www.bml.ucdavis.edu. The oceanography of coastal waters, including bays, river plumes, nearshore and estuaries; focus on transport patterns, how they are forced and implications for ecological and environmental problems. Pertinent for students in oceanography, ecology, environmental engineering, geology and hydrology. GE credit: SciEng | SE, SL.—IV. (IV) Largier

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. (I.) Rejmankova

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—I. (I.) Rejmankova

*(change in existing course—eff. winter 13)*

**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: SocSci | SS.—III. (III.) Lubell

*(change in existing course—eff. winter 13)*

**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: SocSci | SS.—II. (II.) Springborn

*(change in existing course—eff. winter 13)*

**163. Energy and Environmental Aspects of Transportation (4)**
Lecture—3 hours; extensive writing. Prerequisite: Economics 1A or Engineering 106. 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: SciEng or SocSci, Wrt | SE or SS, SL, WE.—I. Sperling

*(change in existing course—eff. winter 14)*

**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: SocSci | SS.—III. (III.)

*(change in existing course—eff. winter 13)*

**165N. Climate Policy (3)**
Lecture/discussion—3 hours. Prerequisite: course 1, Economics 1A, or consent of instructor. Models, data and assumptions behind competing arguments regarding societal response to the prospect of climate change at the state, national and international level from economic, ethical and policy science perspectives.—III. (III.) Springborn

*(new course—eff. fall 13)*

**166N. Ocean and Coastal Policy (3)**
Lecture—3 hours. Prerequisite: course 1 or consent of instructor. Limited enrollment. Overview of U.S. and International ocean and coastal policy, including energy, coastal land-use and water quality, protected areas and species. GE credit: SocSci | SS.—III. (III.) Sanchirico

*(new course—eff. spring 13)*

**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: SocSci | SS.—(III.) Ogden

*(change in existing course—eff. winter 13)*

**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: SocSci | SS.—I. (I.) Ogden

*(change in existing course—eff. winter 13)*

**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: SocSci | SS.

*(change in existing course—eff. winter 13)*

**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: SciEng or SocSci | SE or SS.—(III.) Schwartz

*(change in existing course—eff. winter 13)*

**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: SocSci | SS, WE.—III. (III.) Handy

*(change in existing course—eff. winter 13)*

**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: SocSci | SS.

*(change in existing course—eff. winter 13)*

**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: SocSci | QL, SS.—II. (II.) Handy

*(change in existing course—eff. winter 13)*

**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: SocSci | SS.—II. (II.) Quinn

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.

*(change in existing course—eff. winter 13)*

**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.)

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. (I.) Tomich

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.) Tomich
*(change in existing course—eff. winter 13)*

**197T. Tutoring in Environmental Science and Policy (1-5)**
Tutorial—2-6 hours. Prerequisite: upper division standing and consent of instructor. Experience in teaching under guidance of faculty member. (P/NP grading only.)
*(new course—eff. winter 14)*

# Environmental Toxicology

## New and changed courses in Environmental Toxicology (ETX)

### Lower Division

**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.
*(change in existing course—eff. winter 13)*

**99. Special Study for Undergraduates (1-5)**
Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.
*(change in existing course—eff. winter 13)*

### Upper Division

**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: SciEng | SE, SL.—I. (I.) Denison
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL, VL, WE.—II. (II.) Tjeerdema
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, VL.—III. (III.) Shibamoto
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.) Rice
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, VL, WE.—III. (III.) Miller
*(change in existing course—eff. winter 13)*

**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: SciEng | OL, SE, SL.—I. (I.) Oteiza, Rucker
*(change in existing course—eff. winter 13)*

**110. Toxic Tragedies and Their Impact on Society (2)**
Lecture—2 hours. Prerequisite: Biological Sciences 10 or the equivalent or consent of instructor; Chemistry 118A recommended. Examination of toxic tragedies, their origins, consequences, and effects on toxic regulation. GE credit: SciEng, Wrt | OL, SE, SL, WE.—II. (II.) Rice
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.
*(change in existing course—eff. winter 13)*

**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: SciEng | OL, SE, SL, VL, WE.—II. Cherr, Tjeerdema
*(change in existing course—eff. winter 13)*

**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: SciEng | OL, SE, SL, VL, WE.—III. (III.) Wong
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, VL.—I. (I.) Kado
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, VL, WE.—II. (II.) Alexeeff
*(change in existing course—eff. winter 13)*

**190. Seminar (1)**
Seminar—1 hour. Prerequisite: consent of instructor. Selected topics presented by students, faculty, or outside speakers covering current research and instructional activities within environmental toxicology. Reports and discussion concerning oral and written presentations, literature sources, and career opportunities. (P/NP grading only.) GE credit: SciEng | SE.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

**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.)
*(change in existing course—eff. winter 13)*

**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.)
*(change in existing course—eff. winter 13)*

**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.
*(change in existing course—eff. winter 13)*

**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.
*(change in existing course—eff. winter 13)*

**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.
*(change in existing course—eff. winter 13)*

**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.
*(change in existing course—eff. winter 13)*

**198. Directed Group Study (1-5)**
Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.
*(change in existing course—eff. winter 13)*

**199. Special Study for Advanced Undergraduates (1-5)**
(P/NP grading only.) GE credit: SE.
*(change in existing course—eff. winter 13)*

# Epidemiology

## New and changed courses in Epidemiology (EPI)

### Graduate

**202. Quantitative Epidemiology I: Probability (5)**
Lecture—4 hours; laboratory—2 hours. Prerequisite: Mathematics 16A/B or 17A/B or 21A/B or equivalent; Statistics 102 and 108 or Population Health and Reproduction 402 and 403 or equivalent; concurrent or previous enrollment in a basic epidemiology course (e.g., course 205). Foundations in probability for epidemiologists. Emphasis on properties of and relationships between distributions and application of probability concepts to epidemiology. Includes a mathematical skills laboratory to assist in solution of epidemiologic problems.—Beckett
*(new course—eff. fall 13)*

**203. Quantitative Epidemiology II: Statistical Inference (4)**
Lecture—3 hours; laboratory/discussion—1 hour. Prerequisite: course 202, or Statistics 130A, or 131A, or 133; basic course in Epidemiology (205 or equivalent). Provides the mathematical statistics foundation for statistical models, methods, and data analysis.—II. (II.) Iosif
*(new course—eff. winter 14)*

**204. Quantitative Epidemiology III: Statistical Models (4)**
Lecture—3 hours; laboratory/discussion—1 hour. Prerequisite: course 203, or Statistics 130B, or 131B, or 133; Statistics 108 recommended; basic course in Epidemiology (205 or equivalent); consent of instructor. Introduces statistical models, methods, and data analysis in the areas of generalized linear model and survival analysis methodology.—III. (III.) Li
*(change in existing course—eff. spring 14)*

**205B. Integration of Epidemiologic Concepts (2)**
*(cancelled course—eff. spring 14)*

**206. Epidemiologic Study Design (4)**
Lecture—30 sessions; discussion—9 sessions; laboratory—2 sessions. Prerequisite: course 205 or consent of instructor. Builds on concepts presented in course 205. Concepts of epidemiologic study design–clinical trials, observational cohort studies, case control studies–introduced in course 205A are covered in more depth, using a problem-based format. Discussion of published epidemiologic studies. (Same course as Preventive Veterinary Medicine 406A.)—II. (II.) Atwill, Gold
*(change in existing course—eff. spring 14)*

**207. Advanced Epidemiologic Methodology (4)**
Lecture/discussion—4 hours. Prerequisite: course 206. In-depth integration of advanced epidemiologic concepts, theory, methods, and applications for observational studies, including random and systematic error, confounding, causal inference, effect modification, internal and external validity, estimability and interpretation of effect measures, and advanced study designs.—III. (III.) Hertz-Picciotto, Kass
*(change in existing course—eff. spring 14)*

**210A. Analytic Epidemiology I: Case-Control Studies (3)**
*(cancelled course—eff. fall 13)*

**210B. Analytic Epidemiology II: Cohort Studies (3)**
*(cancelled course—eff. fall 13)*

**228. Quantitative Methods for Epidemiology (4)**
*(cancelled course—eff. fall 13)*

# Evolution and Ecology

## New and changed courses in Evolution and Ecology (EVE)

### Lower Division

**10. Evolution for Non-Biologists (3)**
Lecture—3 hours. Introduction to evolutionary biology for the general population. Offered in alternate years. GE credit: SciEng | QL, SE, SL.—(I.) Begun
*(change in existing course—eff. fall 13)*

**98. Directed Group Study (1-5)**
Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.
*(change in existing course—eff. winter 13)*

**99. Special Study for Lower Division Students (1-5)**
(P/NP grading only.) GE credit: SE.
*(change in existing course—eff. winter 13)*

### Upper Division

**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: SciEng | QL, SE, SL.—I, II, III. (I, II, III.) Begun, Coop
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL, VL.—I, II, III. (I, II, III.) Gaylord, Sanford, Schoener, Schreiber, Shapiro, Strong Williams
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. Langley
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL.—(II.) Moore, Turelli
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL, VL.
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. Wainwright
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, VL, WE.—IV. (IV.) Gaylord
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, VL.—(I.) Patricelli
*(change in existing course—eff. winter 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: SciEng | QL, SE, VL, WE.

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—IV. (IV.) Gaylord, Sanford

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, VL, WE.—IV. (IV.) Sanford

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL, VL, WE.—II. Stachowicz

*(change in existing course—eff. winter 13)*

**119. Population Biology of Invasive Plants and Weeds (3)**
Lecture—2 hours; laboratory—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C; introductory statistics recommended. Origin and evolution of invasive plant species and weeds, reproduction and dispersal, seed ecology, modeling of population dynamics, interactions between invasive species, native species, and crops, biological control. Laboratories emphasize design of competition experiments and identification of weedy species. (Same course as Plant Biology 119.) GE credit: SciEng | SE.—III. (III.) Rejmanek

*(change in existing course—eff. winter 13)*

**120. Global Change Ecology (3)**
Lecture/discussion—3 hours. Prerequisite: course 100 and 101 or equivalents. Treatment of historical evolution of the biosphere resulting from physical, chemical, and biological influences. Special focus upon changes caused by humans. Topics pertain to biodiversity, resources, conservation, and ecosystem services.—II. (II.) Strong

*(change in existing course—eff. winter 13)*

**134. Herpetology (3)**
*(cancelled course—eff. winter 14)*

**134F. Field Herpetology (2)**
*(cancelled course—eff. winter 14)*

**134L. Herpetology Laboratory (2)**
*(cancelled course—eff. winter 14)*

**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: SciEng | QL, SE, SL, VL, WE.—(I.) Shapiro

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL, WE.—I. Shapiro

*(change in existing course—eff. winter 13)*

**161. Microbial Phylogenomics—Genomic Perspectives on the Diversity and Diversification of Microbes (3)**
Lecture—3 hours. Prerequisite: Biological Sciences 2A, 2B, and 2C or equivalent. Use of DNA and genomic sequencing in studies of the diversity of microorganisms. Diversity of microbes, phylogenetics, genome sequencing, comparative genomics, phylogenomics, lateral gene transfer, molecular ecology, metagenomics, and studies of the human microbiome. Offered in alternate years. GE credit: SciEng | SE.—III. Eisen

*(new course—eff. spring 13)*

**180A. Experimental Ecology and Evolution in the Field (4)**
Lecture/laboratory—3 hours; fieldwork—3 hours. Prerequisite: course 100; course 101, or Environmental Science and Policy 100; Entomology 105. Experimental design in field ecology. Examination of primary literature, experimental design, independent and collaborative research, analysis of data, development of original research paper based on field experiments. (Same course as Entomology 180A.) Offered in alternate years. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | QL, SE, VL.—(II.) Yang, Louie

*(change in existing course—eff. winter 14)*

**180B. Experimental Ecology and Evolution in the Field (4)**
Lecture/laboratory—3 hours; fieldwork—3 hours. Prerequisite: Evolution and Ecology or Entomology 180A; course 100; course 101 or Environmental Science and Policy 100; Entomology 105. Experimental design in field ecology. Examination of primary literature, experimental design, independent and collaborative research, analysis of data, development of original research paper based on field experiments. (Same course as Entomology 180B.) Offered in alternate years. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | QL, SE, VL WE.—(III.) Yang

*(new course—eff. winter 14)*

**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. GE credit: SciEng | OL, QL, SE, SL, WE.—I. Strauss

*(change in existing course—eff. winter 13)*

**189. Introduction to Biological Research (1)**
Discussion—1 hour. Prerequisite: upper division standing in Evolution and Ecology or related biological science; consent of instructor. Introduction to research methods in biology. Presentation and discussion of research by faculty, graduate, and undergraduate students. May be repeated for credit up to a total of 6 units. (P/NP grading only.) GE credit: SE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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. (I.) Shapiro

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, WE.

*(change in existing course—eff. winter 13)*

**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.)

*(change in existing course—eff. winter 13)*

**199. Special Study for Advanced Undergraduates (1-5)**
(P/NP grading only.) GE credit: SE.

*(change in existing course—eff. winter 13)*

# Exercise Biology

## New and changed courses in Exercise Biology (EXB)

### Lower Division

**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: SciEng | SE.

*(change in existing course—eff. winter 13)*

### Upper Division

**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: SciEng | SE, SL.—I. (I.) Bodine, Shaffrath

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—III. (III.) Williams

*(change in existing course—eff. winter 13)*

**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: SciEng, Wrt | SE, WE.—I, III. (I, III.) Shaffrath

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.) Gomes

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—II. (II.) Shaffrath

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—II. (II.) Harris, Shaffrath

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.

*(change in existing course—eff. winter 13)*

**120. Sport in American Society (3)**

Lecture—3 hours. Sociological approaches to the study of sport and contemporary American culture, including sport interaction with politics, economics, religion, gender, race, media and ethics. Socialization factors involving youth, scholastic, collegiate, and Olympic sport. (Same course as Physical Education 120.) GE credit: SocSci, Div | SS.—I, III. (I, III.)

*(new course—eff. fall 11)*

**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: SciEng | SE.—II. (II.) Baar

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—Bodine

*(change in existing course—eff. winter 13)*

**126. Tissue Mechanics (3)**

Lecture—2 hours; laboratory/discussion—3 hours. Prerequisite: course 103 or Engineering 45 or consent of instructor. Structural and mechanical properties of biological tissues including bone, cartilage, ligaments, tendons, nerves, and skeletal muscle. (Same course as Biomedical Engineering 126.) GE credit: SciEng | QL, SE, SL, WE.—II. (II.) Hawkins

*(change in existing course—eff. winter 13)*

**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

*(change in existing course—eff. winter 13)*

**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

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III.

*(change in existing course—eff. winter 13)*

**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.)

*(change in existing course—eff. winter 13)*

**198. Directed Group Study (1-5)**

Prerequisite: consent of instructor and chairperson. (P/NP grading only.) GE credit: SE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

# Fiber and Polymer Science

## New and changed courses in Fiber and Polymer Science (FPS)

### Upper Division

**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: SciEng | QL, SE.—II. (II.) Pan

*(change in existing course—eff. winter 13)*

**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: SciEng | OL, QL, SE, SL, VL, WE.—III. (III.) Hsieh

*(change in existing course—eff. winter 13)*

**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. SciEng | GE credit: OL, QL, SE, SL, VL, WE.—I. (I.) Hsieh

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, VL, WE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

# Film Studies

## New and changed courses in Film Studies (FMS)

### Upper Division

**129. Russian Film (4)**
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: completion of Subject A requirement. History of Russian film; film and social revolution, the cult of Stalin, dissident visions; film and the collapse of the Soviet empire; gender and the nation in Russian film. Course taught in English; films are in Russian with English subtitles. Offered in alternate years. (Same course as Russian 129.) GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.—II.
*(change in existing course—eff. fall 11)*

**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: ArtHum, Wrt | AH, OL, VL, WE.—I, III. (I, III.) Clover, Constable, Fisher, Heyer-Caput, Lu, Simmon, Smoodin
*(change in existing course—eff. winter 13)*

**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.)
*(change in existing course—eff. winter 13)*

**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.)
*(change in existing course—eff. winter 13)*

# Food Science and Technology

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

### Lower Division

**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: SciEng | SE, VL.—II. (II.)
*(change in existing course—eff. winter 13)*

**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.
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—I. (I.) McCarthy
*(change in existing course—eff. winter 13)*

### Upper Division

**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: SciEng | SE, VL.—I. (I.) Dungan
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, VL.—II. (II.) German
*(change in existing course—eff. winter 13)*

**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
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, VL, WE.—II. (II.) Shoemaker
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (I.) Bamforth
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—III. (II.) Bamforth
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, WE.—II. (II.) Mitchell
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, VL.—II. (II.) Marco
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, VL, WE.—III. (III.) Young
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, WE.—I. (I.) O'Mahony
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL, VL.—III. (III.)
*(change in existing course—eff. winter 13)*

**110. Food Processing (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: Physics 7A, 7B,7C or the equivalent; Mathematics 16A, 16B, 16C or the equivalent; course 50 (may be taken concurrently). Not open for credit to students enrolled in College of Engineering.Application of the conservation of mass and energy to food processing. Elements of engineering thermodynamics, fluid mechanics, heat and mass transfer. Quantitative analysis through problem solving and simulation. GE credit: SciEng | QL, SE, VL.—I. (I.) McCarthy
*(new course—eff. fall 13)*

**110L. Food Processing Laboratory (2)**
Laboratory—3 hours; discussion—1 hour. Prerequisite: course 110 (may be taken concurrently). Open to Food Science majors only. Laboratory exercises to gain experience with common food processing operations at the bench and pilot plant scales. GE credit: SciEng | QL, SE, SL, VL.—I. (I.) Ristenpart
*(new course—eff. fall 13)*

**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: SciEng | QL, SE, VL.—I. (I.) M. McCarthy
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—III. (III.) Singh
*(change in existing course—eff. winter 13)*

**117. Design and Analysis for Sensory Food Science (4)**
Lecture—3 hours; discussion—1 hour. Methods of design and analysis for sensory food science. Experimental design strategies. Use of taste panels and consumer testing. Data analysis and computation including the relative merits and limitations of parametric and nonparametic approaches. Modifications for quality assurance. GE credit: SciEng | QL, SE.—I. (I.) O'Mahony
*(new course—eff. fall 13)*

**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: SciEng | QL, SE, VL.—III. Rosenberg
*(change in existing course—eff. winter 13)*

**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.) GE credit: SciEng | SE.
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, VL.—III. (III.) G. Smith
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, VL, WE.—III. (III.) G. Smith
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, WE.—II. (II.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.
*(change in existing course—eff. winter 13)*

**151. Food Freezing (1)**
*(cancelled course—eff. fall 13)*

**151Y. Food Freezing (1)**
Discussion—1 hour; web virtual 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: SciEng | QL, SE.—III. (III.) Singh
*(new course—eff. fall 13)*

**159. New Food Product Ideas (3)**
Lecture—3 hours. Prerequisite: upper division standing with background course work in food science (course 50 or 100A), biological sciences (Biological Sciences 2A, 2B, 2C), or the physical sciences (Physics 7A, 7B, 7C or Chemistry 2A, 2B, 2C). Create, refine, test and present viable ideas for new food products. Activities include trend monitoring, consumer research, idea generation, concept screening, and new product concept presentations. GE credit: ArtHum or SocSci | AH or SS, OL, WE.—I. (I.) Biltekoff
*(change in existing course—eff. spring 13)*

**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: SciEng | OL, SE, VL.—III. (III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | OL, SE.—II. (II.) Shoemaker
*(change in existing course—eff. winter 13)*

**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.
*(change in existing course—eff. winter 13)*

**198. Directed Group Study (1-5)**
Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.
*(change in existing course—eff. winter 13)*

**199. Special Study for Advanced Undergraduates (1-5)**
(P/NP grading only.) GE credit: SE.
*(change in existing course—eff. winter 13)*

### Graduate

**203. Food Processing (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 110A, Physics 5C or 7C, Chemistry 107B, or consent of instructor. Principles of food engineering applied to food processing. Relationship of Newtonian and non-Newtonian fluid properties to heat and momentum transfer. Application of mass transfer in controlling kinetics and quality changes of foods.—II. (II.) Nitin
*(change in existing course—eff. spring 13)*

# Forensic Science

## New and changed courses in Forensic Science (FOR)

### Graduate

**207. Advanced Spectroscopy Methods in Forensic Science (3)**
Lecture—3 hours. Restricted to Forensic Science Graduate program or consent of instructor. Discuss, evaluate and interpret advanced molecular spectra/structure, Infrared Spectroscopy, such as chemical applications of spectroscopic methods, vibrational, rotational spectra; electronic spectra, photoelectron spectroscopy generated by various analytical instruments used in forensic science community. Offered in alternate years.—III. Wood
*(new course—eff. fall 14)*

**263. Forensic Computer Science Investigations (3)**
Lecture—3 hours. Prerequisite: graduate student. Restricted to students in the Forensic Science Graduate program unless approved by instructor. Discuss the threats to the security of any kind of evidence that is captured, transmitted, or stored digitally and develop critical thinking and basic knowledge of computer forensic science issues in the evaluation of digital evidence. Offered in alternate years.—(III.) Peisert
*(new course—eff. fall 13)*

**277. Forensic Genetics; Next Generation Techniques and Applications (3)**
Lecture—3 hours. Prerequisite: undergraduate courses in fundamental and applied principles of: genetics, biochemistry, and molecular biology, or consent of instructor. Restricted to Forensic Science Graduate students (GFOR) or consent of instructor. Review organization/function of the human genome, recent developments, next generation sequencing techniques including the preparation of DNA samples, principles of the new generation sequencing assay formats and biochemical reactions. Will include quality control parameter, and bioinformatic approaches. Offered in alternate years.—(I.) Kanthaswamy
*(new course—eff. fall 13)*

# French

## New and changed courses in French (FRE)

### Lower Division

**1. Elementary French (5)**
Discussion—5 hours; laboratory—1 hour. Not open for credit to students who have taken course 1A. Introduction to French grammar and development of all language skills in a cultural context with special emphasis on communication. 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: ArtHum | AH, WC.—I, II, III, IV. (I, II, III, IV.) Webb

*(change in existing course—eff. winter 14)*

**1A. Accelerated Intensive Elementary French (15)**
Lecture/discussion—15 hours. Prerequisite: placement exam required. Introduction to French grammar and development of all language skills in a cultural context with special emphasis on communication. Special 12-week, accelerated, intensive summer session course that combines the work of courses 1, 2, and 3. Not open for credit to students who have completed course 1, 1S, 2, 2S, 3, or 3S. GE credit: ArtHum | AH, WC.—IV. (IV.) Simon

*(change in existing course—eff. winter 14)*

**1S. Elementary French (5)**
Discussion—5 hours; laboratory—1 hour. Introduction to French grammar and development of all language skills in a cultural context with special emphasis on communication. Course is taught abroad. 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. Not open for credit to students who have completed course 1 or 1A. GE credit: ArtHum | AH, WC.—I. (I.)

*(new course—eff. fall 13)*

**2. Elementary French (5)**
Discussion—5 hours; laboratory—1 hour. Prerequisite: course 1. Continuation of course 1. Not open for credit to students who have taken course 1A. GE credit: ArtHum | AH, WC.—I, II, III, IV. (I, II, III, IV.) Webb

*(change in existing course—eff. winter 14)*

**3. Elementary French (5)**
Discussion—5 hours; laboratory—1 hour. Prerequisite: course 2. Not open for credit to students who have taken course 1A. Continuation of course 2. GE credit: ArtHum | AH, WC.—I, II, III, IV. (I, II, III, IV.) Webb

*(change in existing course—eff. winter 14)*

**3S. Elementary French (5)**
Discussion—5 hours; laboratory—1 hour. Prerequisite: course 2 or 2S. Not open for credit to students who have taken course 1A. Continuation of course 2. Course is taught abroad. Not open for credit to students who have completed course 1A or 3. GE credit: ArtHum | AH, WC.—I. (I.)

*(new course—eff. fall 13)*

**21. Intermediate French (5)**
Lecture/discussion—4 hours; laboratory—1 hour. Prerequisite: course 1A, 3, or 3S. Review of grammar and vocabulary acquired in the elementary sequence, as well as the study of new grammatical structures and a continuing enrichment of vocabulary through oral work in class, written exercises, readings and compositions. Not open for credit to students who have completed course 21S. GE credit: ArtHum | AH, OL, WC, WE.—I, II, III. (I, II, III.) Simon

*(change in existing course—eff. winter 14)*

**22. Intermediate French (5)**
Lecture/discussion—4 hours; laboratory—1 hour. Prerequisite: course 21 or 21S. Continuation of course 21 or 21S. Review of grammar and vocabulary, as well as the study of new grammatical structures and a continuing enrichment of vocabulary. Not open for credit to students who have completed course 22S. GE credit: ArtHum | AH, WC, WE.—I, II, III. (I, II, III.) Simon

*(change in existing course—eff. winter 14)*

**22S. Intermediate French (5)**
Lecture/discussion—4 hours; laboratory—1 hour. Prerequisite: course 21 or 21S. Continuation of 21 or 21S. Review of grammar and vocabulary, as well as, the study of new grammatical structures and a continuing enrichment of vocabulary. Not open for credit to students who have completed course 22. GE credit: ArtHum | AH, OL, WC, WE.—I. (I.)

*(new course—eff. fall 13)*

**23. Intermediate French (5)**
Lecture/discussion—4 hours; laboratory—1 hour. Prerequisite: course 22 or 22S. Continuation of course 22 or 22S. Review of grammar and vocabulary, as well as the study of new grammatical structures and a continuing enrichment of vocabulary. Not open for credit to students who have completed course 23S. GE credit: ArtHum | AH, OL, WC, WE.—I, II, III. (I, II, III.) Simon

*(change in existing course—eff. winter 14)*

**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: ArtHum or SocSci, Div, Wrt | AH, OL, WC, WE.—(II.) Russell Webb

*(change in existing course—eff. winter 13)*

### Upper Division

**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: ArtHum | AH, WC, WE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**105S. Advanced French Grammar (4)**
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 23 or 23S. Understanding of, and extensive practice with, various grammatical structures in French. Lexical-semantic, morphological, and syntactic analysis. Taught abroad. Not open for credit to students who have taken course 105. GE credit: WE.—I. (I.)

*(new course—eff. fall 13)*

**107S. 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 nation-state, centralization of the monarchy, and the rise of public education, colonization, class and social relationships. Taught abroad. Not open for credit to students who have completed course 107. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC, WE.—(I.)

*(new course—eff. fall 13)*

**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: ArtHum or SocSci | AH or SS.—III. Russell Webb

*(change in existing course—eff. winter 13)*

**125S. French Literature and Other Arts (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: course 100. Relationship between French literature and other arts, such as painting, music, cinema, architecture, or opera, from different periods. Taught abroad. May be repeated one time for credit when topic differs. GE credit: ArtHum, Wrt | AH, VL, WC, WE.—I. (I.)

*(new course—eff. fall 13)*

**128S. 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. Taught abroad. May be repeated one time for credit when topic differs. GE credit: ArtHum | AH, WC, WE.—I. (I.)

*(new course—eff. fall 13)*

**140. Study of a Major Writer (4)**
Lecture—3 hours; term paper. Prerequisite: course 100; consent of instructor. Concentrated study of works of a single author. May be repeated one time for credit if author-subject changes. GE credit: ArtHum | AH, WC, WE.—II. (II.)

*(change in existing course—eff. winter 13)*

**141. Selected Topics in French Literature (4)**
Lecture—3 hours; term paper. Prerequisite: courses course 100; consent of instructor. Subjects and themes such as satiric and didactic poetry of the Middle Ages, poetry of the Pléiade, theater in the eighteenth century, pre-romantic poetry, autobiography, literature and film, etc. May be repeated two times for credit when topic differs. GE credit: ArtHum | AH, WC, WE.—II. (II.)

*(change in existing course—eff. winter 13)*

**141S. Selected Topics in French Literature (4)**
Lecture—3 hours; term paper. Prerequisite: 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. Taught abroad. May be repeated two times for credit when topic differs. GE credit: ArtHum | AH, WC, WE.—I. (I.)

*(new course—eff. fall 13)*

**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: ArtHum or SocSci | AH or SS, WE.—II. (II.) Russell Webb

*(change in existing course—eff. winter 13)*

**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 con-

struction and constituency, meaning and discourse functions. GE credit: ArtHum or SocSci | AH or SS.—III. (III.) Russell Webb

*(change in existing course—eff. winter 13)*

**162. History of the French Language (4)**
Lecture—3 hours; term paper. Prerequisite: one from course 105, 109, 160, or 161; Linguistics 1 or consent of instructor. 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. Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, WC, WE.—(II.) Webb

*(change in existing course—eff. fall 13)*

**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.

*(change in existing course—eff. winter 13)*

**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.)

*(change in existing course—eff. winter 13)*

**198S. Directed Group Study (1-5)**
Group study on focused topics in French literature and culture. May be repeated for credit. (P/NP grading only.)—III. (III.)

*(new course—eff. fall 13)*

# Genetics (A Graduate Group)

## New and changed courses in Genetics (A Graduate Group) (GGG)

### Graduate

**201C. Molecular Genetic Mechanisms in Disease (4)**
Lecture/discussion—4 hours. Prerequisite: Biological Sciences 101 or the equivalent. Pass one restricted to graduate students in genetics, microbiology or biochemistry and molecular biology graduate groups. Exploration of how basic mechanisms of molecular biology contribute to health and disease. Diseases related to animals, plants, and microbes will highlight fundamental concepts in the assembly, function and regulation of DNA, RNA, and protein.—III. (III.) Segal

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

**290A. Graduate Student Conference in Genetics (1)**
Conference—1 hour. Restricted to Genetics Graduate Group students. Student-given seminars on topics in genetics, with critiques by instructor and peers. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.) Segal

*(new course—eff. fall 12)*

**292. Seminar in Genomics and Epigenomics (1)**
Seminar—1 hour. Topics of current interest in genomics and epigenomics. May be repeated for credit. Offered in alternate years. (S/U grading only.)

*(change in existing course—eff. winter 14)*

**296. Scientific Professionalism and Integrity (2)**
Lecture—1 hour; seminar—1 hour. Prerequisite: graduate standing or consent of instructor. Review of basic skills required of contemporary scientists. Topics include scientific conduct, manuscript preparation, grant writing, seminar presentations, and time management. Emphasis on responsibilities of scientists to factually and thoughtfully communicate results.—I. (I.) Yoder

*(change in existing course—eff. spring 14)*

# Geography (A Graduate Group)

## New and changed courses in Geography (GEO)

### Graduate

**212. Water Resource Management (3)**
Lecture—3 hours. Prerequisite: Civil and Environmental Engineering 114, 141, and 142; Civil and Environmental Engineering 153 recommended. Engineering, institutional, economic, and social basis for managing local and regional water resources. Examples in the context of California's water development and management. Uses of computer modeling to improve water management. (Same course as Civil and Environmental Engineering 267.)—I. (I.) Lund

*(new course—eff. fall 13)*

**214. Seminar in Geographical Ecology (2)**
Seminar—2 hours. Prerequisite: Evolution and Ecology 100 or 101 or consent of instructor. Recent developments in theoretical and experimental biogeography, historical biogeography and related themes in systematics, the biology of colonizing species, and related topics. (Same course as Population Biology 296.)(S/U grading only.)—III. (III.) Shapiro

*(new course—eff. spring 13)*

**230. Citizenship, Democracy, & Public Space (4)**
Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. Introduction to seminal works in political theory, philosophy, and the social sciences that focus on citizenship and the public sphere; development of critical perspective regarding restructuring of public space in a pluralistic and global culture; discussion of contemporary case studies. (Same course as Landscape Architecture 200.)—III. (III.) Rios

*(new course—eff. fall 12)*

**233. Physical Planning and Design (4)**
Lecture—2 hours; discussion—2 hours. Limited to graduate students. Regulation, design, and development of the built landscape, planning and land development processes, zoning and subdivision regulation, site planning, urban design goals and methods, public participation strategies, creatively designing landscapes to meet community and ecological goals. (Same course as Landscape Architecture 205.) Offered irregularly.—Wheeler

*(new course—eff. fall 12)*

**236. Transportation Planning and Policy (4)**
Lecture/discussion—4 hours. Limited enrollment. Transportation planning process at the regional level, including the role of federal policy in shaping regional transportation planning, tools and techniques used in regional transportation planning, issues facing regional transportation planning agencies, pros and cons of potential solutions and strategies. Students taking this course previously as Transportation Planning and Policy 289 cannot repeat it for credit. Taking other Transportation Planning and Policy 289 offerings does not preclude taking Transportation Planning and Policy 220 for credit. (Same course as Transportation Planning and Policy 220.) Offered in alternate years.—III. Handy

*(new course—eff. winter 13)*

**240. Community Development Theory (4)**
Lecture/discussion—4 hours. Introduction to theories of community development and different concepts of community, poverty, and development. Emphasis on building theory, linking applied development techniques to theory, evaluating development policy, and examining case studies of community development organizations and projects. (Same course as Community & Regional Development 240.)—I. (I.)

*(new course—eff. winter 14)*

**244. Political Ecology of Community Development (4)**
Lecture—4 hours. Prerequisite: graduate standing. Community development from the perspective of geographical political ecology. Social and environmental outcomes of the dynamic relationship between communities and land-based resources, and between social groups. Cases of community conservation and development in developing and industrialized countries. (Same course as Community and Regional Development 244.)—II. (II.) Galt

*(new course—eff. winter 14)*

**245. The Political Economy of Urban and Regional Development (4)**
Lecture—4 hours. Prerequisite: Community and Regional Development 157, 244, or the equivalent. How global, political and economic restructuring and national and state policies are mediated by community politics; social production of urban form; role of the state in uneven development; dynamics of urban growth and decline; regional development in California. (Same course as Community & Regional Development 245.)—III. (III.)

*(new course—eff. spring 14)*

**246. The Political Economy of Transnational Migration (4)**
Lecture—4 hours. Prerequisite: graduate standing. Theoretical perspectives and empirical research on social, cultural, political, and economic processes of transnational migration to the U.S. Discussion of conventional theories will precede contemporary comparative perspectives on class, race, ethnicity, citizenship, and the ethnic economy. (Same course as Community & Regional Development 246.)—II. (II.) Guarnizo

*(new course—eff. winter 14)*

**248. Social Policy, Welfare Theories and Communities (4)**
Seminar—4 hours. Prerequisite: graduate standing. Theories and comparative histories of modern welfare states and social policy in relation to legal/normative, organizational, and administrative aspects. Analysis of specific social issues within the U.S./California context. Not open for credit to students having completed Community & Regional Development 248A and 248B. (Same course as Community & Regional Development 248.) Offered in alternate years. —(III.) Hirtz

*(new course—eff. fall 11)*

**252. Landscape and Power (4)**
Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. How various representations of landscape have historically worked as agents of cultural power. Course framework is interdisciplinary, including studies of landscape representation in

literature, art, photography, cartography, cinema, and landscape architecture. (Same course as Landscape Architecture 260.)—I. (I.) Schenker

*(new course—eff. winter 14)*

**270. Experimental Design and Analysis (5)**
Lecture—3 hours; discussion/laboratory—2 hours. Prerequisite: Plant Sciences 120 or equivalent. Introduction to the research process and statistical methods to plan, conduct and interpret experiments.—II. (II.) Dubcovsky

*(new course—eff. winter 14)*

**271. Applied Multivariate Modeling in Agricultural and Environmental Sciences (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: one of Plant Sciences 120, 205, Statistics 106, 108, or equivalent. Multivariate linear and nonlinear models. Model selection and parameter estimation. Analysis of manipulative and observational agroecological experiments. Discriminant, principal component, and path analyses. Logistic and biased regression. Bootstrapping. Exercises based on actual research by UC Davis students.—I. (I.) Laca

*(new course—eff. fall 13)*

**279. Discrete Choice Analysis of Travel Demand (4)**
Lecture—4 hours. Prerequisite: Civil and Environmental Engineering 114. Behavioral and statistical principles underlying the formulation and estimation of discrete choice models. Practical application of discrete choice models to characterization of choice behavior, hypothesis testing, and forecasting. Emphasis on computer exercises using real-world data sets. (Same course as Civil and Environmental Engineering 254.)—III. (III.) Mokhtarian

*(new course—eff. fall 12)*

**281. Transportation Survey Methods (4)**
Lecture—4 hours. Prerequisite: Statistics 13; Civil and Environmental Engineering 251 recommended. Description of types of surveys commonly used in transportation demand modeling, including travel and activity diaries, attitudinal, panel, computer, and stated-response surveys. Discussion of sampling, experimental design, and survey design issues. Analysis methods, including factor, discriminant and cluster analysis. Not open for credit to students who have taken Civil and Environmental Engineering 255. (Same course as Transportation Technology and Policy 200.)—II. (II.) Mokhtarian

*(new course—eff. fall 12)*

**286. Selected Topics in Environmental Remote Sensing (3)**
Discussion—2 hours; lecture—1 hour; project. Prerequisite: consent of instructor; Environmental and Resource Sciences 186 or equivalent required; Environmental and Resource Sciences 186L recommended. In depth investigation of advanced topics in remote sensing applications, measurements, and theory. Not open for credit to students who have taken Civil and Environmental Engineering 255. (Same course as Hydrologic Science 286.) May be repeated for credit. Offered irregularly.—Ustin

*(new course—eff. fall 14)*

# Geology

## New and changed courses in Geology (GEL)

## Lower Division

**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: SciEng, Wrt | SE.—I. (I.)

*(change in existing course—eff. winter 13)*

**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: SciEng, Wrt | SE, WE.—II. (II.) Motani

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.) Motani

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.) Carlson

*(change in existing course—eff. winter 13)*

**17. Earthquakes and Other Earth Hazards (2)**
Lecture—2 hours. Impact of earthquakes, tsunami, volcanoes, landslides, and floods on humans, structures, and the environment. Discussion of the causes and effects of disasters and catastrophes, and on prediction, preparation, and mitigation of natural hazards. GE credit: SciEng | SE, SL.—I, II, III. (I, II, III.) Kellogg

*(change in existing course—eff. fall 13)*

**18. Energy and the Environment (3)**
Lecture—3 hours. Conventional and alternative energy resources and their environmental impacts. Basic principles, historical development, current advantages and disadvantages, future prospects. Oil, natural gas, coal, nuclear, wind, geothermal, water, tidal, solar, hydrogen, and other sources of energy for the 21st century. GE credit: SciEng | SE, SL, WE.—II. (II.) Verosub

*(new course—eff. winter 10)*

**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: SciEng | SE, SL, VL.—II. (II.) Osleger

*(change in existing course—eff. winter 13)*

**25. Geology of National Parks (3)**
Lecture—3 hours. Appreciation of the geologic framework underlying the inherent beauty of U.S. National Parks. Relationship of individual parks to geologic processes such as mountain building, volcanism, stream erosion, glacial action and landscape evolution. GE credit: SciEng | SE, SL, VL.—I. (I.) Osleger

*(change in existing course—eff. winter 14)*

**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: SciEng | SE.—I. II. (I, II.) Billen, Lesher

*(change in existing course—eff. winter 13)*

**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. GE credit: SciEng | SE.—I, II. (I, II.) Billen, Lesher

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. (I.) Day

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, VL.—I. (I.) Day

*(change in existing course—eff. winter 13)*

**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.)

*(change in existing course—eff. winter 13)*

**91. Geology of Campus Waterways (1)**
Lecture/discussion—1 hour; fieldwork—1 hour. Research characterizing geological processes in waterways on campus including links among hydrologic, atmospheric, physical, and human processes; carbon cycling and interpreting processes from sediments; field research techniques; research project design and implementation; implications of results for society and environmental policy. May be repeated for credit three times. (P/NP grading only.) GE credit: SE, SL.—Sumner

*(change in existing course—eff. winter 13)*

**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.)

*(change in existing course—eff. winter 13)*

**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.)
*(change in existing course—eff. winter 13)*

**99. Special Study for Undergraduates (1-5)**
Prerequisite: consent of instructor; lower division standing. (P/NP grading only.) GE credit: SE.
*(change in existing course—eff. winter 13)*

## Upper Division

**101. Structural Geology (3)**
Lecture—3 hours. Prerequisite: courses 50 and 50L, Physics 7A or 9A, Mathematics 16B or 21B, or consent of instructor. Study of processes and products of rock deformation. Introduction to structural geology through a survey of the features and geometries of faults and folds, techniques of strain analysis, and continuum mechanics of rock deformation. GE credit: SciEng | SE.—II. (II.) Cowgill, Oskin
*(change in existing course—eff. fall 13)*

**101L. Structural Geology Lab (2)**
Laboratory—6 hours; fieldwork—2 hours. Prerequisite: courses 50 and 50L, Physics 7A or 9A, and 101 (may be taken concurrently); or consent of instructor. Class size limited to 15 students per session. Laboratory study of the processes and products of rock deformation. Introduction to the practice of structural geology through observations and analysis of rock deformation, including field measurement techniques and geologic mapping. GE credit: SciEng | SE, VL.—II. (II.) Cowgill, Oskin
*(change in existing course—eff. fall 13)*

**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: SciEng | SE, VL, WE.—III. (III.) Cowgill
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I, III. (I, III.) Carlson, Motani
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.) Carlson, Motani
*(change in existing course—eff. winter 13)*

**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: SciEng, Wrt | SE, WE.—II. (II.) Sumner
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—II. (II.) Hill, McClain, Spero
*(change in existing course—eff. winter 13)*

**120. Origins: From the Big Bang to Today (3)**
Lecture—3 hours. Limited enrollment. Long-term and large-scale perspectives on the origins of the universe, stars and planets, life, human evolution, the rise of civilization and the modern world. Multi-disciplinary approach to 'Big History' involving cosmology, astronomy, geology, climatology, biology, anthropology, archeology and traditional history. GE credit: SciEng | SE.—II. (II.) Osleger
*(new course—eff. winter 13)*

**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.
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—III.
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—I. (I.) Turcotte
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, WE.—III. (III.) Mount, Moyle
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. Mount
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—(II.) Motani
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—(II.) Motani
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, VL.—(I.) Sumner
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, WE.—II. (II.) Vermeij
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—(I.) Yin
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—(III.) Zierenberg
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—III. Zierenberg
*(change in existing course—eff. winter 13)*

**149. Geothermal Systems (3)**
Lecture—3 hours; fieldwork. Prerequisite: courses 50 and 50L, Chemistry 2B or consent of instructor. Geology, geochemistry, and geophysics of geothermal systems, including electrical power generation

and direct use applications. Includes one day field trip on a weekend during the quarter. GE credit: SciEng | SE.—II. (II.) Zierenberg

*(new course—eff. spring 13)*

**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: SciEng | QL, SE.—I. (I.) McClain, Spero

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.) McClain

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—IV. (IV.) Hill

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—Hill

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.) Fogg

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—(II.) Rundle

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—I. Billen

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—II. Kellogg

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—III. (III.) Kellogg, Yin

*(change in existing course—eff. winter 13)*

**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

*(change in existing course—eff. winter 13)*

**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.) Horn

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—Hill

*(change in existing course—eff. winter 13)*

**183. Teaching High School Mathematics and Science (3)**
Lecture/discussion—2 hours; field work. Prerequisite: course 81/Education 81 or course 181/Education 181 and major in mathematics, science, or engineering; or completion of a one-year sequence of science or calculus and consent of the instructor. Limited to 40 students per section. 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. (Same course as Education 183.) GE credit: SocSci | OL, SS, WE.—I, II, III. (I, II, III.) Passmore, Stevenson

*(change in existing course—eff. fall 13)*

**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.)

*(change in existing course—eff. winter 13)*

**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.

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, WE.

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, WE.

*(change in existing course—eff. winter 13)*

**198. Directed Group Study (1-5)**
Prerequisite: senior standing in Geology or consent of instructor. GE credit: SciEng | SE.

*(change in existing course—eff. winter 13)*

**199. Special Study for Advanced Undergraduates (1-5)**
(P/NP grading only.) GE credit: SE.

*(change in existing course—eff. winter 13)*

### Professional

**390. Methods of Teaching Geology (2)**
Extensive writing or discussion—2 hours. Prerequisite: graduate student standing in Geology. Introduction to graduate-level writing and undergraduate-level teaching skills in geology. Persuasive (proposal) writing workshop; discussions on campus teaching resources, presenting information, managing classroom dynamics, evaluating student performance. Participation in teaching program required for Ph.D. in Geology. (S/U grading only.)—I. (I.) Billen, Carlson

*(change in existing course—eff. spring 14)*

# German

## New and changed courses in German (GER)

### Lower Division

**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: ArtHum | AH, WC.—I, II, III. (I, II, III.) Arnett

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—I, II. (I, II.) Arnett

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—I, II. (I, II.) Arnett

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—II.

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—I, II. (I, II.)

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—I, II. (I, II.)

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—II, III. (II, III.)

*(change in existing course—eff. winter 13)*

### Upper Division

**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: ArtHum | AH, WC, WE.

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, OL, VL, WE.

*(change in existing course—eff. winter 13)*

**116. Readings in Jewish Writing and Thought in German Culture (4)**
Lecture—3 hours; term paper. Prerequisite: Religious Studies 23 or consent of instructor. Historical tradition of Jewish thought in the German cultural context; unique contributions of Jewish writers to culture of the German-speaking world; what it means to be "other" in the mainstream culture. No credit will be given to those students who have completed Humanities 121. May be repeated two times for credit if topic differs. Offered in alternate years. (Same course as Jewish Studies 116.) GE credit: ArtHum, Div, Wrt. | AH, OL, WC, WE.—(I.)

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

**143. Language Through Media (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: course 22. Study of contemporary German-language news media (press, video, film, CD-ROM, internet) for insight into political and cultural developments in the German-speaking countries. Offered in alternate years. GE credit: ArtHum | AH, OL, VL, WC, WE.—II. Arnett

*(change in existing course—eff. fall 14)*

**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 | AH, WC.—III.

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

# Greek

## New and changed courses in Greek (GRK)

### Lower Division

**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: ArtHum | AH.—I. (I.) Popescu

*(change in existing course—eff. winter 13)*

**2. Elementary Greek (5)**
Lecture—5 hours. Prerequisite: course 1. Continuation of course 1. GE credit: ArtHum | AH.—II. (II.) Popescu

*(change in existing course—eff. winter 13)*

**2NT. Elementary New Testament Greek (1)**
Lecture—1 hour. Prerequisite: course 2 (concurrently). Supplementary study of New Testament Greek. GE credit: ArtHum | AH.—II. (II.) Popescu

*(change in existing course—eff. winter 13)*

**3. Intermediate Greek (5)**
Lecture—5 hours. Prerequisite: course 2. Continuation of course 2. Selected readings from Greek authors. GE credit: ArtHum | AH.—III. (III.) Popescu

*(change in existing course—eff. winter 13)*

**3NT. Elementary New Testament Greek (1)**
Lecture—1 hour. Prerequisite: course 3 (concurrently). Supplementary study of New Testament Greek. GE credit: ArtHum | AH.—III. (III.) Popescu

*(change in existing course—eff. winter 13)*

### Upper Division

**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: ArtHum | AH, WC, WE.—I. (I.) Seal

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC, WE.

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WE.

*(change in existing course—eff. winter 13)*

# Health Informatics

## New and changed courses in Health Informatics (MHI)

### Graduate

**211. Telemedicine (4)**
*(cancelled course—eff. fall 13)*

**211V. Telemedicine (4)**
Web virtual lecture—3 hours; web electronic discussion—1 hour. Issues for the development and maintenance of a successful telemedicine program with focus on strategic planning, clinical applications, project management, risk management and legal issues; reimbursement and contracting; human resources and program sustainability.—I, II, III. (I, II, III.) Yellowlees

*(new course—eff. fall 13)*

**212. Computer Security in Health Informatics (4)**
Lecture—3 hours; project. Prerequisite: course 210; 202; 209. Critical thinking about basic concepts in computer security and privacy. How the computer security and privacy impact health informatics, ranging from electronic health records to telemedicine to remote, virtual surgery.—I, II. (I, II.) Peisert

*(new course—eff. fall 12)*

# Hebrew

## New and changed courses in Hebrew (HEB)

### Lower Division

**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: ArtHum | AH.—I. (I.) Franco

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—IV. (IV.)

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—II. (II.) Franco

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—III. (III.) Franco

*(change in existing course—eff. winter 13)*

### Upper Division

**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: ArtHum | AH.—I. (I.)

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—II. (II.)

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—III. (III.)

*(change in existing course—eff. winter 13)*

# Hindi

## New and changed courses in Hindi (HIN)

### Lower Division

**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: ArtHum | AH.—I. (I.) Chauhan

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—II. (II.) Chauhan

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—III. (III.) Chauhan

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—I. (I.) Chauhan

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—II. (II.) Chauhan

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—III. (III.) Chauhan

*(change in existing course—eff. winter 13)*

# History

## New and changed courses in History (HIS)

### Lower Division

**4A. History of Western Civilization (4)**
Lecture—3 hours; discussion—1 hour. Growth of western civilization from late antiquity to the Renaissance. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.—I, II. McKee

*(change in existing course—eff. winter 13)*

**4B. History of Western Civilization (4)**
Lecture—3 hours; discussion—1 hour. Development of western civilization from the Renaissance to the Eighteenth Century. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.—II. Landau, Stuart

*(change in existing course—eff. winter 13)*

**4C. History of Western Civilization (4)**
Lecture—3 hours; discussion—1 hour. Development of Western Civilization from the Eighteenth Century to the present. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.—I, II, III. Campbell, Saler

*(change in existing course—eff. winter 13)*

**8. History of Indian Civilization (4)**
Lecture—3 hours; discussion—1 hour; written reports. Survey of Indian civilization from the rise of cities (ca. 2000 B.C.) to the present, emphasizing themes in religion, social and political organization, and art and literature that reflect cultural interaction and change. GE credit: ArtHum or SocSci, Div | AH or SS, WC, WE.—II. Sen

*(change in existing course—eff. winter 13)*

**9A. History of East Asian Civilization (4)**
Lecture—3 hours; discussion—1 hour. Surveys traditional Chinese civilization and its modern transformation. Emphasis is on thought and religion, political and social life, art and literature. Perspectives on contemporary China are provided. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—I, III. Bossler

*(change in existing course—eff. winter 13)*

**9B. History of East Asian Civilization (4)**
Lecture—3 hours; discussion—1 hour. Surveys traditional Japanese civilization and its modern transformation. Emphasis is on thought and religion, political and social life, art and literature. Perspectives on contemporary Japan are provided. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—II. Kim

*(change in existing course—eff. winter 13)*

**10B. World History, c. 1350-1850 (4)**
Lecture—3 hours; discussion—1 hour. Major topics in world history from the 14th century to the beginning of the 19th century. Topics will vary but may include oceans as systems of human communication and conflict; the global consequences of "industrious revolutions" in Europe and Asia, etc. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.—I. Harris, Stolzenberg

*(change in existing course—eff. winter 13)*

**10C. World History III (4)**
Lecture—3 hours; discussion—1 hour. Major topics from world history of the 19th and 20th centuries, emphasizing the rise and fall of Western colonial empires; Cold War and the superpowers; the spread of the nation-states; and process of globalization. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.—II, III. Dickinson, El Shakry

*(change in existing course—eff. winter 13)*

**11. History of the Jewish People in the Modern World (4)**
Lecture—3 hours; discussion—1 hour. Histories and cultures of the Jews since 1492. Topics include: the making of Jewish diasporas, roots of antisemitism, the Holocaust in images and texts, changing ideas of the self, Jews in America, contemporary visions of the Jewish past. Offered in alternate years. GE credit: ArtHum | AH, DD, VL, WC, WE.—(I.) Miller

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

**12. Food and History (4)**
Lecture—3 hours; discussion—1 hour. Survey of the ways humans have fed themselves from the dawn of humanity to the present. Transformation of plants and animals into food, cooking into cuisine, and ceremony into etiquette. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, OL, VL.—McKee, Resendez

*(new course—eff. fall 14)*

**15. Introduction to African History (4)**
Lecture—3 hours; discussion—1 hour. Examination of the long-range historical context as background to current conditions in Africa. Includes the early development of African civilizations, the slave trade and its abolition, 20th century colonization, and African independent states. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—II. Decker

*(change in existing course—eff. winter 13)*

**17A. History of the United States (4)**
Lecture—3 hours; discussion—1 hour. The experience of the American people from the Colonial Era to the Civil War. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.—I, II, III. (I, II, III.) Hartigan-O'Connor, Kelman, Smolenski, Taylor
*(change in existing course—eff. winter 13)*

**17B. History of the United States (4)**
Lecture—3 hours; discussion—1 hour. The experience of the American people from the Civil War to the end of the Cold War. Not open for credit to students who have completed course 17C. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.—I, II, III. (I, II, III.) Olmsted, Oropeza, Rauchway
*(change in existing course—eff. winter 13)*

**72A. Social History of American Women and the Family (4)**
Lecture—3 hours; discussion—1 hour. Social and cultural history of women, sex roles and the family from colonial America until the late nineteenth century emphasizing changes resulting from the secularization, commercialization, and industrialization of American society. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.—II. Hartigan-O'Connor
*(change in existing course—eff. winter 13)*

**72B. Social History of American Women and the Family (4)**
Lecture—3 hours; discussion—1 hour. Social and cultural history of women, sex roles, and the family in twentieth-century America, emphasizing female reformers and revolutionaries, working class women, consumerism, the role of media, the "feminine mystique," changes in family life, and the emergent women's movement. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.—III. Materson
*(change in existing course—eff. winter 13)*

**85. Nature, Man, and the Machine in America (4)**
Seminar—4 hours; term paper. Prerequisite: consent of instructor. History of the attitudes and behavior of Americans toward their natural environment and their technology, from colonial times to the present. No final examination. Limited enrollment. GE credit: ArtHum or SocSci | AH or SS, WE.
*(change in existing course—eff. winter 13)*

## Upper Division

**108. 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. Not open for credit to students who have taken History 109A. GE credit: ArtHum or SocSci | AH or SS.—Davis
*(new course—eff. fall 14)*

**109B. Environmental Change, Disease and Public Health (4)**
Lecture/discussion—3 hours; term paper. 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: SciEng or SocSci, Div | SE or SS, SL.—I. (I.) Davis
*(change in existing course—eff. fall 12)*

**110A. Colonialism and the Making of the Modern World (4)**
Lecture—3 hours; term paper. History of the modern world, focusing on struggles between Europeans and colonized peoples; the global formation of capitalism; the creation of nation-states; and the constitution of bourgeois bodies and racial selves in modern societies. Offered in alternate years. GE credit: ArtHum | AH or SS, VL, WC, WE.—III. El Shakry
*(change in existing course—eff. fall 14)*

**111A. Ancient History (4)**
Lecture—3 hours; discussion or paper (student option). History of ancient empires of the Near East and of their historical legacy to the Western world. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.—I. Spyridakis
*(change in existing course—eff. winter 13)*

**111B. Ancient History (4)**
Lecture—3 hours; discussion or paper (student option). Political, cultural and intellectual study of the Greek world from Minoan-Mycenaean period to end of Hellenistic Age. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.—II. Spyridakis
*(change in existing course—eff. winter 13)*

**111C. Ancient History (4)**
Lecture—3 hours; discussion or paper (student option). Development of Rome from earliest times. Rise and fall of the Roman Republic; the Empire to 476 A.D. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.—II. (II.) Spyridakis
*(change in existing course—eff. winter 13)*

**112A. Topics in Pre-Modern Jewish History (4)**
Lecture—3 hours; term paper. Topics in the history of Jews from the Biblical era to the eras of Jewish emancipation. Topics can be framed chronologically (e.g., medieval Jewry) or thematically (e.g., trade and Jewish communities). May be repeated one time for credit. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**112B. Topics in Modern Jewish History (4)**
Lecture—3 hours; term paper. Topics in the history of Jews from the era of Jewish emancipation to the present. Topics can be framed chronologically or thematically (e.g. Zionism, assimilation, the post Holocaust Diaspora). May be repeated one time for credit. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**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: SocSci | SS, WC, WE.—I. (I.) Miller
*(change in existing course—eff. winter 13)*

**113. History of Modern Israel (4)**
Lecture—3 hours; term paper. Topics include the rise and fall of utopian Zionism, the century-long struggle between Jews and Arabs, the development of modern Hebrew culture, the conflict between religious and secular Jews, and the nature of Israel's multicultural society. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—III. Biale
*(change in existing course—eff. winter 13)*

**115A. History of West Africa (4)**
Lecture—3 hours; term paper. Prerequisite: course 15 recommended. Introductory survey of the history of West Africa and/or the Congo region from the earliest times to the present. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**115B. History of East and Central Africa (4)**
Lecture—3 hours; term paper. Prerequisite: course 15 recommended. Introductory survey of the history of east and central Africa from earliest times to the present. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—Decker
*(change in existing course—eff. winter 13)*

**115C. History of Southern Africa (4)**
Lecture—3 hours; term paper. Prerequisite: course 15 recommended. Introductory survey of the history of Southern Africa (including South Africa) from earliest times to the present. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—Decker
*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**115E. The African Slave Trade (4)**
Lecture—3 hours; writing—1 hour. History of the African Slave trades, from the early Egyptian and Saharan trades in the pre-modern period to the trans-Atlantic trade (15th-19th century) and the contemporary trafficking of humans. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—III. (III.) Lawrance
*(change in existing course—eff. winter 13)*

**115F. History of North, Horn, Sudan and Nile Valley (North and North-East Africa) (4)**
Lecture—4 hours; term paper. This course shall investigate the history of the north and northeast regions of continental Africa, encompassing the Mediterranean Coast, Maghreb, Sahara, Horn of Africa, the Nile Valley and the Sudan, covering the ancient period to the present. May be repeated up to four units for credit when instructor differs. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—II. Miller
*(change in existing course—eff. winter 13)*

**116. African History: Special Themes (4)**
Lecture—3 hours; term paper. Prerequisite: courses 115A and 115B recommended. Themes of African history, such as African states and empires, slave trade, relationship of Egypt to rest of Africa, Bantu origins and migrations, and French policy of Assimilation and Association. GE credit: ArtHum or SocSci | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**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: SocSci | SS, WC, WE.—I, II, III, IV. (I, II, III, IV.) Rauchway
*(change in existing course—eff. winter 13)*

**121A. Medieval History (4)**
Lecture/discussion and panel presentations—3 hours. European history from "the fall of the Roman Empire" to the eighth century. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.—McKee
*(change in existing course—eff. winter 13)*

**121B. Medieval History (4)**
Lecture/discussion and panel presentations—3 hours. European history from Charlemagne to the twelfth century. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.—McKee
*(change in existing course—eff. winter 13)*

**121C. Medieval History (4)**
Lecture/discussion and panel presentations—3 hours. European history from the Crusades to the Renaissance. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.—III. McKee
*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**125. Topics in Early Modern European History (4)**
Laboratory/discussion—3 hours; term paper. Prerequisite: course 4B recommended. Social and cultural history, 1300-1800. Topics such as medieval and Renaissance Italy, early modern Italy, Ancient Regime France, family and sexuality, and material culture and daily life. May be repeated for credit. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**130A. Christianity and Culture in Europe: 50-1450 (4)**
Lecture—3 hours; written report or research paper. A history of the ideas and institutions of Christianity and their impact on the late Roman Empire and medieval Europe in terms of outlook on life, art, politics and economics. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**130B. Christianity and Culture in Europe: 1450-1600 (4)**
Lecture—3 hours; written report or research paper. A history of the Lutheran, Zwinglian-Calvinist, Radical, Anglican, and Catholic Reformations as foundation stones of a new culture in Europe, with special attention to the interconnections between the revival of antiquity and the different reform movements. GE credit: ArtHum or SocSci | AH or SS, WC, WE.—Harris
*(change in existing course—eff. winter 13)*

**130C. Christianity and Culture in Europe: 1600-1850 (4)**
Lecture—3 hours; written report or research paper. A survey of the intellectual, cultural and political reorientation of European society in the aftermath of the Wars of Religion. "Secularization" will be discussed in the context of the Enlightenment and Romanticism. GE credit: ArtHum or SocSci | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**131A. Early Modern European History (4)**
Lecture—3 hours; written reports. Prerequisite: courses 4A and 4B recommended. Western European history from about 1350 to about 1500. GE credit: ArtHum or SocSci | AH or SS, WC, WE.—Stuart
*(change in existing course—eff. winter 13)*

**131B. European History During the Renaissance and Reformation (4)**
Lecture—3 hours; term paper. Survey of European society, politics, and culture from the late 15th through the early 17th centuries, with particular focus on the Italian and Northern Renaissance, on the Protestant Reformation, and the Catholic Counter Reformation. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.—Harris
*(change in existing course—eff. winter 13)*

**131C. The Old Regime: Absolution, Enlightenment and Revolution in Europe (4)**
Lecture—3 hours; term paper. Survey of European society, politics, and culture in the 17th and 18th centuries, focusing on religious warfare, absolutism, Scientific Revolution, Enlightenment and the growth of religious tolerance, the French Revolution and the collapse of the old regime. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.—Stuart
*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—Stuart
*(change in existing course—eff. winter 13)*

**133. The Age of Ideas (4)**
Lecture—3 hours; written reports. The Enlightenment and its background in the seventeenth century. GE credit: ArtHum or SocSci | AH or SS, WC, WE.—I. Stolzenberg
*(change in existing course—eff. winter 13)*

**134A. The Age of Revolution (4)**
Lecture—3 hours; written reports. Ideas and institutions during the French Revolution and the Napoleonic era. GE credit: ArtHum or SocSci | AH or SS, WE.
*(change in existing course—eff. winter 13)*

**135A. History of Science to the 18th Century (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: upper division standing. Survey of the historical development of science, technology, and medicine from the ancient world to the eighteenth century, with special emphasis on Isaac Newton as the culmination of the seventeenth century scientific revolution. GE credit: ArtHum or SocSci | AH or SS, WC, WE.—Stolzenberg
*(change in existing course—eff. winter 13)*

**135B. History of Science, 18th to 20th Centuries (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: upper division standing. Survey of the historical development of scientific thought in geology, biology, chemistry, physics, and cosmology from the eighteenth to the twentieth century, with special emphasis on emergence of broad explanatory principles that serve more than one science. GE credit: ArtHum or SocSci | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**136. Scientific Revolution (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: course 135A or 135B recommended. History of science in Western Europe (1400-1750). Investigates the changing definitions of science in the age of Copernicus, Versalius, Harvey, Galileo and Newton. Considers the evolution of new ideas about nature, experiment, observation, and scientific theory. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.—II. Stolzenberg
*(change in existing course—eff. winter 13)*

**138A. Russian History: The Rise of the First Empire, 1500-1881 (4)**
Lecture—3 hours; term paper. Prerequisite: courses 4B and 4C recommended. Expansion of the Russian state in Muscovite and imperial era. Emphasis on autocratic rule, the incorporation of non-Russian peoples, and emergence of Russia as a Great Power. Only two units of credit will be allowed to students who have completed former course 137B. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**138B. Russian History: The Russian Revolution, 1880-1917 (4)**
Lecture—3 hours; term paper. Prerequisite: courses 4B and 4C recommended. History of the fall of the Russian Empire and of the Revolution of 1917. Not open for credit to students who have received credit for former course 138. GE credit: ArtHum or SocSci-ArtHum or SocSci, Wrt | AH or SS, WC, WE.—III. Campbell
*(change in existing course—eff. winter 13)*

**138C. Russian History: The Rise and Fall of the Soviet Union, 1917 to the Present (4)**
Lecture—3 hours; term paper. Prerequisite: courses 4B and 4C recommended. The emergence of the Soviet Union as a socialist system and a Great Power; the decline and collapse of the Soviet Union and the formation of independent nation states in its place. Not open for credit to students who have completed former course 137C. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**141. France Since 1815 (4)**
Lecture—3 hours; term paper. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**142A. History of the Holocaust (4)**
Lecture—3 hours; term paper. Prerequisite: upper division standing. Topics include comparative genocide, medieval and modern antisemitism, modern German history, the rise of Nazism, Jewish life in Europe before the Nazi period, and the fate of the Jewish communities and other persecuted groups in Europe from 1933-1945. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—II. Biale
*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—Biale
*(change in existing course—eff. winter 13)*

**143. History of Eastern Europe and the Balkans (4)**
Lecture—3 hours; essays. History of the Baltic, Danubian, and Balkan lands since the Middle Ages. National cultures and conflicts in the Polish Commonwealth and the Habsburg and Ottoman Empires; nationalist movements, 1789-1914; the twentieth century, including an analysis of the contemporary scene. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**144B. History of Germany since 1789 (4)**
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 144A recommended. History of the German lands in the age of the French Revolution; 19th-century liberalism, nationalism, and industrialization; the World Wars, National Socialism, and the Holocaust; east and west Germany in the Cold War; the post-reunification scene. (Not open for credit to students who have completed former course 144.) GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**145. War and Revolution in Europe, 1789-1918 (4)**
Lecture—3 hours; term paper. Survey of revolutionary movements, international crises, and wars in Europe from the French Revolution to World War I. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**146A. Europe in the Twentieth Century (4)**
Lecture—3 hours; term paper. Survey of the history of Europe from 1919 to 1939. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.—I. Dickinson
*(change in existing course—eff. winter 13)*

**146B. Europe in the Twentieth Century (4)**
Lecture—3 hours; term paper. Survey of the history of Europe since 1939. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.—II. Dickinson
*(change in existing course—eff. winter 13)*

**148A. Women and Society in Europe: 1500-1789 (4)**
Lecture—3 hours; term paper. Prerequisite: course 4B recommended. Roles and perceptions of women from the Renaissance to the French Revolution. Emphasis on social and economic factors as well as on discussions of women in the writings of political theorists and social commentators. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**148B. Women and Society in Europe: 1789-1920 (4)**
Lecture—3 hours; term paper. Prerequisite: course 4C and 148A recommended. Roles and perceptions of women from the French Revolution to World War I, primarily in France and England. Emphasis on social and economic developments within a loosely chronological and comparative framework. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**151A. England: The Middle Ages (4)**
Lecture—3 hours; term paper. Prerequisite: course 4A recommended. Origins of England to the accession of the Lancastrians. Survey includes: impact of Norman Conquest on Anglo-Saxon institutions; rise of the Church, common law, parliament, and the economy; thought, arts, and literature to the age of Chaucer and Wyclif. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Wrt | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Wrt | AH or SS, WC, WE.—Landau
*(change in existing course—eff. winter 13)*

**151D. Industrial England (4)**
Lecture—3 hours; term paper. English history from Waterloo to the Battle of Britain; the rise and continuance of the first industrial nation, examining the transformation of landed to class society, oligarchy to democracy and bureaucracy, Bentham to Bloomsbury, empire to commonwealth. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—Landau
*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—Langland
*(change in existing course—eff. winter 13)*

**160. Spain and America in the 16th Century (4)**
Lecture—3 hours; term paper. Prerequisite: upper division standing. The Atlantic world in the 16th century, particularly the transcultural and reciprocal social and economic relations between Spain and America in the course of colonization. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—III. Harris
*(change in existing course—eff. winter 13)*

**162. History of the Andean Region (4)**
Lecture/discussion—3 hours; written and/or oral reports. History of the Andean region, the area that now comprises modern Peru, Bolivia, and Chile, from the beginning of human settlement to the present. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—III. (III.) C. F. Walker
*(change in existing course—eff. winter 13)*

**163A. History of Brazil (4)**
Lecture—3 hours; written reports. The history of colonial and imperial Brazil from 1500 to 1889. GE credit: ArtHum or SocSci | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**163B. History of Brazil (4)**
Lecture—3 hours; written reports. The history of the Brazilian republic from 1889 to the present. GE credit: ArtHum or SocSci | AH or SS, WC, WE.—I. Langland
*(change in existing course—eff. winter 13)*

**164. History of Chile (4)**
Lecture—3 hours; term paper. Prerequisite: course 161A, 161B, 165, or 168 recommended. Emphasis on the history of Chilean political economy from 1930 to the present. Various strategies of development (modernization, Marxism, Neo-Liberalism); the rise of mass politics; the course of foreign relations; and the richness of Chilean literature. Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**165. Latin American Social Revolutions (4)**
Lecture—3 hours; written reports. Major social upheavals since 1900 in selected Latin American nations; similarities and differences in cause, course, and consequence. GE credit: ArtHum or SocSci | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**166A. History of Mexico to 1848 (4)**
Lecture/discussion—3 hours; written and/or oral reports. Political, economic, and social development of pre-Columbian, colonial and national Mexico to 1848. GE credit: ArtHum or SocSci | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**166B. History of Mexico Since 1848 (4)**
Lecture/discussion—3 hours; written and/or oral reports. History of Mexico from 1848 to the present. GE credit: ArtHum or SocSci | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**167. Modern Latin American Cultural and Intellectual History (4)**
Lecture—3 hours; term paper. Prerequisite: upper division standing. Introduction to the cultural and intellectual history of modern Latin America including architecture, cinema, painting, music, and literature. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.—C.F. Walker, Reséndez
*(change in existing course—eff. winter 13)*

**168. History of Inter-American Relations (4)**
Lecture—3 hours; written reports. Diplomatic history of Latin America since independence, intra-Latin American relations, relations with the United States, participation in international organizations, and communism in Latin America. GE credit: ArtHum or SocSci | AH or SS, WC, WE.—II. C.F. Walker
*(change in existing course—eff. winter 13)*

**169A. Mexican-American History (4)**
Lecture/discussion—3 hours; written and/or oral reports. Economic, social, religious, cultural and political development of the Spanish-speaking population of the Southwestern United States from about 1800 to 1910. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—Oropeza
*(change in existing course—eff. winter 13)*

**169B. Mexican-American History (4)**
Lecture/discussion—3 hours; written and/or oral reports. Role of the Mexican and Mexican-American or Chicano in the economy, politics, religion, culture and society of the Southwestern United States since 1910. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.—I. Oropeza
*(change in existing course—eff. winter 13)*

**170A. Colonial America (4)**
Lecture—3 hours; term paper. Colonial society from 1607 to the American Revolution, with emphasis on European expansion, political, social and economic

foundations, colonial thought and culture, and imperial rivalry. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, WE.—II. Smolenski, Taylor

*(change in existing course—eff. winter 13)*

**170B. The American Revolution (4)**
Lecture—3 hours; term paper. Analysis of the Revolutionary epoch with emphasis on the structure of British colonial policy, the rise of revolutionary movements, the War for Independence and its consequences, and the Confederation period. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, WE.—III. Smolenski, Taylor

*(change in existing course—eff. winter 13)*

**170C. The Early National Period, 1789-1815 (4)**
Lecture—3 hours. Political and social history of the American republic from the adoption of the Constitution through the War of 1812 and its consequences. GE credit: ArtHum or SocSci | ACGH, AH or SS, DD, WE.

*(change in existing course—eff. winter 13)*

**171A. Jacksonian America (4)**
Lecture—3 hours; term paper. Prerequisite: upper division standing. The political and social history of the United States from the end of the War of 1812 to the Compromise of 1850. How the market revolution transformed American life, and led the nation towards war. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.—Kelman

*(change in existing course—eff. winter 13)*

**171B. Civil War and Reconstruction (4)**
Lecture—3 hours; term paper. Prerequisite: upper division standing. Examination of the political and social history of the United States from the Compromise of 1850 to the end of Reconstruction in 1876. Causes of the war, the war itself, and the problems of reconstruction after the war. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.—I. Kelman

*(change in existing course—eff. winter 13)*

**171BF. The Civil War in American Film (1)**
Discussion—1 hour; film viewing. Prerequisite: course 171B concurrently. Viewing and discussion of films with short writing assignments. (P/NP grading only.) GE credit: AH or SS.

*(change in existing course—eff. winter 13)*

**171D. Selected Themes in 19th Century American History (4)**
Lecture—3 hours; term paper. Prerequisite: upper division standing. Interpretative overview of a single topic in the history of the United States in the 19th century. Sample topics include social history, the 1850s, and southern history. May be repeated one time for credit when topic differs. Offered in alternate years. GE credit: ArtHum or SocSci, Wrt | ACGH, AH or SS, WE.

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Wrt | ACGH, AH or SS, WE.—II. Warren

*(change in existing course—eff. winter 13)*

**173. Becoming an American: Immigration and American Culture (4)**
Lecture—3 hours; term paper. Prerequisite: course 17B or 72B recommended. An introduction to the wide range of immigrant experiences and cycles of nativism that have shaped American culture in the twentieth century. From novels, memoirs and films, students will explore how external and internal immigration has created a multicultural society. Offered alternate years. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.—I. Tsu

*(change in existing course—eff. winter 13)*

**174A. The Gilded Age and Progressive Era: United States, 1876-1917 (4)**
Lecture—3 hours; term paper. Prerequisite: course 17B. U.S. history and the construction of modern America from the end of Reconstruction to U.S. entry into World War I. Includes Southern redemption, Western incorporation, electoral corruption, labor movements, Populism, Progressivism, women's suffrage, U.S. imperial expansion, and immigration restriction. Offered in alternate years. GE credit: ArtHum or SocSci, Wrt | ACGH, AH or SS, DD, WE.—Rauchway

*(change in existing course—eff. winter 13)*

**174B. War, Prosperity, and Depression: United States, 1917-1945 (4)**
Lecture—3 hours; term paper. Prerequisite: course 17B. America's emergence as a world power, the business culture of the 1920s, the New Deal and World War II. Emphasis on such issues as government regulation of the economy, welfare capitalism, and class, racial, ethnic, and gender conflicts. Offered in alternate years. GE credit: ArtHum or SocSci, Wrt | ACGH, AH or SS, DD, WE.—II. Olmsted, Rauchway

*(change in existing course—eff. winter 13)*

**174C. The United States Since World War II, 1945 to the Present (4)**
Lecture—3 hours; term paper. America's struggle to respond to new complexities in foreign relations, social tensions, family changes and media. Emphasis on such topics as: Cold War; anticommunist crusade; civil rights, feminist and environmentalist movement; New Left; counterculture; Vietnam; Watergate; and the moral majority. GE credit: ArtHum or SocSci, Wrt | ACGH, AH or SS, DD, WE.—III. Olmsted, Oropeza

*(change in existing course—eff. winter 13)*

**174D. Selected Themes in 20th Century American History (4)**
Lecture—3 hours; term paper. Prerequisite: course 17B or the equivalent. Interpretive overview of a single topic in the history of the United States in the 20th century with attention to the phases and processes of historical change. May be repeated one time for credit when topic differs. Offered in alternate years. GE credit: ArtHum or SocSci | ACGH, AH or SS, WE.—II. Olmsted

*(change in existing course—eff. winter 13)*

**175. American Intellectual History (4)**
Lecture—3 hours; term paper. Prerequisite: course 17B and upper division standing. Ideas that have shaped politics and society in the United States from colonial times to the present. Topics include American liberalism, republicanism, democracy, constitutionalism, communitarianism, utopianism, pragmatism, feminism, Darwinism, nationalism, conservatism, and economics. Offered in alternate years. GE credit: ArtHum or SocSci, Wrt | ACGH, AH or SS, WE.—Rauchway

*(change in existing course—eff. winter 13)*

**176A. Cultural and Social History of the United States (4)**
Lecture—3 hours; term paper. Study of social and cultural forces in American society in the nineteenth century with emphasis on social structure, work and leisure, socialization and the family, social reform movements and changes in cultural values. GE credit: ArtHum or SocSci | ACGH, AH or SS, WE.—II. Hartigan-O'Connor

*(change in existing course—eff. winter 13)*

**176B. Cultural and Social History of the United States (4)**
Lecture—3 hours; term paper. Study of social and cultural forces in American society in the twentieth century with emphasis on social structure, work and leisure, socialization and the family, social reform movements and changes in cultural values. GE credit: ArtHum or SocSci | ACGH, AH or SS, DD, WE.

*(change in existing course—eff. winter 13)*

**178A. Race in America, 1492-1865 (4)**
Lecture—4 hours. Prerequisite: course 17A or 17B or course 177A or 177B. Racial formation during the Age of Discovery, the Colonial Period, Early National and Antebellum periods up to the Civil War. Not open for credit to students who have completed course 178. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.—I. C.E. Walker

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.—Tsu

*(change in existing course—eff. winter 13)*

**180AN. American Political History, 1789-1896 (4)**
Lecture—3 hours; term paper. Prerequisite: upper division standing. Growth of American politics from the birth of the republic to the end of the nineteenth century. Development of political parties, the expanding electorate, and how social issues such as slavery shaped the political process. Not open for credit to students who have completed course 180A. Offered in alternate years. GE credit: ArtHum or SocSci, Wrt | ACGH, AH or SS, WE.

*(change in existing course—eff. winter 13)*

**180BN. American Political History, 1896-present (4)**
Lecture—3 hours; term paper. Prerequisite: course 17B. Politics in the United States from 1896 to the present. Topics include race and partisan politics; communism and anti-communism; the New Deal and the centralization of government; and the rise of the imperial presidency. Not open for credit to students who have completed course 180A or 180C. GE credit: ArtHum or SocSci, Wrt | ACGH, AH or SS, WE.

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Wrt | ACGH, AH or SS, WE.—Smolenski

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci | ACGH, AH or SS, DD, WE.—Hartigan-O'Connor

*(change in existing course—eff. winter 13)*

**183A. The Frontier Experience: Trans-Mississippi West (4)**
Lecture—3 hours; written and/or oral reports. The fur trade, western exploration and transportation, the Oregon Country, the Greater Southwest and the Mexican War, the Mormons, mining discovery, and the West during the Civil War. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, WE.—Taylor, Warren

*(change in existing course—eff. winter 13)*

**183B. The Frontier Experience: Trans-Mississippi West (4)**
Lecture—3 hours; written and/or oral reports. Spread of the mining kingdom, the range cattle industry, Indian-military affairs, settlement of the Great Plains and Rocky Mountain Regions and political organization of the West. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, WE.—I. Warren

*(change in existing course—eff. winter 13)*

**184. History of Sexuality in America (4)**
Lecture—3 hours; extensive writing. History of sexuality in America from pre-European through the late twentieth century. Topics include birth control, marriage, sexual violence, prostitution, inter-racial relationships, heterosexuality and homosexuality, the feminist, gay, and lesbian liberation movements, AIDS, commercialization of sexuality. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.—Materson

*(change in existing course—eff. winter 13)*

**185A. History of Science in America (4)**
Lecture—3 hours; research paper. Survey of the European background. Study of American scientific institutions, ideas, personalities, creative processes in science, and of relationships between society and science from colonial times to present. GE credit: ArtHum or SocSci, Wrt | AH or SS, WE.

*(change in existing course—eff. winter 13)*

**185B. History of Technology in America (4)**
Lecture—3 hours; research paper. Study of American technology, emphasizing biographical approach to historical understanding of technological change, creative processes, institutions, ideas, and relationships between technology and society from colonial times to present. GE credit: ArtHum or SocSci, Wrt | AH or SS, WE.

*(change in existing course—eff. winter 13)*

**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: SocSci | ACGH, DD, SS, WE.—Kelman, Rauchway

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Wrt | ACGH, AH or SS, DD, WE.—III. Tsu, Warren

*(change in existing course—eff. winter 13)*

**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 or SocSci, Div, Wrt | AH or SS, WC, WE.—Anooshahr

*(change in existing course—eff. winter 13)*

**191A. Classical China (4)**
Lecture—3 hours; term paper. History of Chinese civilization from its origins through the establishment of city states and the flowering of classical philosophy, to the rise and fall of the First Empire. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

*(change in existing course—eff. winter 13)*

**191B. High Imperial China (4)**
Lecture—3 hours; term paper. Political disunion and the influx of Buddhism; reunification under the great dynasties of T'ang, Sung, and Ming with analysis of society, culture and thought. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—I. Bossler

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

*(change in existing course—eff. winter 13)*

**191D. Nineteenth Century China: The Empire Confronts the West (4)**
Lecture—2 hours; discussion—1 hour; term paper. Prerequisite: course 9A, or upper division standing. The decline and fall of the Chinese Empire, with particular attention to the social and political crises of the 19th century, and the response of government officials, intellectuals, and ordinary people to the increasing pressures of Western imperialism. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—Bossler

*(change in existing course—eff. winter 13)*

**191E. The Chinese Revolution (4)**
Lecture—2 hours; discussion—1 hour; extensive writing. Prerequisite: upper division standing. Analysis of China's cultural and political transformation from Confucian empire into Communist state. Emphasis on emergence and triumph of peasant revolutionary strategy (to 1949), with some attention to its implications for post-revolutionary culture and politics. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—II.

*(change in existing course—eff. winter 13)*

**191F. History of the People's Republic of China (4)**
Lecture—2 hours; discussion—1 hour; extensive writing. Prerequisite: upper division standing. Comprehensive analysis of recent Chinese history, including land reform, the Cultural Revolution, the post-Mao era, and the consequences of the new economic policies of the 1980s. Not open for credit to students who have completed course 190C. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—III.

*(change in existing course—eff. winter 13)*

**191G. Special Topics in Chinese History to 1800 (4)**
Lecture—3 hours; extensive writing. Prerequisite: course 9A or consent of instructor. Topics in the history of China from the beginning of the imperial period through the high Qing dynasty. Topics may be framed chronologically (e.g.,the Ming Dynasty) or thematically (e.g., Trade in early Chinese history). May be repeated one time for credit when topic differs. Offered irregularly. GE credit: AH, WC, WE.—Bossler, Javers

*(new course—eff. fall 14)*

**191H. Special Topics in Chinese History after 1800 (4)**
Lecture—3 hours; extensive writing. Prerequisite: course 9A or consent of instructor. Topics in the history of China since 1800. Topics may be framed chronologically (e.g., The Republican Period (1911-1948)) or thematically (e.g., The Modern Evolution of Chinese Law). May be repeated one time for credit when topic differs. Offered irregularly. GE credit: AH, WC, WE.— Bossler, Javers

*(new course—eff. fall 14)*

**191J. Sex and Society in Modern Chinese History (4)**
Lecture—3 hours; term paper. Role of sex, gender, and family relations in the development of Chinese politics, society, and personal life in the modern period, 1900-present. Not open for credit to students who have completed course 190C. Offered irregularly. GE credit: ArtHum | AH, WC, WE.—Bossler

*(new course—eff. winter 15)*

**193C. The Middle East Environment: Historical Change and Current Challenges (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. Introduction to desert ecology, environmental history and current environmental problems. Case Studies of Egypt, Maghreb countries, Arabian peninsula/Gulf countries, desertification, water, indigenous knowledge, and national parks. GE credit: ArtHum or SocSci | AH or SS.—Davis

*(change in existing course—eff. fall 13)*

**194A. Aristocratic and Feudal Japan (4)**
Lecture—3 hours; term paper and/or discussion. Broad survey of the cultural, social, religious, and political aspects of Japanese history from mythological times through the sixteenth century emphasizing comparison of the organizations, values, and beliefs associated with the aristocratic and feudal periods. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

*(change in existing course—eff. winter 13)*

**194B. Early Modern Japan (4)**
Lecture—3 hours; term paper and/or discussion. Survey of the cultural, social, economic, and political aspects of Japanese history from the seventeenth through the nineteenth centuries emphasizing the development of those patterns of thought and political organization with which Japan met the challenge of the nineteenth-century Western expansionism. GE credit: ArtHum or SocSci, Div | AH or SS, WC, WE.—Kim

*(change in existing course—eff. winter 13)*

**194C. Modern Japan (4)**
Lecture—3 hours; term paper and/or discussion. Survey of the cultural, social, economic, and political aspects of Japanese history in the twentieth century emphasizing labor and social movements, militarism and the Pacific war, and the emergence of Japan as a major economic power. GE credit: ArtHum or SocSci, Div | AH or SS, WC, WE.—I. Kim

*(change in existing course—eff. winter 13)*

**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 or SocSci | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci | AH or SS, WC, WE.
*(change in existing course—eff. winter 13)*

**195B. History of Modern Korea (4)**
Lecture—3 hours; laboratory/discussion—1 hour. Prerequisite: upper division standing. History of Modern Korea, from Yi dynasty period to 1990s. Political and socioeconomic changes in 19th century, modernization under Japanese colonialism, postwar economic growth and effects of the Cold War. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—I. Kim
*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—II. Sen
*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—III. Sen
*(change in existing course—eff. winter 13)*

# Human Development

## New and changed courses in Human Development (HDE)

### Lower Division

**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: SocSci, Div | ACGH, DD, SS.—I, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

### Upper Division

**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: SocSci, Div | ACGH, DD, SS, WC.—I. (III.)
*(change in existing course—eff. winter 13)*

**162. Issues in Aging (3)**
*(cancelled course—eff. winter 14)*

### Graduate

**206. Cross-Sectional Data Analysis with Categorical Observed and Latent Variables (4)**
*(cancelled course—eff. winter 14)*

**217. Development of Cortical and Perceptual Laterality (3)**
*(cancelled course—eff. spring 14)*

**231. Issues in Cognitive and Linguistic Development (3)**
*(cancelled course—eff. spring 14)*

# Human Rights

## New and changed courses in Human Rights (HMR)

### Upper Division

**120A. Art, Architecture, and Human Rights (4)**
Lecture/discussion—4 hours. Prerequisite: consent of instructor. Study of human rights as they relate to art, architecture, and cultural heritage. Examines museums, art collections, and cultural-heritage management, their relation to the cultural prerogatives of communities and indigenous groups, and protection of cultural heritage during war and conflict. (Same course as Art History 120A.) Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, DD, VL, WC.—III. Watenpaugh
*(new course—eff. fall 14)*

**130. Special Topics in Human Rights (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: course 134 or Religious Studies 134 recommended. Thematic study of human rights. Topics may include contemporary or historical issues in the promotion, protection, and violation of human rights; human rights and the arts, religion, literature are possible topical areas. No credit for students who have completed Religious Studies 90. (Same course as Religious Studies 134) May be repeated for credit when topic differs. Offered irregularly. GE credit: ArtHum or SocSci | AH or SS, WC, WE.—III. Watenpaugh
*(new course—eff. spring 14)*

**131. Genocide (4)**
Lecture/discussion—3 hours; term paper or discussion—1 hour. Prerequisite: upper division standing. Comparative and critical study of the modern phenomenon of genocide from religious, ethical and historical perspectives. (Same course as Religious Studies 131.) Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, VL, WC, WE.—(I.) Watenpaugh
*(new course—eff. spring 14)*

**134. Human Rights (4)**
Lecture/discussion—3 hours; term paper or discussion—1 hour. Introduction to the interdisciplinary study of the origins, evolution, denial and protection of Human Rights. No credit for students who have completed Religious Studies 90. (Same course as Religious Studies 134.) Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—(III). Watenpaugh
*(new course—eff. spring 14)*

**198. Directed Group Study (1-4)**
Prerequisite: consent of instructor. Group study on focused topics in human rights. May be repeated for credit. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.)
*(new course—eff. winter 14)*

**199. Special Study for Advanced Undergraduates (1-5)**
Prerequisite: consent of instructor. Opportunity for advanced undergraduate students to work with a faculty member in a focused manner on a topic or topics of human rights. May be repeated for credit. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.)
*(new course—eff. winter 14)*

### Graduate

**200A. History, Theory and Criticism of Human Rights (4)**
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Restricted to graduate students. Introduces the advanced study of Human Rights and the theoretical and practical elaboration of the international Human Rights system. Seminar will engage with criticism of Human Rights and develop research and teaching within disciplinary and interdisciplinary frameworks. (Same course as Study of Religion 231E.) Offered in alternate years.—II. (II.) Watenpaugh
*(new course—eff. fall 13)*

**200B. Memory, Culture, and Human Rights (4)**
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Restricted to graduate students. Explores the multiple convergences among memory, culture, and human rights. Discusses diverse approaches to how societal actors in different historical, cultural, and national settings, construct meanings of past political violence, intergroup conflicts, and human rights struggles. (Same course as Cultural Studies 210.) Offered in alternate years.—I. (I.) Lazzara
*(new course—eff. fall 13)*

# Humanities

## New and changed courses in Humanities (HUM)

### Lower Division

**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: ArtHum | AH.
*(change in existing course—eff. winter 13)*

**2B. American Humanities Forum (4)**
Lecture—3 hours; extensive writing. Introduction to humanities topics and methodologies; analysis of major figures, works, and genres in American arts and literatures, with emphasis on relationships between history, society, and culture. May be repeated one time for credit if topic differs. GE credit: ArtHum | ACGH, AH, WE.—I, II, III. (I, II, III.)
*(change in existing course—eff. fall 12)*

**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: ArtHum or SocSci, Wrt | AH or SS, WE.
*(change in existing course—eff. winter 13)*

**9D. Don Quixote and the Modern World Discussion (2)**
Discussion—2 hours. Prerequisite: course 9 concurrently. Small group discussions and preparation of short papers for course 9. Offered in alternate years. GE credit: ArtHum | AH, WC, WE.
*(change in existing course—eff. winter 13)*

**15. Language and Identity (4)**
Lecture/discussion—3 hours; extensive writing. Introduction to topics related to the construction of identity through language use, including geographical and social factors affecting language groups. Language ideology affecting linguistic groups, including bilinguals and non-native speakers of English. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WE.
*(change in existing course—eff. winter 13)*

### Upper Division

**144. Marx, Nietzsche, Freud (4)**
Lecture/discussion—3 hours; term paper. Study of major texts of Marx, Nietzsche, and Freud, selected with an eye to their impact on 20th-century economics, ethics, and attitudes toward eros. Particular focus on conceptions of the self and the individual's relation to society. Offered in alternate years. (Same course as German 144.) GE credit: ArtHum, Wri | AH, WC.—I.
*(change in existing course—eff. fall 11)*

# Hydrology

## New and changed courses in Hydrology (HYD)

### Lower Division

**10. Water, Power, Society (3)**
Lecture—2 hours; discussion—1 hour. Water resources issues. How water has been used to gain and wield socio-political power. Water resources development in California as related to current and future sustainability of water quantity and quality. Roles of science and policy in solving water problems. (Same course as Science and Society 10.) GE credit: SciEng or SocSci, Wrt | SE or SS, SL.—III. (III.) Fogg
*(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 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: SciEng | QL, SE, SL.—IV. (IV) Grismer
*(change in existing course—eff. winter 13)*

### Upper Division

**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: SciEng | QL, SE, VL.—II. (II.) Wallender
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—(III.) Goldhamer, Grattan
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL.—III. (III.) Shackel
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—III. (III.) Hernes, Parikh
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL, VL.—I. (I.) Puente
*(change in existing course—eff. winter 13)*

**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: SciEng | OL, QL, SE.—II. (II.) Puente
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL.—(II.) Pasternack
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL, VL.—I. (I.) Fogg
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.) Fogg
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL.—IV. (IV.) Grismer
*(change in existing course—eff. winter 13)*

**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: SocSci | ACGH, SS.—II. Cahill
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL.—II. Pasternack
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL, VL.—II. (II.) Zhang
*(change in existing course—eff. winter 13)*

# Hydrologic Science (A Graduate Group)

## New and changed courses in Hydrologic Science (HYD)

### Graduate

**274. Practice of Groundwater Flow and Transport Modeling (3)**
Lecture—2 hours; lecture/laboratory—0.5 hours; lecture/discussion—0.5 hours. Prerequisite: course 269, Civil and Environmental Engineering 272B, or Civil and Environmental Engineering 272C. Selecting and building groundwater flow and transport models. Planning, preparation, execution, presentation, and review of modeling projects. Review of methods, assumptions, and limitations of groundwater models; practicing with MODFLOW, MT3D, associated GUI, and with other groundwater modeling software of choice. Offered in alternate years.—III. Harter

*(new course—eff. fall 12)*

**286. Selected Topics in Environmental Remote Sensing (3)**
Discussion—2 hours; lecture—1 hour; project. Prerequisite: consent of instructor; Environmental and Resource Sciences 186 or equivalent required; Environmental and Resource Sciences 186L recommended. In depth investigation of advanced topics in remote sensing applications, measurements, and theory. (Same course as Geography 286) May be repeated for credit. Offered irregularly.—I. Ustin

*(change in existing course—eff. fall 14)*

# International Agricultural Development

## New and changed courses in International Agricultural Development (IAD)

### Upper Division

**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.) GE credit: SciEng | QL, SE, VL.—III. (III.) Shafii

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. Gradziel

*(change in existing course—eff. winter 13)*

**162. Field Course in Tropical Ecology and Sustainable Agricultural Development (8)**
*(cancelled course—eff. winter 14)*

# International Commercial Law (A Graduate Group)

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

### Graduate

**201A. Fundamentals in United States Law (4)**
Lecture/discussion—20 hours. Prerequisite: Law school education or equivalent. Investigation of the Common Law System of the U.S. Includes the American constitutional system, the American judiciary, the American civil trial, and foundational substantive and procedural law such as real property, torts, criminal law and procedure, civil procedure, and contracts.—IV.

*(change in existing course—eff. summer 13)*

**201B. Advanced Topics in United States Law (3)**
Lecture/discussion—20 hours. Prerequisite: Law School education or equivalent. Orientation to advanced topics in U.S. law - Intellectual Property (including copyright and trademarks), Commercial and Consumer Law, Advanced Contracts, Antitrust, Taxation, Remedies, Labor Law, Environmental Law, Dispute Resolution, Remedies and introduction to trial techniques and legal research/writing.

*(new course—eff. summer 13)*

**202A. Introduction to Contracts Formation (2)**
Lecture/discussion—20 hours. Prerequisite: Law school education or equivalent. Examines formation of the sorts of promises that are enforced and the nature of protection given promissory obligations in both commercial and noncommercial transactions. Inquiry is made into the means by which traditional doctrine adjusts to changing social demands. Offered irregularly.—II, IV. (II, IV.)

*(new course—eff. summer 13)*

**202AS. Introduction to Contracts Formation (2)**
Lecture/discussion—20 hours. Prerequisite: Law School education or equivalent. Examines formation of the sorts of promises that are enforced and the nature of protection given promissory obligations in both commercial and noncommercial transactions. Inquiry is made into the means by which traditional doctrine adjusts to changing social demands. Offered irregularly.—II, IV. (II, IV.)

*(new course—eff. winter 14)*

**202B. Contracts Performance (2)**
Lecture/discussion—20 hours. Prerequisite: Law school education or equivalent. Examines issues of performing promises that are enforceable and possible breach of promissory obligations in both commercial and noncommercial transactions. Inquiry is made into the means by which traditional doctrine adjusts to changing social demands. Offered irregularly.—II, IV. (II, IV.)

*(new course—eff. fall 13)*

**202BS. Contracts Performance (2)**
Lecture/discussion—20 hours. Prerequisite: Law school education or equivalent; course 202A or equivalent. Examines issues of performing promises that are enforceable and possible breach of promissory obligations in both commercial and noncommercial transactions. Inquiry is made into the means by which traditional doctrine adjusts to changing social demands. Offered irregularly.—II, IV. (II, IV.)

*(new course—eff. winter 14)*

**205A. Overview of US Constitutional Law (2)**
Lecture/discussion—20 hours. Prerequisite: Law School education or equivalent. Principles, doctrines and controversies regarding the structure and division of powers in American government. Includes judicial review, jurisdiction, standing to sue, federalism, federal and state powers and immunities, and the separation of powers among branches of the federal government.

*(new course—eff. summer 13)*

**205AS. Overview of US Constitutional Law (2)**
Lecture/discussion—20 hours. Prerequisite: Law School education or equivalent. Principles, doctrines and controversies regarding the structure and division of powers in American government. Includes judicial review, jurisdiction, standing to sue, federalism, federal and state powers and immunities, and the separation of powers among branches of the federal government. Offered irregularly.—IV.

*(change in existing course—eff. fall 13)*

**205B. Constitutional Law—Protection of Individual Rights (2)**
Lecture/discussion—20 hours. Prerequisite: Law School education or equivalent. Principles, doctrines and controversies regarding the U.S. Constitution Bill of Rights, including due process of law, equal protection, freedom of expression, freedom of religion, state action, and congressional legislation in aid of civil rights and liberties.

*(new course—eff. summer 13)*

**212S. Introduction to Negotiation (2)**
Lecture/discussion—20 hours. Prerequisite: Law School education or equivalent. Introduction to theoretical and empirical approaches to negotiation for the purposes of making deals and resolving legal disputes. Offered irregularly.—IV.

*(change in existing course—eff. fall 13)*

**228A. Mergers and Acquisitions Law (2)**
Lecture/discussion—20 hours. Prerequisite: Law School education or equivalent. Practical approach to mergers and acquisitions with an in-depth look at the planning, negotiation and completion of mergers and acquisitions. Offered irregularly.—IV.

*(change in existing course—eff. fall 13)*

**228AS. Mergers and Acquisitions Law (2)**
Lecture/discussion—20 hours. Prerequisite: Law School education or equivalent. Practical approach to mergers and acquisitions with an in-depth look at the planning, negotiation and completion of mergers and acquisitions. Offered irregularly.—IV.

*(change in existing course—eff. fall 13)*

**283. Contract Remedies (2)**
Lecture/discussion—20 hours. Prerequisite: Law school education or equivalent. Covers a range of remedies for contract breach: remedies under common law and equity, liquidated damages clauses, remedies for mistake and unconscionability as well as breach of contract for the Sale of Goods under UCC Article II. Offered irregularly.—II, IV. (II, IV.)

*(new course—eff. winter 14)*

**283S. Contract Remedies (2)**
Lecture/discussion—20 hours. Prerequisite: Law School education or equivalent; course 202A, 202B or equivalent. Covers a range of remedies for contract breach: remedies under common law and equity, liquidated damages clauses, remedies for

mistake and unconscionability as well as breach of contract for the Sale of Goods under UCC Article II. Offered irregularly.—II, IV. (II, IV.)

*(new course—eff. winter 14)*

**289. Licensing Academy in Intellectual Property & Technology (4)**

Lecture/discussion—20 hours. Prerequisite: course 201. Law School education or equivalent. Intellectual property as it relates to current forms of legal protection and how new innovations fit into these models, including public-private technology transfer, patents, institutional objectives, technology transfer offices, startups, and licenses.

*(new course—eff. summer 13)*

**291C. International Commercial Law Seminar (4)**

Lecture/discussion—20 hours. Prerequisite: course 201. Law School education or equivalent. Advanced seminar on a current topic in International Commercial Law. Offered at the University of Cologne in Cologne, Germany for two weeks each summer. May be repeated three times for credit when topic differs.

*(change in existing course—eff. summer 13)*

**292. International Commercial Law Seminar (1-4)**

Lecture/discussion—20 hours. Prerequisite: Law school education or equivalent. Advanced seminar in a current topic in International Commercial Law. Topic will change each year the course is offered. May be repeated two times for credit when topic differs. Offered irregularly.—II, IV.

*(change in existing course—eff. summer 13)*

**292S. International Commercial Law Seminar (1-4)**

Lecture/discussion—20 hours. Prerequisite: Law school education or equivalent. Advanced seminar in a current topic in International Commercial Law. Topic will change each year the course is offered. May be repeated two times for credit when topic differs. Offered irregularly.—II, IV.

*(new course—eff. spring 13)*

# International Relations

## New and changed courses in International Relations (IRE)

### Lower Division

**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: SocSci | SS, WE.—II. (II.)

*(change in existing course—eff. winter 13)*

### Upper Division

**104. The Political Economy of International Migration (4)**

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: upper division standing. Analysis of worldwide migration patterns, and social scientific theories of international and transnational migration. Focus in economical, political, and social impact of immigration and potential for international and regional cooperation. (Same course as Sociology 104.) GE credit: SocSci | QL, SL, SS.

*(change in existing course—eff. winter 13)*

**131. Ocean Politics (4)**

*(cancelled course—eff. spring 14)*

**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.

*(change in existing course—eff. winter 13)*

**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: SocSci | OL, SS, WE.—I, III. (I, III.)

*(change in existing course—eff. winter 13)*

# Italian

## New and changed courses in Italian (ITA)

### Lower Division

**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. Not open for credit to students who have taken course 1A or 1S. GE credit: ArtHum | AH, WC.—I, II. (I, II.)

*(change in existing course—eff. winter 14)*

**1S. 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. Course is taught abroad. 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. Not open for credit to students who have taken course 1 or 1A. GE credit: ArtHum | AH, WC.—I. (I.) Heyer-Caput

*(change in existing course—eff. winter 14)*

**2. Elementary Italian (5)**

Discussion—5 hours; laboratory—1 hour. Prerequisite: course 1 or 1S. Continuation of course 1 or 1S. Review of grammar and vocabulary, and practice of all language skills through cultural texts. Not open for credit to students who have taken course 1A or 2S. GE credit: ArtHum | AH, WC.—II, III. (II, III.)

*(change in existing course—eff. winter 14)*

**2S. Elementary Italian (5)**

Discussion—5 hours; laboratory—1 hour. Prerequisite: course 1 or 1S. Continuation of course 1 or 1S. Review of grammar and vocabulary, and practice of all language skills through cultural texts. Course is taught abroad. Not open for credit to students who have completed course 1A or 2. GE credit: ArtHum | AH, WC.—I. (I.) Heyer-Caput

*(change in existing course—eff. winter 14)*

**3. Elementary Italian (5)**

Lecture/discussion—5 hours; laboratory—1 hour. Prerequisite: course 2 or 2S. Continuation of course 2 or 2S. Review of grammar and vocabulary, and practice of all language skills through cultural texts. Not open for credit to students who have taken course 1A or 3S. GE credit: ArtHum | AH, WC.—I, III. (I, III.)

*(change in existing course—eff. winter 14)*

**3S. Elementary Italian (5)**

Discussion—5 hours; laboratory—1 hour. Prerequisite: course 2 or 2S. Continuation of course 2 or 2S. Review of grammar and vocabulary, and practice of all language skills through cultural texts. Course is taught abroad. Not open for credit to students who have taken course 1A or 3. GE credit: ArtHum | AH, WC.—I. (I.) Heyer-Caput

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

**5S. Intermediate Italian (4)**

Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: course 4 or 4S. 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. Course is taught abroad. Not open for credit to students who have completed course 5. GE credit: WC.—I, III. (I, III.)

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

### Upper Division

**101. Advanced Conversation, Composition, and Grammar (4)**

Lecture—3 hours. Prerequisite: course 9 or consent of instructor. GE credit: ArtHum | AH, OL, WC, WE.—I. (I.) Heyer-Caput

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, OL, WC, WE.—III.

*(change in existing course—eff. winter 13)*

**104. Italian Translation and Style (4)**

Lecture/discussion—3 hours; term paper. Prerequisite: course 101 or consent of instructor. Practice in translation from Italian to English and English to Italian, using literary and non-literary texts of different styles. Analysis of linguistic problems and elements of style contained in the translation material. GE credit: AH, WC.—III. (III.)

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—III.

*(change in existing course—eff. winter 13)*

**107. Survey of Italian Culture and Institutions (4)**

Lecture—3 hours; term paper. Assessment of the impact of regional autonomy on Italian cultural life from the Middle Ages to the present. Special emphasis will be placed upon achievements in literature,

the arts, philosophy, and socio-political institutions. To be taught in English. GE credit: ArtHum or SocSci | AH, OL, SS, VL, WC, WE.—III. (III.)

*(change in existing course—eff. winter 13)*

**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 or SocSci | AH, OL, SS, VL, WC, WE.—III. (III.)

*(change in existing course—eff. winter 13)*

**108. Contemporary Issues in Italian Culture and Society (4)**
Lecture/discussion—3 hours; term paper. Analysis of cultural issues in contemporary Italy: Myth and reality of imagined Italies, Italian identities; immigration and race relations; the media and popular culture. Taught in English. GE credit: ArtHum or SocSci, Div, Wrt | AH, OL, SS, VL, WC, WE.—I. (I.) Bassi

*(change in existing course—eff. winter 13)*

**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 or SocSci, Div, Wrt | AH, OL, SS, VL, WC, WE.—III. (III.)

*(change in existing course—eff. winter 13)*

**120A. Italian Literature of the Twentieth Century: The Novel (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or consent of instructor. Development of the novel from Svevo to the present. Emphasis on the work of Svevo, Levi, Moravia, Pavese, and Vittorini. GE credit: ArtHum, Wrt | AH, WC, WE.—Cannon, Heyer-Caput

*(change in existing course—eff. fall 13)*

**141. Gender and Interpretation in the Renaissance (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: completion of Subject A requirement, at least one course in literature, or consent of instructor. Critical analysis of Renaissance texts with primary focus on issues such as human dignity, education and gender politics; "high" and "low" culture and its relation to literary practices. (Same course as Comparative Literature 138.) GE credit: ArtHum, Div, Wrt | AH, WC, WE.—I. (I.) Schiesari

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

**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: ArtHum, Wrt | AH, OL, VL, WC, WE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC, WE.

*(change in existing course—eff. winter 13)*

**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.

*(change in existing course—eff. winter 13)*

**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.

*(change in existing course—eff. winter 13)*

# Japanese

## New and changed courses in Japanese (JPN)

## Lower Division

**1. Elementary Japanese (5)**
Lecture/discussion—5 hours. Introduction to spoken and written Japanese in cultural contexts, with emphasis on communication. GE credit: ArtHum | AH, OL, WC.—I. (I.)

*(change in existing course—eff. fall14)*

**1A. Accelerated Intensive Elementary Japanese (15)**
Lecture/discussion—15 hours. Special 12 week accelerated, intensive summer session course that combines the work of courses 1, 2 and 3. Introduction to Japanese grammar and development of all language skills in a cultural context with emphasis on communication. Not open for credit to students who have completed course 1, 2, or 3. GE credit: ArtHum | AH, OL, WC—IV. (IV.)

*(change in existing course—eff. summer 14)*

**1AS. Intensive Elementary Japanese (15)**
Lecture/discussion—15 hours. Intensive course taught combining the work of courses 1, 2 and 3. Introduction to Japanese grammar and development of all language skills in a cultural context with emphasis on communication. Offered in Japan. Not open for credit to students who have taken course 1, 2, or 3. GE credit: ArtHum | AH, OL, WC—IV. (IV.)

*(change in existing course—eff. fall 14)*

**2. Elementary Japanese (5)**
Lecture/discussion—5 hours. Prerequisite: course 1 or the equivalent. Continuation of training in basic Japanese spoken and written skills. GE credit: ArtHum | AH, OL, WC—II. (II.)

*(change in existing course—eff. fall 14)*

**3. Elementary Japanese (5)**
Lecture/discussion—5 hours. Prerequisite: course 2 or the equivalent. Continuation of training in basic spoken and written skills in Japanese language. GE credit: ArtHum | AH, OL, WC—I, II, III. (I, II, III.)

*(change in existing course—eff. fall 14)*

**4. Intermediate Japanese (5)**
Lecture/discussion—5 hours. Prerequisite: course 3 or the equivalent. Intermediate-level training in spoken and written Japanese in cultural context, based on language skills developed in course 3. GE credit: ArtHum | AH, OL, WC—I, II, III. (I, II, III.)

*(change in existing course—eff. fall 14)*

**5. Intermediate Japanese (5)**
Lecture/discussion—5 hours. Prerequisite: course 4 or the equivalent. Intermediate-level training in spoken and written Japanese in cultural context, based on language skills developed in course 4. GE credit: ArtHum | AH, OL, WC—I, II, III. (I, II, III.)

*(change in existing course—eff. fall 14)*

**6. Intermediate Japanese (5)**
Lecture/discussion—5 hours. Prerequisite: successful completion (C- or better) of course 5 or the equivalent. Intermediate-level training in spoken and written Japanese in cultural context, based on language skills developed in course 5. GE credit: ArtHum | AH, OL, WC—III. (III.)

*(change in existing course—eff. fall 14)*

**7S. Intensive Intermediate Japanese (20)**
Lecture/discussion—20 hours. Special intensive course that combines the work of courses 3, 4, 5, and 6. Introduction to Japanese grammar and development of all language skills in a cultural context with emphasis on communication. Taught in Japan. GE credit: ArtHum | AH, OL, WC—III. (III.)

*(change in existing course—eff. fall 14)*

**15S. Introduction to Japanese Culture (2)**
Lecture/discussion—2 hours; fieldwork. 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. (P/NP grading only) GE credit: ArtHum | AH, WC—III. (III.) Sorensen

*(change in existing course—eff. fall 14)*

**25. Japanese Language and Culture (in English) (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or Linguistics 1 or Anthropology 4 recommended. Classification and communication of experience in Japanese culture; principles of language use in Japanese society. Speech levels and honorific language, language and gender, minority languages, literacy. Role of Japanese in artificial intelligence and computer science. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE—I, II. Koyama

*(change in existing course—eff. fall 14)*

**98. Directed Group Study (1-5)**
(P/NP grading only.) GE credit: AH.

*(change in existing course—eff. winter 13)*

## Upper Division

**106. Japanese Culture Through Film (4)**
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: upper division standing or consent of instructor. Aspects of Japanese culture such as love, sexuality, war, the military, the family, the position of women, growing up and death as portrayed in Japanese cinema. Lectures, discussion, and readings in English. Films with English subtitles. GE credit: ArtHum, Div, Wrt | AH, VL, WC.—III. (III.) Gundry

*(change in existing course—eff. winter 13)*

**112. Modern Japanese: Reading and Discussion (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 111. Continuation of course 111. GE credit: ArtHum | AH, OL, WC.—II. (II.)

*(change in existing course—eff. fall 14)*

**113. Modern Japanese: Reading and Discussion (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 112. Continuation of course 112. GE credit: ArtHum | AH, OL, WC.—III. (III.)

*(change in existing course—eff. fall 14)*

**117S. Intensive Modern Japanese: Reading and Discussion (17)**
Lecture/discussion—17 hours. Prerequisite: course 5. Introduction to basic Japanese grammar and development of more advanced reading, writing, and conversation skills in a cultural context. Combination of courses 6, 111, 112, and 113 taught intensively in Japan. Not open to students who have taken courses 6, 111, 112, or 113; an exception can be made for students who have taken course 6 or its equivalent, provided that those five units are deducted from the 17 total unit load. GE credit: ArtHum | AH, OL, WC.—III. (III.)
*(change in existing course—eff. fall 14)*

**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: ArtHum | AH.—III. (III.) Chang
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—III. (III.) Chang
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—II. Chang
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—II. (II.) Gundry, Sorensen
*(change in existing course—eff. winter 13)*

**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
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—(I.) Chang
*(change in existing course—eff. winter 13)*

**137. Readings in Contemporary Japanese Literature (4)**
Lecture/discussion—4 hours. Prerequisite: course 113 or equivalent (placement exam or consent of the instructor). Readings of short stories and essays by contemporary writers. Representative writers include Yoshimoto Banana, Otsuichi, Suzuki Koji, Kyogoku Natsuhiko, Ogawa Yoko, and Murakami Haruki. Readings and discussion in Japanese with some emphasis on translation into English. Offered in alternate years. GE credit: AH, WC.—(II.) Sorensen
*(new course—eff. fall 13)*

**151. Japanese Linguistics (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1, 2, and 3 or equivalent. Introduction to Japanese linguistics, featuring key aspects of the Japanese language. Analysis of Japanese from the perspectives of phonology, syntax, discourse analysis, sociolinguistics and psycholinguistics. GE credit: ArtHum or SocSci | Div, Wrt | SS.—I. (I.)
*(change in existing course—eff. winter 13)*

**198. Directed Group Study (1-5)**
(P/NP grading only.) GE credit: AH, WC.
*(change in existing course—eff. winter 13)*

**199. Special Study for Advanced Undergraduates (1-5)**
(P/NP grading only.) GE credit: AH, WC.
*(change in existing course—eff. winter 13)*

# Jewish Studies

## New and changed courses in Jewish Studies (JST)

### Upper Division

**116. Readings in Jewish Writing and Thought in German Culture (4)**
Lecture—3 hours; term paper. Prerequisite: Religious Studies 23 or consent of instructor. Historical tradition of Jewish thought in the German cultural context; unique contributions of Jewish writers to culture of the German-speaking world; what it means to be "other" in the mainstream culture. No credit will be given to those students who have completed Humanities 121. May be repeated two times for credit if topic differs. Offered in alternate years. (Same course as German 116.) GE credit: GE credit: ArtHum, Div, Wrt. | AH, OL, WC, WE.—(I.)
*(change in existing course—eff. fall 11)*

# Landscape Architecture

## New and changed courses in Landscape Architecture (LDA)

### Lower Division

**1. Introduction to Environmental Design (4)**
Lecture—3 hours; discussion—1 hour; term paper. Introduction to the role of design professionals in contributing to the built environment at a range of scales. Introduction to basic methods used by design professionals to evaluate, design, plan, and manage landscapes and the built environment. Not open for credit to students who have taken course 40. GE credit: ArtHum or SciEng or SocSci, Wrt | AH or SE or SS, VL, WC, WE.—I. (I.) Napawan
*(change in existing course—eff. fall 12)*

**2. Place, Culture and Community (4)**
Lecture—4 hours. Introduction to recognizing and reading cultural landscapes, and the application of cultural landscape meaning to the creation of contemporary built environments. Topics include patterns and influences relating to agriculture, military, transportation, housing, wilderness, recreation and tourism. GE credit: SocSci, Wrt | ACGH, SS, VL, WC, WE.—II. (II.) Owens
*(change in existing course—eff. fall 12)*

**21. Environmental Design Visualization (5)**
Lecture—3 hours; laboratory/discussion—3 hours. Prerequisite: course 1. Restricted to Landscape Architecture majors. Idea expression through graphic media and drawing techniques for visual representation of the built environment, including conventional drafting and expressive techniques. Introduction to computerized graphics techniques. GE credit: ArtHum | AH, OL, VL.—I. (I.)
*(change in existing course—eff. fall 12)*

**30. History of Environmental Design (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Pass one restricted to Pre-Landscape Architecture and Landscape Architecture majors or consent of instructor. History of Environmental Design across disciplines, including landscape architecture, planning, community and urban design. GE credit: ArtHum, Wrt | ACGH, AH, VL, WE.—II. (II.)
*(change in existing course—eff. winter 13)*

**60. Landform and Grading Studio (6)**
Studio—8 hours; extensive problem solving. Prerequisite: course 1, 21, 30, 70. Restricted to Landscape Architecture major. Introduction of landform and topography as landscape medium and utilization of grading and drainage to design meaningful and functional spaces. Introduction to site analysis, site planning, and the conventions of grading & drainage, including contour manipulation and physical model building. GE credit: ArtHum or SciEng | AH or SE, OL, VL.—III. (III.) Napawan
*(change in existing course—eff. winter 14)*

**70. Introduction to Spacemaking (5)**
Lecture—3 hours; laboratory/discussion—3 hours. Prerequisite: course 1, 21, 30. Restricted to Pre-Landscape Architecture and Landscape Architecture majors. Introduction to basic principles of design towards the creation of space. Introduction to design methodologies and skills necessary to define, manipulate, and represent the built environment. Workshops in 2D computer graphic techniques and 3D physical modeling making will reinforce design principles. GE credit: ArtHum | AH, OL, VL.—II. (II.) Rios
*(change in existing course—eff. winter 13)*

### Upper Division

**102. Methods in Design and Landscape Research (4)**
Seminar—4 hours; term paper. Prerequisite: course 170, 171, 172, 180. Restricted to Landscape Architecture majors with consent to pursue senior thesis project in the following quarter. Research, design, and planning methods employed in landscape architecture. Exercises allow students to design independent landscape research. Lectures provide a historical overview of research methodology. GE credit: ArtHum | AH, OL, VL, WE.—II. (II.) Owens
*(new course—eff. winter 14)*

**140. Green Building, Design, and Materials (4)**
Lecture—2 hours; laboratory—4 hours. Prerequisite: course 21, 30, 50, 70. Restricted to Landscape Architecture majors only. Sustainable design and construction techniques at site and building scales. Emphasizes real-world case studies, analysis of opportunities for actual sites, and application of LEED and Sustainable Sites green rating systems. GE credit: ArtHum or SciEng | AH or SE, VL.—I. (I.)
*(new course—eff. fall 13)*

**141. Community Design & Planning (6)**
Lecture—2 hours; studio—6 hours. Prerequisite: course 21, 30, 50, 70. Restricted to Landscape Architecture majors. Introduction to community design and planning in landscape architecture projects. Incorporates social and cultural factors, public and community processes, theories and practices related to human-environment behavior; community involvement in design, social analysis, community engagement, accessibility, diversity and politics of place. GE credit: ArtHum or SocSci | ACGH, AH or SS, DD, OL, VL.—II. (II.) Owens
*(new course—eff. winter 14)*

**142. Applying Sustainable Strategies (4)**
Lecture—3 hours; laboratory—3 hours; extensive problem solving. Prerequisite: course 3, 21 30, 50, 70, 140, 141. Open to Sustainable Environmental Design Majors or by permission of instructor. Capstone class examines case studies and techniques of sustainable development. Student teams will develop detailed proposals for real-world sites. GE credit: ArtHum or SciEng or SocSci | AH or SE or SS, OL, VL, WE.—III. (III.)
*(new course—eff. spring 14)*

**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 Applied Biological Systems Technology 150.) GE credit: SciEng | SE, VL.—I. (I.) Greco, Upadhyaya
*(change in existing course—eff. winter 13)*

**160. Design and Build Studio (6)**
Studio—8 hours; extensive problem solving; fieldwork. Prerequisite: course 1, 2, 3, 21, 30, 50, 70. Restricted to Landscape Architecture majors. Introduction to the spatial design and construction of small-scale projects. Hands-on approach to learning and understanding materials (including wood, concrete, and stone) and methods in landscape construction, and the application of technical skills (including detailing, cost estimation, and specifications). GE credit: ArtHum or SciEng | AH, OL, VL.—I. (I.)
*(change in existing course—eff. winter 14)*\

**170. Site Planning and Design Studio (6)**
Studio—8 hours. Prerequisite: course 21, 30, 50, 70. Open to Landscape Architecture majors. Application of place-making and problem-solving skills to local landscape sites. Analysis of social and environmental conditions in the field. Lectures link design projects to contemporary theories and practices. Includes workshops in computer-aided drafting. GE credit: ArtHum | AH, OL, VL.—I. (I.)
*(change in existing course—eff. fall 13)*

**171. Urban Design and Planning Studio (6)**
Studio—8 hours. Prerequisite: course 21, 30, 50, 70, 170. Restricted to Landscape Architecture majors. Studio designing large-scale landscapes at regional, sub-regional, and neighborhood scales. Focuses on understanding complex social, economic, and environmental factors, developing sustainability priorities and strategies, and applying them through design and policy. GE credit: ArtHum | ACGH, AH, OL, VL.—III. (III.)
*(new course—eff. spring 14)*

**180. Advanced Design and Planning Studio (6)**
Studio—8 hours; fieldwork; extensive problem solving. Prerequisite: course 60, 160, 170, 171, 172. Restricted to Landscape Architecture majors or consent of instructor. Application of advanced theories and methods of design and planning to real-world projects. May be repeated for up to 18 units of credit. GE credit: ArtHum or SciEng | AH, OL, VL.—I, II, III. (I, II, III.)
*(new course—eff. fall 13)*

**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: SciEng | SE, WE.—(II.) Greco
*(change in existing course—eff. winter 13)*

**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: SocSci | ACGH, SS.—II. (II.) Loux, Wheeler
*(change in existing course—eff. winter 13)*

**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: SocSci | ACGH, DD, SS.—Owens
*(change in existing course—eff. winter 13)*

**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: SocSci | DD, SS, WE.—Owens
*(change in existing course—eff. winter 13)*

**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: SciEng | OL, VL, SE.—I. Greco
*(change in existing course—eff. winter 13)*

### Graduate

**200. Citizenship, Democracy, & Public Space (4)**
Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. Introduction to seminal works in political theory, philosophy, and the social sciences that focus on citizenship and the public sphere; development of critical perspective regarding restructuring of public space in a pluralistic and global culture; discussion of contemporary case studies. (Same course as Geography 230.)—III. (III.) Rios
*(new course—eff. fall 12)*

**205. Physical Planning and Design (4)**
Lecture—2 hours; discussion—2 hours. Limited to graduate students. Regulation, design, and development of the built landscape, planning and land development processes, zoning and subdivision regulation, site planning, urban design goals and methods, public participation strategies, creatively designing landscapes to meet community and ecological goals. (Same course as Geography 233.) Offered irregularly.—Wheeler
*(change in existing course—eff. fall 12)*

**260. Landscape and Power (4)**
Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. How various representations of landscape have historically worked as agents of cultural power. Course framework is interdisciplinary, including studies of landscape representation in literature, art, photography, cartography, cinema, and landscape architecture. (Same course as Geology 252.)—I. (I.) Schenker
*(change in existing course—eff. winter 14)*

# Latin

## New and changed courses in Latin (LAT)

### Lower Division

**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: ArtHum | AH.—I. (I.) Popescu, Rundin
*(change in existing course—eff. winter 13)*

**2. Elementary Latin (5)**
Lecture—5 hours. Prerequisite: course 1. Continuation of course 1. GE credit: ArtHum | AH.—II. (II.) Rundin
*(change in existing course—eff. winter 13)*

**3. Intermediate Latin (5)**
Lecture—5 hours. Prerequisite: course 2. Continuation of course 2. Selected readings from Latin authors. GE credit: ArtHum | AH.—III. (III.) Rundin
*(change in existing course—eff. winter 13)*

### Upper Division

**100. Readings in Latin Prose (4)**
Lecture/discussion—4 hours. Prerequisite: course 3 or the equivalent. Review of Latin morphology, grammar, and vocabulary. Readings in prose authors, including Julius Caesar. GE credit: AH.—I. (I.) Stem
*(change in existing course—eff. fall 14)*

**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: ArtHum | AH, WC, WE.—Seal
*(change in existing course—eff. winter 13)*

**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. May be repeated for credit when topics vary. Offered in alternate years. GE credit: ArtHum | AH, WC, WE.—Stem
*(change in existing course—eff. summer 12)*

**120. Readings in Imperial Latin Literature (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or equivalent. Readings in Imperial Latin literature. May be repeated two times for credit when topic differs. Offered in alternate years. GE credit: ArtHum | AH, WC, WE.—Stem
*(change in existing course—eff. winter 14)*

**121. Latin Prose Composition (4)**
Lecture—3 hours; term paper. Prerequisite: course 100 or equivalent. Prose composition. Offered in alternate years. GE credit: ArtHum | AH.
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC, WE.
*(change in existing course—eff. winter 13)*

# Law

## New and changed courses in Law (LAW)

### Graduate

**208A. Legal Research and Writing II (LLM) (2)**
Discussion—2 hours. Persuasive writing and oral advocacy. LLM section students complete integrated research and writing assignments, including a complaint, a strategic defense office memorandum, a motion to dismiss in federal court, and an appellate brief, with oral arguments by all students.
*(new course—eff. spring 14)*

**209AT. Patent Prosecution and Practice (2)**
Discussion—2 hours. Prerequisite: course 274 or consent of instructor. Essential aspects of patent prosecution: the role of the patent practitioner, claims and specification drafting, requirements, and strategy, appeals and post-grant proceedings, American Invents Act considerations, portfolio development and strategy, and litigation considerations.
*(change in existing course—eff. spring 13)*

**210B. Sociology of Criminal Procedure (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.
*(new course—eff. spring 14)*

**211. Negotiation (2)**
Discussion—2 hours. Limited enrollment. Skills course teaches theoretical and empirical approaches to negotiation strategy for the purposes of making deals and resolving disputes. Students participate in simulations to hone their negotiation skills, and write analytical papers.
*(change in existing course—eff. fall 14)*

**213T. Terrorism and International Law (2)**
Seminar—2 hours. International terrorism remains a pressing concern. Devising effective remedies for responding to it within the bounds of the law is critical. Therefore, the new generation of international lawyers needs to be familiar with the relevant law and standards.
*(new course—eff. fall 13)*

**216A. Law and Religion (2)**
Discussion—2 hours. Restricted to 20 students. 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. spring 14)*

**216T. Aoki Social Justice Initiative-Criminal Law and Society (4)**
*(cancelled course—eff. spring 14)*

**218TB. Law of War (3)**
Discussion—3 hours. Surveys the law of armed conflict as it applies to today's battlefields.
*(new course—eff. fall 13)*

**218TC. Antidiscrimination Law (4)**
Discussion—4 hours. Course offers an overview of federal constitutional and statutory antidiscrimination law in the United States.
*(new course—eff. fall 14)*

**219. Evidence (4)**
Discussion—4 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. spring 14)*

**220B. Tax and Distributive Justice (2)**
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).
*(change in existing course—eff. spring 15)*

**220T. State and Local Taxation (3)**
Discussion—3 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. fall 13)*

**221. Trusts, Wills and Decedents' Estates (3)**
Discussion—3 hours. Study of the law of decedent's estates, wills, and trusts.
*(change in existing course—eff. fall 14)*

**222. Critical Race Theory Seminar (3)**
Discussion—3 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. spring 13)*

**224. Animal Law Seminar (2)**
Seminar—2 hours. An introduction to legal principles affecting animals and their use. GE credit: WE.
*(change in existing course—eff. fall 13)*

**228. Business Planning and Drafting (3)**
Discussion—3 hours; extensive writing. Prerequisite: course 215 Business Associations (this prerequisite will not be waived, so do not register for the course unless you have completed Business Associations. Limited enrollment. Introduces students to a number of legal and business considerations relevant to forming and operating an emerging growth business (such as technology startup).

**228C. Law and Statistics (3)**
Discussion—3 hours. Introduction to fundamentals of statistical analysis and how statistical analysis is used in the law and public policy. Course goal is to help students become excellent consumers of statistical information and evidence.
*(new course—eff. spring 14)*

**231A. Sexual Orientation, Gender Identity, and the Law (2)**
Discussion—2 hours. Examines the legal and social regulation of sexual orientation and gender identity.
*(change in existing course—eff. fall 14)*

**232T. Property Law & Race (2)**
Seminar—2 hours. Seminar explores the extent to which property law (common law, federal, state, and local statutes, and administration regulations) historically impacted and currently shapes conceptions of race, racial groups, and racial relations.
*(new course—eff. fall 14)*

**236. Securities Regulations (3)**
Discussion—3 hours. Prerequisite: course 215. Regulation of the distribution of securities under the Securities Act of 1933 and SEC Rules adopted there under, registration and reporting provisions of the 1934 Securities Exchange Act.
*(new course—eff. spring 14)*

**237. Legal History (2)**
Discussion—2 hours. Course traces the development of the common law from its origins in medieval England through the twentieth-century.
*(change in existing course—eff. fall14)*

**241T. Voting Rights Seminar (2)**
Seminar—2 hours. Seminar addresses current issues in the protection of voting rights, particularly the voting rights of racial and ethnic minorities.
*(change in existing course—eff. fall 14)*

**242. Conflict of Laws (2)**
Discussion—3 hours. Study of how law operates across state and national borders. Topics include choice of applicable law in transactions involving multiple jurisdictions, recognition of judgments, and the exercise of jurisdiction.
*(change in existing course—eff. spring 14)*

**243A. Secured Transactions (3)**
Discussion—3 hours. Secured transactions are transactions where a lender takes an interest in debtor's property as "collateral," or security, for repayment of a loan. Covers secured transactions in personal property such as auto and bank loans against business inventory.
*(change in existing course—eff. fall 14)*

**247. Taxation of Partnerships and LLCs (2)**
Discussion—2 hours. Prerequisite: course 220. Study of the federal income tax treatment of partnerships and partners; including entities classified as partnerships.
*(change in existing course—eff. spring 14)*

**248B. International Human Rights (2)**
Discussion—2 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 13)*

**248T. Advanced International Law (3)**
Discussion—3 hour. Prerequisite: basic course in international law or consent of instructor. Review books of international law; Hugo Grotius and Judge

Rosalyn Higgins. Themes include peaceful resolutions of dispute, law of war and peace, and international legal process. GE credit: WE

*(change in existing course—eff. spring 14)*

**250BT. Writing Requirement Workshop (2)**
Seminar—2 hours. Students who have written a course paper or an independent study paper and would like to take papers to the next level, producing a work of publishable quality. (S/U grading only.) GE credit: WE.

*(new course—eff. fall 13)*

**254T. Practicum in Rural Community Advocacy (3)**
Seminar—3 hours. Provides an opportunity to learn about Participatory Action Research (PAR) methods and community–based lawyering in the context of rural community development and advocacy. Using these skills and knowledge to serve rural California communities.

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

**257B. Statutory Interpretation (3)**
Discussion—3 hours. Elective course for Environmental Law Certificate Program. Provides an introduction to the theory and practice of statutory interpretation.

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

**260AT. Employment Law (2)**
Discussion—2 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.

*(change in existing course—eff. spring 14)*

**264. Water Law (2)**
Discussion—2 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.

*(change in existing course—eff. spring 14)*

**264A. Ocean and Coastal Law (2)**
Discussion—2 hours. Introduction to the goals and challenges of coastal and ocean policy; the complicated web of public and private interests in coastal lands and ocean waters; regulation of coastal development; domestic and international fisheries management; and preservation of ocean resources.

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

**266A. Cyberlaw (2)**
Discussion—2 hours. Emerging legal issues crucial to the conduct of business in cyberspace. Discussion of the evolution and current administration of the Internet and the World Wide Web.

*(change in existing course—eff. fall 14)*

**269. Basic Finance for Lawyers (2)**
Discussion—2 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 14)*

**269AT. The Financial Crisis: Law & Policy and Inequality (2)**
Seminar—2 hours. Examines the regulation of financial intermediaries. The stated goal of regulation is to ensure systemic stability and to pursue consumer protection. We will ask whether there is an imbalance between systematic stability and consumer protection before the crisis of 2008.

*(new course—eff. spring 13)*

**270T. Life-Cycle Business Transactions (3)**
Discussion—3 hours. Prerequisite: Business Associations and/or Trusts, Wills & Estates are recommended for enhanced comprehension. Class focuses on analysis of contract drafting design for various types of transactions and actual transactional documents typically encountered.

*(new course—eff. fall 14)*

**271T. Nonprofit Organizations-Key Legal Topics (2)**
Discussion—2 hours. Legal issues raised in operating and governing a nonprofit organization, primarily a public charity.

*(new course—eff. spring 14)*

**274A. International Intellectual Property and Development (2)**
Discussion—2 hours. 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. spring 14)*

**274BT. Law of Trade Secrets and Restrictive Covenants (2)**
Discussion—2 hours. Focus is on the law of trade secrets, including the Uniform Trade Secret Act (UTSA), restrictive covenants not to compete, and current case law developments in the areas of employee mobility and raids, and corporate espionage.

*(change in existing course—eff. fall 13)*

**274CT. Knowledge Commons, Collaborative Authorship, Open Access (2)**
Seminar—2 hours. Focuses on the increasingly global diffusion and success of collaborative forms of cultural and technoscientific production rooted in copyright-based licenses.

*(new course—eff. spring 13)*

**274T. Theory and History of Intellectual Property (2)**
Seminar—2 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.

*(change in existing course—eff. spring 14)*

**275. Complex Litigation (2)**
Discussion—2 hours. Issues that frequently arise in large complex litigation involving multiple parties and multiple claims.

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

**277. Native American Law (3)**
Discussion—3 hours. Seminar focuses on legal relations between Native American tribes and the federal and state governments.

*(change in existing course—eff. fall 13)*

**280. Advanced Legal Writing: Analytical & Persuasive Writing (2)**
Seminar—2 hours. Prerequisite: consent of instructor. Develop essay writing skills and performance test drafting typically employed on the bar examination. (S/U grading only.)

*(change in existing course—eff. fall 13)*

**280AT. Legal Analysis (2)**
Discussion—2 hours. Selected enrollment by permission of professor; 2L's only. Focuses on skills critical to law school success, and ultimately, bar exam success. (S/U grading only.)

*(new course—eff. fall 13)*

**280BT. Problem Solving and Analysis (2)**
Discussion—2 hours. Prerequisite: consent of instructor. Restricted to third-year Law students only. Skills focused on the development of legal analytical and organizational methods essential to successful completion of the Performance Test component of the California Bar Exam (and other states), and, by extension, to success in the practice of law. (S/U grading only.)

*(change in existing course—eff. fall 14)*

**284. Law and Economics (4)**
Discussion—4 hours. Prior study of economics is not required. Introduces students to the economic analysis of law.

*(change in existing course—eff. fall 13)*

**285. Environmental Law (4)**
Discussion—4 hours. Introduction to environmental law focusing primarily on federal law.

*(new course—eff. fall 14)*

**285A. California Environmental Issues (2)**
Discussion—2 hours. The procreativity 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.

*(change in existing course—eff. fall 14)*

**285F. Environmental Justice (2)**
Discussion—3 hours. Introduction to the field of environmental justice.

*(new course—eff. spring 14)*

**285T. Wine and the Law (2)**
Seminar—2 hours. Surveys the legal landscape of this multi-billion dollar industry, focusing on contemporary debates and developments in judicial, legislative, and administrative arenas.

*(change in existing course—eff. spring 14)*

**285TA. Environmental Law Seminar: Emerging Technologies and the Environment (2)**
Seminar—2 hours. Examines legal regimes that might apply to various emerging technologies and consider governance mechanisms and reforms that might enable more foresighted and participatory development and management of technology.

*(change in existing course—eff. fall 13)*

**286. Health Care Law (3)**
Discussion—3 hours. Addresses legal issues raised in general areas: access to health care and health care financing. Course materials and discussion focus on both public and private aspects of these issue areas. GE credit: WE.

*(change in existing course—eff. fall 13)*

**290T. International Trade Law (4)**
Discussion—4 hours. Review existing landscape of trade regulation from the World Trade Organizations, to regional organizations such as NAFTA, ASEAN, and the European Union.

*(new course—eff. fall 14)*

**293AT. Contemporary Issues in Economic Justice (2)**
Discussion—2 hours. Provides an introduction to the social justice critique of free markets.

*(new course—eff. spring 13)*

**293T. Public Interest Lawyering, Civil Rights and Employment Law (2)**
Seminar—2 hours. Prerequisite: course 260; 260AT. Advanced course covers employment law issues through the lens of public interest lawyers and their constituencies.

*(new course—eff. spring 14)*

**296T. Entertainment Law (2)**
Discussion—2 hours. Explores the many facets of Entertainment Law.
*(change in existing course—eff. spring 14)*

### Professional

**400D. Study Abroad - University of Lausanne, Switzerland (12)**
Independent study. Student must apply and be accepted in the International Study Abroad Program. Semester-away study abroad at the University of Lausanne, Switzerland. Enhance knowledge of international legal regimes and obtain a global legal educational experience. (S/U grading only)
*(new course—eff. fall 13)*

**400S. Critical Topics in Environmental Law in a Comparative Perspective (2)**
Seminar—2 hours. Enrollment by application only. Intensive, two-week program provides an opportunity for U.S. and international law students to study environmental law by examining and comparing European Union and U.S. environmental law policies and regulatory regimes. (S/U grading only)
*(new course—eff. summer 14)*

**414A. Negotiations Board (1)**
Variable—1 hour. Prerequisite: consent of instructor. Members of the King Hall Negotiations Board assist in the administration of the King Hall Negotiation Team by performing a variety of tasks under the supervision of the course instructor. One unit of credit for each semester of service on the board, up to a maximum of two units per academic year. Credit is awarded only after approval by the instructor. (P/NP grading only.)
*(new course—eff. fall 12)*

**430. Federal and State Taxation Externship (2-6)**
Clinical activity—2-12 hours. Prerequisite: course 220. Students will have the opportunity to work with the Internal Revenue Service or other governmental tax agency. Journals and attendance at group meetings are required. (S/U grading only.)
*(change in existing course—eff. fall 13)*

**440. Immigration Law Clinic (2-12)**
*(new course—eff. fall 13)*

**440A. Immigration Law Clinic (4)**
Clinical Activity—8 hours. Prerequisite: Prior or concurrent enrollment in course 292. Each student is required to enroll for two semesters, receiving four units each semester for total of eight units. 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 13)*

**440B. Immigration Law Clinic (4)**
Clinical Activity—8 hours. Prerequisite: Prior or concurrent enrollment in course 292. Each student is required to enroll for two semesters, receiving four units each semester for total of eight units. 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 13)*

**485. California Supreme Court Clinic (6)**
Clinical activity—6 hours. Class size limited to 6 students. California Supreme Court Clinic provides students with an immersive experience in litigating cases before the state's highest court.
*(change in existing course—eff. fall 13)*

**490T. Aoki Federal Public Defender Clinic (4)**
Clinical activity—4 hours. Students submit applications for the course. Outgrowth of the work of the Aoki Center on Race and Nation. As part of its work, the Aoki Center provides educational opportunities to students interested in critical race perspectives in practice.
*(change in existing course—eff. fall 14)*

**498. Group Study (1-4)**
Prerequisite: consent of instructor. Groups of students with common interest in studying a stated legal problem may plan and conduct their own research and seminar program under the direction of faculty. Class size limited to no fewer than 4 or more than 10 students. (S/U grading only.)
*(change in existing course—eff. fall 12)*

**498A. Group Study (1-4)**
Prerequisite: consent of instructor. Groups of students with common interest in studying a stated legal problem may plan and conduct their own research and seminar program under the direction of faculty.
*(new course—eff. fall 12)*

# Linguistics

## New and changed courses in Linguistics (LIN)

### Lower Division

**1Y. Introduction to Linguistics (4)**
Web Virtual Lecture—3 hours; discussion—1 hour. Introduction to the study of language; its nature, diversity, and structure. GE credit: ArtHum or SocSci, Wrt | AH or SS.—I, II, III. (I, II, III.)
*(new course—eff. spring 14)*

**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: ArtHum or SocSci | AH or SS, OL. WC.—II. (II.) Farrell, Feng, Ramanathan
*(change in existing course—eff. winter 13)*

**21. Introduction to Reading and Composition for Non-Native Speakers (5)**
*(cancelled course—eff. winter 14)*

**22. Intermediate Reading and Writing for Non-Native Speakers (4)**
*(cancelled course—eff. winter 14)*

**23. Advanced Reading and Composition for Non-Native Speakers (4)**
*(cancelled course—eff. winter 14)*

### Upper Division

**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: ArtHum | AH.—I. Farrell, Orgun
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—II. Farrell, Aranovich
*(change in existing course—eff. winter 13)*

**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 and University Writing Program 106.) GE credit: ArtHum | AH.
*(change in existing course—eff. winter 14)*

**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: ArtHum | AH.—II. Orgun
*(change in existing course—eff. winter 13)*

**112. Phonetics (4)**
Lecture—3 hours; term paper. Prerequisite: course 1. Detailed examination of articulatory and acoustic phonetics. GE credit: SciEng | SE.—I. Orgun
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—III. Aranovich
*(change in existing course—eff. winter 13)*

**127. Text Processing and Corpus Linguistics (4)**
Lecture—3 hours; extensive problem solving. Prerequisite: course 1, course 5, course 6, or Anthropology 4. Investigation of the lexical organization of human languages through corpus linguistics. Application of principles of linguistic analysis, automatic text processing, and statistical research to solving problems of textual evaluation and classification, as well as information retrieval and extraction. Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, QL.—III. Aranovich
*(new course—eff. spring 14)*

**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: ArtHum | AH.—III. Aranovich, Farrell
*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH.—I. Ojeda
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—Hawkins
*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH.—III. Farrell, Hawkins
*(change in existing course—eff. winter 13)*

**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: SocSci | SS, WE.—(III.) Ramanathan
*(change in existing course—eff. winter 13)*

**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: SocSci, Div, Wrt | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.—(I.) Uchikoshi
*(change in existing course—eff. winter 13)*

**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: SciEng or SocSci | SE or SS.—II. Ojeda
*(change in existing course—eff. winter 13)*

**180. Second Language Learning and Teaching (4)**
Lecture/discussion—4 hours. 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: SocSci, Div, Wrt | SS, WE.—I. (I.) Menard-Warwick
*(change in existing course—eff. fall 13)*

### Professional

**300. Language Pedagogy (4)**
Lecture/discussion—4 hours. Prerequisite: graduate standing in Linguistics or consent of instructor; concurrent enrollment in course 297T recommended. Methods of teaching second languages to nonnative speakers, stressing particularly recent linguistic methodology and techniques, as related to teaching and tutoring in the UC Davis ESL program.—I. (I.) Menard-Warwick
*(change in existing course—eff. fall 13)*

# Management

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

### Lower Division

**11A. Elementary Accounting (4)**
Lecture—3 hours; discussion—1 hour. Basic concepts of accounting; interpreting and using financial statements; understanding accounting principles. GE credit: SocSci | SS.—I, II. (I, II.)
*(change in existing course—eff. spring 14)*

**11B. Elementary Accounting (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 11A. Theory of product costing; Analyzing the role and impact of accounting information on decision making; planning and performance evaluation. GE credit: SocSci | SS.—III. (III.)
*(change in existing course—eff. fall 13)*

### Graduate

**224. Managing Human Resources (3)**
Lecture/discussion—3 hours. Restricted to students in the MBA program. Explore choices firms make in managing workers; decisions as to wages, benefits, working conditions, and other management policies and practices. Analyze employment systems' fit with firms' environments and strategies, and consequences of choices managers make regarding policies and practices. Not open to students who have taken MGT/B 224.—II. (II.) Hsu
*(change in existing course—eff. winter 14)*

**239. Digital Marketing (3)**
Lecture/discussion—3 hours. Prerequisite: course 204. Course equips students for a career in digital marketing and social media. Topics include online advertising, search engine optimization, interactive mktg, online privacy issues, e-commerce, social influence, social network theory, measurement of social influence, integrating social and traditional media.—III. (III.) Yoganarasimhan
*(new course—eff. spring 14)*

**252. Managing for Operational Excellence (3)**
Lecture—3 hours. Open to students in the Graduate School of Management. Explores the management of operations as applied to manufacturing as well as services provided both inside and outside the organization. Develop an understanding of how uncertainty affects planning and delivery by looking at fundamental models of operations.—IV. (IV.) Woodruff
*(change in existing course—eff. winter 14)*

**268. Articulation and Critical Thinking (3)**
Laboratory/discussion—3 hours. With commitment to this course, students will become competent public speakers, write well at a level expected in business, think efficiently and critically about business challenges and have a useful personal code of ethics to shape their actions and decisions. No student may repeat course for credit.—I. (I.)
*(change in existing course—eff. winter 14)*

### Professional

**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
*(new course—eff. spring 13)*

**408. The Business of the Media (1)**
Lecture/discussion—1 hour. Focuses on the media industries and how emerging digital technologies are disrupting the way media consumption, distribution and business models work. Will highlight the economics of several media – both news and entertainment. (S/U grading only.)—III, IV. (III, IV.)
*(new course—eff. spring 12)*

**409. Managing Multi-Asset Class Investment Portfolios (1)**
Lecture/discussion—1 hour. Prerequisite: course 202A, 203A, 205. Covering a wide variety of investment principles, both theoretical and pragmatic. Helps prepare students to more thoughtfully approach investment decision-making. Topics include: Endowments, pension funds, family offices, sovereign wealth funds, and insurance companies.—III. (III.)
*(change in existing course—eff. spring 14)*

**410. Corporate Governance (1)**
Lecture/discussion—1 hour. Covers recent and not-so-recent business and accounting scandals, discuss how corporations can better operate in the interests of shareholders and the public, and learn from people who rely on corporate governance in making investment decisions. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.) Maher
*(change in existing course—eff. winter 14)*

**411. Turnaround Management (1)**
Lecture/discussion—1 hour. Evaluate the financial performance of a company, identify opportunities for improvement, propose real solutions to enhance performance, and most important inspire action in staff. (S/U grading only.)—I, II, III. (I, II, III.)
*(new course—eff. spring 13)*

**412. International Marketing (1)**
Lecture/discussion—1 hour. Understanding basic concepts of international marketing. Understanding and managing heterogeneous, dynamic, and interdependent environments across countries. How to develop and implement an international marketing strategy: where and how to compete, how to adapt to your marketing mix.—II. (II.) Peters
*(new course—eff. winter 13)*

**413. Sustainable Business Ventures: Business and Energy (1)**
Lecture/discussion—1 hour. Introduction to sustainability goals, indicators, values, measurement techniques, and practice how it applies to large and small enterprise.—II. (II.) Jaffe
*(new course—eff. spring 13)*

**414. Multi-Channel Marketing (1)**
Lecture/discussion—1 hour. Multi-channel marketing strategies empower managers to create value for different customer segments. Covers the necessary concepts to evaluate and select go-to market strategies in order to capitalize on the ubiquity of modern customers. (S/U grading only.)—II. (II.) Rubel
*(new course—eff. winter 13)*

**415. Climate Risks and Opportunities (1)**
Lecture/discussion—1 hour. Provide a working knowledge of the risks and opportunities arising from climate change and climate policy for businesses. (S/U grading only)—IV. (IV.) Mazzacurati
*(change in existing course—eff. summer 14)*

**416. Topics in Private Equity (1)**
Lecture—1 hour. Prerequisite: course 205. Restricted to students in the MBA program. Focuses on the finance principles related to the risk and return of the private equity (PE) industry, valuation of PE target

companies, the structuring of leveraged buyouts (LBOs), and the management of portfolio companies. (S/U grading only.)—II. (II.) Yasuda

*(new course—eff. fall 13)*

**417. Incentives and Controls (1)**
Lecture/discussion—1 hour. Understand how organizations use financial and nonfinancial performance management and incentive systems to motivate people and manage resources. (S/U grading only)—I, II, III, IV. (I, II, III, IV.) Maher

*(new course—eff. spring 14)*

**418. Scientific Discovery and Business Innovation at Scale in the Food and Agriculture Sector (1)**
Lecture—3 hours. Restricted to students in the MBA program. Scientific discovery and business innovation within the food and agriculture sector profoundly influences the sustainability of society and enterprise competitiveness. Students will learn how business innovation models co-exist antagonistically or synergistically with scientific discovery and its influence on enterprise competitiveness. (S/U grading only)—I, II, III, IV. (I, II, III, IV.) Schmitz

*(new course—eff. spring 14)*

**440. Integrated Management Project (3)**
Project—3 hours. Prerequisite: first-year core courses of M.B.A. program. Applies classroom learning to solve complex business challenges for real world clients. Student teams learn practical consulting skills while their clients benefit from the student's experience, insights, and work product.—III, IV. (III, IV.)

*(new course—eff. summer 12)*

**440A. Integrated Management Project (3)**
Lecture/discussion—3 hours. Prerequisite: first-year core courses of MBA program. Restricted to full-time (day) MBA students. Applies classroom learning to solve complex business challenges for real world clients. Student teams learn practical consulting skills while their clients benefit from the student's experience, insights, and work product. (Deferred grading only, pending completion of sequence.)—I. (I.)

*(new course—eff. fall 12)*

**440B. Integrated Management Project (3)**
Project—3 hours. Prerequisite: first-year core courses of MBA program. Restricted to full-time (day) MBA students. Applies classroom learning to solve complex business challenges for real world clients. Student teams learn practical consulting skills while their clients benefit from the student's experience, insights, and work product. (Deferred grading only, pending completion of sequence.)—II. (II.)

*(new course—eff. spring 13)*

**490. Directed Group Study Management Practicum (3)**
Lecture/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. May be repeated for credit. Offered irregularly.—IV. (IV.)

*(change in existing course—eff. summer 12)*

**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 Adviser. 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. winter 12)*

# Mathematics

## New and changed courses in Mathematics (MAT)

## Lower Division

**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: SciEng | QL, SE, SL.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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. Introduction to differential calculus via applications in biology and medicine. Limits, derivatives of polynomials, trigonometric, and exponential functions, graphing, applications of the derivative to biology and medicine. Not open for credit to students who have completed course 16B, 16C, 21A, 21B, or 21C; only 2 units of credit to students who have completed course 16A. GE credit: SciEng | QL, SE, SL.—I, II, III. (I, II, III.)

*(change in existing course—eff. fall 14)*

**17C. Calculus for Biology and Medicine (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 16B, 17B, or 21B. Matrix algebra, functions of several variables, partial derivatives, systems of differential equations, and applications to biology and medicine. Not open for credit to students who have completed course 21C; only 2 units of credit to students who have completed course 16C. GE credit: SciEng | SE, SL.—III. (III.)

*(change in existing course—eff. fall 14)*

**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.

*(change in existing course—eff. winter 13)*

**21BL. Emerging Scholars Program Calculus Workshop (2)**
Workshop—6 hours. Prerequisite: course 21A or 21AH; concurrent enrollment in 21B. Continuation of course 21A. Same course content as 21B. Enrollment for students in the Emerging Scholars Program by instructor's invitation only. Offered irregularly. (P/NP grading only.) GE credit: SE.

*(change in existing course—eff. winter 13)*

**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.

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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.)

*(change in existing course—eff. winter 13)*

**22B. Differential Equations (3)**
Lecture—3 hours. Prerequisite: courses 21C; 22A or 67. Solutions of elementary differential equations. GE credit: SciEng | QL, SE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I, III. (I, III.)

*(change in existing course—eff. winter 13)*

## Upper Division

**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: SciEng, Wrt | SE.—I, II. (I, II.)

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.)

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—(II.)

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—I. (I.)

*(change in existing course—eff. winter 13)*

**115B. Number Theory (4)**
Lecture—3 hours; extensive problem solving. Prerequisite: courses 22A or 67 (or equivalent) and 115A (or equivalent). Euler function, Moebius function, congruences, primitive roots, quadratic reciprocity law. Offered in alternate years. GE credit: SciEng | QL, SE, SL.—II.
*(change in existing course—eff. fall 14)*

**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: SciEng | SE.—(III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—I. (I.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—II. (II.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—II. (II.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—III. (III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—(III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I, II. (I, II.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II, III. (II, III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—I. (I.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—II. (II.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—III. (III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—III. (III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL.—III.
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—I, II. (I, II.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—III. (III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, VL.—III. (III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—II. (II.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.)
*(change in existing course—eff. winter 13)*

**147. Topology (4)**
Lecture—3 hours; extensive problem solving. Prerequisite: courses 22A or 67; 125A. Basic notions of point-set and combinatorial topology. GE credit: SciEng | SE.—III. (III.)
*(change in existing course—eff. fall 14)*

**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: SciEng | QL, SE.—II. (II.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. (I.)
*(change in existing course—eff. winter 13)*

**150B. Modern Algebra (4)**
Lecture/discussion—4 hours. Prerequisite: course 150A. Bilinear forms, rings, factorization, modules. GE credit: SciEng | SE.—II. (II.)
*(change in existing course—eff. winter 13)*

**150C. Modern Algebra (4)**
Lecture/discussion—4 hours. Prerequisite: course 150B. Group representations, fields, Galois theory. GE credit: SciEng | SE.—III. (III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—I. (I.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—III. (III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III.
*(change in existing course—eff. winter 13)*

**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: SciEng, Wrt | OL, QL, SE, WE.—II.
*(change in existing course—eff. winter 13)*

**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.)
*(change in existing course—eff. winter 13)*

**199. Special Study for Advanced Undergraduates (1-5)**
(P/NP grading only.) GE credit: SE.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

# Medicine, School of

## New and changed courses in Medical Sciences (MDS)

## Professional

**405. Metabolism, Endocrinology, Reproduction and Nutrition (9.5)**
Lecture—3.8 hours; discussion/laboratory—2.8 hours. Prerequisite: consent of instructor. Restricted to Medical school students. Basic and pathophysiologic processes involved in human metabolic and nutritional regulation and in reproductive and endocrine control systems across the lifespan. Integrate information across these systems and use clinical reasoning process to identify and understand relevant perturbations and diseases. (P/F grading only; deferred grading only, pending completion of sequence.)—II, III. (II, III.) Hou, Sweeney, Turgeon
*(new course—eff. winter 13)*

**406. Endocrinology, Nutrition, Reproduction and Genetics (9.5)**
Lecture—3.8 hours; discussion/laboratory—2.8 hours. Prerequisite: Biological Chemistry 410A; Human Physiology 400. Restricted to Medical students only. Basic and pathophysiologic processes involved in human reproductive and endocrine control systems, nutritional regulation, and foundational genetics across the lifespan. Integrate information across these systems and use clinical reasoning process to identify and understand relevant perturbations and diseases. May be repeated three times for credit. (P/F grading only; deferred grading only, pending completion of sequence.)—II, III. (II, III.) Hou, Segal, Turgeon
*(new course—eff. winter 14)*

**420. Multisystem Clinical Presentations (0.5)**
Extensive problem solving—15 hours; independent study—6 hours. Prerequisite: completion of Pathophysiology Block; consent of instructor. Capstone course integrates coursework, knowledge, skills and experiential learning to enable the student to demonstrate a broad mastery of learning across the curriculum. (P/F grading only.)—III. (III.) Venugopal
*(new course—eff. winter 14)*

**468. Multidisciplinary International Preceptorship (1-12)**
Clinical activity—30 hours. Prerequisite: medical students with consent of instructor. Multidisciplinary preceptorship in a foreign country. Participate in clinical and didactic learning experiences. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)
*(change in existing course—eff. fall 12)*

**489C. Clinical Reintroduction Experience (1-9)**
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
*(change in existing course—eff. summer 12)*

**493B. International and Comparative Health Care—Clinical (3-9)**
Clinical activity—30 hours. Prerequisite: consent of 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)—I, II, III, IV. (I, II, III, IV.) Wilkes
*(change in existing course—eff. spring 14)*

**493QA. Improving Quality in Health Care (3)**
Lecture—8 hours; discussion/laboratory—10 hours; project—10 hours. Prerequisite: consent on 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. (Same course as Nursing 493A.) (H/P/F grading only; deferred grading only, pending completion of sequence.)—I. (I.) Bakerjian, Shaikh
*(change in existing course—eff. fall 12)*

**493QB. Improving Quality in Health Care (3)**
Lecture—8 hours; discussion/laboratory—10 hours; project—10 hours. Prerequisite: consent on 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. (Same course as Nursing 493B.) (H/P/F grading only; deferred grading only, pending completion of sequence.)—II. (II.) Bakerjian, Shaikh
*(change in existing course—eff. fall 12)*

**493QC. Enhancing Patient Safety in Health Care (6)**
Seminar—6 hours; clinical activity—8 hours; discussion—6 hours. Prerequisite: fourth-year Medical student; consent of instructor. Inter-professional module is designed to explore the theory and practical methods being employed to improve patient safety in health care while providing an opportunity for interprofessional educational experience. (Same course as Nursing 493C.) (H/P/F grading only.)—II, III, IV. (II, III, IV.) Bakerjian, Natale
*(new course—eff. spring 13)*

# Medicine: Biological Chemistry

## New and changed courses in Biological Chemistry (BCM)

## Professional

**405. Metabolism, Endocrinology, Reproduction and Nutrition (9.5)**
*(cancelled course—eff. spring 12)*

**410A. Genetics and Molecular Medicine (4)**
Lecture—3 hours; discussion—3 hours; web virtual lecture—1 hour. Prerequisite: consent of instructor. Medical Students only. Biochemistry of proteins and nucleic acids. Includes an introduction to cancer biology and a full discussion of carbohydrate metabolism. Introduction to medical genetics and the clinical consequences of genetic abnormalities. Molecular aspects of human disease are highlighted throughout the course. (Same course as Pediatrics 420.) (P/F grading only; deferred grading only, pending completion of sequence.)—I, IV. (I, IV.) Segal, Sweeney
*(change in existing course—eff. summer 12)*

# Medicine: Emergency Medicine

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

### Professional

**480. Emergency Medicine Health Policy (1-6)**
Lecture—4 hours; discussion—16 hours; independent study—10 hours. Prerequisite: consent of instructor. Current health policy issues affecting emergency medicine in California. Participation in policy discussions, attend meetings with California legislators and staff, and work with lobbyists to understand how policy is made in California. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Moulin
*(new course—eff. spring 13)*

# Medicine: Dermatology

## New and changed courses in Dermatology (DER)

### Professional

**420. Integumentary System (2)**
Lecture/discussion—3 hours: clinical activity—0.25 hours. Prerequisite: approval of School of Medicine Committee on Student Promotions. Restricted to Medical students only; student must have passed all SOM Year 1 courses. Cell biology, pathology, and physical diagnosis of the skin. Recognition of normal variations, and common or important dermatoses. Patient demonstrations of select conditions. (P/F grading only.)—I. (I.) Eisen, Isseroff
*(change in existing course—eff. fall 13)*

# Medicine: Family and Community Medicine

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

### Graduate

**252A. Professional Role Development (1-3)**
Seminar—1-3 hours. Prerequisite: enrollment in the Master's Track of the FNP Certificate Program. Professional role development and clinical management issues based on family nursing theory and research.—IV. (IV.) Hass
*(change in existing course—eff. summer 12)*

**252B. Professional Development (2)**
Lecture/discussion—2 hours. Prerequisite: enrollment in the Family Nurse Practitioner/Physician Assistant Program. Restricted to students in the Family Nurse Practitioner/Physician Assistant Program. Further exploration of the interprofessional, multidisciplinary team and the leadership role of nurse practitioners and physician assistants within a variety of practice environments. May be repeated two times for credit.—I, II, III, IV. (I, II, III, IV.) Bakerjian
*(change in existing course—eff. spring 14)*

### Professional

**300. Health Assessment for Advanced Practice (1-4)**
Lecture/discussion—3 hours; laboratory/discussion—2 hours; seminar—1 hour. Prerequisite: enrolled in the Family Nurse Practitioner or Physician Assistant Certificate Program, or consent of instructor. Fundamentals of clinical skills in health and physical assessment, effective communication in the clinical provider/patient relationship. Professional behavior and cultural sensitivity.—IV. (IV.) Ceesay-Slater, Himmerick
*(change in existing course—eff. summer 12)*

**300D. Health Assessment for Advanced Practice (1-5)**
Lecture/discussion—2 hours; laboratory/discussion—1.5 hours; clinical activity—1.5 hours. Prerequisite: enrollment in the Family Nurse Practitioner/Physician Assistant Program. Restricted to students in the Family Nurse Practitioner/Physician Assistant Program only. Instruction and practice of the fundamental clinical skills necessary for patient care comprise this course with a primary focus on advanced clinical skills, principles of clinical decision making, and verbal presentation skills. May be repeated two times for credit with instructor's recommendation. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.) Himmerick
*(new course—eff. spring 13)*

**331A. Scientific Basis of Diseases—A (3.5)**
Lecture/discussion—3 hours; web electronic discussion—5 hours. Prerequisite: registered student in the Family Nurse Practitioner or Physician Assistant Certificate Program or consent of instructor. Anatomy, physiology and concepts of pathophysiology.—IV. (IV.) Milton
*(change in existing course—eff. summer 12)*

**331B. Scientific Basis of Disease—B (3.5)**
Lecture/discussion—3.5 hours. Prerequisite: course 331A, registered student in the Family Nurse Practitioner or Physician Assistant Certificate Program or consent of instructor. Continuation of FAP 331B with expansion of concepts.—IV. (IV.) Milton
*(change in existing course—eff. summer 12)*

**354B. Fundamentals of Primary Health Care for FNP/PAs (8)**
Lecture/discussion—7 hours; web virtual lecture—1 hour. Prerequisite: enrollment in the Family Nurse Practitioner/Physician Assistant Program. Open to students in the Family Nurse Practitioner/Physician Assistant Program only. Etiology, epidemiology, pathophysiology, clinical presentation, differential diagnosis, laboratory diagnosis, treatment, patient education, preventive strategies, and psychosocial issues related to selected diseases and disorders which are commonly encountered in clinical practice. May be repeated two times for credit.—I, II, III, IV. (I, II, III, IV.) Hass, O'Rourke
*(change in existing course—eff. winter 13)*

**354C. Fundamentals of Primary Health Care for FNP/PA Students (8)**
Lecture/discussion—7 hours; web virtual lecture—1 hour. Open to students in the Family Nurse Practitioner/Physician Assistant Program only. Introduces primary health care concepts essential to the care of common medical problems seen in primary care settings. May be repeated two times for credit.—I, II, III, IV. (I, II, III, IV.) Hass, Henderson, O'Rourke, Newman
*(change in existing course—eff. fall 13)*

**358B. Pharmacology (2)**
Lecture/discussion—1 hour; discussion—1 hour. Prerequisite: consent of instructor. Restricted to registered students in the Family Nurse Practitioner/Physician Assistant Program. Addresses systems based pharmacology focused on classes of drugs used to treat disorders in the following systems: ENT, ophthalmology, endocrinology, gastrointestinal, and dermatology. Content is coordinated with the Fundamentals of Primary Health Care course. May be repeated two times for credit.—I, II, III, IV. (I, II, III, IV.) Brazil, Christiansen
*(change in existing course—eff. fall 12)*

**358D. Pharmacology (2)**
Lecture/discussion—1 hour; discussion—1 hour. Restricted to students in the Family Nurse Practitioner/Physician Assistant Program. Systems based pharmacology focused on classes of drugs used to treat disorders in the following systems: musculoskeletal/rheumatology, neurology, hematology/oncology, and psychiatry/behavioral medicine. May be repeated two times for credit.—I, II, III, IV. (I, II, III, IV.) Brazil, Christiansen
*(new course—eff. spring 13)*

**368A. Behavioral Science for FNP/PA Students (2)**
Lecture/discussion—1 hour; seminar—1 hour. Prerequisite: registered student in the Family Nurse Practitioner/Physician Assistant Certificate Program or consent of instructor. Normal psychosocial development in family system theory as it relates to primary care for assessment, coping, strategies, resources, and goals. Health behavioral changes. Chronic care model.—IV. (IV.) Henderson
*(change in existing course—eff. summer 12)*

### Professional

**430FA. SJVP Longitudinal Primary Care Clerkship at UCSF (A) (4)**
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. (H/P/F grading only; deferred grading only, pending completion of sequence.)—I. (I.) Eidson-Ton, Vierra
*(change in existing course—eff. summer 14)*

**430FB. SJVP Longitudinal Primary Care Clerkship at UCSF (B) (6)**
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. (H/P/F grading only; deferred grading only, pending completion of sequence.)—II. (II.) Eidson-Ton, Vierra
*(change in existing course—eff. summer 14)*

**430FC. SJVP Longitudinal Primary Care Clerkship at UCSF (C) (2)**
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going

patient write-ups, rounds, conferences are required. (H/P/F grading only; deferred grading only, pending completion of sequence.)—III. (III.) Eidson-Ton, Vierra

*(change in existing course—eff. summer 14)*

**430TA. TeachMS Longitudinal Primary Care Clerkship (A) (4)**

Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Internal Medicine and Psychiatry for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. (H/P/F grading only; deferred grading only, pending completion of sequence.)—I. (I.) Eidson-Ton, Vierra

*(new course—eff. fall 13)*

**430TB. TeachMS Longitudinal Primary Care Clerkship (B) (6)**

Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Internal Medicine and Psychiatry for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. (H/P/F grading only; deferred grading only, pending completion of sequence.)—II. (II.) Eidson-Ton, Henderson, Holt, Vierra

*(new course—eff. fall 13)*

**430TC. TeachMS Longitudinal Primary Care Clerkship (C) (2)**

Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Internal Medicine and Psychiatry for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. (H/P/F grading only; deferred grading only, pending completion of sequence.)—III. (III.) Eidson-Ton, Henderson, Holt, Vierra

*(new course—eff. fall 13)*

# Medicine: Human Physiology

## New and changed courses in Human Physiology (HPH)

### Professional

**405. Metabolism, Endocrinology, Reproduction and Nutrition (9.5)**

*(cancelled course—eff. spring 12)*

# Medicine: Internal Medicine

## New and changed courses in Internal Medicine (IMD)

### Upper Division

**164. Practicum in Community Health Clinic: Bayanihan Clinic (1-2)**

Clinical activity—5 hours. Through active participation in the medical aspects of community health clinics, the undergraduate student gains knowledge of the organization, administration, and problem-solving capabilities. May be repeated for credit. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.) Guerrero

*(new course—eff. winter 14)*

### Professional

**405. Metabolism, Endocrinology, Reproduction and Nutrition (9.5)**

*(cancelled course—eff. spring 12)*

**420C. Pulmonary & Critical Care Medicine (2.5)**

Laboratory/discussion—5.5 hours. Prerequisite: approval of SOM's Committee on Student Promotions. Restricted to Medical students only; student must pass all SOM Year 1 courses. Clinical aspects of respiratory anatomy, physiology, and pathology. Diagnostic procedures and a description of the major pulmonary diseases & disorders, and critical care medicine. (P/F grading only.)—I. (I.) Stollenwerk

*(change in existing course—eff. fall 13)*

**420D. Cardiovascular System (2.5)**

Lecture/discussion—5.5 hours. Prerequisite: Approval of the School of Medicine Committee on Student Promotions. Restricted to Medical students only; student mast pass all SOM Year 1 courses. Principles of etiology, mechanisms, diagnosis and management of the major diseases of the cardiovascular system. Included are ischemic, valvular, hypertensive, cardiomyopathic, pericardial, and electrical disorders. (P/F grading only.)—I. (I.) Venugopal

*(change in existing course—eff. fall 13)*

**430FA. SJVP Longitudinal Medicine Clerkship at UCSF (A) (4)**

Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. May be repeated for credit. (H/P/F grading only; deferred grading only, pending completion of sequence)—I. (I.) Aronowitz, Johl

*(change in existing course—eff. summer14)*

**430FB. SJVP Longitudinal Medicine Clerkship at UCSF (B) (6)**

Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. May be repeated for credit. (H/P/F grading only; deferred grading only, pending completion of sequence)—II. (II.) Aronowitz, Johl

*(change in existing course—eff. summer 14)*

**430FC. SJVP Longitudinal Medicine Clerkship at UCSF (C) (2)**

Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. May be repeated for credit. (H/P/F grading only; deferred grading only, pending completion of sequence)—III. (III.) Aronowitz, Johl

*(change in existing course—eff. summer14)*

**430TA. TeachMS Longitudinal Medicine Clerkship (A) (4)**

Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. May be repeated for credit. (H/P/F grading only; deferred grading only, pending completion of sequence.)—I. (I.) Aronowitz, Johl

*(new course—eff. fall 13)*

**430TB. TeachMS Longitudinal Medicine Clerkship (B) (4)**

Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. May be repeated for credit. (H/P/F grading only; deferred grading only, pending completion of sequence.)—II. (II.) Aronowitz, Johl

*(new course—eff. fall 13)*

**430TC. TeachMS Longitudinal Medicine Clerkship (C) (2)**

Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. May be repeated for credit. (H/P/F grading only; deferred grading only, pending completion of sequence.)—III. (III.) Aronowitz, Johl

*(new course—eff. fall 13)*

**462. Medicine Wards AI (6)**

Clinical activity—40 hours. Prerequisite: Medical Sciences 431; consent of instructor; demonstrated ability to accept responsibility. Limited enrollment. Assume role of acting intern and be primary physician on medical ward under direction of medical resident and staff. Teams I-V take call every fifth night. Emphasis on evidence-based inpatient care. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Henderson

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

# Medicine: Internal Medicine—Gastroenterology

## New and changed courses in Internal Medicine—Gastroenterology (GAS)

### Professional

**460. Gastroenterology Clinical Clerkship (3-18)**

Clinical activity—30 hours. Prerequisite: completion of third year of medical school. Work-up, manage, and follow-up new patients on active inpatient consulting service. Gastroenterology/Hepatology patients. Daily rounds with attending physician. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Terrado

*(change in existing course—eff. summer 13)*

# Medicine: Internal Medicine—General Medicine

## New and changed courses in Internal Medicine—General Medicine (GMD)

### Professional

**470. Health Care Ethics (3-9)**
Lecture/discussion—2 hours; laboratory/discussion—1 hour. Prerequisite: consent of instructor. Guided independent study of issues in biomedical ethics, with discussion of readings that are based on student interests and needs. Participation in ethics rounds. (Same course as Nursing 470.) (S/U grading only.)—I, II, III, IV. (I, II, III, IV.) Loewy
*(new course—eff. spring 12)*

# Medicine: Internal Medicine—Hematology-Oncology

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

### Professional

**420. Oncology (4)**
Lecture/discussion—2 hours. Prerequisite: approval by the SOM Committee on Student Promotions. Restricted to Medical student only; students must pass all Year 1 SOM courses. 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; deferred grading only, pending completion of sequence.)—I, II. (I, II.) Welborn
*(change in existing course—eff. fall 13)*

# Medicine: Internal Medicine—Pulmonary Medicine

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

### Professional

**460. Comprehensive Pulmonary Medicine Clerkship (3-6)**
Clinical activity—40 hours. Prerequisite: completion of second year of medical school and/or consent of instructor; completion of Internal Medicine Clerkship. Rotation intended to provide a comprehensive student education in Pulmonary Medicine. Students will participate in hands on clinical education, as well as completing an assigned curricula. Intended for students pursuing Internal Medicine & Primary Care careers. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Stollenwerk
*(change in existing course—eff. summer 13)*

**461. Critical Care Clinical Clerkship (3-6)**
Clinical activity—40 hours. Prerequisite: completion of second year of medical school and/or consent of instructor; completion of Internal Medicine and Surgical Clerkships. Rotation intended to provide student education in the Critical Care Management of sub-specialty patients. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Stollenwerk
*(new course—eff. summer 13)*

**462. Pulmonary Clinical Clerkship (3-6)**
Clinical activity—35 hours. Prerequisite: completion of second year of medical school and/or consent of instructor; completion of Internal Medicine Clerkship. Similar to course 460. Rotation designed for students interested in learning pulmonary medicine, but who desire more variety in their clerkships, and do not desire the comprehensive experience offered by a four-week pulmonary rotation. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Stollenwerk
*(change in existing course—eff. summer 13)*

# Medicine: Internal Medicine—Rheumatology-Allergy

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

### Graduate

**299. Research in Autoimmune Disease (1-12)**
Laboratory. Prerequisite: consent of instructor. Independent research will be encouraged in both animal models of human disease (including congenitally athymic [nude], asplenic, and New Zealand mice) and the cellular immune system of patients with systemic lupus erythematosus, Sjögren's syndrome, polymyositis and drug hypersensitivity. (S/U grading only.)—Adamopoulos
*(change in existing course—eff. winter 13)*

# Medicine: Medical Microbiology

## New and changed courses in Medical Microbiology (MMI)

### Lower Division

**10. Parasitic Disease in Humans (2)**
*(cancelled course—eff. spring 14)*

### Upper Division

**115. Ecological Parasitology (3)**
*(cancelled course—eff. spring 14)*

**116. Parasitology for Wildlife Biologists (3)**
*(cancelled course—eff. spring 14)*

### Graduate

**210. Animal Models of Infectious Disease Journal Club (1)**
*(cancelled course—eff. winter 14)*

**210A. Critical Analysis of Contemporary Research on Animal Models of Human (1)**
Lecture/discussion—1 hour. Prerequisite): students funded by the Animal Models of Infectious Diseases Training Grant; consent of instructor. Topics will include diverse vertebrate and invertebrate models of human infectious diseases. Limited enrollment. May be repeated for credit. (S/U grading only.)—II. (II.) Bevins, Solnick
*(new course—eff. fall 13)*

**210B. Comparative Analysis of Animal Models of Human Infectious Diseases (1)**
Lecture/discussion—1 hour. Compares the major vertebrate and invertebrate animal models that are used most commonly to study human infectious disease, including mouse, nonhuman primate, Caenorhabditis elegans, and drosophila. May be repeated for credit. Offered in alternate years. (S/U grading only.)—II. Bevins, Solnick
*(new course—eff. winter 14)*

**280. The Endogenous Microbiota in Lifespan Health and Disease (3)**
Lecture—3 hours. Prerequisite: graduate standing. Recent research into host-associated microbial communities has yielded important insights into the microbial communities inhabiting mucosal surfaces, and how the composition of these communities contributes to normal development, metabolism, education of the immune system, and disease susceptibility. Not open for credit to students who have completed Internal Medicine: Infectious Diseases 280.—III. (III.) Dandekar, Tsolis
*(change in existing course—eff. spring14)*

# Medicine: Obstetrics and Gynecology

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

### Professional

**405. Metabolism, Endocrinology, Reproduction and Nutrition (9.5)**
*(cancelled course—eff. spring 12)*

**430F. SJVP OBGYN Clerkship at UCSF (12)**
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Obstetrics, gynecologic and gynecological oncology experience in the delivery room, operating room, clinics and wards at UCSF Fresno. Rounds, conferences, interactive student presentations and seminars ongoing. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Hou
*(new course—eff. fall 13)*

**472. Family Planning and Reproductive Health (1-6)**
Clinical activity—30 hours; seminar—5 hours. Prerequisite: course 430; consent of instructor. Elective that will focus on the Gynecologic Subspecialty of Family Planning. Counseling and provision of contraceptive methods, experience with pelvic ultrasounds, management of spontaneous, inevitable and induced abortion and postabortion care by both surgical and medical techniques are included. May be repeated for credit. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV.) Hou
*(change in existing course—eff. spring 14)*

**494A. Shifa Clinic (1)**
Clinical activity—8 hours. Prerequisite: Medical student in good standing; consent of instructor. Interaction with patients from multiple ethnic and cultural backgrounds under the direct supervision of a physician/preceptor. Women's health issues and primary care issues in a diversely mixed population. (H/P/F grading only; deferred grading only, pending completion of sequence.)—IV. (IV.) Yasmeen
*(new course—eff. summer 12)*

**494C. Shifa Clinic (1)**
Clinical activity—8 hours. Prerequisite: Medical student in good standing; consent of instructor. Interaction with patients from multiple ethnic and cultural backgrounds under the direct supervision of a physician/preceptor. Women's health issues and primary

care issues in a diversely mixed population. (H/P/F grading only; deferred grading only, pending completion of sequence.)—II. (II.) Yasmeen

*(new course—eff. summer 12)*

# Medicine: Orthopaedic Surgery

## New and changed courses in Orthopaedic Surgery (OSU)

### Professional

**421. The Musculoskeletal System (2.5)**

Lecture/discussion—4 hours; discussion—2 hours. Prerequisite: consent of committee on student progress. Medical student only. Basic and clinical science of orthopaedic surgery and rheumatology. (P/NP grading only.)—I. (I.) Marder, VanDenBogaerde

*(change in existing course—eff. summer 12)*

**465. Externship in Advanced Orthopaedics (3-6)**

Clinical activity—40 hours. Prerequisite: fourth-year medical student in good academic standing and consent of instructor. Advanced Orthopaedic rotation done at an approved institution. Topics may include Trauma, Sports, Spine, Pediatrics, Joint and/or Foot/Ankle. Students are expected to perform at the level of an Intern. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

*(new course—eff. summer 13)*

# Medicine: Pathology

## New and changed courses in Medicine: Pathology (PMD)

### Professional

**407. Advanced Neuropathology (3)**

Lecture/discussion—40 hours. Prerequisite: third or fourth year medical student and consent of instructor. Restricted to Medical students only. Presents an integrated introduction to mechanisms of the central and peripheral nervous system injury. Students will gain an understanding of pathological mechanisms underlying disease, the anatomic and molecular manifestations of pathologic processes of the CNS and PNS. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Lechpammer

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

**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; deferred grading only, pending completion of sequence.)—II, III. (II, III.) Gandour-Edwards

*(change in existing course—eff. fall 13)*

# Medicine: Pediatrics

## New and changed courses in Medicine: Pediatrics (PED)

### Professional

**430F. SJVP Pediatric Clerkship at UCSF (12)**

Clinical activity—45 hours. Prerequisite: approval by SOM Committee on Student Progress. Restricted to medical student only. Eight-week clinical clerkship providing students with the opportunity to learn fundamentals of caring for the pediatric patient by participating in nursery, ambulatory and inpatient services at UCSF Fresno. Rounds, conferences, student presentations ongoing. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Butani

*(new course—eff. fall 13)*

# Medicine: Pharmacology and Toxicology

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

### Graduate

**205. Problem Solving in Pharmacology (1)**

Lecture/discussion—1 hour. Restricted to Graduate Students in Pharmacology and Toxicology, Chemistry and Clinical Research Graduate Groups; other students may be accepted with consent of instructor. Students will be introduced to a current biomedical problem that would benefit from a developing drug and will develop an experimental strategy for addressing the issue. Students will develop model systems for testing various classic and recent pharmacological approaches. May be repeated 12 times for credit. Course changes subjects every quarter; each course is unique and can be taken as often as desirable; certain students (Trainees of the Training Program in Pharmacological Sciences) must take course for at least three years.—I, II, III. (I, II, III.) Hell

*(new course—eff. fall 14)*

**208. Advanced Cardiac Physiology and Pharmacology (3)**

Lecture—2 hours; lecture/discussion—1 hour. Prerequisite: Pharmacology and Toxicology 201, Pharmacology and Toxicology 202, an equivalent course in general pharmacology or physiology (example, Biomedical Engineering 204), or knowledge of basic pharmacology/physiology. Open to graduate students from the Pharmacology and Toxicology, Molecular, Cellular and Integrated Physiology, Biomedical Engineering and Clinical Research Graduate Groups; other students (including undergraduates) may be accepted upon consultation with the instructors. Detailed characterization of the mechanisms involved in cardiac excitation–contraction coupling, alterations that occur in heart disease and pharmacological interventions. Topics include cardiac contractile apparatus, action potential, Ca cycling, excitation–transcription coupling, cardiac inotropy, heart failure and arrhythmias.—III. (III.) Bossuyt, Despa, Ripplinger

*(new course—eff. spring 13)*

# Medicine: Psychiatry

## New and changed courses in Medicine: Psychiatry (PSY)

### Professional

**430FA. SJVP Longitudinal Psychiatry Clerkship at UCSF (A) (4)**

Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. May be repeated for credit. (H/P/F grading only; deferred grading only, pending completion of sequence)—I. (I.) Ton

*(change in existing course—eff. summer 14)*

**430FB. SJVP Longitudinal Psychiatry Clerkship at UCSF (B) (6)**

Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. May be repeated for credit. (H/P/F grading only; deferred grading only, pending completion of sequence)—II. (II.) Ton

*(change in existing course—eff. summer 14)*

**430FC. SJVP Longitudinal Psychiatry Clerkship at UCSF (C) (2)**

Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. May be repeated for credit. (H/P/F grading only; deferred grading only, pending completion of sequence)—III. (III.) Ton

*(change in existing course—eff. summer 14)*

**430TA. TeachMS Longitudinal Psychiatry Clerkship (A) (4)**

Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Promotions; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Medicine for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. (H/P/F grading only; deferred grading only, pending completion of sequence.)—I. (I.) Ton

*(new course—eff. fall 13)*

**430TB. TeachMS Longitudinal Psychiatry Clerkship (B) (6)**

Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Promotions; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Medicine for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. May be repeated for credit. (H/P/F grading only; deferred grading only, pending completion of sequence.)—II. (II.) Ton

*(new course—eff. fall 13)*

**430TC. TeachMS Longitudinal Psychiatry Clerkship (C) (2)**

Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Promotions; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Medicine for 24 weeks. Time is spent in direct patient care sit-

uations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. May be repeated for credit. (H/P/F grading only; deferred grading only, pending completion of sequence.)—III. (III.) Ton

*(new course—eff. fall 13)*

# Medicine: Public Health Sciences

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

### Upper Division

**132. Health Issues Confronting Asian Americans and Pacific Islanders (4)**

Lecture/discussion—4 hours. Health issues confronting Asian Americans and Pacific Islanders. (Same course as Asian American Studies 132.) GE credit: SocSci | SS.—II. (II.)

*(change in existing course—eff. winter 13)*

# Medicine: Radiation Oncology

## New and changed courses in Medicine: Radiation Oncology (RON)

### Graduate

**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, Li, Vaughan

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

### Professional

**463. Radiation Oncology Clerkship (3-9)**

Clinical activity—30 hours. Prerequisite: completion of Medical Sciences 430, 431; third-year clinical clerkship, consent of instructor required. Introduction to radiation oncology. Students will participate in workup and treatment planning for radiation oncology patients and will be introduced to the concepts involved in clinical radiation oncology, radiation biology, and radiation physics. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Chen

*(change in existing course—eff. summer 12)*

# Medicine: Radiology—Diagnostic

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

### Professional

**461. Advanced Clinical Clerkship in Diagnostic Radiology (3-6)**

Clinical activity—35 hours; conference—4 hours; discussion/laboratory—1 hour. Prerequisite: satisfactory completion of second year medical school curriculum and of third-year clerkships in Internal Medicine and General Surgery; consent of instructor. Restricted to eight students per rotation; open to visiting medical students from accredited programs. Work with clinical Radiologists in image interpretation fluoroscopy angiography image-guided intervention cardiac stress testing radionuclide therapy. Daily conferences in Radiology Diagnosis and Therapy Health Physics Radiation Safety. Prepare two clinical cases for in-class presentation. Assigned readings. May be repeated for credit. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV.) Bateni, Shakeri

*(change in existing course—eff. spring 14)*

**473. Advanced Clinical Clerkship in Neuroradiology (3-6)**

Clinical activity—35 hours; conference—4 hours; independent study—1 hour. Prerequisite: fourth-year medical student with interest in Diagnostic Radiology, Neuroradiology, Neurology, Neurosurgery, Psychiatry, Psychology, or related field; satisfactory completion of course 461, or the equivalent, is strongly encouraged. Restricted to one student per 2/4 week rotation. Work with Neuroradiologists in image interpretation of CT, MRI, and fluoroscopy. Opportunity to participate in assessment of Neurointerventional patients, and to observe Neurointerventional procedures. Daily conferences in Neuroimaging, General Radiology, Health Physics, and Radiology Safety. Assigned readings. Credit limited to 3 units for 2 weeks; 6 units for 4 weeks. May be repeated for credit. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV.) Bobinski

*(change in existing course—eff. spring 14)*

**474. Advanced Clinical Clerkship in Pediatric Radiology (3-6)**

Clinical activity—30 hours; conference—5 hours; film viewing—3 hours; independent study—2 hours. Prerequisite: fourth-year medical students with interest in Radiology and/or Pediatrics; interested third-year medical students who have successfully completed Pediatrics clinical clerkships may enroll, given availability and consent of the instructor of record; prior completion of course 461, or the equivalent, encouraged. Restricted to two students per two-week or four-week rotation. Participation in the radiological care of Pediatric patients; evaluate the patient receiving the radiographic study, including pertinent historical/physical findings. Student expected to write up case files on interesting cases encountered during their rotation. Credit limited to 3 units for 2 weeks, or 6 units for 4 weeks. May be repeated for credit. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV.) Gorges

*(change in existing course—eff. spring 14)*

**475. Advanced Clinical Clerkship in Musculoskeletal Radiology (MSK) (3-6)**

Clinical activity—35 hours; conference—4 hours; discussion/laboratory—1 hour. Prerequisite: fourth-year medical student with interest in Musculoskeletal Radiology, Orthopedic Surgery, Sports Medicine, PMNR, or related field; satisfactory completion of course 461, or the equivalent, is strongly encouraged. Restricted to one student per 2/4 week rotation. Work with Musculoskeletal Radiologists in interpretation of CT, MRI, radiography, and fluoroscopy. Opportunity to assess patients for, and to observe imageguided procedures. Daily conferences in Musculoskeletal Imaging, General Radiology, Health Physics, and Radiology Safety. Assigned readings. Credit limited to 3 units for 2 weeks, 6 units for 4 weeks. May be repeated for credit. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV.) Bateni

*(change in existing course—eff. spring 14)*

**476. Advanced Clinical Clerkship Vascular/Interventional Radiology (IR) (3-6)**

Clinical activity—35 hours; conference—4 hours; discussion/laboratory—1 hour. Prerequisite: fourth-year medical student with interest in Diagnostic Radiology, Vascular/Interventional Radiology, Cardiovascular Imaging, Cardiology, Cardiovascular Surgery, Surgical Oncology, General Surgery, or related field; satisfactory completion of course 461, or the equivalent, is strongly encouraged. Restricted to one student per 2/4 week rotation. Medical student will work with Vascular/Interventional Radiologists in the evaluation of patients for interventional procedures. There will be opportunities to Daily conferences in Neuroimaging, General Radiology, Health Physics, and Radiology Safety. Assigned readings. Credit limited to 3 units for 2 weeks, 6 units for 4 weeks. May be repeated for credit. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV.) Link

*(change in existing course—eff. spring 14)*

**477. Advanced Clinical Clerkship in Ultrasound Radiology (3-6)**

Clinical activity—30 hours; conference—5 hours; film viewing—3 hours. Prerequisite: fourth-year medical student with interest in Radiology, OB/GYN, or in other medical or surgical subspecialties employing ultrasound in their clinical practice; prior completion of course 461, or the equivalent, is encouraged. Restricted to two students per 2/4 week rotation. Participation as an active team member on a busy clinical ultrasound service. Credit limited to 3 units for 2 weeks, 6 units for 4 weeks. May be repeated for credit. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV.) McGahan

*(change in existing course—eff. spring 14)*

**478. Advanced Clinical Clerkship Abdominal Imaging (3-6)**

Clinical activity—35 hours; conference—4 hours; discussion/laboratory—1 hour. Restricted to two students per 2/4 week rotation. Work with clinical Radiologists on abdominal and pelvic CT, MR, ultrasound, digital radiography, gastrointestinal and genitourinary procedures, image-guided intervention. Offered as a 2-week rotation for third-year medical students and a 2/4-week rotation for fourth-year medical students. Credit limited to 3 units for 2 weeks, 6 units for 4 weeks. May be repeated for credit. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV.) Lamba

*(change in existing course—eff. spring 14)*

# Medicine: Surgery

## New and changed courses in Medicine: Surgery (SUR)

### Professional

**430F. SJVP Surgery Clerkship at UCSF (12)**

Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Eight-week general surgery clerkship includes GI, Burn, Oncology, Plastics, Vascular Cardiothoracic, consult, transplant and trauma. Clerkship assignments are at UCSF Fresno. Daily core material presentations and reading assignments. Student involvement includes work-up and care of surgical patients. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Wisner

*(new course—eff. fall 13)*

# Microbiology

## New and changed courses in Microbiology (MIC)

### Lower Division

**10. Natural History of Infectious Diseases (3)**

Lecture—3 hours. Topics in the natural history of infectious diseases principally affecting humans. Introduction to infectious microbial agents, ecology, epidemiology, and induction of disease. Focus on diseases of a contemporary nature. Not open for

credit to students who have completed course 101, course 102, or course 104. GE credit: SciEng | SE.—I. (I.)

*(change in existing course—eff. fall 14)*

**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

*(change in existing course—eff. winter 13)*

## Upper Division

**101. Introductory Microbiology (5)**

Lecture—3 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: Biological Sciences 1A, or 2A; 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 courses 102, 102L, 104, or 104L. GE credit: SciEng | SE, SL.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 14)*

**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: SciEng | QL, SE.—I. (I.) Stewart

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, WE.—I. (I.) Igo, Nelson

*(change in existing course—eff. winter 13)*

**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: SciEng | 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: SciEng | 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: SciEng | SE.—I. (I.) Xu

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.) Nelson

*(change in existing course—eff. winter 13)*

**140. Bacterial Physiology (3)**

Lecture—3 hours. Prerequisite: Biological Sciences 101, 102, 103 (103 may be taken concurrently), or Biological Sciences 101, 105; Microbiology 102 recommended. Fundamentals of bacterial growth and bacterial responses to environmental stresses. Topics will include carbon and nitrogen regulation, growth rate control, post-exponential growth, and motility and chemotaxis. Not open for credit to students who have completed course 130A. Not offered every year. GE credit: SciEng | SE.

*(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. Not offered every year. GE credit: SciEng | SE.

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.) Falk, Manning

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.) Lin

*(change in existing course—eff. winter 13)*

**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.)

*(change in existing course—eff. winter 13)*

# Middle East/South Asia Studies

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

## Upper Division

**100. Middle East and South Asia: Comparative Perspectives (4)**

Lecture—3 hours; extensive writing. Ethnographic and historical points of intersection and divergence in various aspects of the Middle East and South Asia in precolonial, colonial, and postcolonial societies. Anthropological, historical, and theoretical debates surrounding the region. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

*(change in existing course—eff. winter 13)*

**111A. Great Cities of Arab Middle East and South Asia (4)**

Lecture—3 hours; extensive writing. Prerequisite: some knowledge of Islamic/Middle Eastern history is very useful; consent of instructor. In-depth examination of the great cities of North Africa, the Middle East and South Asia as cultural and historical artifacts. Topics include: the concept of the Islamic city, processes of modernity, and representations that reinforce imagination, memory and personal identity. Offered irregularly. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—I, II. (I, II.) Miller

*(new course—eff. fall 13)*

**121A. A Story for a Life: The Arabian Nights (4)**

Lecture/discussion—3 hours; term paper. In-depth investigation of the best-known work of pre-modern Arabic literature, taught in translation. Not open for credit to students who have taken Arabic 140. (Same course as Arabic 140.) Offered in alternate years. GE credit: ArtHum | AH, OL, WC, WE.—(I.) Sharlet

*(new course—eff. fall 13)*

**122A. Themes in the Arabic Novel (4)**

Lecture/discussion—3 hours; independent study; extensive writing. Class size limited to 30 students. Select modern Arabic fiction (novels and short stories) in translation. Thematically connected readings supplemented by non-fictional writings when appropriate. May be repeated two times for credit if the texts/theme of required course readings sufficiently change. Offered in alternate years. GE credit: ArtHum | AH, OL, WC, WE.—I, IV. (I, IV.) Radwan

*(new course—eff. fall 13)*

**131A. Modern Iranian Cinema (4)**

Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: upper-division standing, or consent of instructor. Iranian cinema of the 20th century in the context of profound cultural and social changes in Iran especially since the Iranian Revolution. Productions by representative directors such as Kiarostami, Makhmalbaf, Bahram Beizaie are included. Knowledge of Persian not required. Offered in alternate years. (Same course as Cinema & Technocultural

Studies 146A.) GE credit: ArtHum, Div, Wrt | AH, OL, VL, WC, WE.—(III.)

*(new course—eff. fall 13)*

**150. Women and Islamic Discourses (4)**
Lecture/discussion—4 hours. Prerequisite: Women's Studies 50 or comparable course. Introduction to the debates/discourses about women and Islam. Transformations in debates/discourses in colonial and postcolonial periods in the Middle East & South Asia. Comparative study of debates/discourses on family, work, law, sexuality, religion, comportment, human rights, feminist and religious movements. Not offered every year. (Same course as Women's Studies 185.) GE credit: ArtHum or SocSci | AH or SS, WC.—Joseph

*(change in existing course—eff. winter 13)*

**151A. Iranian Society & Culture (4)**
Lecture—2 hours; discussion—1 hour; term paper. Prerequisite: some knowledge of Islamic/Middle Eastern history is very useful; consent of instructor. In-depth investigation of modern Iranian society and culture. Exploration of structures of Iranian society: family, gender, religion, minorities, economy, politics, and state. Iran's role in the globalizing world, and the role of Iranian diasporas. Offered in alternate years. GE credit: ArtHum | AH, OL, VL, WC, WE.—(II.) Joseph

*(new course—eff. spring 13)*

**180. Topics in Middle East and South Asian Studies (4)**
Lecture—3 hours; extensive writing. Comparative perspective on the Middle East and South Asia. Topics may include modernity, religious traditions, colonialism, subalternity and social movements, gender and sexuality, history and memory, science and development, ritual and performance, public culture, diasporas. May be repeated one time for credit. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**181B. Topics in Regional ME/SA Studies (4)**
Lecture—3 hours; term paper. Indian/South Asia 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. fall 13)*

**181C. Topics in Regional ME/SA Studies: Arab Studies (4)**
Lecture—3 hours; term paper. Arab Studies topics. May be repeated three times for credit when different topics and themes are studied. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS.—III. (III.)

*(new course—eff. fall 13)*

**182B. 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 India/South Asia topics specializing in region-specific Middle East and South Asia studies. May be repeated three times for credit when different topics and themes are studied.—II. (II.)

*(new course—eff. fall 12)*

**182C. Undergraduate Proseminar in Middle East/South Asia: Arab Studies (4)**
Seminar—3 hours; term paper. Prerequisite: course 100 recommended. Class size limited to 15 students. Seminar in Arab Studies topics. May be repeated three times for credit. GE credit: WE. —III. (III.)

*(new course—eff. fall 13)*

# Molecular and Cellular Biology

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

### Lower Division

**99. Special Study (1-5)**
Independent study—3-15 hours. Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.

*(change in existing course—eff. winter 13)*

### Upper Division

**110V. iBioseminars in Cell and Molecular Biology (3)**

*(cancelled course—eff. spring 14)*

**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: SciEng | QL, SE, SL, VL, WE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—I, III. (I, III.) Fraser, Wilson

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I, II. (I, II.) Baldwin, Browning

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—II. (II.) Callis, Tian

*(change in existing course—eff. winter 13)*

**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

*(change in existing course—eff. winter 13)*

**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: SciEng | OL, QL, SE, SL, VL.—II. (II.) Kaplan

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—(I.) Scholey

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, WE.—II. (II.) McNally

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.) Erickson

*(change in existing course—eff. winter 13)*

**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.

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—I. (I.) Armstrong, Edwards

*(change in existing course—eff. winter 13)*

**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.)

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, VL, WE.—I, II, III. (I, II, III.) Engebrecht, Kiger, Natzle, Rose, Sanders, Sundaresan

*(change in existing course—eff. winter 13)*

**163. Developmental Genetics (3)**
Lecture—3 hours. Prerequisite: course 121. Current aspects of developmental genetics. Historical background and current genetic approaches to the study of development of higher animals. GE credit: SciEng | SE.—II. (II.) Natzle, Rose

*(change in existing course—eff. winter 14)*

**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.)

*(change in existing course—eff. winter 13)*

**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.)

*(change in existing course—eff. winter 13)*

**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.

*(change in existing course—eff. winter 13)*

**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.)

*(change in existing course—eff. winter 13)*

**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.

*(change in existing course—eff. winter 13)*

**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,)

*(change in existing course—eff. winter 13)*

**198. Directed Group Study (1-5)**
Variable—1-5 hours. Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.

*(change in existing course—eff. winter 13)*

**199. Special Study for Advanced Undergraduates (1-5)**
Independent study—3-15 hours. Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.

*(change in existing course—eff. winter 13)*

### Graduate

**220L. Advanced Biochemistry Laboratory Rotations (5)**
Laboratory—15 hours. Prerequisite: course 210 and 211 (may be taken concurrently) and 120L or the equivalent. Two five-week assignments in BMCDB research laboratories. Individual research problems with emphasis on methodological/procedural experience, experimental design, proposal writing and oral communication of results. May be repeated two times for credit.—I, II, III. (I, II, III.) Nunnari, Starr

*(change in existing course—eff. winter 14)*

**221B. Mechanistic Enzymology (3)**
*(cancelled course—eff. spring 14)*

**252. Cellular Basis of Morphogenesis (4)**
*(cancelled course—eff. spring 14)*

# Molecular, Cellular, and Integrative Physiology

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

### Graduate

**210L. Physiology Laboratory Rotations (5)**
Laboratory—15 hours. One mandatory rotation and up-to two voluntary rotations. Students learn techniques and perform experiments related to particular research problems. At the end of the rotations students give a short talk and hand in a research paper. May be repeated two times for credit. (S/U grading only.)—I, II. (I, II.)

*(change in existing course—eff. spring 14)*

# Music

## New and changed courses in Music (MUS)

### Lower Division

**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

*(change in existing course—eff. winter 13)*

**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

*(change in existing course—eff. winter 13)*

**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

*(change in existing course—eff. winter 13)*

**3A. Introduction to Music Theory, Part I (4)**
Lecture—1 hour; recitation—3 hours. Fundamentals of music theory, ear-training, harmony, counterpoint, and analysis directed toward the development of listening and writing techniques. Intended for the general student. GE credit: ArtHum | AH.—I, II. (I, II.) Triest

*(change in existing course—eff. winter 13)*

**3B. Introduction to Music Theory, Part II (4)**
Lecture—1 hour; recitation—3 hours. Prerequisite: completion of course 3A or permission of the instructor. Continuation of course 3A. Development of melodic and harmonic writing skills. Basic analysis training. Intended for the general student. GE credit: ArtHum | AH.—II, III. (II, III.) Triest

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—I. (I.) Nichols

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—II. (II.) Nichols

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—III. (III.) Nichols

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—I. (I.) San Martin

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—II. (II.) San Martin

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—III. (III.) San Martin

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—I. (I.) Triest

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—II. (II.) Triest

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—III. (III.) Triest

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH—I. (I.) Craig

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH—II. (II.) Craig

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH—III. (III.) Craig

*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, VL, WE.—II.

*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, VL, WE.—III.

*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, VL, WE.—I.

*(change in existing course—eff. winter 13)*

**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: ArtHum, Div, Wrt | ACGH, AH, DD, VL, WE.—III. (III.)

*(change in existing course—eff. winter 13)*

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

*(change in existing course—eff. winter 13)*

**99. Special Study for Undergraduates (1-5)**
(P/NP grading only.) GE credit: AH.

*(change in existing course—eff. winter 13)*

## Upper Division

**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: ArtHum | AH.—I. (I.) San Martin

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—II. (II.) San Martin

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—I. (III.) Bauer

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—I, II, III. (I, II, III.) Ortiz, Rohde, San Martin

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—I. (I.) Nichols

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—(II.) Nichols

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, VL.—II-III. (II-III.) Ortiz

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—I, II. Baldini, Thomas

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—II. Baldini, Thomas

*(change in existing course—eff. winter 13)*

**116. Introduction to the Music of The Beatles (4)**
Lecture—3 hours; listening—1 hour. Prerequisite: course 3A; course 10; course 11; or consent of instructor. Survey of music of The Beatles, focusing on the songs of Lennon and McCartney. Emphasis on understanding their evolution as musicians, composers and cultural figures. Discussion of their musical influences in wider cultural contexts. GE credit: AH, VL, WC.—III. (III.) Reynolds

*(new course—eff. spring 15)*

**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: ArtHum | AH, OL.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, OL.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, VL, WE.—III. Busse Berger

*(change in existing course—eff. winter 13)*

**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: ArtHum, Div, Wrt | ACGH, AH, DD, WE.—(II.) Levy

*(change in existing course—eff. winter 13)*

**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 taken Spanish 171 and 171S. (Same course as Spanish 171) Offered in alternate years. May be repeated one time for credit when topic differs. GE credit: ArtHum | AH, WC.—II. Irwin, Ortiz

*(change in existing course—eff. winter 14)*

**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. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, DD, VL, WC, WE.—Spiller

*(change in existing course—eff. winter 14)*

**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.

*(change in existing course—eff. winter 13)*

**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

*(change in existing course—eff. winter 13)*

**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

*(change in existing course—eff. winter 13)*

**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.)

*(change in existing course—eff. winter 13)*

**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

*(change in existing course—eff. winter 13)*

**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

*(change in existing course—eff. winter 13)*

**146. Chamber Music Ensemble (1)**
Rehearsal—2 hours; student practice—1 hour. Prerequisite: admission subject to audition before first class meeting. Open to any student in the University whose proficiency meets the requirements of concert performance. Study, rehearsal, and performance of ensemble music for strings, winds, voice, piano, harpsichord, and organ. May be repeated for credit. (P/NP grading only.) GE credit: AH.—I, II, III. (I, II, III.) Baldini

*(change in existing course—eff. winter 13)*

**147. University Wind Ensemble (2)**
Rehearsal—4 hours. Prerequisite: consent of instructor. Rehearsal, study, and performance of a full variety of wind ensemble music; and to have students share their work in public performances. May be repeated for credit. (P/NP grading only.) GE credit: AH.—(I.) Nowlen

*(change in existing course—eff. winter 13)*

**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

*(change in existing course—eff. winter 13)*

**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

*(change in existing course—eff. winter 13)*

**150. Brasilian Samba School (2)**
Rehearsal—2 hours. Prerequisite: consent of instructor. Practice of Brasilian music. Basic instrumental technique and repertory. Focus on the percussion traditions of Rio de Janeiro and Bahia. May be repeated up to six times for credit. (P/NP grading only.) GE credit: ArtHum | AH.—I, II, III. (I, II, III.) Froh

*(change in existing course—eff. winter 14)*

**151. Korean Percussion Ensemble (2)**
Rehearsal—2 hours; listening—2 hours; practice—2 hours. Prerequisite: consent of instructor. Class size limited to 20 students. Practice of Korean percussion styles. Basic instrumental technique and repertory. Focus on the percussion traditions of samulnori and basic concepts of p'ungmul. (P/NP grading only) May be repeated six times for credit. GE credit: AH.—I, II, III. (I, II, III.) Lee

*(new course—eff. fall 14)*

**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.)

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**198. Directed Group Study (1-5)**
Prerequisite: consent of instructor. (P/NP grading only.) GE credit: AH.

*(change in existing course—eff. winter 13)*

**199. Special Study for Advanced Undergraduates (1-5)**
(P/NP grading only.) GE credit: AH.

*(change in existing course—eff. winter 13)*

### Graduate

**210C. Proseminar in Music (Ethnomusicology) (4)**
Seminar—3 hours; term paper. Introduction to ethnomusicology through its intellectual history, theoretical approaches, analytical techniques, and methodologies.—I. (I.) Spiller

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

# Native American Studies

## New and changed courses in Native American Studies (NAS)

### Lower Division

**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: ArtHum or SocSci | ACGH, AH or SS, DD, VL, WC, WE.—Tsinhnahjinnie

*(change in existing course—eff. winter 13)*

**33. Introduction to Native American Art (4)**
Lecture—4 hours. Introduction to Native American Art from throughout North America, inclusive of traditional forms, techniques and designs in a range of media including ceramics, basketry, fiberwork, carving, painting, sculpture and photography within a context of social and political history. GE credit: ArtHum, Div | ACGH, AH or SS, DD, OL, VL, WE.—I. (I.) Tsinhnahjinnie

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

**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: ArtHum | ACGH, AH, DD, OL, VL, WC.—Tsinhnahjinnie

*(change in existing course—eff. winter 13)*

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

*(change in existing course—eff. winter 13)*

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

*(change in existing course—eff. winter 13)*

## Upper Division

**101. Contemporary Native American Art (4)**
Lecture—3 hours; extensive writing. Examination of contemporary artworks by selected Native American and Indigenous Master artists, in a wide range of media, including ceramics, metal arts, photography, video, painting, installation and performance within a context of political and social histories. Offered in alternate years. GE credit: ArtHum, Div | ACGH, AH or SS, DD, OL, VL, WE.—Tsinhnahjinnie

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

**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: ArtHum or SocSci | ACGH, AH or SS, DD, WE.—II. (II.) Macri

*(change in existing course—eff. winter 13)*

**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: SocSci | SS.—Mendoza

*(change in existing course—eff. winter 13)*

**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: SocSci | SS.—II. Mendoza

*(change in existing course—eff. winter 13)*

**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: SocSci | SS.—II. Mendoza

*(change in existing course—eff. winter 13)*

**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: SocSci | SS.—III. Mendoza

*(change in existing course—eff. winter 13)*

**115. Native Americans in the Contemporary World (4)**
Lecture/discussion—4 hours. Prerequisite: course 1, 10. Important issues facing Native Americans in the contemporary world. Focus primarily on the diverse ways of life, histories and realities of indigenous people throughout the Americas as they develop their own cultural and political institutions. GE credit: ArtHum or SocSci, Div | AH or SS, ACGH, DD, OL, WE.—II. (II.) Crum

*(change in existing course—eff. fall 13)*

**125. Performance and Culture Among Native Americans (4)**
Lecture—3 hours; film viewing—3 hours. Prerequisite: upper division standing in division of humanities or social sciences or consent of instructor. Interdisciplinary study of public expressive forms among Native Americans. Comparison and analysis of music, dances, rituals, and dramas from throughout North, Central, and South America in their social and cultural contexts. Not open for credit to students who have completed Music 125. Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, WC, WE.—(III.) Mendoza

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

**133A. Ethnoshistory of Native Peoples of Mexico and Central America to 1500 (4)**
Lecture/discussion—4 hours; term paper. Prerequisite: course 1 or course 10 or consent of instructor. Ethnohistorical development of the indigenous peoples of Mexico and Central America up to and including the earliest period of European contact. Focus is on indigenous written historical records of the Maya, Mixtec, and Nahuatl peoples. May be repeated one time for credit. This course can be repeated provided the student chooses a new topic for the term paper/project and for the PowerPoint presentations. The material is so extensive that more than one exposure to it can be very beneficial to students wanting to focus on ancient Mesoamerica. GE credit: ArtHum or SocSci, Div | AH or SS, VL, WC, WE.—III. (III.) Macri

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

**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: ArtHum or SocSci, Div, Wrt | AH, OL, SS, WE.—(III.)

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci | AH or SS, DD, OL, WE.—(III.) Coates

*(change in existing course—eff. winter 13)*

**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: ArtHum, Div | AH, OL, WE.—(II.) Hernández-Ávila

*(change in existing course—eff. winter 13)*

**161. California Indian Environmental Policy I (4)**
Lecture/discussion—4 hours; term paper. Prerequisite: course 1 or course 10 or consent of instructor. Contemporary California Indian environmental policy issues, with a focus on water, minerals, contamination, and alliance-building. Issues will be placed within historical and political context, drawing on theories of Native environmental ethics, environmental justice, and Federal Indian law. Offered in alternate years. GE credit: ACGH, DD, SS, WE.—I. Middleton

*(new course—eff. fall 12)*

**162. California Indian Environmental Policy II (4)**
Lecture/discussion—4 hours; term paper. Contemporary California Indian environmental policy issues, with a focus on planning, site protection, and collaborative structures. Issues will be placed within historical and political context, drawing on theories of Native environmental ethics, environmental justice, and Federal Indian law. Offered in alternate years. GE credit: SocSci | ACGH, DD, SS, WE.—(II.) Middleton

*(new course—eff. spring 13)*

**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: ArtHum or SocSci | AH or SS, DD, OL, WE.—II. (II.)

*(change in existing course—eff. winter 13)*

**181C. Contemporary Native American Poetry (4)**
Lecture—4 hours. Prerequisite: one of the following: course 5, English 3, Comparative Literature 1, 2, 3. Works of poetry by contemporary Native American/indigenous poets, with some attention to traditional cultural poetic expressions. GE credit: ArtHum, Div, Wrt | AH, DD, OL, WE.—I, II, III. (I, II, III.) Hernández-Avila

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

**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 influ-

ences on the Native writers themselves. Offered irregularly. GE credit: ArtHum or SocSci | AH or SS, OL, WC.—IV. (IV.) Hernández-Avila

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci | AH, DD, OL, WC.—(III.) Hernández-Avila

*(change in existing course—eff. winter 13)*

**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: ArtHum, Div, Wrt | AH, DD, OL, WE.—III, IV. (III, IV.) Hernández-Ávila

*(change in existing course—eff. winter 13)*

**191. Topics in Native American Studies (4)**
Lecture/discussion—4 hours. Prerequisite: upper division standing. Selected topics in Native American Studies related to indigenous knowledges and worldviews from a historical, cultural, hemispheric perspective. May be repeated for credit when topic differs and/or when offered by a different instructor. Offered irregularly. GE credit: ArtHum or SocSci. Div | AH or SS, DD, OL, WE.—I, II, III. (I, II, III.) Hernandez-Avila

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

**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: ArtHum | AH.—I, II, III, IV. (I, II, III, IV.) Tsinhnahjinnie

*(change in existing course—eff. winter 13)*

# Nematology

## New and changed courses in Nematology (NEM)

### Upper Division

**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: SciEng | SE.—I. (I.) Ferris

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.) Caswell-Chen, Nadler

*(change in existing course—eff. winter 13)*

# Neurobiology, Physiology, and Behavior

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

### Lower Division

**15. The Biology and Physiology of Aging (4)**
Lecture—3 hours; discussion—1 hour. Broad examination of age-associated changes in body functions. Includes basic cell physiology, a survey of major organ systems and the age-induced alterations in system function. Some age-associated diseases will also be examined. Not open for credit to students who have completed course 15V. GE credit: SciEng | SE.—I. (I.)

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

**15V. The Biology and Physiology of Aging (4)**
Web virtual lecture—3 hours; web electronic discussion—1 hour. Broad examination of the biological and physiological basis of aging in animals and plants. Concepts in demographic, evolutionary, genetic, and cell aging. Major human organ systems, age-related alterations in system function, and age-related diseases. Intended for non-science majors. Not open for credit to students who have completed course 15. GE credit: SciEng | SE, SL.—III. (III.) McDonald

*(change in existing course—eff. winter 13)*

### Upper Division

**100L. Neurobiology Laboratory (3)**
Lecture—1 hour; laboratory—3 hours; extensive writing or discussion. Prerequisite: course 100 (may be taken concurrently). Experimental basis of neurobiology principles discussed in course 100. Topics include neurophysiology, sensory systems, motor systems, cellular neuroscience, cognitive neuroscience, and quantitative data analysis and modeling techniques. GE credit: SciEng | SE.—I. Goldman

*(new course—eff. fall 13)*

**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: SciEng | SE.—I, II, III. (I, II, III.) Debello, Fuller, Furlow, Ishida, Usrey, Weidner, Wingfield, Zito

*(change in existing course—eff. winter 13)*

**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

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

**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: SciEng | QL, SE.

*(change in existing course—eff. winter 13)*

**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

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

**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: SciEng | SE.—III. (III.) McAllister

*(change in existing course—eff. winter 13)*

**163. Systems Neuroscience (3)**
Lecture—3 hours. Prerequisite: course 100 or equivalent basic neuroscience training with consent of instructor. Concepts and techniques in systems neuroscience: e.g., measuring and manipulating neural activity, structure of neocortex, sensory processing, motor control, short-term and long-term storage of information, neural codes, neural mechanisms underlying cognitive functions. GE credit: SE.—III. (III.) Ditterich

*(new course—eff. spring 14)*

**167. Computational Neuroscience (5)**
Lecture—4 hours; lecture/laboratory—3 hours. Prerequisite: course 100 or permission of instructor; Math 17A, 17B, 17C, or equivalent; Physics 7A, B, C or equivalent strongly recommended; consent of instructor. Mathematical models and data analysis techniques used to describe computations performed by nervous systems. Lecture topics include single neuron biophysics, neural coding, network dynamics, memory, plasticity, and learning. Lab topics include programming mathematical models and data analysis techniques in MATLAB. Offered in alternate years. GE credit: SciEng | SE, QL.—(I.) Goldman

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

# Neuroscience

## New and changed courses in Neuroscience (NSC)

### Upper Division

**160. Molecular and Cellular Neurobiology (3)**
Lecture—1.5 hours; discussion—1.5 hours. Prerequisite: Neurobiology, Physiology, and Behavior 100, Biological Sciences 101 and consent of instructor. Selected topics in neurobiology. Topics include channel biophysics, action potential propagation, intracellular signal transduction pathways, synaptic physiology and quantal analysis, cellular mechanisms of synaptic plasticity, and neuromodulation of synaptic circuitry. (Same course as Neurobiology, Physiology, and Behavior 160.) GE credit: VL.—III. (III.) Burns, Mulloney

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

# Nursing, School of

## New and changed courses in Nursing (NRS)

### Graduate

**204. Research Skills for Nursing Science and Health-Care Leadership (4)**
Lecture/discussion—3 hours; laboratory/discussion—1 hour. Prerequisite: current enrollment in the Nursing Science and Health-Care Leadership graduate program or consent of instructor. Foundation for analyzing research, health, and systems data to answer clinical, systems, or policy questions. Use and examine multiple sources of data and information as a basis for planned change and transformation in health care.—III. (III.)
*(change in existing course—eff. winter 14)*

**210Y. Applied Health Informatics (4)**
Lecture/discussion—1 hour; web virtual lecture—3 hours. Open to current student in NSHL graduate programs or consent of instructor. Within the conceptual framework of the Foundation of Knowledge model, this course integrates nursing science, information science, computer science and cognitive science to acquire, process, generate and disseminate knowledge.—I, II. (I, II.) Odor
*(new course—eff. winter 14)*

**291D. Doctoral Seminar (2)**
Discussion—2 hours. Prerequisite: current enrollment in the Nursing Science and Health-Care Leadership graduate program or consent of instructor. Focus on the theory, research and knowledge relevant to one of two fields of emphasis: population health or health systems. Emphasis placed on reading, critique and synthesis of classic and cutting-edge research in nursing and health care. May be repeated 10 times for credit.—I, II, III. (I, II, III.)
*(new course—eff. winter 14)*

**298. Special Topics in Nursing Science and Health-Care Leadership (1-4)**
Lecture/discussion—1-2 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 for credit. Offered irregularly.—I, II, III. (I, II, III.)
*(change in existing course—eff. spring 14)*

**298V. Online Special Topics in Nursing Science and Health-Care Leadership (1-4)**
Web virtual lecture—1-4 hours; web electronic discussion—1-4 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 for credit. Offered irregularly.—I, II, III. (I, II, III.)
*(new course—eff. winter 14)*

### Professional

**400. Basic Clinical Skills (1-4)**
Lecture/laboratory—1-4 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Instruction and practice of the fundamental clinical skills necessary for patient care comprise this course with a primary focus on principles of effective communication in establishing the therapeutic provider-patient relationship. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. summer 13)*

**401. Basic Clinical Skills (1-4)**
Lecture/laboratory—1-4 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Continuation of focus on history taking and physical examination skills with advanced/specialized content. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. fall 3)*

**410A. Advanced Clinical Skills (1-4)**
Lecture/laboratory—1-4 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Continuation of focus on history taking and physical examination skills with advanced/specialized content. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. winter 14)*

**410B. Advanced Clinical Skills (1-4)**
Lecture/laboratory—1-4 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Continuation of focus on history taking and physical examination skills with advanced/specialized content related specified systems. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. spring 14)*

**410C. Advanced Clinical Skills (1-4)**
Lecture/laboratory—1-4 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Continuation of focus on history taking and physical examination skills with advanced/specialized content related specified systems. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. summer 14)*

**410D. Advanced Clinical Skills (1-4)**
Lecture/laboratory—1-4 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Continuation of focus on history taking and physical examination skills with advanced/specialized content related specified systems. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. fall 13)*

**410E. Advanced Clinical Skills (1-4)**
Lecture/laboratory—1-4 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Continuation of focus on history taking and physical examination skills with advanced/specialized content related specified systems. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. fall 13)*

**410F. Advanced Clinical Skills (1-4)**
Lecture/laboratory—1-4 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Continuation of focus on history taking and physical examination skills with advanced/specialized content related specified systems. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. spring 14)*

**440. Supervised Clinical Hours (1-3)**
Clinical Activity—36 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Students are placed in clinical settings and/or clinical simulation laboratories to observe and practice the integration of clinical skills with direct supervision by faculty. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. spring 14)*

**450A. Supervised Clinical Practice-Primary Health Care (1-16)**
Clinical activity—48 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Each of the required primary care rotations is a four-week supervised clinical practice experience in primary care, under the supervision of an appropriate community-based primary care provider per accreditation requirements. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. fall 13)*

**450B. Supervised Clinical Practice-Primary Health Care (1-16)**
Clinical activity—48 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Each of the required primary care rotations is a four-week supervised clinical practice experience in primary care, under the supervision of an appropriate community-based primary care provider per accreditation requirements. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. fall 13)*

**450C. Supervised Clinical Practice-Primary Health Care (1-16)**
Clinical activity—48 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Each of the required primary care rotations is a four-week supervised clinical practice experience in primary care, under the supervision of an appropriate community-based primary care provider per accreditation requirements. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. fall 13)*

**450D. Supervised Clinical Practice-Primary Health Care (1-16)**
Clinical activity—48 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Each of the required primary care rotations is a four-week supervised clinical practice experience in primary care, under the supervision of an appropriate community-based primary care provider per accreditation requirements. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. fall 13)*

**450E. Supervised Clinical Practice-Primary Health Care (1-16)**
Clinical activity—48 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Each of the required primary care rotations is a four-week supervised clinical practice experience in primary care, under the supervision of an appropriate community-based primary care provider per accreditation requirements. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. fall 13)*

**451. Supervised Clinical Practice-Pediatrics (1-16)**
Clinical activity—48 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Four-week clinical rotation under the supervision of an appropriate community-based Pediatric Medicine provider per accreditation requirements. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. fall 13)*

**452. Supervised Clinical Practice-Women's Health (1-16)**
Clinical activity—48 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Four-week clinical rotation under the supervision of an appropriate community-based women's health and prenatal care provider per accreditation requirements. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. fall 13)*

**453. Supervised Clinical Practice-Mental Health (1-16)**
Clinical activity—48 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Four-week clinical rotation under the supervision of an appropriate community-based psychiatrist, psychiatric/mental health provider per accreditation requirements. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. fall 13)*

**454. Supervised Clinical Practice-Emergency Medicine (1-16)**
Clinical activity—48 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Four-week clinical rotation under the supervision of an appropriate Emergency Medicine provider per accreditation requirements. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. fall 13)*

**455. Supervised Clinical Practice-Inpatient Surgery (1-16)**
Clinical activity—48 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Four-week clinical experience under the supervision of an appropriate surgical provider per accreditation requirements. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. fall 13)*

**456. Supervised Clinical Practice-Inpatient Medicine (1-16)**
Clinical activity—48 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Four-week clinical rotation under the supervision of an appropriate inpatient provider per accreditation requirements. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. fall 13)*

**459. Supervised Clinical Practice-Other Specialties (1-16)**
Clinical activity—48 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Two four-week selective rotations are available to accommodate student interest and/or accommodate a student's clinical deficits identified by the program. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. fall 13)*

**470. Health Care Ethics (3-9)**
Lecture/discussion—2 hours; laboratory/discussion—1 hour. Prerequisite: consent of instructor. Guided independent study of issues in biomedical ethics, with discussion of readings that are based on student interests and needs. Participation in ethics rounds. (Same course as General Medicine 470.) (S/U grading only.)—I, II, III, IV. (I, II, III, IV.) Loewy
*(new course—eff. spring 12)*

**471. Supervised Clinical Practice-Geriatrics (1-16)**
Clinical activity—48 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Four-week clinical rotation under the supervision of an appropriate community-based Geriatric Medicine provider per accreditation requirements. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. fall 13)*

**475. Supervised Clinical Practice-Acute Care (1-16)**
Clinical activity—48 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. A two to four week rotation focus on providing acute care in inpatient settings. Students will work directly with specific inpatient units. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. fall 13)*

**480. Supervised Clinical Practice-Rural Health (1-16)**
Clinical activity—48 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Rural health rotations focus on providing care in medically underserved rural sites. Students will experience care across the continuum in ambulatory, inpatient, and community based settings. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. fall 13)*

**490. Supervised Clinical Practice-Quality and Safety (1-16)**
Clinical activity—48 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Clinical rotation that allow students to work directly with patient safety and quality improvement committees in a various organizations. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. fall 13)*

**493A. Improving Quality in Health Care (3)**
Lecture—8 hours; discussion/laboratory—10 hours; project—10 hours. Prerequisite: consent on 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. (Same course as Medical Sciences 493QA.) (S/U grading only; deferred grading only, pending completion of sequence.)—I. (I.) Bakerjian, Shaikh
*(new course—eff. fall 12)*

**493B. Improving Quality in Health Care (3)**
Lecture—8 hours; discussion/laboratory—10 hours; project—10 hours. Prerequisite: consent on 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. (Same course as Medical Sciences 493QB.) (S/U grading only; deferred grading only, pending completion of sequence.)—II. (II.) Bakerjian, Shaikh
*(new course—eff. fall 12)*

**493C. Enhancing Patient Safety in Health Care (3)**
Seminar—1 hour; clinical activity—1 hour; discussion—1 hour. Prerequisite: Nursing Science and Health-Care Leadership graduate students; consent of instructor. Inter-professional module is designed to explore the theory and practical methods being employed to improve patient safety in health care while providing an opportunity for inter-professional educational experience. (Same course as Medical Sciences 493QC.) (S/U grading only.)—III. (III.) Bakerjian, Natale
*(new course—eff. spring 13)*

# Nutrition

## New and changed courses in Nutrition (NUT)

### Lower Division

**99. Individual Study for Undergraduates (1-5)**
Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.
*(change in existing course—eff. winter 13)*

### Upper Division

**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: SciEng | OL, SE, SL.—I. (I.) Haj, Oteiza
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.) McDonald
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.) McDonald
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—III. (III.) Stewart
*(change in existing course—eff. winter 13)*

**116A. Clinical Nutrition (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: SciEng | SE.—I, II. (I, II.) Clifford, Steinberg, Stern
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. (I.) Frank

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I, II. (I, II.) Clifford, Steinberg, Stern

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.) Steinberg

*(change in existing course—eff. winter 13)*

**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: SciEng, Wrt | SE, WE.—I. (I.) Clifford, Gaikwad

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—II. (II.) Heinig

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—III. (III.) Fadel

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.) Klasing

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL.—I. (I.) Hung

*(change in existing course—eff. winter 13)*

**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: SciEng | OL, SE, SL, WE.

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I, II, III, IV. (I, II, III, IV.)

*(change in existing course—eff. winter 13)*

**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: SciEng | OL, SE, VL.—I, II, III. (I, II, III.) Zidenberg-Cherr

*(change in existing course—eff. winter 13)*

**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.)

*(change in existing course—eff. winter 13)*

**199. Special Study for Advanced Undergraduates (1-5)**
(P/NP grading only.) GE credit: SE.

*(change in existing course—eff. winter 13)*

# Nutritional Biology (A Graduate Group)

## New and changed courses in Nutritional Biology (NUB)

### Graduate

**210A. Advanced Nutrition I: Nutrition and Metabolism, Macronutrients (5)**
Lecture—4 hours; discussion—1 hour. Prerequisite: admission to the Nutritional Biology Graduate Group or consent of instructor. Class size limited to 30 students. Advanced general nutritional concepts. Integrating nutrition with biological systems, population nutrition issues, and research approaches. Advanced concepts on lipid and protein metabolism.—I. (I.) Oteiza

*(new course—eff. winter 14)*

**210C. Advanced Nutrition III: Nutrition in Health and Disease (5)**
Lecture—4 hours; discussion—1 hour. Prerequisite: admission to the Nutritional Biology Graduate Group or consent of instructor. Class size limited to 30 students. Integration of biochemical, physiological, and genetic aspects of nutrition in the context of clinical and epidemiological observations related to health and disease, including obesity and diabetes, cancer, vascular and neurodegenerative diseases, osteoporosis, and birth defects. Review and consideration of governmental.—III. (III.) Miller

*(new course—eff. winter 14)*

**290C. Research Group Conference (1)**
Discussion—1 hour. Prerequisite: graduate standing. Weekly conference on research problems, progress and techniques in animal sciences. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

*(new course—eff. fall 13)*

**298. Directed Group Study (1-5)**
Prerequisite: graduate standing in Nutritional Biology Graduate Group, or consent of instructor. May be repeated three times for credit when topics differs and consent of instructor.—I, II, III. (I, II, III.)

*(new course—eff. fall 13)*

**299. Research (1-12)**
Prerequisite: consent of instructor. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

*(new course—eff. fall 13)*

# Performance Studies

## New and changed courses in Performance Studies (PFS)

### Graduate

**200. Methods and Materials in Theatre Research (4)**
Seminar—3 hours; term paper. Essential research tools in theatre and related fields; bibliographies, primary sources; methods of evaluating and presenting evidence; delineating research areas in the field.—I. (I.)

*(new course—eff. fall 12)*

**259. Topics in Contemporary Theatre and Performance (4)**
Seminar—3 hours; term paper. Special topics designed to study in depth aspects of contemporary performance including performance analysis, cultural and historical context, modes of production, theoretical and political entailments, and issues of spectatorship; e.g., "Brecht and After," "British Theater," "Race and Gender in Performance." May be repeated five times for credit.—I, II, III. (I, II, III.)

*(new course—eff. fall 12)*

**265A. Performance Studies: Modes of Production (4)**
Seminar—3 hours; term paper. Introduction to the literature of performance production in a variety of media: theatre, dance, film, video, computer-based, looking at cultural, aesthetic, rhetorical and political theory. May be repeated three times for credit when topic differs. Offered in alternate years.

*(new course—eff. fall 12)*

**265B. Performance Studies: Signification and the Body (4)**
Seminar—3 hours; term paper. Introduction to analysis of the body in performance, drawing on theoretical models from several fields. May be repeated three times for credit when topic differs. Offered in alternate years.

*(new course—eff. fall 12)*

**265C. Performance Studies: Performance and Society (4)**
Seminar—3 hours; term paper. Introduction to the role of performance (broadly defined), in everyday life, sociopolitical negotiation, identity, social movements, the media, and the state. May be repeated three times for credit when topic differs. Offered in alternate years.

*(new course—eff. fall 12)*

**265D. Performance Studies: Theory, History, Criticism (4)**
Seminar—3 hours; term paper. Introduction to the theory, history and criticism, informing performance studies. May be repeated three times for credit when topic differs. Offered in alternate years.
*(new course—eff. fall 12)*

**290. Colloquia in Performance Studies (4)**
Lecture/discussion—2 hours; discussion/laboratory—1 hour; term paper. 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 new, exchange of information and make announcements. Course must be taken every year that a Performance Studies graduate 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 12)*

**298. Group Study (1-5)**
Independent study—1-5 hours. Prerequisite: consent of instructor.—I, II, III. (I, II, III.)
*(new course—eff. fall 12)*

**299. Individual Study (1-12)**
Prerequisite: consent of instructor. (S/U grading only.)—I, II, III. (I, II, III.)
*(new course—eff. fall 12)*

**299D. Dissertation Research (1-12)**
Prerequisite: consent of instructor and Advancement to Candidacy. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)
*(new course—eff. fall 12)*

# Personal Accountancy

## New and changed courses in Personal Accountancy (ACC)

### Graduate

**201. Financial Reporting (4)**
Lecture—4 hours. Restricted to Master of Professional Accountancy graduate students. Coverage includes the fundamentals of accounting and reporting economic events and transactions. Emphasizes the preparation of balance sheets, income statements, statements of cash flow, and statements of stockholders' equity.—I. (I.)
*(new course—eff. fall 12)*

**203. Intermediate Financial Reporting (4)**
Lecture—4 hours. Prerequisite: course 201 or Management 200A. Restricted to graduate students in the Graduate School of Management. Focuses on the Preparation of complex financial statements. Topics include accounting recognition, measurement, and disclosure, as well as the theoretical foundations of and motivations for financial reporting choices.—II. (II.)
*(new course—eff. winter 13)*

**205. Advanced Financial Reporting (4)**
Lecture—4 hours. Prerequisite: course 203. Restricted to graduate students in the Graduate School of Management. Advanced treatment of recognition, measurement, and disclosure including pensions, accounting for income taxes, mergers and acquisitions, consolidations, special-purpose entities, and foreign subsidiaries. Includes accounting for governmental and nonprofit entities, as well as advanced treatment of international accounting standards.—III. (III.)
*(new course—eff. winter 13)*

**211. Tax Reporting and Analysis (4)**
Lecture—4 hours. Restricted to Master of Professional Accountancy graduate students. Introduction to the taxation of business entities and their related transactions, with an emphasis on the details of tax law and tax reporting requirements. Topics include individual, partnership, and corporate taxation, as well as tax theory. Not open for credit to students who have completed Management 264.—I. (I.)
*(new course—eff. fall 12)*

**213. Intermediate Tax Reporting and Analysis (4)**
Lecture—4 hours. Prerequisite: course 211 or Management 264. Restricted to graduate students in the Graduate School of Management. Detailed analysis of federal taxation of individuals. Topics include the timing of income recognition, deductions and credits for tax purposes, as well as the basics of property transactions.—II. (II.)
*(new course—eff. winter 13)*

**215. Advanced Tax Reporting and Analysis (4)**
Lecture—4 hours. Prerequisite: course 213. Restricted to graduate students in the Graduate School of Management. Advanced treatment of complex tax transactions and entities. Topics include aspects of federal taxation of entities and the applicable impact upon individual taxpayers. Coverage includes basis analysis as applicable to pass through entities and an introduction to professional responsibilities.—III. (III.)
*(new course—eff. spring 13)*

**217. Taxation of Individuals, Property, and Estates (4)**
Lecture—4 hours. Prerequisite: course 213. Restricted to graduate students in the Graduate School of Management. In-depth analysis of individual income tax issues and property transactions including non-taxable exchanges, compensation, gifts, and transfer taxes. Expanded analysis of multistate tax issues. Emphasis is on the interrelationships of complex individual transactions as well as planning techniques.—III. (III.)
*(new course—eff. spring 13)*

**219. Taxation of Business Entities (4)**
Lecture—4 hours. Prerequisite: course 213. Restricted to graduate students in the Graduate School of Management. Analysis of detailed business entity tax issues including basis calculations, alternative minimum taxation, multistate and multinational taxation, stock transactions, and mergers and acquisitions. Tax planning for entities and relationships between business entities and their owners. Offered irregularly.—III. (III.)
*(new course—eff. spring 13)*

**231. Analysis and Use of Accounting Reports (4)**
Lecture—4 hours. Prerequisite: course 203. Restricted to graduate students in the Graduate School of Management. Evaluation of complex financial accounting reports by managers and persons outside the firm, such as investors, creditors, and financial analysts. Topics include cash flow vs. income measurement, ratio and valuation analysis, and the effects of international accounting standards. Not open for credit to students who have completed Management 272.—III. (III.)
*(new course—eff. spring 13)*

**241. Auditing and the Accounting Profession (4)**
Lecture—4 hours. Prerequisite: course 201 or Management 200A. Restricted to Graduate School of Management students. Introduction to the audit environment, professional standards, the accounting profession, and the professional responsibilities of accountants. Integrate audit topics across the areas of financial, cost, tax and systems accounting. (S/U grading only.)—I. (I.)
*(new course—eff. fall 12)*

**243. Auditing and Attestation Services (4)**
Lecture—4 hours. Prerequisite: course 241. Restricted to graduate students in the Graduate School of Management. Advanced treatment of the audit process and environment. Topics include audit planning and performance, evidence, internal controls, professional standards, and audit reports. Reviews, compilations and attestation services are examined, as are governmental agency audits.—III. (III.)
*(new course—eff. spring 13)*

**251. Managerial Accounting and Controls (4)**
Lecture—4 hours. Prerequisite: course 201 or Management 200A. Restricted to graduate students in the Graduate School of Management. Analysis of management accounting systems including cost accounting, performance measurement, and compensation and reward systems. Focuses on the production of information useful for managerial decision-making, as well as the design of these systems. Not open for credit to students who have completed Management 271.—II. (II.)
*(new course—eff. winter 13)*

**253. Accounting Information and Control Systems (4)**
Lecture—4 hours. Prerequisite: course 201 or Management 200A. Restricted to graduate students in the Graduate School of Management. Analysis of information systems used for accounting, recordkeeping, and control. Topics include the regulatory requirements of accounting control systems as well as their implementation and auditing considerations.—III. (III.)
*(new course—eff. spring 13)*

**261. Communications for Professional Accountants (4)**
Lecture—4 hours. Prerequisite: course 201 or Management 200A. Restricted to graduate students in the Graduate School of Management. Overview of written and oral professional communications with an emphasis on structuring and documenting audits and reports, understanding audiences (investors, creditors, regulators, and other stakeholders), and consideration of ethical and regulatory responsibilities.—II. (II.)
*(new course—eff. winter 13)*

**271. Accounting Ethics (4)**
Lecture—4 hours. Prerequisite: course 201 or Management 200A. Restricted to Graduate School of Management students. Analysis of accountants' professional responsibilities and ethics. Topics include the behavioral foundations of ethics in a business environment, how those elements affect accountants' integrity, objectivity, and independence. Professional standards related to accountants' conduct are also covered.—I. (I.)
*(new course—eff. fall 12)*

# Philosophy

## New and changed courses in Philosophy (PHI)

### Lower Division

**7. Philosophical Perspectives on Sexuality (3)**
Lecture—3 hours. Philosophical issues related to sexuality, including, but not limited to, ethical and social issues regarding sexual practice, orientation, classification and identity. GE credit: ArtHum | AH.—II. (II.) Sennet
*(new course—eff. winter 13)*

**11. Asian Philosophy (4)**
Lecture—3 hours; discussion—1 hour. Survey of the main philosophical systems of south and east Asia: Hinduism, Buddhism, Confucianism, and Taoism. Topics include the nature of reality, including God, the universe and the human self, human knowledge, and the proper conduct of human life. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—I. Mattey
*(change in existing course—eff. fall 14)*

**24. Introduction to Ethics (4)**
Lecture—3 hours; discussion—1 hour. Reading of historical and contemporary philosophical works in ethics. Topics include the nature of morality, the justification of moral claims, and major ethical theories, such as consequentialist, deontological, and virtue theories. GE credit: ArtHum, Wrt | AH, WE.—III. (III.) Mattey, Oshana
*(change in existing course—eff. fall 14)*

### Upper Division

**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: ArtHum | AH, WE.—Millstein
*(change in existing course—eff. winter 13)*

**129. Knowledge and the A Priori (4)**
Lecture/discussion—3 hours; extensive writing. Prerequisite: one course in philosophy. Self-evidence, intuition, the (in)fallibility and (in)defeasibility of a priori methods. Analytic, formalist and Kantian accounts of how knowledge can be acquired through reasoning and intuition alone, without recourse to empirical methods. Offered in alternate years. GE credit: AH, WE.—III. Molyneux
*(new course—eff. fall 14)*

**136. Formal Epistemology (4)**
Lecture/discussion—4 hours. Prerequisite: course 12. Formal (mathematical) approaches to belief revision, knowledge and deduction, meta-knowledge, (multi-agent) epistemic logic, Bayesian confirmation, Bayes nets, epistemic and probabilistic paradoxes. Offered irregularly. GE credit: AH.—I. Molyneux
*(new course—eff. fall 14)*

# Physical Education

## New and changed courses in Physical Education (PHE)

### Upper Division

**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 Exercise Biology 120.) GE credit: SocSci, Div | SS.—II, IV. (II, IV.) Salitsky
*(new course—eff. fall 11)*

**300. The Elementary Physical Education Program (2)**
Lecture—1 hour; laboratory—2 hours. Prerequisite: consent of instructor. Restricted to senior standing or credential student. Introduction to principles, theories, material, and practices of elementary school physical education program.—III. (III.)
*(change in existing course—eff. spring 14)*

# Physicians Assistant Studies

## New and changed courses in Physicians Assistant Studies (PAS)

### Professional

**440. Preparation for Clinical Practice (1-3)**
Clinical activity—36 hours. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Students are placed in clinical settings and/or clinical simulation laboratories to observe and practice the integration of clinical skills with direct supervision by faculty. —I, II, III, IV. (I, II, III, IV.)
*(new course—eff. spring 14)*

# Physics

## New and changed courses in Physics (PHY)

### Lower Division

**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: SciEng | SE.—I. (I.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I, III. (I, III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I, II. (I, II.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II, III. (II, III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I, III. (I, III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. (I.)
*(change in existing course—eff. winter 13)*

**9HB. Honors Physics (5)**
Lecture—3 hours; discussion/laboratory—4 hours. Prerequisite: Physics 9HA or 9A, Mathematics 21C (may be taken concurrently). Special relativity, ther-

mal 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: SciEng | SE.—II. (II.)

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.)

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. (I.)

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.)

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, VL.—I. (I.)

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.

*(change in existing course—eff. winter 13)*

**98. Directed Group Study (1-5)**
Prerequisite: consent of instructor; primarily for lower division students. (P/NP grading only.) GE credit: SE.

*(change in existing course—eff. winter 13)*

**99. Special Study for Undergraduates (1-5)**
Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.

*(change in existing course—eff. winter 13)*

## Upper Division

**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: S SciEng | E.—I. (I.)

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.)

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I-II. (I-II.)

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.) Zhu

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.) Zhu

*(change in existing course—eff. winter 13)*

**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. GE credit: SciEng | SE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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. GE credit: SciEng | SE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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. GE credit: SciEng | SE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. (I.)

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.)

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. (I.)

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, VL.—I. (I.)

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.)

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, WE.—III. (III.)

*(change in existing course—eff. winter 13)*

**122A. Advanced Laboratory in Condensed Matter Physics (4)**
Laboratory—8 hours. Prerequisite: course 104A, 105A, 110B, 115A and 112 (may be taken concurrently) 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: SciEng | SE, WE.—II. (II.)

*(change in existing course—eff. spring 14)*

**122B. Advanced Laboratory in Particle Physics (4)**
Laboratory—8 hours. Prerequisite: course 104A, 105A, 110B, 115A and 112 (may be taken concurrently) or consent of the department. Experimental techniques and measurements in nuclear and particle physics. Students perform three to six experi-

ments depending on difficulty. Individual work is stressed. Thorough write-ups of the experiments are required. GE credit: SciEng | SE, WE.—II. (II.)

*(change in existing course—eff. spring 14)*

**123. Signals and Noise in Physics (4)**
Lecture—3 hours; project—1 hour. Prerequisite: courses 9A, B, C, D and 104A, or consent of instructor. Techniques of measurement and analysis designed to avoid systematic error and maximize signal/noise ratio. Illustrative examples of optimal filters ranging from condensed matter to cosmology. Not open to students who have completed this course previously as course 198. Not offered every year. GE credit: SciEng | SE.—III. (III.) Tyson

*(change in existing course—eff. winter 13)*

**129A. Introduction to Nuclear Physics (4)**
Lecture—3 hours. 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: SciEng | SE.—III. (III.) Calderon

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.

*(change in existing course—eff. winter 13)*

**130A-130B. Elementary Particle Physics (4-4)**
Lecture—3 hours; extensive problem solving. Prerequisite: course 115A passed with a grade of C- or better or consent of instructor. Properties and classification of elementary particles and their interactions. Experimental techniques. Conservation laws and symmetries. Strong, electromagnetic, and weak interactions. Introduction to Feynman calculus. GE credit: SciEng | SE.—II, III. (II, III.)

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II-III. (II-III.)

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—(I.) Becker, Boeshaar

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. Boeshaar, Knox

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—(II.) Fassnacht

**154. Astrophysical Applications of Physics (4)**
Lecture—3 hours; project. Prerequisite: course 105AB, 110A; 110B and 115A concurrently; 112 or consent of instructor. Applications of classical and quantum mechanics, thermodynamics, statistical mechanics, and electricity and magnetism to 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: SciEng | SE.—(III.) Knox

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. Kaloper

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. Albrecht

*(change in existing course—eff. winter 13)*

**157. Astronomy Instrumentation and Data Analysis Laboratory (4)**
laboratory—8 hours. Prerequisite: course 104A, 105A, 110A; 115A and 110B may be taken concurrently. Open to Astrophysics Specialization majors; consent of instructor required. Experimental techniques, data acquisition and analysis involving laboratory astrophysics plus stellar, nebular and galaxy digital imaging, photometry and/or spectroscopy. Students perform three experiments. Individual work stressed. Minimum 10-15 page journal style articles of two experiments are required. Offered in alternate years. GE credit: SciEng | SE, WE.—(III.) Boeshaar, Tyson

*(change in existing course—eff. spring 14)*

**160. Environmental Physics and Society (3)**
Lecture—3 hours. Prerequisite: course 9D or 7C; or course 10 or 1B and Mathematics 16B or the equivalent. Impact of humankind on the environment will be discussed from the point of view of the physical sciences. Calculations based on physical principles will be made, and the resulting policy implications will be considered. (Same course as Engineering 160.) GE credit: SciEng or SocSci | SE or SL.—III. (III.)

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

**185. Alumni Seminar Series (1)**
Seminar—1 hour. Weekly guest speakers (usually a physics alumnus or alumna) tell students about their careers. Speakers use their experience to give students valuable perspectives on life after a degree in physics. May be repeated two times for credit. (P/NP grading only.) GE credit: SciEng | SE.—III. (III.)

*(new course—eff. fall 13)*

**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.)

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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.)

*(change in existing course—eff. winter 13)*

**198. Directed Group Study (1-5)**
Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.

*(change in existing course—eff. winter 13)*

**199. Special Study for Advanced Undergraduates (1-5)**
(P/NP grading only.) GE credit: SE.

*(change in existing course—eff. winter 13)*

## Graduate

**270. Current Topics in Physics Research (3)**
Lecture/discussion—3 hours. Prerequisite: graduate standing in Physics or consent of instructor. Reading and discussion to help physics graduate students develop and maintain familiarity with the current

and past literature in their immediate field of research and related areas. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

*(change in existing course—eff. fall 13)*

**292. Seminar in Elementary Particle Physics (1)**

*(cancelled course—eff. winter 10)*

# Plant Biology

## New and changed courses in Plant Biology (PLB)

### Upper Division

**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: SciEng | SE, VL.—III. (III.) Potter

*(change in existing course—eff. winter 13)*

**119. Population Biology of Invasive Plants and Weeds (3)**

Lecture—2 hours; laboratory—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C; introductory statistics recommended. Origin and evolution of invasive plant species and weeds, reproduction and dispersal, seed ecology, modeling of population dynamics, interactions between invasive species, native species, and crops, biological control. Laboratories emphasize design of competition experiments and identification of weedy species. (Same course as Evolution and Ecology 119.) GE credit: SciEng | SE.—III. (III.) Rejmanek

*(change in existing course—eff. winter 13)*

**123. Plant-Virus-Vector Interaction (3)**

Lecture—3 hours. Prerequisite: Biological Sciences 2A, Biological Sciences 101; course 105, Plant Pathology 120, and Entomology 100 recommended. Analysis of interactions necessary for viruses to infect plants.Interactions among insect vectors and host plants involved in the plant-virus life cycle. Evolutionary aspects of the molecular components in viral infection and modern approaches to the interdiction of viral movement. (Same course as Entomology 123 and Plant Pathology 123.) Offered in alternate years. GE credit: SE, SL, WE.—(I.) Lucas, Gilbertson, Ullman

*(change in existing course—eff. winter 14)*

**126. Plant Biochemistry (3)**

Lecture—3 hours. Prerequisite: Biological Sciences 103 or 105. The biochemistry of important plant processes and metabolic pathways. Discussion of methods used to understand plant processes, including use of transgenic plants. (Same course as Molecular and Cellular Biology 126.) GE credit: SciEng | SE, SL.—II. (II.) Callis, Tian

*(change in existing course—eff. winter 13)*

**143. Evolution of Crop Plants (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: Plant Sciences 2 or Biological Sciences 1C or 2C. Origins of crops and agriculture, including main methodological approaches, centers of crop biodiversity, dispersal of crops, genetic and physiological differences between crops and their wild progenitors, agriculture practiced by other organisms, and role and ownership of crop biodiversity. GE credit: SciEng or SocSci, Div, Wrt | SE or SS, SL, WE.—III. (III.) Gepts

*(change in existing course—eff. winter 13)*

**148. Introductory Mycology (4)**

Lecture—2 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1A, 1B, 1C. Systematics, ecology, evolution, and morphology of fungi. Importance of fungi to humans. (Same course as Plant Pathology 148.) GE credit: SE.—I. MacDonald, Rizzo

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

### Professional

**396. Teaching Assistant Training Practicum (1-4)**

Prerequisite: graduate standing; consent of instructor. Practical experience in acting as teaching assistant in Plant Biology courses. Learning activity: hands on experience in preparing for and conducting discussions, guiding student laboratory work, and the formulation of questions and topics for examinations. May be repeated for credit. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.)

*(new course—eff. fall 13)*

*(change in existing course—eff.*

# Plant Pathology

## New and changed courses in Plant Pathology (PLP)

### Upper Division

**123. Plant-Virus-Vector Interaction (3)**

Lecture—3 hours. Prerequisite: Biological Sciences 2A, Biological Sciences 101; Plant Biology 105, course 120, and Entomology 100 recommended. Analysis of interactions necessary for viruses to infect plants.Interactions among insect vectors and host plants involved in the plant-virus life cycle. Evolutionary aspects of the molecular components in viral infection and modern approaches to the interdiction of viral movement. (Same course as Entomology 123 and Plant Biology 123.) Offered in alternate years. GE credit: SE, SL, WE.—(I.) Lucas, Gilbertson, Ullman

*(change in existing course—eff. winter 14)*

**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

*(change in existing course—eff. winter 13)*

**189D. Global Disease Biology Research Discussion (1)**

Discussion—1 hour. Prerequisite: junior standing, courses 90, 187, Science and Society 23; course 189 required concurrently. Restricted to Global Disease Biology majors only. Course helps prevent or solve problems during the students' research activity. Independent advising and assistance on research proposal. (P/NP grading only)—I, II, III. (I, II, III.)

*(new course—eff. fall 15)*

# Plant Sciences

## New and changed courses in Plant Sciences (PLS)

### Lower Division

**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: SciEng | SE.—I. (I.) Gradziel

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—II. (II.) Saltveit, Marrush

*(change in existing course—eff. winter 13)*

**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

*(change in existing course—eff. winter 13)*

**12. Plants and Society (4)**

Lecture—3 hours; extensive writing—3 hours. Prerequisite: high school biology. Dependence of human societies on plant and plant products. Plants as resources for food, fiber, health, enjoyment and environmental services. Sustainable uses of plants for food production, raw materials, bioenergy, and environmental conservation. Global population growth and future food supplies. Not open for credit to students who have complete Plant Biology 12. (Former course Plant Biology 12.) (Same course as Science and Society 12.) GE credit: SciEng or SocSci, Div, Wrt | SE or SS, WE.—I, II, III. (I, II, III.) Drakakaki, Fischer, Jasieniuk, Tian

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

**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: SciEng | SE.—III. (III.) Van Horn, Williams

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, VL.—I, II, III. (I, II, III.) Lieth
*(change in existing course—eff. winter 13)*

**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
*(change in existing course—eff. winter 13)*

## Upper Division

**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: SciEng | SE.—I. (I.) Fischer, Zakharov
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—(I.) Blumwald
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.) Bradford, Labavitch, Saltveit
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—(II.) Bradford
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.) Brown
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—(III.) Shackel
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—II. (II.) Tate, Van Kessel
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, VL.—III. (III.) Potter
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. (I.) Al-Khatib, Flint
*(change in existing course—eff. winter 13)*

**110B. Management of Agronomic Crops in Temperate and Tropical Systems (3)**
*(cancelled course—eff. winter 14)*

**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: SciEng | SE.—III. Teuber
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.) DeJong
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.) DeJong
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, VL.—III. Rice
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, VL.—I. (I.) Berry, Dahlgren, Rice
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, VL.—III. (III.) Young

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, VL.—III. (III.) Young

*(change in existing course—eff. winter 13)*

**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: SciEng | OL, SE, SL.—III. (III.) Six

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.) St. Clair

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. Brown, Richards

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. Gradziel

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, SL.—II. (II.) Cadenasso

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—(I.) Gradziel

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—(III.) Gradziel

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.) Burger

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. (I.) Saltveit, Zakharov

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—(III.) Zakharov

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—(I.)

*(change in existing course—eff. winter 13)*

**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: SciEng | VL, SE.—II. (II.) DiTomaso, Fischer

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. Anderson

*(change in existing course—eff. winter 13)*

**180. Introduction to Geographic Information Systems (4)**

*(cancelled course—eff. winter 14)*

**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: SciEng, Wrt | OL, SE, WE.—III. (III.) Kliebenstein

*(change in existing course—eff. winter 13)*

**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

*(change in existing course—eff. winter 13)*

**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.

*(change in existing course—eff. winter 13)*

**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

*(change in existing course—eff. winter 13)*

### Graduate

**222. Advanced Plant Breeding (4)**

Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 154 and 205; Genetics 201D or Animal Genetics 107 recommended. Philosophy, methods, and problems in developing improved plant species. Topics include: inbreeding, heterosis, progeny testing, breeding methodology, index selection, germplasm conservation, and breeding for stress resistance. Laboratories include tours of breeding facilities and calculation and interpretation of quantitative data. Offered in alternate years.—(III.) Teuber

*(change in existing course—eff. winter 14)*

# Political Science

## New and changed courses in Political Science (POL)

### Lower Division

**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: ArtHum or SocSci, Wrt | AH or SS, WC, WE.

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci | AH or SS, QL, SE, VL, WE.

*(change in existing course—eff. winter 13)*

### Upper Division

**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: ArtHum or SocSci, Wrt | AH or SS, WE.

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Wrt | ACGH, AH or SS, WE.

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Wrt | AH or SS or SE, QL, VL, WE.

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Wrt | AH or SS, WE.

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Wrt | AH or SS, WC, WE.

*(change in existing course—eff. winter 13)*

**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: SocSci, Wrt | SS, WE.

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Wrt | AH or SS, WC, WE.

*(change in existing course—eff. winter 13)*

**118B. History of Political Theory: Early Modern (4)**

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 4. Critical analyses of the works of late modern political philosophers such as Rousseau, Kant, Hegel, Tocqueville, Mill, Marx and Nietzsche. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.

*(change in existing course—eff. winter 13)*

**118C. History of Political Theory: Late Modern (4)**

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 4. Critical analyses of the works of late modern political philosophers such as Rousseau, Kant, Hegel, Tocqueville, Mill, Marx and Nietzsche. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Wrt |

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.

*(change in existing course—eff. winter 13)*

**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.

*(change in existing course—eff. winter 13)*

**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: SocSci | SS, WE.

*(change in existing course—eff. winter 13)*

**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: SocSci, Wrt | OL, SS, WE.

*(change in existing course—eff. winter 13)*

**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: SocSci | OL, SS, VL, WE.
*(change in existing course—eff. winter 13)*

**195. Special Studies in American Politics (4)**
Seminar—4 hours. Prerequisite: consent of instructor and upper division standing. Intensive examination of one or more special problems appropriate to American politics. May be repeated one time for credit when topic differs. GE credit: SocSci | ACGH, SS, WE.
*(change in existing course—eff. winter 13)*

**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: SocSci | ACGH, SS, WE.—I, II, III.
*(change in existing course—eff. winter 13)*

**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: SocSci | SS, WE.
*(change in existing course—eff. winter 13)*

**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: SocSci | SS, WE.
*(change in existing course—eff. winter 13)*

**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: SocSci | SS, WE.
*(change in existing course—eff. winter 13)*

**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: SocSci | QL, SS, VL, WE.
*(change in existing course—eff. winter 13)*

### Graduate

**284. Advanced Network Analysis (4)**
Seminar—3 hours; term paper. Prerequisite: course 211, 212, 279. Exponential Random Graph Models (ERGMS) of networks, game theoretic models of network formation and network dynamics, diffusion processes, shocks and network collapse, percolation, cross-network spillover processes, social and political applications of advanced network models. Offered irregularly.
*(new course—eff. fall 13)*

# Population Biology

## New and changed courses in Population Biology (PBG)

### Graduate

**233. Computational Methods in Population Biology (3)**
Lecture/laboratory—2 hours; discussion/laboratory—1 hour. Prerequisite: a course in theoretical ecology (e.g., Ecology 231 or an equivalent to Environmental Science and Policy 121 from your undergraduate institution) or consent of instructor; no programming experience required. Numerical methods for simulating population dynamics using the computational software package R. Emphasis placed on model formulation and development, theoretical concepts and philosophical principles to guide simulation efforts, model parameterization, and implementing simulations with R. (Same course as Ecology 233.) Offered in alternate years. (S/U grading only.)—(II.) Baskett, Schreiber
*(new course—eff. fall 13)*

**271. Research Conference in Ecology (1)**
Seminar—1 hours. Prerequisite: consent of instructor. Critical presentation and evaluation of current literature and ongoing research in ecology. Requirements include active participation in weekly discussions and the presentation of a paper or chapter once per quarter. May be repeated for credit. (Same course as Ecology 271.) (S/U grading only.)—I, II, III. (I, II, III.) Schoener, Schreiber
*(change in existing course—eff. winter 14)*

**296. Seminar in Geographical Ecology (2)**
Seminar—2 hours. Prerequisite: Evolution and Ecology 100 or 101 or consent of instructor. Recent developments in theoretical and experimental biogeography, historical biogeography and related themes in systematics, the biology of colonizing species, and related topics. (Same course as Geography 214.)(S/U grading only.)—III. (III.) Shapiro
*(change in existing course—eff. fall 12)*

# Portuguese

## New and changed courses in Portuguese (POR)

### Upper Division

**1A. Accelerated Intensive Elementary Portuguese (15)**
Lecture/discussion—15 hours. Not open to students who have completed courses 1, 2 or 3. Intended for students who wish to complete three quarters of Portuguese 1, 2, and 3. GE credit: WC.—IV. (IV.)
*(new course—eff. spring 14)*

**98. Directed Group Study (1-5)**
Prerequisite: consent of instructor and Department Chairperson. Directed group study primarily for lower division students.—I. (I.)
*(new course—eff. spring 14)*

### Upper Division

**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: ArtHum | AH, WC, WE.—I. (I.) Newcomb
*(change in existing course—eff. winter 13)*

**111. The Structure of Portuguese: Sounds and Words (3)**
Lecture/discussion—3 hours. Prerequisite: course 22 or 23. Linguistic description of sound patterns of Portuguese 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. GE credit: SS.—II. (II.)
*(new course—eff. winter 14)*

**130. Survey of Luso-Brazilian Literature: 1500-1800 (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: course 22 or 23; 100. Overview of Luso-Brazilian literature, covering three major literary periods: Renaissance, Baroque, and Enlightenment. Attention to the concept of imitation and nativism. GE credit: AH, WC.—II. (II.)
*(new course—eff. winter 15)*

**132. Portuguese Literature: Medieval and Renaissance (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: course 22 or 31. Overview of the origins of the Portuguese literature, spanning from the 13th C to the 16th C. Studies of lyrical and epic poetry, drama, and travel narratives. GE credit: AH, WC.—II. (II.)
*(new course—eff. winter 15)*

**134. Luis de Camões (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: course 22 or 31; 100. Overview of the greatest Renaissance Portuguese poet, Luis de Camões. Study his famous epic poem, Os Lusiadas, and a series of sonnets written by him. GE credit: AH, WC.—III. (III.)
*(new course—eff. spring 14)*

**141. Introduction to Luso-Brazilian Culture (4)**
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 23. Introduction to history, geography, and culture of Portugal and Brazil. Art, history of ideas, and everyday cultural manifestations. Introduction to critical reading and textual analysis. Taught in Portuguese. GE credit: ArtHum, Div, Wrt | AH, WC.—I. (I.)
*(new course—eff. fall 14)*

**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: ArtHum | AH, WC, WE.—I, II. (I, II.) Bernucci, Newcomb
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC, WE.—III. (III.) Bernucci, Newcomb
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WE.—I. (I.) Bernucci, Newcomb

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC, WE.—II. (II.) Bernucci, Newcomb

*(change in existing course—eff. winter 13)*

**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

*(change in existing course—eff. winter 13)*

**199. Special Study for Advanced Undergraduates (1-5)**
Independent study with professor for advanced undergraduate students, or honor thesis students. (P/NP grading only) Offered irregularly. GE credit: AH.

*(new course—eff. winter14)*

# Psychology

## New and changed courses in Psychology (PSC)

## Upper Division

**100Y. Introduction to Cognitive Psychology (4)**
Web virtual lecture—3 hours; discussion—1 hour; lecture—1 hour. Prerequisite: courses 1; 41. Introduction to human information processing, mental representation and transformation, imagery, attention, memory, language processing, concept formation, problem solving, and computer simulation. Not open for credit to students who have completed former course 136 or current course 100.—II. (II.) Luck

*(new course—eff. fall 13)*

**103B. Statistical Analysis of Psychological Data (5)**
Lecture—4 hours; laboratory—2 hours. Prerequisite: course 103A; Statistics 13 or 102. Pass One open to Psychology majors. Probability theory, sampling distributions, statistical inference, and hypothesis testing using standard parametric and correlational approaches. Simple regression analysis, multiple regression analysis, non-parametric statistics, introduction to multivariate statistics, with applications in psychology. Not open for credit to students who have completed course 105. GE credit: QL.—II, III. (II, III.) Blozis, Ferrer, Grimm, Widaman

*(change in existing course—eff. spring 14)*

**124. Comparative Neuroanatomy (4)**
Lecture—3 hours; laboratory—2 hours. Prerequisite: course 101 or Neurobiology, Physiology, and Behavior 100 or 101. Overview of the neuroanatomy of the nervous system in a variety of mammalian and non-mammalian vertebrates. Examine changes or modifications to neural structures as a result of morphological or behavioral specializations. (Same course as Neurobiology, Physiology, and Behavior 124.) GE credit: SL.—II. (II.) Krubitzer, Recanzone

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

**125. Behavioral Genetics and Epigenetics (3)**
Lecture—3 hours. Prerequisite: course 101. Review of basic principles in genetics and select topics in epigenetics with emphasis on behavior. Use of modern molecular methods to outline complex relationships between genes, environment, and behavior.—II, III. (II, III.) Stolzenberg, Trainor

*(new course—eff. fall 13)*

**129. Sensory Processes (4)**
*(cancelled course—eff. winter 14)*

**135. Cognitive Neuroscience: The Biological Foundations of the Mind (4)**
Lecture—4 hours;. Prerequisite: course 1, 41, or consent of instructor; course 101, 121, or 129 recommended. Neuroscientific foundations of higher mental processes including attention, memory, language, higher-level perceptual and motor processes, and consciousness. Emphasis on the neural mechanisms which form the substrates of human cognition and the relationship of mind to brain.—I, II, III. (I, II, III.) Ekstrom, Geng, Janata, Mangun, Raganath

*(change in existing course—eff. fall 14)*

**137. Neurobiology of Learning & Memory (4)**
Lecture—4 hours. Prerequisite: courses 1, 41, 101. Overview of the neural basis of learning and memory focusing on modern behavioral neuroscience research with animals. Topics include consolidation, neural plasticity, cellular competition for memory storage, and the role of neurogenesis in learning.—I, III. (I, III.) Wiltgen

*(new course—eff. winter 14)*

**143. Infant Development (4)**
Lecture—3 hours; extensive writing. Prerequisite: courses 1 and 41, and either course 140 or Human Development 100A. Psychological development in infancy. Topics include physical and motor development, sensory and nervous system development, and memory and cognitive development. Emphasis will be on evaluating theories, empirical research, and experimental methods for understanding infant development. GE credit: WE.—III. (III.) Oakes

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

**157. Stereotyping, Prejudice, and Stigma (4)**
Lecture/discussion—4 hours. 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. GE credit: Div.—I, II, III. (I, II, III.) Sherman

*(change in existing course—eff. fall 13)*

**162. Introduction to Personality Psychology (4)**
Lecture—3 hours; term paper. Prerequisite: course 1, 41. Pass One open to Psychology majors. Scientific study of personality. Methods of personality research. Overview of current research and theory in the field of personality psychology. Not open for credit to students who have completed former course 147. GE credit: SocSci, Wrt | SS.—I, II, III. (I, II, III.) Robins, Shaver

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

## Graduate

**204A. Statistical Analysis of Psychological Experiments (5)**
Lecture—4 hours; laboratory—2 hours. Prerequisite: Statistics 102 or equivalent; graduate standing in Probability theory, sampling distributions, statistical inference, and hypothesis testing using standard parametric and correlational approaches. Analysis of variance, factorial and repeated measures, and tests of trends. Not open for credit to students who have completed course 206.—I. (I.) Ferrer, Widaman

*(change in existing course—eff. spring 14)*

**204C. Applied Psychometrics and Measurement Theory (4)**
*(cancelled course—eff. winter 14)*

**204D. Advanced Statistical Inference from Psychological Experiments (5)**
Lecture—4 hours; laboratory—2 hours. Prerequisite: course 204A or the equivalent or consent of instructor. Advanced topics in statistical inference, which may include probability theory, sampling distributions, statistical inference and hypothesis testing, nonparametric statistics, Bayesian approaches, and advanced issues in analysis of variance. Not open for credit to students who have completed course 205.—III. (III.) Blozis

*(change in existing course—eff. spring 14)*

**205E. Applied Psychometrics and Measurement Theory (4)**
Lecture—4 hours. Prerequisite: course 204A or equivalent; graduate standing in Psychology or consent of instructor. Examination of the basic principles and applications of classical and modern test theory. Topics include test construction, reliability theory, validity theory, factor analysis, and latent trait theory. Not open for credit to students who have completed course 204 or 204C. Offered in alternate years.—III. Widaman

*(new course—eff. fall 13)*

**205F. Item Response Theory (4)**
Lecture—3 hours; term paper. Prerequisite: course 204A or the equivalent; graduate standing in Psychology or consent of instructor. Item response theory allows for the creation of precise measurement instruments in psychological testing. Review Classical Test Theory, and then cover basic IRT models through advanced applications. Offered in alternate years.—III. Grimm

*(new course—eff. winter 14)*

**221. Academic Writing in Psychology (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: consent of instructor. Class size limited to 10. Strategies for developing and honing academic writing skills and writing productivity, with a particular focus on how to write a clear and compelling empirical journal article in psychology. May be repeated four times for credit with consent of instructor if student chooses to focus on a substantially different writing project. Offered irregularly.—I, II, III. (I, II, III.) Ledgerwood

*(new course—eff. spring 13)*

# Religious Studies

## New and changed courses in Religious Studies (RST)

## Lower Division

**1A. Pilgrimage (4)**
Lecture—3 hours; discussion—1 hour. Introduction to comparative religion, focusing on the theme of pilgrimage in different religious traditions. Not open to

students who have taken course 3A. Offered irregularly. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—I, II, III, IV. (I, II, III, IV.) Tezcan, Venkatesan

*(change in existing course—eff. fall 13)*

**1B. Death and Afterlife (4)**

Lecture—3 hours; discussion—1 hour. Introduction to comparative religion, focusing on the theme of death and the afterlife in different religious traditions. Not open to students who have taken course 3B. GE credit: ArtHum, Div, Wrt | AH, OL, VL, WC, WE.—I, II, III, IV. (I, II, III, IV.)

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

**1C. Sacrifice (4)**

Lecture—3 hours; discussion—1 hour. Introduction to comparative religion, focusing on the theme of sacrifice in different religious traditions. Not available to those who have taken course 3C. Offered irregularly. GE credit: ArtHum, Div, Wrt | AH, OL, VL, WC, WE.—I, II, III, IV. (I, II, III, IV.) Coudert

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

**1D. Conversion (4)**

Lecture—3 hours; discussion—1 hour. Introduction to comparative religion, focusing on the theme of conversion in different religious traditions. Not available to those who have taken course 3D. Offered irregularly. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—I, II, III, IV. (I, II, III, IV.)

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

**1E. Fundamentalism (4)**

Lecture—3 hours; discussion—1 hour. Introduction to comparative religion, focusing on the idea of fundamentalism in different religious traditions. Not available to those who have taken course 3E. Offered irregularly. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, OL, VL, WE.—I, II, III, IV. (I, II, III, IV.) Watenpaugh

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

**1F. Religion Today (4)**

Lecture—3 hours; discussion—1 hour. Introduction to comparative religion, focusing on different religious traditions in the contemporary world. GE credit: ArtHum, Div, Wrt | AH, DD, WC, WE.—I, II, III, IV. (I, II, III, IV.)

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

**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: ArtHum | AH, OL, WC, WE.—Vidas

*(change in existing course—eff. winter 13)*

**10. Contemporary Ethical Issues (2)**

Lecture—2 hours. Presents challenging, contemporary ethical issues from a multicultural perspective. Rotating topics will include Ethical Eating, Capital Punishment, Euthanasia, Poverty, and Animal Rights. May be repeated for credit. GE credit: ArtHum, Wrt | AH, WE.—III. (III.) Coudert, Janowitz

*(change in existing course—eff. winter 13)*

**11. Ethical Eating (4)**

Lecture—3 hours; term paper or discussion—1 hour. Introduction to the complex and varied ethical, religious, and cultural meanings that food has had across the centuries and globe. Offered irregularly. GE credit: ArtHum, Div, Wrt | AH, OL, VL, WC, WE.—Coudert

*(change in existing course—eff. winter 14)*

**15Y. Reading War/Fighting War (4)**

Lecture—2 hours; web electronic discussion—1 hour; extensive writing. Introduction to both classic religious texts about war and a set of actual scenarios drawn from the experience and training of soldiers in recent military conflicts. Offered irregularly. GE credit: ArtHum, Div, Wrt | ACDH, AH, DD, OL, VL, WC, WE.—(III.) Janowitz

*(new course—eff. spring 13)*

**21. Hebrew Scriptures (4)**

Lecture—3 hours; term paper or discussion. Selected texts from the Hebrew Scriptures (Genesis II Chronicles) and review of modern scholarship on the texts from a variety of perspectives (historical, literary, sociological, psychological). Course work is based on an English translation and no knowledge of Hebrew is required. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—I. (I.)

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

**30. Religions of South Asia (4)**

Lecture—3 hours; discussion—1 hour. 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. Offered irregularly. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.—I, II. (I, II.) Elmore, Venkatesan

*(change in existing course—eff. winter 14)*

**42. Religion and Science Fiction (4)**

Lecture—3 hours; term paper. Representations of actual and fictional religious movements in science fiction and fantasy writing and film. Examination of: the characteristics of religion and religiosity in fictional religious movements; the relationship between religion, science, and technology in modern speculative fiction. Offered irregularly. GE credit: ArtHum, Div, Wrt | AH, VL, WE.—I, II, III, IV. (I, II, III, IV.) Chin

*(change in existing course—eff. winter 14)*

**45. Christianity (4)**

Lecture/discussion—3 hours; term paper or discussion. Major concepts and practices in the Christian tradition. Survey of the history of Christianity and Christian expansion from antiquity to modern times. Course pays particular attention to Christianity in China, India, Africa, the Middle East, and Latin America. Offered in alternate years. GE credit: ArtHum | AH, VL, WC, WE.—I, II, III, IV. Chin

*(change in existing course—eff. winter 13)*

**60. Introduction to Islam (4)**

Lecture/discussion—3 hours; term paper or discussion—1 hour. Introduction to topics central to the Islamic tradition. Muhammad, the Qur'an, Islamic law, theology, philosophy, cosmology, worship, and mysticism. Race and gender in Islam, Islamic revival, and varying experiences of Islam in different historical and cultural settings. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—(I.) Tezcan

*(change in existing course—eff. winter 14)*

**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 or SocSci, Div, Wrt | AH or SS, VL, WC, WE.—II. Elmore, Venkatesan

*(change in existing course—eff. winter 13)*

**69. Introduction to Hindu Mythology (4)**

Lecture/discussion—3 hours; term paper or discussion—1 hour. 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

*(change in existing course—eff. winter 14)*

**70. Religion and Language (4)**

Lecture/discussion—3 hours; term paper. Basic toolkit for studying religious discourse in a variety of traditions. Concentration on the sacred and profane, the wondrous and ordinary, and the mystical and reasonable. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—I, II. (I, II.) Miller

*(change in existing course—eff. winter 14)*

**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: ArtHum, Div, Wrt | AH, WE.—II.

*(change in existing course—eff. winter 13)*

**90. Human Rights (4)**

Lecture/discussion—3 hours; term paper. Introduction to the interdisciplinary study of the origins, evolution, denial and protection of Human Rights. GE credit: ArtHum or SocSci, Div | AH or SS, WC, WE.—I, II. (I, II.) Watenpaugh

*(change in existing course—eff. winter 13)*

## Upper Division

**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: ArtHum or SocSci | AH or SS, WC, WE.—III. (III.)

*(change in existing course—eff. winter 13)*

**120. Religion, Magic and Science (4)**

Lecture—3 hours; extensive writing. Religion, magic, and science from the middle ages to the present. Contrast between modern scientific methodology and religious and magical thinking. (Same course as Science and Technology Studies 120.) Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, OL, VL, WC, WE.—(I.) Coudert

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

**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: ArtHum | AH, WE.—III. (III.)

*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, WC, WE.—II.

*(change in existing course—eff. winter 13)*

**131. Genocide (4)**

Lecture/discussion—3 hours; term paper or discussion—1 hour. Prerequisite: upper division standing. Comparative and critical study of the modern phenomenon of genocide from religious, ethical and historical perspectives. (Same course as Human Rights 131.) Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, VL, WC, WE.—(I.) Watenpaugh

*(change in existing course—eff. spring 14)*

**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, Man-

ichaeism, 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: ArtHum | AH, WC, WE.—I. Vidas

*(change in existing course—eff. winter 13)*

**134. Human Rights (4)**

Lecture/discussion—3 hours; term paper or discussion—1 hour. Introduction to the interdisciplinary study of the origins, evolution, denial and protection of Human Rights. No credit for students who have completed Religious Studies 90. (Same course as Human Rights 134.) Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.—(III). Watenpaugh

*(change in existing course—eff. spring 14)*

**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: ArtHum | AH, WC, WE.—I. (I.)

*(change in existing course—eff. winter 13)*

**143. New Testament Apocrypha (4)**

Lecture—3 hours; term paper. Prerequisite: course 40. Extra-canonical Christian writings and their reception, from antiquity to the present. Emphasis on the importance of New Testament figures both as literary characters and as authors within different Christian traditions. Offered irregularly. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—I, II, III. (I, II, III.) Chin

*(change in existing course—eff. winter 14)*

**144. History of the Bible (4)**

Lecture—3 hours; term paper. Prerequisite: course 21 or 40. History of the formation of the Christian biblical canon, with emphasis on differences between Christian traditions; survey of translations and adaptations of biblical narrative in Christianity, Judaism, and Islam, as well as in contemporary culture. Offered irregularly. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—I, II, III. (I, II, III.) Chin

*(change in existing course—eff. winter 14)*

**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: ArtHum | ACGH, AH, DD, WE.—II.

*(change in existing course—eff. winter 13)*

**150. Religious Ethics (4)**

Lecture/discussion—3 hours; term paper or discussion. Prerequisite: course 10 recommended. Study of the religious bases of ethics through examination of ethical problems that arise in different religious cultures around the world and in nations where multiple religious cultures face similar issues. Offered irregularly. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—Chin, Coudert

*(change in existing course—eff. winter 14)*

**161B. Modern Islam: Authority and Tradition In Process (4)**

Lecture/discussion—3 hours; term paper. Survey of Islamic thought, social organization, politics from eighteenth century through present. Focus on changing notations of moral authority and tradition. Concentration on Middle East and South Asia with sustained treatment of North American engagements with the Islamic world. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, OL, WC, WE.—II. Miller, Watenpaugh

*(new course—eff. spring 14)*

**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: ArtHum | AH, VL, WC.—III. Elmore

*(change in existing course—eff. winter 13)*

# Russian

## New and changed courses in Russian (RUS)

### Lower Division

**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: ArtHum | AH, WC.—I. (I.)

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—II. (II.)

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—III. (III.)

*(change in existing course—eff. winter 13)*

**4. Intermediate Russian (4)**

Discussion—4 hours; laboratory—1 hour. Prerequisite: course 3. Grammar review and conversational practice. GE credit: ArtHum | AH, WC.—I. (I.)

*(change in existing course—eff. winter 13)*

**5. Intermediate Russian (4)**

Discussion—4 hours; laboratory—1 hour. Prerequisite: course 4. Grammar review. Introduction to literature. Conversational practice. GE credit: ArtHum | AH, WC.—II. (II.)

*(change in existing course—eff. winter 13)*

**6. Intermediate Russian (4)**

Discussion—4 hours; laboratory—1 hour. Prerequisite: course 5. Grammar review. Intermediate conversation and continued reading of literature. GE credit: ArtHum | AH, WC.—III. (III.)

*(change in existing course—eff. winter 13)*

**45. Russian Fantasy and Science Fiction (4)**

*(cancelled course—eff. spring 14)*

### Upper Division

**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: ArtHum | AH, WC.—I. (I.)

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—II. (II.)

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—III. (III.)

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, OL.—II.

*(change in existing course—eff. winter 13)*

**123. Twentieth-Century Russian Prose (4)**

*(cancelled course—eff. spring 14)*

**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: ArtHum | AH, WC, WE.—I, II, III. (I, II, III.) Kaminer

*(change in existing course—eff. winter 13)*

**128. Twentieth-Century Russian Poetry (4)**

*(cancelled course—eff. spring 14)*

**129. Russian Film (4)**

Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: completion of Subject A requirement. History of Russian film; film and social revolution, the cult of Stalin, dissident visions; film and the collapse of the Soviet empire; gender and the nation in Russian film. Course taught in English; films are in Russian with English subtitles. Offered in alternate years. (Same course as Film Studies 129.) GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.—(II.)

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

**142. Women in Russian Culture (4)**

Lecture/discussion—3 hours; term paper. Prerequisite: any introductory course in literature. Study of the representation of (and by) women in contemporary Russian fiction and film. Exploration of issues such as family dynamics/motherhood, sexuality, work, and women 's relationship to the state. Offered in English. Offered in alternate years. GE credit: ArtHum | AH, WC, WE.—(I.) Kaminer

*(change in existing course—eff. winter 14)*

**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: ArtHum | AH, WC, WE.

*(change in existing course—eff. winter 13)*

**197T. Tutoring in Russian (1-4)**
Seminar—1-2 hours; laboratory—1-2 hours. Prerequisite: upper division standing; consent of instructor. Tutoring in undergraduate courses, including leadership in small voluntary discussion groups affiliated with departmental courses. May be repeated six times for credit. (P/NP grading only.)—I, II, III. (I, II, III.)
*(new course—eff. winter 14)*

**299. Individual Study (1-12)**
Prerequisite: graduate standing. Restricted to graduate students. May be repeated for credit. (S/U grading only) —I, II, III. (I, II, III.)
*(new course—eff. spring 14)*

### Professional

**396. Teaching Assistant Training Practicum (1-4)**
May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)
*(new course—eff. winter 14)*

# Science and Society

### New and changed courses in Science and Society (SAS)

### Lower Division

**7V. Terrorism and War (4)**
Web Virtual Lecture—3 hours, autotutorial—5 hours, web electronic discussion—1 hour, extensive writing; term paper or discussion. Prerequisite: consent of instructor. Terrorism and war from science and social sciences perspectives: terrorism (terrorist cells, WMD's, religious extremism), warfare (military strategy, genocide), and statecraft (diplomacy, clash of civilizations, epochal wars). GE credit: SocSci, Wrt | SS, WC, WE.—III. (IIII.) Arquilla, Carey
*(new course—eff. spring 13)*

**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: SciEng or SocSci, Div, Wrt | SE or SS, WE.—III. (III.) Fogg
*(change in existing course—eff. fall 11)*

**12. Plants and Society (4)**
Lecture—3 hours; extensive writing—3 hours. Prerequisite: high school biology. Dependence of human societies on plant and plant products. Plants as resources for food, fiber, health, enjoyment and environmental services. Sustainable uses of plants for food production, raw materials, bioenergy, and environmental conservation. Global population growth and future food supplies. Not open for credit to students who have complete Plant Biology 12. (Former course Plant Biology 12.) (Same course as Plant Sciences 12.) GE credit: SciEng or SocSci, Div, Wrt | SE, SS.—I, II, III. (I, II, III.) Fischer, Jasieniuk, Nevins, Tian
*(change in existing course—eff. fall 11)*

**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: SciEng or SocSci | SE or SS, DD, OL, QL, SL, VL, WC, WE.—I, II, III. (I, II, III.) Bloom
*(change in existing course—eff. winter 13)*

### Upper Division

**110. Applications of Evolution in Medicine, Human Behavior, and Agriculture (4)**
Lecture—2 hours; discussion—1 hour; term paper. Prerequisite: Biological Sciences 2A, 2B, and 2C. Class size limited to 60 students. Applications of evolutionary biology in medicine, human behavior, and agriculture. Examination of the imprint of evolution on the human life cycle from conception to death. GE credit: SciEng | SE, SL, WE.—III. (III.) Rosenheim
*(new course—eff. fall 13)*

**121. Global Poverty: Critical Thinking and Taking Action (4)**
Lecture—3 hours; discussion—1 hour. Social science and engineering analysis of causes and effects of world poverty and of policies to reduce it via economic growth, foreign aid, and community-level interventions, e.g., in potable water, sanitation, lighting, small scale energy, irrigation, health and microfinance. GE credit: SocSci | SS, WC.—II. (II.) Jarvis, Kornbluth
*(new course—eff. fall 13)*

# Science and Technology Studies

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

### Lower Division

**98. Directed Group Study (1-5)**
Prerequisite: consent of instructor (P/NP grading only.) GE credit: SS.
*(change in existing course—eff. winter 13)*

### Upper Division

**120. Religion, Magic and Science (4)**
Lecture—3 hours; extensive writing. Religion, magic, and science from the middle ages to the present. Contrast between modern scientific methodology and religious and magical thinking. (Same course as Religious Studies 120.) Offered in alternate years. GE credit: GE credit: ArtHum, Div, Wrt | AH, OL, VL, WC, WE.—Coudert
*(change in existing course—eff. fall 11)*

**151. Media Theory (5)**
Lecture—2 hours; discussion—1 hour; film viewing—3 hours; extensive writing. Critical and theoretical approaches to the emergence of new technologies since the invention of photography. Examine various approaches to media (formalist, semiotic, structuralist, Frankfurt School, cybernetics, visual and gamer theory). (Same course as Cinema and Technocultural Studies 150.) GE credit: AH or SS, OL, VL, WE.
*(new course—eff. fall 14)*

**160. Ghosts of the Machine: How Technology Rewires our Senses (4)**
Lecture—3 hours; extensive writing or discussion—1 hour. Historical, aesthetic and critical approaches to how information technologies produced ghost effects or a sense of terror in response to new media like the photograph, gramophone, film, typewriter, computer, Turing Machine. Focus on technological media transforms sense perception. Offered in alternate years. (Same course as Technocultural Studies 160.) GE credit: ArtHum or SocSci | ACGH, AH or SS, VL, WE.—Ravetto-Biagioli
*(new course—eff. fall 13)*

**162. Surveillance Technologies and Social Media (4)**
Lecture—3 hours; film viewing—3 hours; term paper. Prerequisite: Technocultural Studies 1 or course 20. Study of the ubiquitous presence of CCTV, face recognition software, global tracking systems, biosensors, and data mining practices that have made surveillance part of our daily life. Exploration of the boundary between security and control, information and spying. (Same course as Cinema & Technocultural Studies 162.) Offered in alternate years. GE credit: ACGH, AH or SS, OL, VL, WE.—Ravetto
*(new course—eff. winter 15)*

**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: ArtHum, Wrt | AH, SL, WE.—I. Milburn
*(change in existing course—eff. winter 13)*

**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: SocSci | SS, WE.—III. (III.)
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.—Carroll
*(change in existing course—eff. winter 13)*

# Sociology

### New and changed courses in Sociology (SOC)

### Lower Division

**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: SocSci | SS.
*(change in existing course—eff. winter 13)*

**46B. Introduction to Social Research (5)**
Lecture—4 hours; discussion—1 hour. Data-analysis techniques, measurement, scaling, multivariate analysis, and quantitative measures of association. GE credit: SocSci | QL, SS.—II. (II.)
*(change in existing course—eff. fall 12)*

**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: SocSci | SS.
*(change in existing course—eff. winter 13)*

## Upper Division

**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: SocSci | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci | ACGH, DD, SS.
*(change in existing course—eff. winter 13)*

**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: SocSci | SL, SS.
*(change in existing course—eff. winter 13)*

**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: SocSci | SS, WC.
*(change in existing course—eff. winter 13)*

**106. Intermediate Social Statistics (5)**
Lecture—4 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: SocSci | QL, SL, SS.
*(change in existing course—eff. fall 12)*

**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: SocSci | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci, Wrt | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci | ACGH, DD, SS.
*(change in existing course—eff. winter 13)*

**124. Education and Inequality in the U S (4)**
Lecture—3 hours; term paper or discussion—1 hour. Functions of schooling in contemporary U.S. society. Racial, ethnic, social class, and gender inequalities in student outcomes. Consideration of classic and current controversies in the sociology of education and education policy. GE credit: SocSci | SS.
*(change in existing course—eff. fall 14)*

**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: SocSci, Wrt | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci, Wrt | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci, Div, Wrt | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci, Div | ACGH, DD, SS.
*(change in existing course—eff. winter 13)*

**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: SocSci, Div | ACGH, DD, SS.
*(change in existing course—eff. winter 13)*

**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: SocSci, Div | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci, Div, Wrt | ACGH, DD, SS.
*(change in existing course—eff. winter 13)*

**135. Social Relationships (4)**
Lecture—3 hours; discussion—1 hour or term paper. Prerequisite: course 1, 2 or 3, and upper division standing. Social and cultural factors influencing friendships and intimate relationships. Topics include relationship development, relationship maintenance, and relationship loss. GE credit: Div, SocSci, Wrt | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci | ACGH, DD, SS.
*(change in existing course—eff. winter 13)*

**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: SocSci | ACGH, SS, WC.
*(change in existing course—eff. winter 13)*

**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: SocSci | ACGH, SS.
*(change in existing course—eff. winter 13)*

**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: SocSci | ACGH, DD, SS.
*(change in existing course—eff. winter 13)*

**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: SocSci, Wrt | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci, Wrt | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci, Div, Wrt | SS, WC.
*(change in existing course—eff. winter 13)*

**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: SocSci, Div, Wrt | SS, WC.
*(change in existing course—eff. winter 13)*

**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: SocSci | SS, WC.
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci, Div, Wrt | ACGH, DD, SS.
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci | ACGH, DD, SS, WC.
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci | DD, SS, WC.
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci | ACGH, DD, SS, WC.
*(change in existing course—eff. winter 13)*

**161. The Civil Justice System (4)**
Lecture—3 hours; term paper. Prerequisite: course 155; upper division standing. Pass One open to upper division and graduate Sociology & Sociology Organizational Studies majors. Empirical studies of the different aspects of the civil justice system in the United States and Global Society including the litigation, juries, civil rights, and international laws relating to trade, the environment, and human rights.—II. (II.)
*(new course—eff. fall 13)*

**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: SocSci | SS.
*(change in existing course—eff. winter 13)*

**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: SocSci, Div, Wrt | ACGH, DD, SS.
*(change in existing course—eff. winter 13)*

**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: SocSci | SS.

*(change in existing course—eff. winter 13)*

**174. American Jewish Identities and Communities (4)**
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: upper division standing required. 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 LGBT Jews. Offered in alternate years. GE credit: SocSci | SS.

*(change in existing course—eff. fall 14)*

**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: SocSci | SS.

*(change in existing course—eff. winter 13)*

**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: SocSci | SS.

*(change in existing course—eff. winter 13)*

**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: SocSci | SS.

*(change in existing course—eff. winter 13)*

**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: SocSci | SS.

*(change in existing course—eff. winter 13)*

**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: SocSci, Wrt | SS.

*(change in existing course—eff. winter 13)*

**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: SocSci, ACGH, SS, WC.

*(change in existing course—eff. winter 13)*

**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: SocSci | SS.

*(change in existing course—eff. winter 13)*

**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: SocSci | SS, WC.

*(change in existing course—eff. winter 13)*

**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: SocSci | SS.

*(change in existing course—eff. winter 13)*

**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: SocSci | SS.

*(change in existing course—eff. winter 13)*

**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: SocSci | SS, WE.

*(change in existing course—eff. winter 13)*

**194H. Special Study for Honors Students (1-5)**
Prerequisite: senior standing and admission to the Honors Program. Independent study of a sociological problem involving the writing of an Honors thesis. (P/NP grading only; deferred grading only, pending completion of sequence) May be repeated up to eight units for credit. GE credit: WE.—I, II. (I, II.)

*(new course—eff. fall 14)*

**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: SocSci | SS.

*(change in existing course—eff. winter 13)*

**195. Special Topics in Sociological Analysis (4)**
Seminar—3 hours; term paper. Prerequisite: upper division standing and consent of instructor. In-depth examination of topics in sociology. Emphasis on student research and writing. May be repeated for credit when topic differs. GE credit: SocSci | SS.

*(change in existing course—eff. winter 13)*

### Graduate

**207A. Methods of Quantitative Research (4)**
Lecture—3 hours; term paper. Prerequisite: course 106 or the equivalent. Principles of study design, examination of measurement, survey research methods and multivariate analysis. Course will stress actual practice of techniques. Students will carry out quantitative data analysis using packaged computer programs. —I. (I.)

*(change in existing course—eff. fall 14)*

**207B. Methods of Quantitative Research (4)**

*(cancelled course—eff. spring 14)*

**242B. Comparative Methods in Historical Sociology (4)**

*(cancelled course—eff. spring 14)*

**292B. Field Research (4)**

*(cancelled course—eff. spring 14)*

# Soil Science

## New and changed courses in Soil Science (SSC)

### Upper Division

**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: SciEng | QL, SE, SL, VL.—I. (I.) Scow, Southard

*(change in existing course—eff. winter 13)*

**102. Environmental Soil Chemistry (3)**
Lecture—3 hours. Prerequisite: course 100 or the equivalent; general chemistry. Soil chemistry processes related to the fate and transport of contaminants in soil. Soil minerals, natural organic matter, surface charge, soil solution chemistry, redox reactions in soil, and sorption of inorganic and organic contaminants. GE credit: SciEng | QL, SE, SL.—II. (II.) Parikh

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL, VL, WE.—IV. (IV.) Amundson, Dahlgren, O'Geen, Southard

*(change in existing course—eff. winter 13)*

**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

*(change in existing course—eff. winter 13)*

**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: SciEng | OL, QL, SE, SL, VL, WE.—III. (III.) Horwath

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL, WE.—II. (II.) Scow

*(change in existing course—eff. winter 13)*

**112. Soil Ecology (3)**
*(new course—eff. winer 14)*

**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: SciEng | SE, SL.—III. (III.) O'Geen

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL, VL.—III. (III.) Southard

*(change in existing course—eff. winter 13)*

### Graduate

**209. Physiology and Ecology of Mycorrhizal Symbioses (3)**
*(new course—eff. winer 14)*

**216. Physical Geochemistry (3)**
*(new course—eff. winer 14)*

**218. Soil Erosion and Conservation (3)**
*(new course—eff. winer 14)*

**298. Group Study (1-5)**
Prerequisite: consent of instructor. May be repeated for credit when topic differs. (S/U grading only) —I, II, III. (I, II, III.)

*(change in existing course—eff. spring 14)*

# Spanish

## New and changed courses in Spanish (SPA)

### Lower Division

**2V. Elementary Spanish (5)**
Web virtual lecture—3 hours; web electronic discussion—2 hours. Prerequisite: course 1, 1S, or previous high school Spanish language experience. Continuation of course 1,1S, or previous high school experience in the areas of grammar and basic language skills. Online format combining synchronous chatting with technologically based materials. Not open for credit to students who have taken course 2, 2S, 2Y, or higher. GE credit: WC.—I, II, III, IV. (I, II, III, IV.) Blake

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

**2VL. Elementary Spanish (5)**
*(cancelled course—eff. spring 13)*

**2Y. 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.)

*(new course—eff. spring 13)*

**3VL. Elementary Spanish (5)**
*(cancelled course—eff. spring 13)*

**3V. Elementary Spanish (5)**
Web virtual lecture—3 hours; web electronic discussion—2 hours. Prerequisite: course 2, 2S, 2V, or 2Y. Continuation of course 2, 2S, 2V or 2Y. Online format combining synchronous chatting with technologically based materials. Not open to students who have taken course 3, 3S, 3Y, or higher. GE credit: WC.—II, IV. (II, IV.) Blake

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

**3VL. Elementary Spanish (5)**
*(cancelled course—eff. spring 13)*

**3Y. 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.)

*(new course—eff. spring 13)*

**21V. Intermediate Spanish (5)**
*(cancelled course—eff. fall 13)*

**21Y. Intermediate Spanish (5)**
Lecture/discussion—3 hours; web electronic discussion—2 hours. Prerequisite: course 3, 3S, or 3V. 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.)

*(change in existing course—eff. fall 13)*

**22V. Intermediate Spanish (5)**
*(change in existing course—eff. fall 13)*

**22V. Intermediate Spanish (5)**
Lecture/discussion—3 hours; web electronic discussion—2 hours. Prerequisite: course 21, 21S, or 21V. Continuation of course 21, 21S, or 21V in the areas of grammar and basic language skills. Online format combining synchronous chatting with technologically-based materials. Not open to students who have taken course 22 or 22S. Offered irregularly. GE credit: WC.—I, II, III, IV. (I, II, III, IV.) Blake, Bradley

*(new course—eff. fall 13)*

### Upper Division

**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: ArtHum | AH, OL, WC, WE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, OL, WC, WE.—III.

*(change in existing course—eff. winter 13)*

**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: ScoSci | SS.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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: ScoSci | SS.—II, III. (II, III.) Blake, Colombi

*(change in existing course—eff. winter 13)*

**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: ScoSci | SS.—I, II, III. Bradley

*(change in existing course—eff. winter 13)*

**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: ScoSci | SS.—III. (III.) Colombi

*(change in existing course—eff. winter 13)*

**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: ArtHum or ScoSci | AH or SS.—I, II. (I, II.) Blake

*(change in existing course—eff. winter 13)*

**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: ArtHum or ScoSci | AH or SS.—III.

*(change in existing course—eff. winter 13)*

**116. Applied Spanish Linguistics (4)**
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: Linguistics 1 and course 24, 24S 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. Not open to students who have taken course 116S. Offered irregularly. GE credit: ScoSci | SS.—I, II, III. (I, II, III.) Blake, Colombi

*(change in existing course—eff. winter 14)*

**116S. Applied Spanish Linguistics (4)**
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: Linguistics 1 and course 24, 24S 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. Offered in a Spanish speaking country, in Spanish, under the supervision of UC Davis faculty. Not open to students who have taken course 116. Offered irregularly. GE credit: SocSci | SS.—I, II, III. (I, II, III.) Blake, Colombi

*(new course—eff. fall 13)*

**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: ScoSci | SS.—III. (III.)

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—I. (I.) Martín

*(change in existing course—eff. winter 13)*

**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: ScoSci | AH, WC.—II. (II.) Altisent

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, OL, VL, WC.—II, III. Martín

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, OL, WC, WE.—II. (II.) Martín

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC, WE.—(I, II.) Martín

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC, WE.—II, III. Martín

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—III. (III.) Altisent

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC, WE.—II. (II.) Altisent

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC, WE.—III. (III.) Altisent

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, OL, WC.—(III.) Altisent

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC, WE.—II. (II.) Altisent

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, OL, WC, WE.—I, II, III. (I, II, III.) Altisent, Armistead, González, Martín, Martínez-Carazo

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—I. (I.) Bernucci, Egan

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—II. (II.) Bejel, Irwin, Egan, Lazzara, Peluffo

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—II. (II.) Egan, Bejel

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—(I.) Egan, Peluffo

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—(II.) Bejel, Bernucci, Egan

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—II. (II.) Egan
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—(II.) Egan, Peluffo
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—III. Bejel, Bernucci, Egan, Irwin, Lazzara, Peluffo
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—(II.) Bejel, Bernucci, Egan
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—I, II, III, IV. (I, II, III, IV.) Bejel, Bernucci, Egan, Irwin, Lazarra, Peluffo
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WC.—III. (III.) Lazzara, Peluffo
*(change in existing course—eff. winter 13)*

**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, musica motena, musica andina) as well as its implications in other musical genres. Taught in Spanish. Not open to students who taken course 171S or Music 127. (Same course as Music 127) May be repeated one time for credit when content differs. Offered in alternate years. GE credit: ArtHum | AH, WC.—II. Irwin, Ortiz
*(change in existing course—eff. winter 14)*

**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: ArtHum | AH, WC.—II. (II.)
*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci | AH or SS, OL, WE.—I. (I.) Blake, Bradley, Colombi
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, OL, WE.—II. (II.) Altisent, González, Martin, Martínez-Carazo
*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, OL, WC, WE.—III. (III.) Bejel, Egan, Irwin, Lazzara, Peluffo
*(change in existing course—eff. winter 13)*

**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.
*(change in existing course—eff. winter 13)*

**198. Directed Group Study (1-5)**
Prerequisite: consent of instructor and Department Chairperson. (P/NP grading only.) GE credit: AH, WC, WE.
*(change in existing course—eff. winter 13)*

**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.
*(change in existing course—eff. winter 13)*

### Graduate

**203. Research Methodologies (1)**
Seminar—2 hour. Introduction to the range of scholarly research methodologies currently being realized in Spanish linguistics, literary and cultural studies: archival research, textual analysis, discourse analysis, statistics for linguistics, etc.; introduction to scholarly writing (MLA style) and scholarly publishing. (S/U grading only.)—II. (II.) Altisent, Bejel, Bernucci, Blake, Carazo, Colombi, Egan, Irwin, Martin, Martinez-Lazzara, Newcomb, Peluffo
*(change in existing course—eff. fall 13)*

**220. Catalan Language and Culture (4)**
Lecture/discussion—3 hours; laboratory—1 hour. Prerequisite: good command of Spanish, Portuguese, French or Italian and graduate level of studies in any of these languages. Open to advanced undergraduate students, with notions of Catalan, can be admitted with consent of instructor; designed for graduate students. Foundation for the acquisition of Catalan oral, reading and elementary writing level skills for students of Spanish (Iberianists or Hispanists), with the capacity to interpret educated written language. Emphasis on weekly review of grammar and all language skills. Offered irregularly.—I. Altisent
*(new course—eff. winter 14)*

# Statistics

## New and changed courses in Statistics (STA)

### Lower Division

**13V. Elementary Statistics (4)**
*(change in existing course—eff. fall 13)*

**13Y. 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 for students who have completed course 13, or higher. GE credit: SciEng | QL, SE.—I. (I.) Utts
*(new course—eff. fall 13)*

### Upper Division

**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: SciEng | QL, SE.—I. (I.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—II. (II.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—I, II, III. (I, II, III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—II, III. (II, III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE, QL.—III. (III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—I. (I.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—III. (III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—III. (III.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—I. (I.)
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—(II.)
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.
*(change in existing course—eff. winter 13)*

### Graduate

**201. SAS Programming for Statistical Analysis (3)**
Lecture—2 hours; discussion/laboratory—1 hour. Prerequisite: introductory, upper-division Statistics course; some knowledge of vectors and matrices; courses 106 or 108 or the equivalent suggested. Introductory SAS language, data management, statistical applications, methods. Includes basics, graphics, summary statistics, data sets, variables and functions, linear models, repetitive code, simple macros, GLIM and GAM, formatting output, correspondence analysis, bootstrap. Prepare SAS base programmer certification exam.—III. (III.)
*(new course—eff. fall 13)*

**206. Statistical Methods for Research - I (4)**
Lecture—3 hours; laboratory/discussion—1 hour. Prerequisite: introductory statistics course; some knowledge of vectors and matrices. Focus on linear statistical models. Emphasis on concepts, method and data analysis; formal mathematics kept to minimum. Topics include simple and multiple linear regression, polynomial regression, diagnostics, model selection, factorial designs and analysis of covariance. Use of professional level software.—I. (I.)
*(new course—eff. fall 13)*

**207. Statistical Methods for Research - II (4)**
Lecture—3 hours; laboratory/discussion—1 hour. Prerequisite: course 206; knowledge of vectors and matrices. Linear and nonlinear statistical models emphasis on concepts, methods/data analysis using professional level software; formal mathematics kept to minimum. Topics include linear mixed models, repeated measures, generalized linear models, model selection, analysis of missing data, and multiple testing procedures.—I. (I.)
*(new course—eff. fall 13)*

**208. Statistical Methods in Machine Learning (4)**
Lecture—3 hours; laboratory/discussion—1 hour. Prerequisite: course 206, 207 and 135, or their equivalents. Focus on linear and nonlinear statistical models. Emphasis on concepts, methods, and data analysis; formal mathematics kept to minimum. Topics include resampling methods, regularization techniques in regression and modern classification, cluster analysis and dimension reduction techniques. Use professional level software.—III. (III.)
*(new course—eff. fall 13)*

# Study of Religion (A Graduate Group)

## New and changed courses in Study of Religion (REL)

### Graduate

**200A. Historical Roots of the Study of Religion (4)**
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Consideration of the historical and philosophical formation of religion as a concept. Treats the emergence of religion as a category of analysis and understanding from the Reformation through the Enlightenment.—I. (I.) Chin, Coudert, Elmore, Janowitz
*(new course—eff. fall 13)*

**200B. Foundational Theories of Religion (4)**
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Survey of classical 19th and 20th century approaches to the study of religion.—II. (II.) Chin, Coudert, Elmore, Janowitz
*(new course—eff. fall 13)*

**200C. Contemporary Approaches to the Study of Religion (4)**
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Consideration of major themes, issues and methods in the contemporary study of religion. Perspectives from diverse cultural settings employed to consider modern historical, philosophical, and social contexts that inform understandings of religion.—III. (III.) Chin, Elmore, Janowitz
*(new course—eff. fall 13)*

**200D. Field Profile Seminar I and II (1-2)**
Project. Prerequisite: graduate standing or consent of instructor. Individually guided research to survey the field of study, under the supervision of a faculty member. Four units total over two or more quarters are required by the end of the second year. May be repeated for credit.—I, II, III. (I, II, III.)
*(new course—eff. fall 13)*

**210A. Special Topics in American Religious Cultures (4)**
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Comparative, interpretive study of the treatment of specific topics in American religious cultures. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)
*(new course—eff. fall 13)*

**210B. Special Topics in Asian Religious Cultures (4)**
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Comparative, interpretive study of the treatment of specific topics in Asian religious cultures. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)
*(new course—eff. fall 13)*

**210C. Special Topics in Mediterranean Religious Cultures (4)**
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Comparative, interpretive study of the treatment of specific topics in Mediterranean religious cultures. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)
*(new course—eff. fall 13)*

**230A. Thematic Topics - Body and Praxis (4)**
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Comparative, interpretive study of the treatment of religion through

specific topics and themes relating to the body and praxis. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)
*(new course—eff. fall 13)*

**230B. Thematic Topics - Language, Rhetoric, and Performance (4)**
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Comparative, interpretive study of the treatment of religion through specific topics and themes relating to language, rhetoric, and performance. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)
*(new course—eff. fall 13)*

**230C. Thematic Topics - Modernity, Science, and Secularism (4)**
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Comparative, interpretive study of the treatment of religion through specific topics and themes relating to modernity, science, and secularism. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)
*(new course—eff. fall 13)*

**230D. Thematic Topics - Theory and Method (4)**
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Comparative, interpretive study of the treatment of religion through specific topics and themes relating to theory and method. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)
*(new course—eff. fall 13)*

**230E. Thematic Topics - Values, Ethics, and Human Rights (4)**
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Comparative, interpretive study of the treatment of religion through specific topics and themes relating to values, ethics, and human rights. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)
*(new course—eff. fall 13)*

**230F. Thematic Topics - Visual Culture, Media, and Technology (4)**
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Comparative, interpretive study of the treatment of religion through specific topics and themes relating to visual culture, media, and technology. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)
*(new course—eff. fall 13)*

**231E. History, Theory and Criticism of Human Rights (4)**
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Restricted to graduate students. Introduces the advanced study of Human Rights and the theoretical and practical elaboration of the international Human Rights system. Seminar will engage with criticism of Human Rights and develop research and teaching within disciplinary and interdisciplinary frameworks. (Same course as Human Rights 200A.)—II. (II.) Watenpaugh
*(new course—eff. fall 13)*

**298. Group Study (1-5)**
Prerequisite: graduate standing or consent of instructor. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)
*(new course—eff. fall 13)*

**299. Research (1-12)**
Prerequisite: graduate standing or consent of instructor. (S/U grading only.)—I, II, III. (I, II, III.)
*(new course—eff. fall 12)*

**299D. Dissertation Writing (1-12)**
Prerequisite: advanced to candidacy for the Ph.D. program; consent of instructor. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)
*(new course—eff. fall 13)*

# Sustainable Agriculture and Food Systems

## New and changed courses in Sustainable Agriculture and Food Systems (SAF)

### Lower Division

**92. Internship (1-12)**
Internship—3-36 hours. Prerequisite: consent of instructor. Restricted to Sustainable Agriculture and Food Systems majors or with consent of instructor. Lower-division internship for students enrolled in the Sustainable Agriculture and Food Systems program of study. Enrollment for non-majors by consent of instructor. May be repeated up to 12 units for credit with consent of instructor. (P/NP grading only.)—I, II, III. (I, II, III.) Galt, Horwath, Tomich, Van Horn
*(new course—eff. fall 13)*

**98. Directed Group Study (1-5)**
Prerequisite: consent of instructor. Restricted to Sustainable Agriculture and Food Systems major or with consent of instructor. Group study on focused topics in Sustainable Agriculture and Food Systems. Varies according to instructor. Course plan is adapted to student need and interest in conjunction with the expertise of the instructor. Offered irregularly. (P/NP grading only.)—I, II, III. (I, II, III.)
*(new course—eff. fall 13)*

**99. Special Study for Undergraduates (1-5)**
Independent study—3-15 hours. Prerequisite: consent of instructor. Under faculty supervision, students pursue a special or individualized course of study related to Sustainable Agriculture and Food Systems. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)
*(new course—eff. fall 13)*

### Upper Division

**192. Internship (1-12)**
Internship—3-36 hours. Prerequisite: upper-division standing; consent of instructor. Restricted to Sustainable Agriculture and Food Systems majors or with consent of instructor. Upper-division internship for students enrolled in the Sustainable Agriculture and Food Systems program of study. Enrollment for non-majors by consent of instructor. May be repeated up to 12 units for credit. (P/NP grading only.)—I, II, III. (I, II, III.) Galt, Horwath, Tomich, Van Horn
*(new course—eff. fall 13)*

**197T. Tutoring in Sustainable Agriculture and Food Systems (1-5)**
Tutorial—3-15 hours. Prerequisite: upper division standing; consent of instructor. Undergraduates assist the instructor by tutoring students in regularly scheduled courses that fulfill SA&FS major requirements. May be repeated for credit. Offered irregularly. (P/NP grading only.)—I, II, III. (I, II, III.)
*(new course—eff. fall 13)*

**197TC. SA&FS Tutoring in the Community (1-5)**
Tutorial—3-15 hours. Prerequisite: upper division standing; consent of instructor. Undergraduates assist the instructor by tutoring in the community in settings related to Sustainable Agriculture and Food Systems. May be repeated for credit. Offered irregularly. (P/NP grading only.)—I, II, III. (I, II, III.)
*(new course—eff. fall 13)*

**198. Directed Group Study (1-5)**
Prerequisite: upper division standing; consent of instructor. Restricted to Sustainable Agriculture and Food Systems major or with consent of instructor. Group study on focused topics in Sustainable Agriculture and Food Systems. Varies according to instructor. Course plan is adapted to student need and interest in conjunction with the expertise of the instructor. May be repeated for credit. Offered irregularly. (P/NP grading only.)—I, II, III. (I, II, III.)
*(new course—eff. fall 13)*

**199. Special Study for Advanced Undergraduates (1-5)**
Independent study—3-15 hours. Prerequisite: upper division standing; consent of instructor. Under faculty supervision, advanced students pursue a special or individualized course of study related to Sustainable Agriculture and Food Systems. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)
*(new course—eff. fall 13)*

# Technocultural Studies

## New and changed courses in Technocultural Studies (TCS)

### Lower Division

**5. Media Archaeology (4)**
Lecture/discussion—3 hours; term paper. Evolution of media technologies and practices beginning in the 19th Century as they relate to contemporary digital arts practices. Special focus on the reconstruction of the social and artistic possibilities of lost and obsolete media technologies. GE credit: ArtHum or SciEng | AH or SE, VL, WE.
*(change in existing course—eff. winter 13)*

### Upper Division

**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: ArtHum | ACGH, AH, DD, VL.—I. (I.) Drew
*(change in existing course—eff. winter 13)*

**158. Technology and the Modern American Body (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 and either American Studies 1 or 5. The history and analysis of the relationships between human bodies and technologies in modern society. Dominant and eccentric examples of how human bodies and technologies influence one another and reveal underlying cultural assumptions. (Same course as American Studies 158.) GE credit: ArtHum | ACGH, AH, WE.—de la Pena
*(change in existing course—eff. fall 11)*

**160. Ghosts of the Machine: How Technology Rewires our Senses (4)**
Lecture—3 hours; extensive writing or discussion—1 hour. Historical, aesthetic and critical approaches to how information technologies produced ghost effects or a sense of terror in response to new media like the photograph, gramophone, film, typewriter, computer, Turing Machine. Focus on technological media transforms sense perception. Offered in alternate years. (Same course as Science and Technol-

ogy Studies 160.) GE credit: ArtHum or SocSci | ACGH, AH or SS, VL, WE.—Ravetto-Biagioli

*(new course—eff. fall 13)*

# Textiles and Clothing

## New and changed courses in Textiles and Clothing (TXC)

### Lower Division

**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: ArtHum or SocSci, Div, Wrt | AH or SS, VL, WC, WE.—III. (III.) Kaiser

*(change in existing course—eff. winter 13)*

### Upper Division

**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: SciEng | QL, SE, VL, WE.—III. (III.) Pan

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, VL.—III. (III.) Sun

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, SL, WE.—III. (III.) Sun

*(change in existing course—eff. winter 13)*

**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: SocSci | OL, SS, VL.

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, VL.—II. (II.) Hsieh

*(change in existing course—eff. winter 13)*

**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: SocSci | SS, VL.—III. Rucker

*(change in existing course—eff. winter 13)*

**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: SocSci | SS, WE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

# Transportation Technology and Policy

## New and changed courses in Transportation Technology and Policy (TTP)

### Graduate

**200. Transportation Survey Methods (4)**

Lecture—4 hours. Prerequisite: Statistics 13; Civil and Environmental Engineering 251 recommended. Description of types of surveys commonly used in transportation demand modeling, including travel and activity diaries, attitudinal, panel, computer, and stated-response surveys. Discussion of sampling, experimental design, and survey design issues. Analysis methods, including factor, discriminant and cluster analysis. Not open for credit to students who have taken Civil and Environmental Engineering 255. (Same course as Geography 281.)—II. (II.) Mokhtarian

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

**220. Transportation Planning and Policy (4)**

Lecture/discussion—4 hours. Limited enrollment. Transportation planning process at the regional level, including the role of federal policy in shaping regional transportation planning, tools and techniques used in regional transportation planning, issues facing regional transportation planning agencies, pros and cons of potential solutions and strategies. Students having taken this course previously as course 289 cannot repeat it for credit; having taken other course 289 offerings does not preclude taking this course for credit. (Same course as Geography 236.) Offered in alternate years.—III. Handy

*(change in existing course—eff. winter 13)*

# UC Davis Washington Center

## New and changed courses in UC Davis Washington Center (WAS)

### Upper Division

**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: SocSci, Wrt | OL, SS, WE.

*(change in existing course—eff. winter 13)*

# University Writing Program

## New and changed courses in University Writing Program (UWP)

### Lower Division

**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: ArtHum, Wrt | AH, WE.—I, II, III, IV. (I, II, III, IV.)

*(change in existing course—eff. winter 13)*

**1V. Expository Writing (4)**

Web virtual lecture—2 hours; web electronic discussion—2 hours. Prerequisite: completion of Entry-Level Writing Requirement. Composition, the essay, paragraph structure, diction, and related topics. Frequent writing assignments. Not open to students who have taken course 1 or 1Y. GE credit: ArtHum, Wrt | AH, WE.—I, II, III, IV. (I, II, III, IV.)

*(new course—eff. fall 13)*

**1Y. Expository Writing (4)**

Lecture/discussion—2 hours; web electronic discussion—2 hours. Prerequisite: completion of Entry-Level Writing Requirement. Composition, the essay, paragraph structure, diction, and related topics. Frequent writing assignments. Not open to students who have taken course 1 or 1V. GE credit: ArtHum, Wrt | AH, WE.—I, II, III, IV. (I, II, III, IV.)

*(new course—eff. fall 13)*

**10. Introduction to Professional Writing Studies (4)**

Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or the equivalent. Introduction to writing as an object of study and to theories and research in the field. Survey of how writing is created, disseminated, and used in private, public, and academic contexts. GE credit: ArtHum | AH, WE.—I. (I.)

*(new course—eff. fall 13)*

**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: ArtHum | AH, WE.—II. (II.)

*(change in existing course—eff. winter 14)*

**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: ArtHum, Wrt | AH, WE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, WE.—I, II. (I, II.)

*(change in existing course—eff. winter 13)*

**21. Introduction to Reading and Composition for Non-Native Speakers (5)**
Lecture/discussion—5 hours. Prerequisite: admission by placement examination only. Provides undergraduate students whose native language is not English with intensive work in reading and in writing organized, coherent, and grammatically correct paragraphs and short academic essays. (P/NP grading only.)—I. (I.)

*(new course—eff. fall 13)*

**22. Intermediate Reading and Writing for Non-Native Speakers (4)**
Lecture/discussion—4 hours. Prerequisite: admission by placement examination, successful completion of course 21, or by consent of instructor. Provides undergraduate students whose native language is not English with experience in writing essays in recognized rhetorical modes. Students will also read to develop fluency and critical thinking and will study grammar needed for academic writing. (P/NP grading only.)—I, II, III. (I, II, III.)

*(new course—eff. fall 13)*

**23. Advanced Reading and Composition for Non-Native Speakers (4)**
Lecture/discussion—4 hours. Prerequisite: admission by placement examination, successful completion of course 22, or by consent of instructor. Provides undergraduate students whose native language is not English with experience writing persuasive essays related to reading passages. Students will also read for tone, style, context, and assumptions and will study advanced grammar needed for persuasive essays. (P/NP grading only.)—I, II, III. (I, II, III.)

*(new course—eff. fall 13)*

**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.

*(change in existing course—eff. winter 13)*

**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.

*(change in existing course—eff. winter 13)*

## Upper Division

**100. Genre Theory and Professional Writing (4)**
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 1 or the equivalent; course 10. Introduction to discipline of professional writing. Examination of writing as a social practice, using genre theory as a conceptual framework. Analysis of how genres function rhetorically in specific contexts and how social systems both shape and are shaped by genres. GE credit: AH, WE.—II, (II.)

*(new course—eff. winter 14)*

**101. Advanced Composition (4)**
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Instruction in advanced principles of expository writing. Writing tasks within and beyond the University. Different writing modes, including narrative, analysis, explanation, argument, critique. GE credit: ArtHum, Wrt | AH, WE.—I, II, III, IV. (I, II, III, IV.)

*(change in existing course—eff. winter 13)*

**102A. Writing in the Disciplines: Special Topics (4)**
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to majors or to 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 one time for credit if taken in conjunction with a different subject-matter course. GE credit: ArtHum, Wrt | AH, WE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**102B. Writing in the Disciplines: Biology (4)**
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to majors in a biological science or to students concurrently enrolled in an upper division biological science course. Advanced instruction in writing in biology. Not open for credit to students who have completed English 102B. GE credit: ArtHum, Wrt | AH, WE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**102C. Writing in the Disciplines: History (4)**
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to majors in history or to students concurrently enrolled in an upper division course accepted for the history major. Advanced instruction in writing in history. GE credit: ArtHum, Wrt | AH, WE.—II. (II.)

*(change in existing course—eff. winter 13)*

**102D. Writing in the Disciplines: International Relations (4)**
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to majors in international relations or to students concurrently enrolled in an upper division course accepted for the major. Advanced instruction in writing in international relations. GE credit: ArtHum, Wrt | AH, WE.—II. (II.)

*(change in existing course—eff. winter 13)*

**102E. Writing in the Disciplines: Engineering (4)**
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to upper division 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 engineering. GE credit: ArtHum, Wrt | AH, WE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**102F. Writing in the Disciplines: Food Science and Technology (4)**
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to majors in food science and technology and to students concurrently enrolled in an upper division course in food science and technology. Advanced instruction in writing in food science and technology. GE credit: ArtHum, Wrt | AH, WE.—III. (III.)

*(change in existing course—eff. winter 13)*

**102G. Writing in the Disciplines: Environmental Writing (4)**
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to students with upper division coursework with an environmental focus. Advanced instruction in writing and practice in effective styles of communication in the fields of environmental study, policy, or advocacy. Not open for credit to students who have completed course 102A in the same academic field. GE credit: ArtHum, Wrt | AH, WE.—III. (III.)

*(change in existing course—eff. winter 13)*

**102H. Writing in the Disciplines: Human Development and Psychology (4)**
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to majors and minors or to students concurrently enrolled in an upper division course in Human Development or Psychology. Advanced instruction in writing and practice in effective styles of communication in Human Development and Psychology. Not open for credit to students who have completed course 102A in the same academic field. GE credit: ArtHum, Wrt | AH, WE.—I. (I.)

*(change in existing course—eff. winter 13)*

**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. Open to majors and minors in ethnic studies, or students with upper division coursework focusing on race and ethnicity. Advanced instruction in cross-disciplinary writing about race and ethnicity and practice in effective styles of communication. Not open for credit to students who have completed. GE credit: ArtHum, Wrt | AH, WE.—I. (I.)

*(change in existing course—eff. winter 13)*

**102J. Writing in the Disciplines: Fine Arts (4)**
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to majors and minors or to students concurrently enrolled in an upper 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 course 102A in the same academic field. GE credit: ArtHum, Wrt | AH, WE.—I, III. (I, III.)

*(change in existing course—eff. winter 13)*

**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. Open to majors and minors in Sociology or to students concurrently enrolled in an upper division Sociology course. Advanced instruction in writing and practice in effective styles of communication in Sociology and related academic and professional fields. Not open for credit to students who have completed course 102A in the same academic field. GE credit: ArtHum, Wrt | AH, WE.—III. (III.)

*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, WE.—II. (II.)

*(change in existing course—eff. winter 13)*

**102M. Writing in the Disciplines: Community and Regional Development (4)**
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or the equivalent. Open to upper division Community and Regional Development majors and minors or upper division students concurrently enrolled in an upper division Community and Regional Development course. Advanced instruction in writing in the Community and Regional Development discipline and practice in effective styles of communication. GE credit: ArtHum | ACGH, AH, WE.—III. (III.)

*(new course—eff. fall 13)*

**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: ArtHum | AH, WE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, WE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, WE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, WE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, WE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, WE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, WE.—III. (III.)

*(change in existing course—eff. winter 13)*

**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: ArtHum | AH, WE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

**106. English Grammar (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or English 3 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 English 106 and Linguistics 106.) GE credit: ArtHum | AH.

*(new course—eff. winter 14)*

**110. Specialized Genres in Professional Writing (4)**
Lecture/discussion—3 hours; extensive writing. Prerequisite: satisfaction of the upper-division writing requirement. Restricted to upper-division students who have satisfied the upper-division writing requirement. Counts toward the writing minor. Instruction in the elements and practices of professional writing in specialized genres. Offered irregularly. GE credit: ArtHum, Wrt | AH, WE.

*(change in existing course—eff. winter 14)*

**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: ArtHum, Wrt | AH, WE.

*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, WE.—(II.)

*(change in existing course—eff. winter 13)*

**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: ArtHum, Wrt | AH, WE.—II.

*(change in existing course—eff. winter 13)*

**121. History of Scientific Writing (4)**
Lecture/discussion—3 hours; extensive writing. Prerequisite: upper division standing. History of scientific writing from the 17th century to the present; origins and evolution of scientific genres; role of scientific writing in producing scientific knowledge; discursive differences between disciplines; emergence of English as a global language of science. Offered in alternate years. GE credit: ArtHum or SciEng | AH or SE, SL, WE.—(III.) Andersen, Flynn, Haynes, Perrault, Whithaus

*(new course—eff. fall 13)*

**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.

*(change in existing course—eff. winter 13)*

**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.

*(change in existing course—eff. winter 13)*

**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.

*(change in existing course—eff. winter 13)*

**199. Special Study for Advanced Undergraduates (1-5)**
Prerequisite: consent of instructor. (P/NP grading only.) GE credit: AH, WE.

*(change in existing course—eff. winter 13)*

## Graduate

**255. Theory and Research in Response to Student Writing (4)**
Discussion—3 hours; extensive writing: extensive writing or discussion; project. Restricted to graduate standing. Intensive focus on the critical topic of response or feedback to student writers. Coverage of philosophy, theory, and empirical research on teacher written feedback, teacher-student writing conferences, peer response, and error correction. Offered in alternate years.—II. (II.) Ferris

*(new course—eff. fall 13)*

**271. Second Language Writing (4)**
Seminar—3 hours; extensive writing; project. Prerequisite: graduate standing. Restricted to graduate standing. Traces the history of second language writing theory and research on second language writers in a variety of academic and professional contexts. Emphasis on writer characteristics, texts, and contexts. Offered irregularly.—II, III. (II, III.) Ferris
*(new course—eff. fall 13)*

**280. Journal Editing Workshop: Writing on the Edge (2)**
Seminar—2 hours. Reading and critiquing manuscript submissions. Discussing relevant work in the field of writing studies. Applying principles of professional editing. Developmental editing, copy-editing, and typesetting of accepted manuscripts. Soliciting articles and communicating with contributors. Students encouraged to enroll both quarters. May be repeated for credit. (S/U grading only.)—I, II. (I, II.) Masiel
*(new course—eff. fall 13)*

### Professional

**390. Theory and Practice of Teaching University-Level Composition (4)**
Seminar—3 hours; extensive writing. Open to graduate students teaching course 1 in the fall quarter following this course. Examination of current theories and practices in teaching of writing. Practical application to undergraduate writing courses. Emphasis on designing assignments and class sequences, and responding to student writing. Examination of impact of cultural, technological and theoretical changes on composition pedagogy.—II. (II.) Ferris
*(new course—eff. fall 13)*

# Veterinary Medicine

### New and changed courses in Veterinary Medicine (VMD)

### Lower Division

**92. Internship in Veterinary Science (1-12)**
*(cancelled course—eff. summer 14)*

### Upper Division

**192. Internship in Veterinary Science (1-12)**
*(cancelled course—eff. summer 14)*

### Graduate

**298. Group Study (1-5)**
*(cancelled course—eff. summer 14)*

**299. Research (1-12)**
*(cancelled course—eff. summer 14)*

# Veterinary Medicine: Anatomy, Physiology and Cell Biology

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

### Professional

**92. Internship (1-12)**
Internship—3-36 hours. Prerequisite: lower division standing; consent of instructor. Internship experience off and on campus in all subject areas offered in the Department of Anatomy, Physiology & Cell Biology. Internships are supervised by a member of the faculty. Offered irregularly. (P/NP grading only.)
*(change in existing course—eff. winter 13)*

### Graduate

**285. Morphometry of Cells, Tissues and Organs (2)**
*(cancelled course—eff. spring 14)*

# Veterinary Medicine: Medicine and Epidemiology

### New and changed courses in Veterinary Medicine: Medicine and Epidemiology (VME)

### Graduate

**219. Clinical Experimental Design (3)**
*(cancelled course—eff. spring 14)*

**290C. Research Group Conference (1)**
*(cancelled course—eff. spring 14)*

# Veterinary Medicine: Molecular Biosciences

### New and changed courses in Veterinary Medicine: Molecular Biosciences (VMB)

### Upper Division

**101Y. Principles of Pharmacology and Toxicology (3)**
Laboratory/discussion—1.5 hours; web virtual lecture—1.5 hours; web electronic discussion—0.5 hour; autotutorial—5 hours. Prerequisite: upper division standing in a science major; Chemistry through organic chemistry and general biology, or consent from instructor; good standing with university; computing capability using MS Word, Excel, and PowerPoint, menu driven software programs, SmartSite; computer, or ready access to a computer, with broadband Internet access. Restricted to upper division undergraduate students in good standing with school and fulfill course prerequisites. Hybrid course provides training in core concepts of pharmacological and toxicological sciences. Develop higher-order problem solving and critical thinking skills. GE credit: OL, SE, SL.—III. (III). Buckpitt, Puschne
*(new course—eff. fall 13)*

# Veterinary Medicine: Pathology, Microbiology, and Immunology

### New and changed courses in Veterinary Medicine: Pathology, Microbiology, and Immunology (PMI)

### Upper Division

**129Y. One Health: Human, Animal & Environment Interfaces (3)**
Lecture/discussion—3 hours; web electronic discussion. Class size limited to upper division undergraduate students in good standing with the school and who fulfill the course prerequisites below. Enrollment limited to 100 students/term. Introduction to fundamentals, challenges, and opportunities in One Health using local and global health case studies. Animal, human, and environmental health problems, along with tools and transdisciplinary approaches, will be introduced to foster innovative thinking that addresses complex issues. GE credit: SciEng or SocSci | OL, SE or SS, SL.—III. (III.) Miller, Papageorgiou
*(new course—eff. spring 13)*

### Graduate

**201. Integrative Pathobiology Core I (5)**
Lecture—3 hours; discussion—2 hours. Overview of molecular biology techniques, tissue structure and function, cell membrane pathology and cellular mechanisms of disease including cellular responses and adaptations to stress, cell cycle, cell death, cell biomechanics, vascular disturbances, and mechanisms of neoplasia and tumorigenesis.—II. (II.)
*(new course—eff. winter 14)*

**202. Integrative Pathobiology Core II (4)**
Lecture—2 hours; discussion—2 hours. The second required core course in the graduate group with topics in inflammation, host-pathogen interaction, regenerative medicine, integrative pathology and population and ecosystem health.—III. (III.) Foley
*(new course—eff. spring 14)*

**203. Experimental Design and Data Analysis in Pathobiology (2)**
Lecture—1 hours; lecture/laboratory—2 hours. Follows two required core courses in, courses 201 and 202, for Ph.D. and M.S. students. Goal is to bridge gap between statistics and real-world pathobiology to increase students' skills and independence in experiment design and data analysis.—Barker
*(new course—eff. fall 13)*

**250. Philosophy and Ethics of Biomedical Science (1)**
*(cancelled course—eff. spring 12)*

**275. Comparative Pathology of Organ Systems (4)**
*(cancelled course—eff. winter 14)*

**283. Comparative Avian Anatomy and Pathology (1-3)**
*(cancelled course—eff. winter 14)*

**285. Cellular Basis of Disease (3)**
*(cancelled course—eff. winter 14)*

**287. Comparative Pathology of Laboratory Animals (3)**
*(cancelled course—eff. winter 14)*

**292B. Surgical Pathology Conference (1)**
*(cancelled course—eff. winter 13)*

**293B. Necropsy and Surgical Pathology (2-4)**
*(cancelled course—eff. fall 14)*

**296. Microbiological Diagnosis (2-5)**
*(cancelled course—eff. spring 14)*

# Veterinary Medicine: Population Health and Reproduction

## New and changed courses in Veterinary Medicine: Population Health and Reproduction (PHR)

### Graduate

**251. Food and Water Borne Safety (2)**
Lecture/discussion—2 hours. Prerequisite: MPVM or graduate student standing. Direct experience with food and water borne diseases. Topics will cover bacteria, parasites, and toxins from environmental and animal sources that impact food and water safety at the interface of livestock health and the food chain.—III. (III.) Weimer
*(new course—eff. fall 13)*

**277. Mathematical Models in Epidemiology (3)**
Lecture/discussion—2 hours; laboratory—2 hours. Prerequisite: Preventive Veterinary Medicine 403 and Epidemiology 405; consent of instructor; although not required, students are encouraged to refresh their knowledge of high school calculus and differential equations. Class size limited to 30 students. Theory of epidemics and mathematical modeling concepts for infectious diseases to include discrete and continuous time models, their use to explore disease dynamics and investigate prevention and control strategies for human and veterinary infectious diseases. (Same course as Epidemiology 277.)—III. (III.) Aly
*(new course—eff. fall 13)*

**290A. Seminar (1)**
*(cancelled course—eff. fall 14)*

**292. Current Topics in Reproduction (1)**
*(cancelled course—eff. fall 14)*

# Veterinary Medicine: Surgical and Radiological Sciences

## New and changed courses in Veterinary Medicine: Surgical and Radiological Sciences (VSR)

### Graduate

**250. Anesthesia in Animal Research (2)**
*(cancelled course—eff. spring 14)*

# Viticulture and Enology

## New and changed courses in Viticulture and Enology (VEN)

### Upper Division

**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: SciEng | SE.—III. (III.) Smart
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.) Matthews
*(change in existing course—eff. winter 13)*

**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: SciEng | OL, SE, WE.
*(change in existing course—eff. winter 13)*

**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.
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. (I.) Williams
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. (I.) Williams
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. (I.) Ebeler
*(change in existing course—eff. winter 13)*

**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: SciEng, Wrt | QL, SE, VL, WE.—I. (I.) Ebeler
*(change in existing course—eff. winter 13)*

**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. SciEng | GE credit: SE, WE.—I. (I.) Bisson
*(change in existing course—eff. winter 13)*

**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: SciEng | OL, SE, WE.—I. (I.) Bisson
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—III. (III.) Heymann
*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE, VL, WE.—III. (III.) Heymann
*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.) Boulton

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, WE.—II. (II.) Boulton

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—II. (II.) Mills

*(change in existing course—eff. winter 13)*

**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: SciEng | SE, VL, WE.—II. (II.) Mills

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—III. (III.) Block

*(change in existing course—eff. winter 13)*

**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: SciEng | QL, SE.—(III.) Boulton

*(change in existing course—eff. winter 13)*

**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

*(change in existing course—eff. winter 13)*

**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.)

*(change in existing course—eff. winter 13)*

**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.

*(change in existing course—eff. winter 13)*

**199. Special Study for Advanced Undergraduates (1-5)**
(P/NP grading only.) GE credit: SE.

*(change in existing course—eff. winter 13)*

### Graduate

**216. Sustainable Vineyard Development (5)**
Lecture/discussion—3 hours; fieldwork—3 hours; term paper. Prerequisite: course 101A, 101B, 101C, and one of courses 115 and 118 or consent of instructor; course 110, Soil Science 100, Atmospheric Science 133 and Agricultural and Resource Economics 140 recommended. Application of plant, meteorological, soil, water, GIS, and economic sciences to sustainable vineyard development. Preparation of a comprehensive study to determine the viticultural and economic feasibility of a given site for raisin, table, or wine grape production.—I. (I.) Smart

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

# Wildlife, Fish, and Conservation Biology

## New and changed courses in Wildlife, Fish, and Conservation Biology (WFC)

### Upper Division

**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: SciEng | SE.—III. (III.) Eadie, Kelt, Todd, Van Vuren

*(change in existing course—eff. winter 13)*

**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: SciEng | Wrt | SE, VL, WE.—I. Eadie, Kelt, Todd, Van Vuren

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I. (I.) Eadie

*(change in existing course—eff. winter 13)*

**120L. Laboratory in Biology and Conservation of Fishes (2)**
Laboratory—3 hours. Prerequisite: course 120 (may be taken concurrently). Limited enrollment. Morphology, taxonomy, conservation, and identification of marine and freshwater fishes with emphasis on California species.—I. (I.) Moyle

*(change in existing course—eff. spring 14)*

**130. Physiological Ecology of Wildlife (4)**
Lecture—3 hours; discussion—1 hour. 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, including consideration of climate-change and other threats to biodiversity. Tropical, temperate, and polar ecosystems are highlighted. GE credit: SciEng | SE.—II. (II.) Fangue

*(change in existing course—eff. fall 14)*

**134. Herpetology (3)**
Lecture—2 hours; term paper. Prerequisite: Biological Sciences 2A, 2B, 2C; Evolution and Ecology 101 or Environmental Science and Policy 100 or equivalent upper division course recommended. Evolution and ecology of the world's diverse reptiles and amphibians. Emphasis on adaptations to environments, species interactions, management, and conservation. Offered in alternate years.—(II.) Todd

*(new course—eff. fall 13)*

**134L. Herpetology Laboratory (3)**
Laboratory—6 hours. Prerequisite: Biological Sciences 2A, 2B, 2C; Evolution and Ecology 101 or Environmental Science and Policy 100 or equivalent upper division course recommended; course 134 concurrently; consent of instructor. Diagnostic characteristics and functional attributes of amphibians and reptiles, emphasizing ecological, bio-geographic and phylogenetic patterns. Field experience with common species of reptiles and amphibians in the Davis area. Offered in alternate years.—(II.) Todd

*(new course—eff. fall 13)*

**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: SciEng | SE.—(II.) Caro

*(change in existing course—eff. winter 13)*

**150. Urban Wildlife Ecology (3)**
Lecture—3 hours. Prerequisite: Biological Sciences 2A, 2B, 2C, or the equivalent. Introduction to the behavior, ecology, and evolution of wild animals in urban environments. Effects of urbanization on disease, fitness, and dynamics of animal populations. Conservation and conflict management efforts in urban settings. Offered in alternate years.—II. Townsend

*(new course—eff. spring 14)*

**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: SciEng | SE, WE.—I. (I.) Todd

*(change in existing course—eff. winter 13)*

**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 recom-

mended. 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: SciEng | SE, VL.—(III.) Elliott-Fisk

*(change in existing course—eff. winter 13)*

**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: SciEng | SE.—I, II, III. (I, II, III.)

*(change in existing course—eff. winter 13)*

# Women's Studies

## New and changed courses in Women's Studies (WMS)

### Lower Division

**20. Cultural Representations of Gender (4)**
Lecture/discussion—4 hours. Prerequisite: one course specified for the Women's Studies major. Interdisciplinary investigation of how specific cultures represent gender difference. Examine a variety of cultural forms and phenomena including film, television, literature, music, popular movements, and institutions. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, VL, WC, WE.—III. (III.) Craig

*(change in existing course—eff. winter 13)*

**50. Introduction to Critical Gender Studies (4)**
Lecture—3 hours; discussion—1 hour. Introduction to interdisciplinary, critical gender studies. Addresses the emergence of women's, gender and feminist studies internationally, its links to women's movements, and its influence within the various arts, humanities and social science disciplines. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, VL, WE.—I, II, III, IV. (I, II, III, IV.)

*(change in existing course—eff. winter 14)*

**60. Feminist Critiques of Western Thought (4)**
Lecture/discussion—4 hours. Prerequisite: consent of instructor. Critical introduction to major traditions of social thinking in the West from a feminist perspective. Offered irregularly. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.—Craig, Kuhn

*(change in existing course—eff. winter 14)*

### Upper Division

**102. Gender and Post Colonialism (4)**
Lecture/discussion—4 hours; term paper. Prerequisite: course 50, 60. Explores changing configurations of race, gender, sexuality, class and implications for governmentality in one or more colonial or postcolonial regimes in one or more societies. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, DD, WC, WE.—I. Mena

*(change in existing course—eff. winter 14)*

**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: ArtHum or SocSci | ACGH, AH or SS, DD, WE.—I. (I.) Constable, Craig, Kuhn, Mena, Nettles-Barcelón

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci | ACGH, AH or SS, DD, WE.—II. (II.) Constable, Mena, Nettles-Barcelón

*(change in existing course—eff. winter 13)*

**138. Critical Fashion Studies (4)**
Lecture/discussion—4 hours. Prerequisite: one course in Women's Studies, or Textiles and Clothing 7. Feminist cultural studies of style-fashion-dress through transnational circuits, personal subjectivities. Fashion as means of gender oppression and liberation. Histories and discourses of masculinities and femininities. Clothing works on global assembly line. Use of dress in construction / regulation of identities. Offered irregularly. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, DD, VL, WC, WE.—Kaiser

*(change in existing course—eff. winter 14)*

**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: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, VL, WE.—(II.) Kaiser

*(change in existing course—eff. winter 13)*

**145. Women's Movements in Transnational Perspective (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: course 50, 60, consent of instructor. Class size limited to 90 students. Transnational perspectives on twentieth and twenty-first century women's movements in Western, colonial and post-colonial contexts, examining movement's forms and political orientations and relationships between women's movements and other forces for change. Offered in alternate years. GE credit: ArtHum or SocSci, Div | AH or SS, OL, WC, WE.—III, IV. (III, IV.) Craig, Mama

*(new course—eff. fall 13)*

**146. Gender, War and Peace (4)**
Lecture/discussion—4 hours. Prerequisite: course 20, 50, or 60; consent of instructor. Applies a critical gender perspective to militarism as manifest in contexts of military rule, war, conflict, peacebuilding and security post-conflict. Addresses the changing configurations of gender and sexuality in military institutions and militarized economies and cultures from an interdisciplinary perspective. Offered irregularly. GE credit: ArtHum or SocSci | ACGH, AH or SS, DD, WC, WE.—III. (III.) Mama

*(new course—eff. fall 13)*

**148. Science, Gender, and Social Justice (4)**
Lecture/discussion—4 hours; term paper. Prerequisite: course 50 or consent of instructor. Class size limited to 60 students. Critical reading and reflection on the history of Western science, scientific institutions and the changing role of science in relation to inequalities of class, race, gender and sexuality, and global struggles for equality and justice. Offered irregularly. GE credit: ArtHum or SocSci, Div | AH or SS, DD, WC, WE.—III. (III.) Craig, Kaiser, Mama

*(new course—eff. fall 13)*

**160. Women, 'Race' and Sexuality in Postcolonial Cinema (4)**
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: course 20 or 50. Class size limited to 90 students. Feminist analysis of race, sexuality and class in the representation of women in commercial and/or independent films. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE.—(III.) Mama

*(change in existing course—eff. winter 14)*

**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 when topic differs. Offered irregularly. GE credit: ArtHum or SocSci, Div | ACGH, AH or SS, DD, VL.—Constable

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

**175. Gender and Experience of Race (4)**
Lecture/discussion—4 hours. Prerequisite: course 50, 60, or consent of the instructor. Exploration of the co-construction of "race" and gender in comparative national historical contexts and contemporary lived experience. Study of intersections of race and gender in identities and how institutions, labor migration, social movements and consumption shape racialized gendered identities. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.—III. (III.) Ho, Nettles

*(new course—eff. fall 13)*

**178A-G. Women Writers and the Transnational Imaginary (4)**
Lecture/discussion—4 hours. Prerequisite: one course in Women's Studies, or consent of instructor. Writings by women from diverse regions and cultures, understood in their cultural, socio-economic, and historical contexts, with each course offering a 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. Offered irregularly. GE credit: ArtHum, Div, Wrt | AH, WC, WE.—Constable, Ho, Joseph, Kuhn, Mena, Mama, Nettles-Barcelón

*(change in existing course—eff. winter 14)*

**182. Globalization, Gender and Culture (4)**
Lecture/discussion—4 hours. Prerequisite: course 50; consent of instructor. Critical gender analysis of globalization as a process of interconnected cultural, social and economic transformations inflected by gender, nation, class and race/ethnicity. Critical self-reflection and social observation skills. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, OL, WC, WE.—III. Mama

*(change in existing course—eff. winter 14)*

**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: ArtHum or SocSci | AH or SS, WC.—Joseph

*(change in existing course—eff. winter 13)*

**189. Special Topics in Critical Gender Studies (4)**
Lecture/discussion—4 hours. Prerequisite: one course specified for 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. Offered irregularly. GE credit: ArtHum or SocSci | AH or SS, WE.—I.

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

**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: ArtHum or SocSci | ACGH, AH or SS, DD.—III. (III.) Constable, Craig, Ho, Joseph, Kaiser, Kuhn, Mama, Mena, Nettles-Barcelón, Swain

*(change in existing course—eff. winter 13)*

**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: ArtHum or SocSci, Wrt | ACGH, AH or SS, DD, WE.—III. (III.) Kaiser

*(change in existing course—eff. winter 13)*

**193. Feminist Leadership Seminar (2)**

Seminar—2 hours. Prerequisite: course 50, 192. Use feminist methods to critically reflect on the ethical, methodological and strategic aspects of an organization, project, campaign, movement or other social change initiative. May be repeated for credit. Offered irregularly. (P/NP grading only.) GE credit: ArtHum or SocSci | ACGH, AH or SS, DD, WE.—(III.)

*(change in existing course—eff. winter 14)*

**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: ArtHum or SocSci | AH or SS, WE.—Constable, Craig, Ho, Joseph, Kaiser, Kaplan, Kuhn, Mama, Mena, Nettles-Barcelón, Swain

*(change in existing course—eff. winter 13)*

**195. Thematic Seminar in Critical Gender and Women's Studies (4)**

Seminar—4 hours. Prerequisite: course 50, 60. Limited enrollment. Group study of a topic, issue or area in feminist theory and research involving intensive reading and writing. May be repeated for credit. Offered irregularly. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.

*(change in existing course—eff. winter 14)*

# Policies & Requirements Addendum

## Academic Calendar

### Changes to the Academic Calendar

See *http://catalog.ucdavis.edu/PDF/AcademicCalendar.pdf*.

## Appendix

### Changes to the Appendix

### UNIVERSITY POLICY ON NONDISCRIMINATION, SEXUAL HARASSMENT/ SEXUAL ASSAULT, DISABILITY ACCOMMODATIONS, STUDENT RECORDS AND PRIVACY

**Nondiscrimination.** The University of California, in accordance with applicable Federal and State law and University policy, does not discriminate on the basis of race, color, national origin, religion, sex, gender identity, pregnancy (including pregnancy, childbirth, and medical conditions related to pregnancy or childbirth), physical or mental disability, age, medical condition (cancer-related or genetic characteristics), ancestry, marital status, citizenship, sexual orientation, or service in the uniformed services (includes membership, application for membership, performance of service, application for service, or obligation for service in the uniformed services) status as a Vietnam-era veteran or special disabled veteran. The University also prohibits sexual harassment, including sexual assault. This nondiscrimination policy covers admission, access, and treatment in University programs and activities.

**Discrimination, Harassment, or Arbitrary Treatment.** If students have questions about student-related nondiscrimination policies or concerns about possible discrimination, harassment, or arbitrary treatment, they may contact Student Judicial Affairs for information and assistance 530-752-1128. Additional resources for students include the UC Davis Compliance Officer (ADA and Title IX Officer) 530-752-9466 or the dean's office for their college. Graduate students may also contact the Office of Graduate Studies 530-752-0650 or the Graduate Students Association 530-752-6108. Students are encouraged to seek assistance as soon as possible, as time limits may apply to grievance processes.

Campus policies provide for a prompt and effective response to student complaints. This response may include early resolution procedures or, as appropriate, an administrative review or investigation. The student will be informed of the results of the review.

**Sexual Harassment/Sexual Assault.** Sexual harassment and sexual assault are prohibited by law and by university policy and will not be condoned. Campus policy (PPM Section 380-12 at *http://manuals.ucdavis.edu/ppm/380/380-12.pdf*) describes campus procedures for responding to reports of sexual harassment and sexual assault. Under this policy, sexual assault is considered an extreme form of sexual harassment. UC Davis's response to reports of sexual harassment and sexual assault may include interim actions, early resolution processes, and formal investigation procedures. If a complaint of sexual harassment or sexual assault is substantiated, the campus will take appropriate remedial action, including discipline. The Harassment and Discrimination Assistance and Prevention Program 530-752-9255 works with students to resolve complaints of sexual harassment, including sexual assault; and provides referrals to other campus resources. Students may report sexual harassment to deans, supervisors, managers, the Campus Sexual Harassment Officer and other campus officials, including Student Judicial Affairs, Student Housing, and the Chief Compliance Officer (Title IX Officer). With the exception of certain confidential resources, University officials receiving a report of sexual harassment or sexual assault must immediately consult with the Sexual Harassment Officer. Students may seek confidential advice and support from Counseling and Psychological Services 530-752-0871, the Campus Violence Prevention Program (530) 752-3299, the Lesbian, Gay, Bi-Sexual, and Transgender Resource Center 530-752-24452, and the Women's Resources and Research Center 530-752-3372. Consultation with these resources will not lead to an official report unless additional action is taken by the individual seeking advice.

## Art Studio

### Changes to the Art Studio Major Program Requirements

### A.B. Major Requirements:

| | UNITS |
|---|---|
| **Preparatory Subject Matter** | **24** |
| Four courses chosen from Art Studio 2, 5, 7, 8, 9, 11, 12 | 16 |
| Two lecture courses chosen from Art Studio 24, 30, or Art History 1A, 1B, 1C, 1D, 1DV, 1E, 5, 10, 25 | 8 |
| **Depth Subject Matter** | **44** |
| 36 upper division units in Art Studio | 36 |
| Any two upper division theory or history courses from Art History, Cinema and Technocultural Studies, Design, Music or Theatre and Dance | 8 |
| **Total Units for the Major** | **68** |

**Major Advisers.** Information on the current Academic Advisors can be obtained by contacting the Art Department Main Office at 530-752-0105.

## Asian American Studies

### Changes to the Asian American Studies Major Program Requirements—Humanities Emphasis

### A.B. Major Requirements:

| | UNITS |
|---|---|
| **Humanities Emphasis** | |
| **Preparatory Subject Matter** | **31** |
| Asian American Studies 1, 2 | 8 |
| One Asian language: Chinese 1, 2, 3; Japanese 1, 2, 3; or equivalent Asian language | 15 |
| Note: For courses in Asian languages, see Chinese and Japanese (under East Asian Languages and Cultures). For other Asian courses, see East Asian Languages and Culture and East Asian Studies. | |
| At least two lower division courses from the following departments or programs: African American and African Studies, Chicana/o Studies, Native American Studies, Women and Gender Studies (all lower division courses of at least 4 units are acceptable except those numbered 92, 97T, 98, and 99) | 8 |
| **Depth Subject Matter** | **44-47** |
| At least seven upper division Asian American Studies courses (excluding 197T, 198, 199) and not more than 6 units of internships | 28-30 |
| Select four courses from one of the following tracks | 16-17 |

**Literature/Culture Track**
Comparative Literature 153; Dramatic Art 154, 155; English 178, 179, 185A, 185B
**History/Culture Track**
Dramatic Art 154, 155; History 191F, 194C, 196B, 173, 178

**Total Units for the Major ..... 78-81**

**Minor Adviser.** Britt Sumida, 530-752-4447 or bnsumida@ucdavis.edu

# Biological Sciences

## Changes to the Biological Sciences Major Program 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 or 21A-21B.
*Mathematics 16A-16B accepted to fulfill this recommendation only for transfer students admitted prior to fall 2013.

**Total units for the major ..... 77-94**

## Changes to the Biological Sciences B.S. Major Requirements—Field Course Lists

**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, 104, 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, 119, 143, 147, 148; Plant Pathology 120, 130, 148; Plant Sciences 144, 176 ..... 3-5

## Changes to the Biological Sciences —Evolution, Ecology and Biodiversity emphasis—Field requirement

### B.S. Major Requirements:

UNITS

**Evolution, Ecology and Biodiversity emphasis ..... 12**

Students choose to complete Biological Sciences 105 or 102+103 for this emphasis.

**Field requirement:** Students must take Evolution and Ecology 100 to satisfy Field requirement (*a*), and Evolution and Ecology 101 to satisfy Field requirement (*b*).

*(1)* At least 12 units including at least one course from each of the following two groups..... 12

*(a) Biodiversity:* Entomology 103; Evolution and Ecology 105, 106, 108, 112, 112L, 114, 134, 134L, 134F, 140; Microbiology 105, 105L; Nematology 110; Plant Biology 116, 147, 148; Wildlife, Fish, and Conservation Biology 110, 110L, 111, 111L, 120, 120L.
*(b) Advanced Evolution and Ecology:* Advanced Evolution and Ecology: Evolution and Ecology 102, 103, 107, 115, 117, 119, 120, 131, 138, 141, 147, 149, 150, 180A, 180B, 181.

*(2)* Laboratory/Fieldwork Requirement. Included in the above 12 units, complete a total of 2 units or a total of 6 hours/week of fieldwork or laboratory work. Courses that may be used to satisfy this requirement are: One course from: Evolution and Ecology 105, 106, 108, 112L, 114, 134L; Microbiology 105L; , 1, Fish, and Conservation Biology 110L; 111L OR two courses from Evolution and Ecology 117, 119, 134F, 140, 180A, 180B; Plant Biology 147; Wildlife, Fish, and Conservation Biology 120L

## Changes to the Biological Sciences —Plant Biology emphasis

**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 ..... 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, 148; Plant Pathology 148 ..... 4-5

# Biological Sciences, College of

## Changes to the Biological Sciences College Requirements for the Bachelor's Degree; Unit Credit Limitations

### *Unit Credit Limitations*

- **Passed/Not Passed Units.** All courses used to satisfy major requirements must be taken on a letter-graded basis, unless courses are only offered on a Passed/Not Passed basis.

  The Academic Senate limits the total number of courses graded P, including units earned in courses graded "P/NP only," to one third of the units completed on the UC Davis campus.
- **Physical Education.** Maximum of 6 units of Physical Education 1, 6 and similar physical activity courses including transfer work.
- **Transfer work.** Maximum of 105 units of credit earned at two-year institutions (community college).
- **Graduate Courses.** Units from courses in the 200 series (with the exception of course 299) may apply toward the minimum 64-unit upper division requirement and/or as a substitution for undergraduate courses in the major under the following conditions.
  - Students must obtain written permission from the course instructor and the master adviser for their major.
  - The master adviser will confirm that students have a minimum 3.400 GPA in the major at the time that they register for the course.
- **Professional and teaching courses.** Maximum of 9 units in courses numbered 300-399 and 400-499. These units may not be applied toward the 64-unit upper division requirement.
- **Upper division standing.** Must complete 84 units before enrolling in 192, 194H and 199 to receive degree and upper division credit.
- **Special Study.** Not more than 5 units per quarter of Special Study courses (99, 194H, 199).
- **Nonstandard Courses.** Maximum of 20 units of nonstandard courses including transfer work.*

Nonstandard courses are defined here as tutoring, internship, research, research conference, honors research and similar course activities. Some examples of these courses are, but are not limited to, courses numbered 90C, 92, 92C, 97T, 97TC, 99, 189, 190C, 191, 192, 192C, 193, 194H, 197T, 197TC, 199, etc. Courses numbered 98 or 198 are not included in this 20-unit limitation.

There are additional unit credit limitations on tutoring and internship units.

- **Tutoring.** Maximum of 3 tutoring units including but not limited to 97T, 197T, 97TC and 197TC.
- **Internship.** A maximum of 6 internship units including but not limited to 92, 192, 92C, 192C.

*Specific exceptions to these limits may be granted by the Committee on Undergraduate Petitions based on the uniqueness of the experiences and their concordance with the petitioner's educational objectives.

**Credit for Open Campus (Concurrent) Courses.** Students may apply credit for courses taken in the Open Campus (Concurrent) Program through UC Davis Extension towards the 180-unit undergraduate degree requirement. The grade points earned when enrolled in Open Campus courses will count toward the calculation of a student's UC GPA upon his/her admission or readmission to regular student status at UC Davis. However, the units earned do not satisfy the university residence requirement. Students registered at UC Davis may not enroll in Open Campus courses.

### Changes to the Biological Sciences College Requirements for the Bachelor's Degree; English Composition Requirement

#### *English Composition Requirement*

The English Composition requirement may be satisfied in one of two ways:

1. Completing 8 units, to include 4 upper division units, in English composition courses with at least a C- or Passed grade from the following list: Comparative Literature 1, 2, 3, 4, English 3, Native American Studies 5, University Writing Program 1, 18, 19, 101, 102 series, or 104 series.

**OR**

2. Passing the English Composition Examination, administered by the Entry Level Writing program, upon completion of 70 units of degree credit. This examination does not yield credit. Students interested in entering the health science field should check with the Health Sciences Advising Office or the Dean's Office before choosing this option.

### Changes to the Biological Sciences College Requirements for the Bachelor's Degree; Additional Bachelor of Arts Requirements

#### *Additional Bachelor of Arts Requirements*

Bachelor of Arts degrees are available in Biological Sciences; Evolution, Ecology and Biodiversity; Exercise Biology; Microbiology; and Plant Biology. These degrees offer students an opportunity to broaden their education while pursuing a rigorous life science major.

Candidates for the Bachelor of Arts degrees must complete two additional requirements.

1. **Foreign Language.** The requirement can be met in one of three ways:
   - Complete with passing grades 15 quarter units of college level course work, or the equivalent thereof, in a single language.
   - Attain a minimal score prescribed by the Committee on Undergraduate Curriculum and Educational Policy, in the College Entrance Examination Board Achievement Test in Foreign Language, which may be taken at any time during the student's high school career, or any other achievement test approved by the Committee on Undergraduate Curriculum and Educational Policy.
   - Placement beyond the 15-unit level on a placement/proficiency examination offered by one of the foreign language departments of the University.
2. **Breadth Requirements.** Satisfaction of the campus General Education requirement (or IGETC for transfer students) in effect Fall 2011 will satisfy the Breadth requirement. Students that matriculated prior to Fall 2011 have the option of completing the Breadth Requirement specified in the College of Biological Sciences regulations prior to this revision. Completion of a minor in the humanities, social sciences or fine arts can offer structure and coherence to the courses selected for satisfaction of the requirement.

# Chemistry

### Changes to the Applied Chemistry Major Program Requirements—Forensic Chemistry emphasis

#### B.S. Major Requirements:

| | UNITS |
|---|---|
| **Preparatory Subject Matter** | **47-54** |
| Chemistry 2A-2B-2C or 2AH-2BH-2CH | 15 |
| Physics 7A-7B-7C or 9A-9B-9C | 12-15 |
| Mathematics 16A-16B-16C or 17A-17B-17C or 21A-21B-21C | 9-12 |
| Biological Sciences 2A | 4 |
| Environmental Toxicology 20 | 4 |
| Statistics 13, 32, 100 or 102 | 3-4 |
| **Depth Subject Matter** | **51-61** |
| Chemistry 104, 105, 115 | 11 |
| Chemistry 107A-107B or 110A-110B-110C | 6-12 |
| Chemistry 118A-118B-118C or 128A-128B-128C-129A-129B | 12-13 |
| Environmental Toxicology 101, 102A, 102B | 13 |
| At least two courses from Biological Sciences 101; Environmental Science and Policy 161; Environmental Toxicology 103A, 103B, 111, 135, 138; Statistics 108, 130A | 6-9 |
| At least 3 additional upper division units in chemistry (Chemistry 199 or 194H strongly encouraged) | 3 |
| **Total Units for the Major** | **98-115** |

### Changes to the Pharmaceutical Chemistry emphasis

#### B.S. Major Requirements:

| | UNITS |
|---|---|
| **Preparatory Subject Matter** | **48-55** |
| Chemistry 2A-2B-2C or 2AH-2BH-2CH | 15 |
| Physics 7A, 7B, 7C or 9A-9B-9C | 12-15 |
| Mathematics 16A-16B-16C or 17A-17B-17C or 21A-21B-21C | 9-12 |
| Biological Sciences 2A, and 2B or 2C | 9 |
| Statistics 13, 32 or 100 | 3-4 |
| **Depth Subject Matter** | **48-64** |
| Chemistry 124A, 130A-130B-135, 150 | 15 |
| Chemistry 107A-107B or 110A-110B-110C | 6-12 |
| Chemistry 118A-118B-118C or 128A-128B-128C-129A-129B-129C | 12-15 |
| Biological Sciences 102 or Chemistry 131 | 3 |
| At least four courses (not used to satisfy the above requirements) from Biological Sciences 102, 103, Biotechnology 171 or Veterinary Medicine 170, Chemistry 131, 199 (minimum 3 units) or 194H, Environmental Toxicology 103A, Microbiology 104, Neurobiology, Physiology, and Behavior 100, 101, Plant Biology 126 | 12-19 |
| **Total Units for the Major** | **96-119** |

# Coaching Principles and Methods

(College of Letters and Science)

The Coaching Principles and Methods minor is an interdisciplinary minor open to undergraduates in all four colleges. Students must complete a statement of interest to assist in placing them in future internships. This form is available in the Physical Education Program Office (264 Hickey Gym) and may be turned in at any time.

## Minor Program Requirements:

UNITS

**Coaching Principles and Methods ..... 20**

Physical Education 1 (must complete a minimum of two Physical Education 1 courses in two different activities or sports..... 1
Physical Education 7 ..... 1
Physical Education 100 ..... 2
Physical Education 143 ..... 3
Physical Education 141 ..... 3
Physical Education 192 ..... 2

**Required Minor Electives**

A minimum of 8 units with courses from at least two different departments. One course must be taken from race/class/gender list. Second course can be from race/class/gender list or from sociocultural issues and settings list.

**Race/Class/Gender List:**
One course from African American Studies 123, 130, 133, American Studies 154, 156, Anthropology 128B, 139AN, Asian American Studies 112, 115, 116, 120, 150, 150B, 150C, 150D, 150E, Chicana/o Studies 110, 120, 122, 123, Native American Studies 115, 134, 180, Sociology 128, 129, 130, 132, 134, 172, 174, Women's Studies 130, 158, 170.

**Sociocultural Issues and Settings List:**
American Studies 115, 130, 152, Anthropology 141B, Education 115, 122, 153, Exercise Biology 102, 121, 122, Human Development 100B, 110, Native American Studies 156, Physical Education 120, Psychology 126, 140, 151, 157, 158, 161, 162, 168, Sociology 122, 123, 124, 131, 153, Women's Studies 140

PHE 192 has a prerequisite of junior/senior standing. PHE 192 cannot be taken until after a student has completed more than 90 total units. PHE 192 internship must be in a coaching or teaching setting. Setting must be approved IN ADVANCE by the coaching minor advisor before a CRN will be issued.

**Minor Adviser.** Lou Bronzan, 530-752-5541 or stbronzan@ucdavis.edu

**Advising Center.** 289 Hickey Gym

# Communication

## Changes to the Communication Major Program Requirements

### The Major Program

The major in communication focuses upon human symbolic behavior in interpersonal and mediated contexts.

**The Program.** The program of study in communication examines communication processes at several different levels of analysis. Courses dealing with communication at the individual, interpersonal, organizational and societal levels of analysis are offered. The emphasis in the program reflects the changing focus in the discipline and society toward computer-mediated communication, quantitative behavioral science and cognitive science. Classes addressing such topics as communication and cognition, message systems, interpersonal communication, nonverbal communication, communication and persuasion, organizational communication, mass media effects, computer-mediated communication and public communication campaigns explore communication at these levels of analysis. Related social science courses are also part of the major.

**Preparatory Requirements.** Before declaring a major in communication, students must complete the following courses with a combined grade point average of at least 2.500 at the University of California (at least 3.000 GPA may be required for similar courses taken at community college). All courses must be taken for a letter grade:

Anthropology 4 or Linguistics 1.....4 units
Computer Science 15 or Philosophy 12.....4 units
Psychology 1.....4 units
Sociology 1.....5 units
Statistics 13.....4 units

**Career Alternatives.** Communication graduates have found careers in such fields as broadcast and print journalism, administration, sales, management, politics and government, education, social work, and public relations. A communication degree is also excellent preparation for law school or other graduate programs.

## A.B. Major Requirements:

UNITS

**Preparatory Subject Matter ..... 25**

Anthropology 4 or Linguistics 1..... 4
Communication 1 or 3 or 5/Linguistics 5 .. 4
Computer Science 15 or Philosophy 12 .... 4
Psychology 1 ..... 4
Sociology 1 ..... 5
Statistics 13 ..... 4

**Depth Subject Matter ..... 40**

Communication 101..... 4
Communication 102, 105, 134, 140..... 16
Select five of the following additional courses ..... 20
Communication 103, 135, 136, 137, 138, 139, 142, 143, 144, 146, 152, 165, 170, 172, 180, 189A, 189B, 189C, 189D, Anthropology 117, 120, Economics 122, Linguistics, 171, 177,182, Political Science 165, Psychology 100, 107, 152, 154, Sociology 126, 175, Statistics 102, 106, 108
Note: Many of the upper division courses offered by the other L&S departments have their own prerequisites not accounted for by lower division Communication courses. To the degree that students elect to take those courses having "hidden prerequisites," the number of units necessary to complete the major increases above the stated minimum.

**Total Units for the Major ..... 65**

# Earth and Planetary Sciences

## Change to department name

Formerly Geology

(College of Letters and Science)

# East Asian Languages and Cultures

## Changes to the East Asian Languages and Cultures Major Program Requirements

### Chinese

### A.B. Major Requirements:

UNITS

**Preparatory Subject Matter.....0-30**

Chinese 1, 2, 3, 4, 5, 6; or 1BL, 2BL, 3BL; or 1CN, 2CN, 3CN.
Recommended:
Chinese 10, 11, 50, Comparative Literature 14, Japanese 10, Linguistics 1, History 9A.

**Depth Subject Matter ..... 40**

Chinese 106, 107, 111, 112, 113, 114, 160 ..... 28
Note: With prior approval of an undergraduate adviser, students already proficient in Chinese at the third-year level (courses 111-112-113) should take three other upper division Chinese courses instead.
Three courses selected from Chinese 100A, 101, 102, 103, 104, 105, 108, 109A-I, 110, 115, 116, 120, 130, 131, 132, 140, 150; one of the three courses must be from 101, 102, 103, 104, 109G..... 12
Recommended:
Japanese 101, 102, 103, 104, 105, 106; Anthropology 148A-148B; Art History 163A-163B; East Asian Studies 113; History 191A-F; Religious Studies 172; or other advanced literature and culture courses selected in consultation with the undergraduate adviser.

**Total Units for the Chinese Major .....52-70**

### Japanese

### A.B. Major Requirements:

UNITS

**Preparatory Subject Matter.....0-30**

Japanese 1, 2, 3, 4, 5, 6
Recommended:
Japanese 10, 15, 25, Chinese 10, 11, 50, Linguistics 1, History 9B.

**Depth Subject Matter ..... 40**

Japanese 101, 102, 103, 111, 112, 113 ..... 24
Eight units selected from Japanese 104, 105, 106, 107, 108, 109, 115, 131, 132, 133, 134, 135, 136, 141 ..... 8
Eight units selected from Chinese 101, 102, 103, 104, 105, 106, 107, 108, 109A-I, 110; Anthropology 149A-149B; Art History 164; Comparative Literature 153; History 194A-194B-194C; Religious Studies 170, 172; or other advanced literature and culture courses selected in consultation with the undergraduate adviser ..... 8

**Total Units for the Japanese Major...40-70**

**Major Advisers.** C. Chang, D. Gundry, and J. Sorensen *(Japanese)*; C. Chu, M. Halperin and M. Yeh *(Chinese)*

# Engineering

## Changes to Engineering Major Program Requirements

## The Major Programs

Thirteen majors, leading to the B.S. degree, are open to students.

**Aerospace Science & Engineering**
**Biochemical Engineering**
**Biological Systems Engineering**
**Biomedical Engineering**
**Chemical Engineering**
**Civil Engineering**
**Computer Engineering**
**Computer Science and Engineering**
**Electrical Engineering**
**Electronic Materials Engineering (not accepting new students)**
**Materials Science and Engineering**
**Mechanical Engineering**
**Optical Science and Engineering (not accepting new students)**

Two combined majors are offered leading to the B.S. degree:

**Chemical Engineering/Materials Science and Engineering (not accepting new students)**
**Mechanical Engineering/Materials Science and Engineering (not accepting new students)**

# Engineering: Applied Science

## Changes to Optical Science and Engineering Major Program Requirements

**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 (or 45 Y) | 4 |
| English 3 or University Writing Program 1, 1Y, or 1V 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 |
| 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 |
| Upper Division Composition Requirement: One course from the following (grade of C- or better required): University Writing Program UWP 101, 102A, 102B, 102G, 102E, 104A, 104B, 104C, 104D, 104E, 104T or by passing the Upper Division Composition Exam | 0 or 4 |
| **Minimum Upper Division Units** | **86** |
| **Minimum Units Required for Major** | **180** |

# Engineering: Biological and Agricultural

## Changes to Biological and Agricultural Engineering Undergraduate Major Program Requirements & Minor Requirements

## 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 | 15 |
| Engineering 6, 35, 17 | 12 |
| Biological Systems Engineering 1 | 4 |
| Biological Systems Engineering 75 | 4 |
| University Writing Program 1, 1Y or 1V | 4 |
| Communication 1 or 3 | 4 |
| **Minimum Lower Division Units** | **90** |

**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) | 3 |
| Upper Division Composition Requirement* one course from the following: University Writing Program 101, 102B, 102E, 102F, 102G, 104A, 104E, 104F, 104T | 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.** M. Delwiche

## 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 167 | 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)*

## Energy Efficiency 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 188 and Civil Engineering 125 | 8 |
| Select 12 units from: Civil Engineering 126, 127, 128, 143; Environmental Science and Policy 167; Design 136A, 136B, 137A | 12 |
| **Total Units for the Minor** | **18** |

**Minor Advisors.** Frank Loge *(Civil and Environmental Engineering)*, Dan Sperling *(Institute of Transportation Studies)*, Mark Modera *(Western Cooling Efficiency Center)*

# Engineering: Biomedical

## Changes to the Biomedical Engineering Major Program Requirements & Minor Program Requirements

### 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, 1Y, or 1V, or English 3, or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5 | 4 |
| Biological Sciences 2A | 5 |
| Biomedical Engineering 1, 20 | 6 |
| **Minimum Lower Division Units** | **81** |

### 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-110L, 111 | 34 |
| Science electives | 7 |
| To be chosen according to specialization. BIS 2B, BIS 2C, PHY 9D, BIM 102, BIM 161A, BIM 161L, BIM 161S or any graded upper division course in the Biological Sciences, Chemistry or Physics that is designated as Science and Engineering topical breadth. | |
| Engineering electives | 20 |
| Any graded upper division Biomedical Engineering course (except Biomedical Engineering 102, 161A, 161L, 161S). No more than 4 units allowed from lower division coursework. Engineering 4, 35, 45 or 45Y, 102, 103, 104, 104L, 106; Biological Systems Engineering 128, 130, 165, 175; Chemical Engineering 141, 144, 155AB, 160, 161AB, 161L, 170; Computer Science 124; Electrical and Computer Engineering 110AB, 118, 130AB, 140AB, 150AB, 151, 157AB, 160; Materials Science and Engineering 147, 160, 162, 162L, 164, 172, 172L, 174, 174L, 180, 181, 182; Mechanical Engineering 50, 150AB, 151, 152, 154, 165, 171, 172. | |
| Upper Division Composition Requirement, one course from the following: University Writing Program 101; 102 B, E; 104 A, E, F, I, T; or by passing the Upper Division Composition exam administered by the College of Letters and Science | 0-4 |
| **Minimum Upper Division Units** | **76** |
| **Minimum Units Required for Major** | **157** |
| **General Education electives** | **24-29** |
| **Total required units depends on general education requirements in effect at time of matriculation at UC Davis.** | |
| **Minimum Total Units for B.S. in Biomedical Engineering** | **181-186** |

**Additional upper division elective policies:**

- 2 units from Chemistry 118AB may be applied towards Science electives if 118AB are also used to satisfy lower division subject credit.
- 2 units from Electrical and Computer Engineering 100 may be applied towards Engineering electives if Electrical and Computer Engineering 100 is taken to satisfy upper division subject credit.
- 4 units of Biomedical Engineering 199 may be counted towards Engineering or Science electives with approval of Biomedical Engineering Undergraduate Committee.

**Science electives and Engineering Electives are to be selected in consultation with a staff or faculty advisor.**

## Minor Program Requirements:

All courses must be taken for a letter grade. No grade lower than a C- for coursework completed in the minor.

| | UNITS |
|---|---|
| **Biomedical Engineering** | **21** |
| Neurobiology, Physiology and Behavior 101 or Biomedical Engineering 116, and Biomedical Engineering 102 | 9 |
| Electives* Biomedical Engineering 117, 118, 126, 140, 141, 142, 143, 151, 152, 161A, 161L, 162, 163, 173, 189A, 189C | 12 |

*Electives to be chosen in consultation with the Biomedical Engineering Departmental Adviser.

# Engineering: Chemical Engineering and Materials Science

Ahmet Palazoglu, Ph.D., Chairperson of the Department 530-752-6496; Fax 530-752-1031

**Department Office.** 3001 Ghausi Hall 530-752-0400; Fax 530-752-1031; *http://chms.engineering.ucdavis.edu*

## Changes to the Chemical Engineering and Materials Science Chairperson Contact Information & Major Program Requirements

## Chemical Engineering Undergraduate Program

### 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 or 45Y | 4 |
| Biological Science 2A or Biotechnology 1 | 4 or 5 |
| English 3 or University Writing Program 1, 1V 1Y, or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5 | 4 |
| **Minimum Lower Division Units** | **75** |

### Chemical Engineering Upper Division Required Courses

| | |
|---|---|
| Chemical Engineering 140, 141, 142, 143, 148A, 148B, 152A, 152B, 155A, 155B, 157, 158A, 158B, 158C | 54 |
| Chemistry 110A, 110B, 128A, 128B, 129A | 16 |
| Chemical Engineering and Materials Science Electives. Choose any upper division courses in the areas of Chemistry (CHE), Chemical Engineering (ECH) or Materials Science and Engineering (EMS). You may receive elective credit up to a maximum of 4 units for any combination of engineering courses numbered 190C, 192, 198, and 199. Courses may also be selected from the following: BIS 102; Food Science and Technology 100A, 102A, 102B; Fiber and Polymer Science 150. | 8 |
| Upper Division Composition Requirement: One course from the following (grade of C- or better is required): University Writing Program UWP 102E, 102F, 104A, 104E, 104T or by passing the Upper-Division Composition Exam | 0 or 4 |
| **Minimum Upper Division Units** | **78** |
| **Minimum Units Required for Major** | **153** |

## Chemical Engineering/Materials Science and Engineering Undergraduate Program

The Chemical Engineering/Materials Science and Engineering program is not accepting new students.

### Lower Division Required Courses

| | |
|---|---|
| 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 |
| Engineering 45 or 45Y | 4 |
| Chemical Engineering 51 | 4 |
| Chemical Engineering 80 | 1 |
| English 3 or University Writing Program 1, 1V, or 1Y Comparative Literature 1, 2, 3, or 4 or Native American Studies 5 | 4 |
| **Minimum Lower Division Units** | **80** |

### Upper Division Required Courses

| | |
|---|---|
| Chemical Engineering 140, 141, 142, 143, 148A, 148B, 152A, 152B, 155A, 155B, 157, 158A, 158B, 158C | 54 |
| Chemistry 110A, 110B, 128A, 128B, 129A | 16 |
| 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; may use 172, 174 if not used above | 4 |
| Upper Division Composition Requirement: One course from the following (grade of C- or better is required): University Writing Program UWP 102E, 102F, 104A, 104E, 104T or by passing the Upper-Division Composition Exam | 0 or 4 |
| **Minimum Upper Division Units** | **92** |
| **Minimum Units Required for Major** | **162** |

**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 com-

pletion of the Honors Program will be acknowledged on the student's transcript.

## Biochemical Engineering Undergraduate Program

**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 | 5 |
| Chemical Engineering and Materials Science 5, 6 | 6 |
| Chemical Engineering 51 | 4 |
| Chemical Engineering 80 | 1 |
| English 3 or University Writing Program 1, 1V or 1Y, or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5 | 4 |
| **Minimum Lower Division Units** | **72** |

**Upper Division Required Courses**

| | |
|---|---|
| Chemical Engineering 140, 141, 142, 143, 148A, 152A, 152B, 155A, 157, 158A, 158C, 161A, 161B, 161C, 161L | 58 |
| Biological Sciences 102 | 3 |
| Microbiology 101 | 5 |
| Chemistry 110A, 128A, 128B, 129A | 12 |
| Biochemical Engineering electives | 9 |

Choose at least one laboratory course from the Laboratory Elective list; additional courses may be chosen from either list. You may receive biochemical engineering elective credit up to a maximum of two units of an internship (192) or independent study (199), or Biotechnology 189L 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. Research does not replace the required lab elective.

*Laboratory elective list:* Biomedical Engineering 161L; Biotechnology 161A, 161B; Food Science and Technology 102B, 104L, 123L; Molecular and Cellular Biology 120L, 160L; Neurobiology, Physiology, and Behavior 101L, 104L; Viticulture and Enology 123L, 124L.

*Lecture elective list:* Biological Sciences 2B, 2C, 101, 103, 104; Biological Systems Engineering 165; Biomedical Engineering 102, 107, 109, 140, 161A,162; Biotechnology 160, 188; Chemical Engineering 144, 166, 170; Chemistry 130A, 130B; Food Science and Technology 102A, 104, 123; Microbiology 140, 150; Molecular and Cellular Biology, 123; Neurobiology, Physiology, and Behavior 101, 103; Plant Biology 112; Plant Sciences 100A,152; Statistics 120, 130A, 131A.; Viticulture and Enology 123, 124

| | |
|---|---|
| Upper Division Composition Requirement: One course from the following (grade of C- or better is required): University Writing Program UWP 102E, 102F, 104A, 104E, 104T or by passing the Upper-Division Composition Exam | 0 or 4 |
| **Minimum Upper Division Units** | **87** |
| **Minimum Units Required for Major** | **159** |

## Materials Science and Engineering Undergraduate Program

**Lower Division Required Courses**

| | |
|---|---|
| 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, and 45 or 45Y | 12 |
| Chemical Engineering and Materials Science 6 | 4 |
| English 3 or University Writing Program 1, 1V or 1Y, or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5 | 4 |
| Communication 1 or 3 | 4 |
| **Minimum Lower Division Units** | **80** |

**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 Aerospace 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, 122A, 151, 160 | 3 |
| Upper Division Composition Requirement: One course from the following (grade of C- or better is required): University Writing Program UWP 102E, 102F, 104A, 104E, 104T or by passing the Upper-Division Composition Exam | 0 or 4 |
| **Minimum Upper Division Units** | **79** |
| **Minimum Units Required for Major** | **159** |

**Minor Requirements**

| | UNITS |
|---|---|
| Materials Science and Engineering 160, 162, 164 | 12 |
| Select one course from Materials Science 172 or 174 | 4 |
| Additional 4 units from the following, if not used above, Materials Science 147, 162L, 172, 172L, 174, 174L, 180, 181 or182 | 4 |
| **Total Units Required for Minor** | **20** |

## Electronic Materials Engineering Undergraduate Program

**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, and 45 or 45Y | 12 |
| Chemical Engineering and Materials Science 6 | 4 |
| English 3 or University Writing Program 1, 1V or 1Y, or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5 | 4 |
| Communication 1 or 3 | 4 |
| **Minimum Lower Division Units** | **80** |

**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 |
| Unrestrictive electives | 3 |
| Upper Division Composition Requirement: One course from the following (grade of C- or better is required): University Writing Program UWP 102E, 102F, 104A, 104E, 104T or by passing the Upper-Division Composition Exam | 0 or 4 |
| **Minimum Upper Division Units** | **78** |
| **Minimum Units Required for Major** | **158** |

# Engineering: Civil and Environmental

## Changes to the Civil and Environmental Engineering Major Program Requirements

## Civil Engineering Undergraduate Program

**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 lower division students and is not open to upper division students. Students who do not take this course will substitute four units of additional engineering coursework.) | 4 |
| One course from Civil and Environmental Engineering 19, Engineering 6, or Computer Science Engineering 30 | 4 |
| Engineering 35, 45 or 45Y | 8 |
| Civil and Environmental Engineering 16 | 2 |
| English 3 or University Writing Program 1, 1V, or 1Y,or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5 | 4 |
| Communication 1 or 3 | 4 |
| **Minimum Lower Division Units** | **83** |

## Civil Engineering

**Upper Division Required Courses**

| | |
|---|---|
| Engineering 102, 103, 104, 104L, 105, 106 | 20 |
| Civil and Environmental Engineering 114, 190 | 6 |
| 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). Courses listed in more than one group may be counted only once. 30*

*Environment:* Civil and Environmental Engineering 148A or 149 and at least one from courses 140, 143, 148B, 150

Geotechnical: Civil and Environmental Engineering 171 and 171 Lab and at least one from courses 173, 175, 179

*Structures:* Civil and Environmental Engineering 130 and at least one from courses 131, 132, 135, 136, 137, 138, 139

*Transportation:* Civil and Environmental Engineering 161, 162, or 179, and any one from courses 161 162,163, 165, 179

*Water Resources:* Civil and Environmental Engineering 141 and 141 Lab and at least

one from courses 142, 144, 145, 146, 155
*Senior Design Requirement:* Must complete at least two of the following courses as part of the Group Option or Civil & Environmental Engineering elective Requirement: Civil & Environmental Engineering 127, 136, 145, 148B, 150, 162, or 173
Civil & Environmental Engineering electives ..... 16
Civil & Environmental Engineering electives may include: Any upper division, letter-graded Civil & Environmental Engineering course not already used towards another degree requirement, and may include, but not exceed, a combination of 6 units from Civil & Environmental Engineering 198 & 199.**
Upper Division Composition Requirement: One course from the following: University Writing Program 101, 102E, 102G, 104A, 104E, 104T or by passing the Upper Division Composition Exam offered by the College of Letters & Science ..... 0-4
*Units in excess of the 30 unit requirement may count toward the Civil & Environmental Engineering elective requirement. Please consult with the undergraduate staff adviser.
**A maximum of 4 units of upper-division courses outside of Civil & Environmental Engineering may be considered on a petition basis. Please consult with the undergraduate staff adviser.

# Engineering: Computer Science

## Changes to the Computer Science Engineering Major Program Requirements & Minor Program Requirements

## Computer Science and Engineering Undergraduate Program

**Lower Division Required Courses**

UNITS

Mathematics 21A-21B-21C-21D ..... 16
Mathematics 22A or MAT 67-22B ..... 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, 1V, 1Y or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5 ..... 4
Communication 1 ..... 4
General Education electives ..... 32

## 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,160, 193 A & B ..... 32
Computer Science electives-a minimum of 3 courses and a minimum of 11 units chosen from Computer Science Engineering 120†, 122A†, 122B, 124, 129, 130, 140B, 142, 145, 152B, 152C, 153, 158, 163, 165A, 165B, 170, 171, 175, 177, 178, 189 A-M; one course from approved 192 or 199 or Electrical and Computer Engineering 194ABC; Electrical and Computer Engineering 180B ..... 11
Upper Division Composition Requirement: University Writing Program UWP 101 or by passing the Upper-Division Composition Exam administered by the College of Letters Science ..... 0-4
† Completion of both Computer Science Engineering 120 and 122A will satisfy the computer science theory requirement and a computer elective requirement.

## The Minor in Computational Biology

The minor in Computational Biology will provide to students with engineering, physical or biological majors the foundations necessary to build efficient computational models and algorithms, use state-of-the-art techniques for scientific analysis and create scalable infrastructure environments for biological and biotechnological applications.

Students must take a total of 20 upper-division units, with two required courses and 12 units of upper-division electives, as specified below. A minimum GPA of 2.000 is required for coursework in the minor. Students should note that most of the courses listed below have lower division prerequisites. In particular, required course Engineering: Computer Science 122A has a prerequisite chain of Engineering: Computer Science 20, 30, 40, and 60.

UNITS

**Computational Biology ..... 20**

Required courses ..... 8

Engineering: Computer Science 122A; 124

Electives ..... 12

At least one biology course from the following: Molecular & Cellular Biology 121 124, 161, 182: Evolution and Ecology 100, 102, 104, 131; Biological Sciences 101, 104, 122

At least one computational or statistics course from the following: Engineering: Computer Science 130, 132, 140, 145, 156, 158, 160, 165A, 166, 170, 177; Evolution and Ecology 175, Statistics 141, 130A; Biotechnology 150; Biological Sciences 132

At least one computational biology and bioinformatics course from the following: Engineering: Computer Science 129, Biological Sciences 132; Biomedical Engineering 117, Evolution and Ecology 175, Biotechnology 150

**Minor Advisors.** Lori Avellar, Vladimir Filkov, Dan Gusfield, Patrice Koehl, Bertram Ludaescher, Ilias Tagkopoulos

# Engineering: Electrical and Computer Engineering

## Changes to the Electrical and Computer Engineering Major Program Requirements

## Electrical Engineering Undergraduate Program

**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 1,1Y or 1V or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5 ..... 4
Communication 1 or 3 ..... 4
**Lower Division Units ..... 71**

**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; 183
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, 170+, 171, 173A; Computer Science and Engineering 40, 150, 152B, 163, 175, 177, 178
Technical electives***, **** ..... 9
Upper Division Composition Requirement: One course from the following (grade of C- or better is required): University Writing Program 101, 102A-L, 104-T or by passing the Upper Division Composition Exam ..... 0 or 4
**Minimum Upper Division Units ..... 74**

## Computer Engineering Undergraduate Program

**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, 1Y or 1V or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5 ..... 4
Communication 1 or 3 ..... 4
**Lower Division Units ..... 80**

**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
Upper Division Composition Requirement: One course from the following (grade of C- or better is required): University Writing Program 101, 102A-L, 104-T or by passing the Upper Division Composition Exam ..... 0 or 4
**Minimum Upper Division Units ..... 67**

# Engineering: Mechanical and Aerospace Engineering

## Changes to the Mechanical and Aerospace Engineering Mission Statement & Major Program Requirements

The Mechanical Engineering/Materials Science program is not accepting new students.

**Mission.** The Department of Mechanical and Aerospace Engineering is committed to educating future engineers so that they may contribute to the economic growth and well-being of the state, the nation, and the world, and to the advancement of knowledge in the mechanical and aerospace sciences.

**Objectives.** The objectives of the programs offered in Mechanical and Aerospace Engineering include the following: to prepare its graduates to practice mechanical and/or aerospace engineering in a broad range of industries, to enable interested graduates to pursue graduate education, to prepare its graduates to participate in research and development, and in other creative and innovative efforts in science, engineering, and technology and to allow interested graduates to pursue entrepreneurial endeavors.

**Preparatory Requirements.** In order to change to any major offered by the Department of Mechanical and Aerospace Engineering, students must:

- Be a registered student and have completed at least one quarter (minimum of 12 units) at UC Davis;
- Have completed not more than 135 cumulative units (excluding AP units);
- Be in good academic standing and meet minimum progress requirements;
- Have received a letter grade for all courses that satisfy Engineering degree requirements;
- Have: a) completed at least the following five courses: Mathematics 21A, B, C; Physics 9A and Chemistry 2A and b) have a GPA of 2.800 or better in all completed Mathematics, Physics, Biology and Chemistry courses required for your intended major, and have received a C- or better in each of these courses;
- Have no grade lower than a C- in any completed engineering course required for your intended major(s) taken at UC Davis;
- Have a 2.800 UC GPA in completed engineering courses.

## Mechanical Engineering Undergraduate Program

**Mechanical Design Suggested Advisers.** H.H. Cheng, R.T. Farouki, M.R. Hill, M.L. Hull, B.S. Linke, B. Ravani, M. Soshi, S. Velinsky, K. Yamazaki

**Biomedical and Engineering Fluid Mechanics Suggested Advisers.** R.C. Aldredge, A.I. Barakat, J.J. Chattot, M. Hafez, I.M. Kennedy, S.K. Robinson, B.D. Shaw, C.P. van Dam, A.S. Wexler

**Manufacturing Suggested Advisers.** H.H. Cheng, R.T. Farouki, B.S. Linke, D.A. Horsley, V. La Saponara, M. Soshi, B. Ravani, K. Yamazaki

**Systems Dynamics and Control Suggested Advisers.** F.O. Eke, R.A. Hess, S. Joshi

**Ground Vehicle Systems Suggested Advisers.** P. A. Erickson, M. Hill, J. Park, N. Sarigul-Klijn, S. Velinsky

**Transportation System Suggested Advisers.** P.A. Erickson, J.W. Park, S. Velinsky

## Mechanical Engineering Program Requirements

**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 (or 45Y) | 12 |
| Mechanical Engineering 50 | 4 |
| English 3 or University Writing Program 1, 1Y or 1V, or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5 | 4 |
| Communication 1 or 3 | 4 |

**Upper Division Required Courses**

| | |
|---|---|
| Engineering 100, 102, 103, 104, 105 | 19 |
| Mechanical Engineering 106, 107A & B, 150A, 165, 172, | 22 |
| Mechanical Engineering 185A & 185B (taken in consecutive quarters), or Aerospace Science and Engineering 130A & 130B | 8 |
| Engineering 190 | 3 |
| Select one course from Engineering 180; Mathematics 128C; Mechanical Engineering 115; Statistics 131A | 4 |
| Select one course from System Dynamics/ Mechanical Design electives: Engineering 122, Mechanical Engineering 121, 150B, 154 or 171 | 4 |
| Select two courses from these Restricted Electives: Aerospace Science and Engineering 129, 138, 139, 140, 141, 142; Materials Science and Engineering 180, 182; Mechanical Engineering 134, 151, 152, 161, 162, 163. Students may also choose from Aerospace Science and Engineering 130A, 130B, Mechanical Engineering 150B, 154, 171 if these courses are not used in satisfaction of other degree requirements | 8 |
| Technical Elective Requirement | 7 |

Four units must be taken from any Upper Division Engineering course, which may include courses from the above System Dynamics/Mechanical Design or Restricted Elective lists if these courses are not used in satisfaction of other degree requirements. Up to 4 units may be selected from EME 185A/B or any engineering 192, 199 not used in satisfaction of other degree requirements. Courses that cannot be used are Biomedical Engineering 110L, Engineering 160, 191, 198 (Gearing up for Graduate School/ undergraduate research), Computer Science Engineering 188 or any 197T course.

Up to 3 units may be used from the following technical electives list:

Agricultural and Resource Economics (ARE) 100A, 100B, 112
Applied Biological Systems Technology (ABT) 101, 142, 165
Atmospheric Science (ATM) 149, 160
Biological Sciences (BIS) 2A, 2B, 2C
Chemistry (CHE) 2C, 2CH, 8A, 8B and any upper division course except CHE 195 and 197
Economics (ECN) 100, 101, 102, 103, 122
Engineering (EME, EAE, ENG, BIM, EAD, EBS, ECH, EMS, ECI, ECS, EEC) any upper division course except BIM 110L, ENG 160, 191, 198 (gearing up for grad school/undergraduate research), ECS 188 or any 197T course
Environmental and Resource Sciences (ERS) 100, 100L, 121, 131, 136, 185, 186, 186L
Exercise Biology (EXB) 102
Fiber and Polymer Science (FPS) 100 (same as EMS 147)
Food Science and Technology (FST) 159, 160
Geology (GEL) 17, 32, 35, 36, 50, 50L, 60, 100, 100L, 101, 101L, 130, 131, 160, 162, 163
Hydrologic Science (HYD) 110, 124, 134, 141, 142, 143, 144, 146, 151, 182
Management (MGT) 11A, 11B, 100, 120, 140, 150, 160, 170, 180
Mathematics (MAT) any upper division course except MAT 197TC
Physics (PHY) 9HE and any upper division course except PHY 160 (restricted to one unit of technical elective), 195, 197T
Statistics (STA) any upper division course except 100, 102, 103, 104, 106, 108

Upper Division Composition Requirement: One course from the following (grade of C- or better is required): University Writing Program 101, 102E, 104A, 104E, 104T or by passing the Upper-Division Composition Exam 0 or 4

**Minimum Units Required for Major .....157**

## The Mechanical Engineering/ Materials Science Undergraduate Program

The Mechanical Engineering/Materials Science program is not accepting new students through Undergraduate Admissions or the change of major process.

**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 (or 45Y) | 12 |
| Mechanical Engineering 50 | 4 |
| English 3 or University Writing Program 1, 1Y or 1V, or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5 | 4 |
| Communication 1 or 3 | 4 |

**Upper Division Required Courses**

| | |
|---|---|
| Engineering 100, 102, 103, 104, 105 | 19 |
| Mechanical Engineering 106, 107A, 107B, 150A, 165, 171, 172 | 26 |
| Mechanical Engineering 185A & 185B or Materials Science and Engineering 188A & B (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 Engineering 180; Mathematics 128C; Mechanical Engineering 115; Statistics 131A | 4 |
| Engineering 190 | 3 |
| Technical Electives | 10 |

One course must be chosen from the following System Dynamics/Mechanical Design electives: 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 Engi-

neering 147; Mechanical Engineering 134, 151, 152, 161, 163. Students may also choose from Mechanical Engineering 150B, 154 if not used for the System Dynamics/Mechanical Design elective requirement above. Students may also choose from 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 Mechanical Engineering 185A & B, Materials Science and Engineering 188A & B or any course numbered 192 or 199 not used in satisfaction of core requirements may be applied to the technical elective degree requirement.

Upper Division Composition Requirement: One course from the following (grade of C- or better is required): University Writing Program 101, 102A, 102B, 102G,102E, 104A, 104B, 104C, 104D, 104E, 104E, 104T or by passing the Upper-Division Composition Exam ..... 0 or 4

**Minimum Units Required for Major..... 170**

### Division of Aerospace Science and Engineering

### Aerospace Science & Engineering Undergraduate Program

**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 (or 45Y) ..... 12
English 3 or University Writing Program 1, 1Y or 1V, or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5 ..... 4
Communication 1 or 3 ..... 4

**Upper Division Required Courses**

Engineering 100, 102, 103, 104, 105 .. 19
Mechanical Engineering 106, 107A & B, 165, 172..... 22
Aerospace Science and Engineering 126, 127, 129, 130A, 130B, 133, 135, 138..... 32
Select one course from Engineering 180, Mechanical Engineering 115 or Mathematics 128C ..... 4
Engineering 190 ..... 3
Technical electives ..... 7

One course must be chosen from the following astronautics electives: Aerospace Science and Engineering 140, 141 or 142

The remaining units must be taken from any Upper Division Engineering course except Biomedical Engineering 110L, Engineering 160, 191, 198 (Gearing up for Grad School/undergraduate research), Computer Science Engineering 188 or any 197T course.

Upper Division Composition Requirement: One course from the following (grade of C- or better is required): University Writing Program 101, 102E, 104A, 104E, 104T or by passing the Upper-Division Composition Exam ..... 0 or 4

**Minimum Units Required for Major..... 161**

# Entomology and Nematology

### Change to department name

Formerly Entomology

(College of Agricultural and Environmental Sciences)

# Environmental Policy Analysis and Planning

### Change to Environmental Policy Analysis and Planning Major Program Requirements

### The Major Program

The major in environmental policy analysis and planning develops an understanding of governmental policy-making and skills for designing and assessing policy in fields related to environmental quality and natural resource management.

Any student in good standing is eligible to transfer to the major; to do so, please see the staff adviser, Melissa Whaley, in 2134 Wickson Hall, or the master adviser, Jim Sanchirico, in 2102 Wickson Hall.

**The Program.** This major provides students with a strong background in policy analysis, including the evaluation of policy alternatives and the study of factors affecting policy formulation and implementation. Key components of this interdisciplinary training include a general background in the natural sciences relevant to environmental policy, mathematics, statistics, and research methodology to quantitatively analyze environmental problems and policy options. In addition, students are encouraged to develop substantive knowledge in a specific field of environmental policy, such as urban and regional planning, water policy, transportation and energy, climate policy, or conservation management.

**Career Alternatives.** Environmental policy analysis and planning graduates are prepared for employment in environmental, natural resource, energy, and transportation focused public agencies, consulting firms, and businesses concerned with environmental affairs, or as legislative aides for elected representatives. The major is also excellent preparation for students who want to go on to graduate work in law, planning, public policy, political science, economics, or business.

### B.S. Major Requirements:

UNITS

**English Composition and Public Speaking Requirement..... 7-8**

University Writing Program 101, 102A, 102G, 104A, 104B, 104C, 104D, or 104E..... 4
Communication 1 or 3 or Dramatic Art 10 ..... 3-4

**Preparatory Subject Matter ..... 46-52**

Biological Sciences 2A, 10, or 10V ..... 4-5
Chemistry 2A ..... 5
Plant Sciences 21, or Science & Society 18 ..... 3
Economics 1A, 1B..... 8
Animal Science 1, Atmospheric Science 60, Biological Sciences 2B, Environmental Science & Management 100, Geology 1 or 134, Plant Sciences 12, or Wildlife, Fish, & Conservation Biology 11 ..... 3-5
Environmental Science & Policy 1..... 4
Mathematics 16A-16B or 21A-21B ..... 6-8
Physics 1A, 1B..... 6
Political Science 1 ..... 4
Statistics 13 or 32..... 3-4

Satisfaction of General Education requirement.

**Depth Subject Matter ..... 47-51**

(Students must take these units on a letter grade basis, and must attain an overall grade point average of 2.000 or higher in the Depth Subject Matter courses.)
Environmental Science & Policy 110, 160, 168A ..... 13
Environmental Science & Policy 168B ..... 4
Environmental Science & Policy 161 ..... 4
Environmental Science & Policy 179 ..... 4
Environmental Science & Policy 178 ..... 4
Select one course from Agricultural & Resource Economics 106, Sociology 106, Statistics 100, 103, or 108..... 4-5
Agricultural & Resource Economics 100A or Economics 100..... 4
Agricultural & Resource Economics 176 or Environmental Science & Policy 175 ..... 4
Applied Biological Systems Technology 150 or Environmental Science & Policy 179L..... 2-4
Select one course from Applied Biological Systems Technology 181N, 182, or Environmental Science & Management 185 or 186 and 186L..... 4-5

**Areas of Specialization (choose one)..... 12-17**

Students must select courses in the Areas of Specialization that have not been taken in the Depth Subject Matter.

**City and Regional Planning**

Environmental Science & Policy 171 and 172 ..... 8
Select one course from Civil & Environmental Engineering 162, 165 or Environmental Science & Policy 163 ..... 3-4
Select one course from Art History 168, Community & Regional Development 149, 152, 156, or 171, Environmental Toxicology 110, Environmental Science & Policy 173 or Political Science 100..... 2-5

**Climate Change Policy**

Environmental Science & Policy 165N..... 3
Select one course from Agriculture & Resource Economics 176, Economics 125, Environmental Science & Policy 163, 167, or 171 ..... 4
Select two courses from Atmospheric Science 116, 133, or 160, Environmental Science & Management 131, Environmental Science & Policy 116N, or Science & Society 25 or 25V ..... 6-8

**Conservation Management**

Select two courses from ESP 166N, 169, 170, or 172 ..... 6-8
Select one course from Environmental Horticulture 160, Environmental Science & Management 141, Environmental Science & Policy 100, 121, or 127, Evolution & Ecology 115, 138, or Wildlife, Fish, & Conservation Biology 154 or 155 ..... 3-5
Select one course from African American & African Studies 176, 177, Agriculture & Resource Economics 115A, Anthropology 103, Asian American Studies 114, Chicana/Chicano Studies 112, Community & Regional Development 153A, 153B, or 153C, International Relations 104, or Sociology 145A ..... 4

**Energy and Transportation Planning**

Economics 125 or Environmental Science & Policy 175 ..... 4
Select two courses from Civil & Environmental Engineering 162, 165, Environmental Science & Policy 163, 167, or 172 ..... 7-8
Select one course from Atmospheric Science 116, Civil & Environmental Engineering 123, 143, Engineering 160, or Environmental Science & Management 131..... 4

**Environmental Policy & Politics**

Select one course from Political Science 100, 104, 105, 107, or 109 ..... 4
Select one course from Political Science 162, 164, 165, or 170 ..... 4
Select one course from Civil & Environmental Engineering 165, Environmental Science & Policy 165N, 166N, 167, 169, 170, 171, 172 ..... 3-4
Select one course from Agricultural & Resource Economics 106, 176, Civil & Environmental Engineering 153, Economics 130, or Environmental Science & Policy 175 ..... 4

**Environmental Science**

Students choosing the Environmental Science area of specialization must consult with a faculty adviser to identify an emphasis within this specialization and to select four upper division courses with a common theme. Possible areas of emphasis are biological conservation, pollutants in the environment, ecology, planning in the presence of environmental hazards, sustainable development, or environmental economics. If you are considering this area of specialization, please contact the major adviser as soon as possible.

**Water Management**

Select two courses from Environmental Science & Policy 166N, 169, or Hydrologic Science 150 ..... 6
Select one or two courses from section *(A)* and one or two courses from section *(B)* for a total of two courses: *(A)* Environmental Science & Management 100, 121, Environmental Science & Policy 151, 155, Geology 134, Hydrologic Science 141, 143, Soil Science 118, or Wildlife, Fish, & Conservation Biology 120 *(B)* Biological Sciences 124, Environmental Science & Policy 116N, 124, 150C, or 152 ..... 6-8

**Total Units for the Degree ..... 112-128**

**Major Adviser.** J. Sanchirico *(Environmental Science and Policy)*

### Minor Program Requirements:

The faculty for environmental policy analysis and planning offers the following minor. The Environmental Policy Analysis minor is for natural and social science students desiring basic training in policy analysis theory and methods.

UNITS

**Environmental Policy Analysis ..... 23-25**

*Preparation:* Economics 1A; basic course in political science.
Environmental Science & Policy 1 ..... 4
Environmental Science & Policy 160, 161, 168A ..... 13
Select two courses from Environmental Science & Policy 163, 165N, 166N, 167, 169, 171, 172, or 179 ..... 6-8

**Minor Adviser.** J. Sanchirico *(Environmental Science and Policy)*

# Exercise Biology

### Changes to the Major Program Admissions Criteria

Admissions suspended for 2013-2014.

# Human Ecology

### Change to department name

Formerly Human and Community Development

(College of Agricultural and Environmental Sciences)

# Human Development

### Changes to the Human Development Major Program Requirements

### B.S. Major Requirements:

UNITS

**Preparatory Subject Matter ..... 38-46**

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 ..... 3-5
Psychology 1 ..... 4
One course from: Psychology 41 or Sociology 46A and 46B, or Statistics 10 or 13 ..... 4-8

# Letters and Science, College of

### Changes to the Letters and Science College Requirements for the Bachelor's Degree; Other Unit Credit Limitations; Area (Breadth) Requirement; Foreign Language Requirement-A.B. and B.A.S. Degrees

**Other Unit Credit Limitations.** The following are additional courses that have limits on the number of units that can be counted toward your degree.

- **Internship courses (numbers 92, 192)**: 12 units maximum including internship units taken at other institutions; see Nonstandard courses
- **Music** 130, 131, 140-150 (combined): 19 units maximum
- **Nonstandard courses (92, 97T, 97TC, 99, 192, 194H, 197T, 197TC, 199 and similar courses)**: 30 units maximum or one-sixth of the units taken at UC Davis, whichever is the smaller; note the separate unit limits on internship, special study and tutoring courses; and major limitations
- **Physical Education 1 and 6 (combined)**: 6 units maximum
- **Special Study courses (99, 194H, 199)**: 5 units maximum in any one quarter; see Nonstandard courses
- **Tutoring courses (97T, 97TC, 197T, 197TC)**: 10 units maximum; see Nonstandard courses, above

#### *Area (Breadth) Requirement*

The College Breadth Requirement promotes the intellectual growth of students by asking them to acquire a broader background of knowledge than is provided by the usual major. The Breadth requirement also guides students in exploring the interdependence of knowledge.

**A.B. Degree.** Satisfaction of the campus General Education requirement.

**B.S. Degree.** A total of 90 units in natural sciences/ mathematics; units used in satisfaction of the campus General Education requirement in Science and Engineering topical breath may also be used to satisfy this 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. Subject to the restrictions just listed, courses acceptable for fulfilling the 90-unit natural sciences/mathematics Area requirement are:

#### *Natural Sciences and Mathematics*

- Anatomy, Physiology and Cell Biology 100
- Anthropology 1, 5, 15, 151, 152, 153, 154A, 154BN, 156A, 156B, 157, 158
- Astronomy
- Avian Sciences 13
- Biological Sciences
- Cell Biology and Human Anatomy 101, 101L
- Chemistry
- Engineering 6, 10, 35, 102
- Engineering: Biomedical 126
- Engineering: Computer Science 10, 30, 40, 50, 60, 120, 122A, 122B, 140A, 140B, 142, 150, 152A, 152B, 153, 154A, 154B, 158, 160, 163, 165A, 165B, 170, 175, 177, 178
- Engineering: Electrical and Computer 70, 170, 173A
- Entomology 10, 100, 153

- Environmental and Resource Sciences 30, 131
- Environmental Science and Policy 30, 100, 121
- Environmental Toxicology 101
- Evolution and Ecology
- Exercise Biology 101, 103, 106, 106L, 110, 111, 112, 113, 115, 116, 117, 126
- Fiber and Polymer Science 110
- Food Science and Technology 100A, 100B, 101A, 101B
- Geology
- Integrated Studies 8A
- Mathematics
- Microbiology
- Molecular and Cellular Biology
- Neurobiology, Physiology, and Behavior
- Nutrition 10, 111AV, 111B
- Pathology, Microbiology, and Immunology 126
- Physical Education 133, 135
- Physics
- Plant Biology
- Psychology 41, 100, 101, 103A, 103B, 104, 113, 121, 122, 123, 124, 126, 127, 129, 130, 131, 135, 146, 180B
- Statistics
- Wildlife, Fish, and Conservation Biology 10

### *Foreign Language Requirement; A.B. and B.A.S. Degrees*

A key component of liberal education, the study of another language exposes students to a ubiquitous and highly diverse component of human behavior and interaction. Language learning enables students to communicate effectively in an increasingly internationalized world, enhances their ability to understand ways of thinking different from their own, gives them direct access to cultural production from another time and place, awakens in them an awareness of the conditioned nature of their assumptions about the world, and trains them to cope more effectively with intellectual and practical problems they may face in their future careers.

The College of Letters and Science encourages its students to acquire functional proficiency in at least one language other than English before graduating. At a minimum, the College requires A.B. candidates to complete three sequenced quarters (15 units) of courses, or its equivalent, in one foreign language. B.S. candidate requirements are determined by their respective major program.

**Languages Satisfying the Requirement**

The Foreign Language Requirement may be satisfied in any language offered at UC Davis, including ancient languages, or which is normally taught at - and for which transfer credit is allowed - from another institution, including American Sign Language. Students may also satisfy this requirement by examination in a language not offered on the UC Davis campus (see below).

**Satisfaction of the Requirement**

**At UC Davis or Another Accredited Institution.** You may satisfy the requirement by taking 15 quarter units of one foreign or classical language offered at UC Davis. You may also fulfill this requirement by taking the equivalent number of transferable quarter units in one foreign language at an accredited institution.

Transfer students should consult the Transfer Credit Evaluation, which is issued by the Deans' Office within a quarter after their first enrollment at UC Davis. Students planning to continue to study the same language at UC Davis must consult the relevant language coordinator.

If you have successfully completed the second or third year of a language in the tenth or higher grade in high school, you may receive unit credit for course 1 of that language when taken at UC Davis, but the grading mode will be P/NP only. Although a Passed or Not Passed grade will be charged to your P/NP option, no petition is required; see Pass/Not Passed (P/NP) Grading in the Academic Information chapter.

**Through Study Abroad.** Certain study abroad programs offered by UC Davis through the Education Abroad Center, UC Education Abroad Program and other accredited institutions may be used to satisfy the requirement. Some of these programs do not have a language prerequisite, but others do. If you intend to apply for a study abroad program with a language prerequisite, you should plan on completing the relevant foreign language requirement by the end of your second or third year, depending on the program.

**With the Intersegmental General Education Transfer Curriculum (IGETC).** IGETC is a series of courses which prospective transfer students attending California community colleges may complete to satisfy the lower division breadth/general education requirements at the University of California. Students may satisfy the Foreign Language requirement by attaining certification of IGETC completion.

**By Examination: Proficiency Exam.** The Language Learning Center (LLC) offers proficiency tests in numerous languages. A proficiency test does not yield unit credit - it only determines whether the Foreign Language requirement has been met or at which point in the language sequence you should enroll. Students must follow the language program's placement policy if they decide to study the language at UC Davis.

**By Examination: Standardized Tests.** College Board Subject Test: Earning a qualifying score of at least 550 on a College Board Foreign Language Subject Test satisfies the requirement. This test may be taken at any time during your high school career. Once your score is on file at Undergraduate Admissions, notify the Letters and Science Deans' Office so that satisfaction of the College requirement can be noted on your record.

**College Board Advanced Placement Examination.** A score of 5, 4 or 3 on any foreign language College Board Advanced Placement Examination, with the exception of Latin, taken in high school will satisfy the Foreign Language requirement.

**International Baccalaureate Higher Level Examination.** A score of 7, 6, or 5 on the French A1, A2, or B Examination, the German A1, A2 or B Examination, the Italian A1 Examination, the Latin Examination, the Portuguese A1, A2 or B Examination, or the Spanish A1 Examination taken in high school will satisfy the Foreign Language requirement.

**By Examination: Other means.** If you have not completed the required level language course, but assume you have attained equivalent language fluency and cultural knowledge, you may satisfy the language requirement by passing a proficiency examination. For more information, consult the appropriate foreign language department.

You may validate your knowledge of a language acquired by any means before matriculating at UC Davis by taking a proficiency test or another form of evaluation (if available in the relevant language department). A test may not be taken, however, in a language for which you have already received degree credit.

# Managerial Economics

## Changes to the Managerial Economics Major Program Requirements

(College of Agricultural and Environmental Sciences)

*http://www.agecon.ucdavis.edu*

**Faculty.** See Agricultural and Resource Economics, on page 141.

## The Major Program

The Managerial Economics major at UC Davis is a disciplinary program combining strong preparation in microeconomic theory and quantitative methods. It prepares students for the analysis of management and policy issues in business, finance, marketing, production, agriculture, food distribution, natural resources, the environment, resource allocation, and international development. Students specialize in one of three options: *(1)* Managerial Economics focuses on the economic aspects of managerial decision-making. *(2)* Environmental and Resource Economics concentrates on issues related to the use of resources and environmental quality. *(3)* Agricultural Economics focuses on the economic and policy aspects of production and marketing of foods and fibers. Students in the Managerial Economics program develop valuable skills and strengths that lead to careers in business and government.

**Internships and Career Alternatives.** Students in managerial economics have opportunities to gain additional career information and preparation through internships in a variety of private business and governmental agencies. Graduates qualify for supervisory and management training positions in banking, finance, commodity and stock brokerages in the private sector, farm and ranch production, food and agricultural processing, agricultural sales and service, and a variety of agency career positions in local, state, and federal government. Graduates are well qualified to seek advanced degrees in agricultural and resource economics, economics, business administration, or law. For more information, see *http://iccweb.ucdavis.edu*.

## B.S. Major Requirements:

UNITS

**English Composition Requirement ..... 4**

In addition to the College English Composition requirement, choose one course from English 3, University Writing Program 1, 18, 19, 101, 102A-G, 104A-F

**Preparatory Subject Matter..... 35-37**

Plant Sciences 21, Engineering Computer Science 10, 15 or 30 ..... 3-4
Economics 1A-1B ..... 8
Economics courses must be taken for a letter grade
Management 11A-11B ..... 8
Mathematics 16A-16B-16C or 21A-21B ..... 8-9
Mathematics courses must be taken for a letter grade
Statistics 13, 103 ..... 8
Statistics must be taken for a letter grade

**Major Breadth ..... 37**

Social Science, Natural Science, and Agricultural Science
* See course requirements for the major at *http://manecon.ucdavis.edu*.

**Total Depth Subject Matter ..... 52**

**Core ..... 20**

Agricultural and Resource Economics 100A, 100B, 106, 155..... 16
Economics 101 ..... 4

**Restricted Electives..... 32**

Choose at least one of the options below:

**Managerial Economics option**

Agricultural and Resource Economics 18 ..... 4
Choose at least 12 units from Agricultural and Resource Economics 112, 118, 136, 157, 171A, 171B. Select the remaining 16 units from the aforementioned courses or from Agricultural and Resource Economics 115A, 120, 121, 130, 132, 138, 139, 140, 143, 144, 145, 146, 150, 156, 175, 176, 194HA-194HB, Economics 115A, 121A, 121B, 151A, 151B, 160A, 160B

**Environmental and Resource Economics option**

Agricultural and Resource Economics 175, 176 ..... 8
Choose at least 18 units from Agricultural and Resource Economics 15, 120, 138, 145, 146, 150, 156, Economics 123, 125, 130, Environmental Science and Policy 168A, 168B, 178. Select the remaining 6 units from the aforementioned courses or upper division courses in Agricultural and Resource Economics and/or Economics, Environmental Science and Policy 160, 161, 163, 165, 166, 167, 171, 172, 173, Environmental Toxicology 138

**Agricultural Economics option**

Choose at least 15 units from Agricultural and Resource Economics 120, 130, 132, 138, 139, 140, 145, 150. Select the remaining 17 units from the aforementioned courses, Agricultural and Resource Economics 18, or upper division courses in Agricultural and Resource Economics and/or Economics

** Students graduating with this major are required to attain at least a C average (2.000) in all upper division courses taken at the University in the depth subject matter. All core and restricted electives must be taken for a letter grade.*

**Total Units for the Major ..... 128-130**

**Student Advising** for the major is in 1176-A Social Sciences and Humanities Building (530) 754-9536.

**Major Advisers.** Contact Department office

## Minor Program Requirements:

The Department of Agricultural and Resource Economics offers four minor options for students majoring in other disciplines who wish to complement their study programs with a minor in Managerial Economics. Each option requires Agricultural and Resource Economics 100A, which has prerequisites of Economics 1A-1B and Mathematics 16A-16B. For some courses, Statistics 13 and 103 may be required. Variable-unit courses and lower division courses are not accepted in any option.

To qualify for a minor in Managerial Economics, a student must complete the following courses *for a letter grade*.

Economics 1A and 1B ..... 8 units
Mathematics 16A-16B or 21A-21B..... 6-8 units
Statistics 13..... 4 units

UNITS

**Managerial Economics ..... 18**

**General emphasis**

Agricultural and Resource Economics 100A or the equivalent..... 4
Additional upper division courses in Agricultural and Resource Economics ..... 14

**Managerial Economics emphasis**

Agricultural and Resource Economics 100A or the equivalent..... 4
Additional upper division courses in Agricultural and Resource Economics .....14
Select 9 or more units from Agricultural and Resource Economics 112, 118, 136, 157, 171A, 171B.
Select additional upper division Agricultural and Resource Economics courses to complete the 18-unit total for the minor.

**Environmental and Natural Resource Economics emphasis**

Agricultural and Resource Economics 100A or the equivalent.....4
Additional upper division courses in Agricultural and Resource Economics .....14
Select 9 or more units from Agricultural and Resource Economics 175 and 176, and either 100B or 120.
Select additional upper division Agricultural and Resource Economics courses to complete the 18-unit total for the minor.

**Agricultural Economics emphasis**

Agricultural and Resource Economics 100A or the equivalent .....4
Additional upper division courses in Agricultural and Resource Economics .....14
Select 9 or more units from Agricultural and Resource Economics 120, 130, 132, 138, 139, 140, 145, 150.
Select additional upper division Agricultural and Resource Economics courses to complete the 18-unit total for the minor.

**Graduate Study.** See Graduate Studies, on page 111.

# Mathematics

## Changes to Mathematics Major Program Requirements

## A.B. Major Requirements:

UNITS

**Preparatory Subject Matter.....43-50**

Mathematics 12 (or high school equivalent).....0-3
Mathematics 21A, 21B, 21C, 21D, 22B, 25 .....23
Mathematics 67, or 22A and 108.....4-7
Computer Science Engineering 30 and Mathematics 22AL (or equivalent basic knowledge of MATLAB) or Engineering 6 or 5
Additional non-Mathematics courses chosen from natural sciences.....12
NOTE: Basic knowledge of MATLAB is required in both MAT 67 and 22A. Students can learn it on their own, enroll in ENG 6 or in the one unit course MAT 22AL (can be taken concurrently).

**Depth Subject Matter .....34-38**

*A. Entry Level (Optional)*..... 0-4
(Suggested choices: one course from Mathematics 108, 114, 115A, 141, 145)
*B. Core* .....16
Mathematics 125A .....4
Mathematics 125B.....4
Mathematics 135A .....4
Mathematics 150A .....4
*C. Choose one Plan from the following two: (up to 4 of these 18 units may be approved upper division courses outside of the Department of Mathematics with extensive use of mathematics)*.....18

**Plan 1: General Mathematics**

Additional upper division mathematics units selected in consultation with and subject to approval of an adviser .....18

**Plan 2: Secondary Teaching**

Mathematics 111 .....4
Mathematics 115A .....4

Mathematics 141 ..... 4
Additional upper division mathematics units selected in consultation with and subject to approval of an adviser ..... 6
NOTE: Students who wish to satisfy the single subject matter waiver for the teaching credential should see an adviser as early as possible.

**Total Units for the Major ..... 77-84**

### Applied Mathematics

### B.S. Major Requirements:

UNITS

**Preparatory Subject Matter ..... 42-52**

Mathematics 12 (or high school equivalent) ..... 0-3
Mathematics 21A, 21B, 21C, 21D, 22B, 25 ..... 1923
Mathematics 25, 67 ..... 8
Mathematics 67, or 22A and 108 ..... 4-7
Mathematics 22AL or equivalent basic knowledge of MATLAB ..... 0-1
Computer Science Engineering 30, 40 ..... 8
One two-quarter sequence from Physics 9A-9B; Biological Sciences 2A-2B; Chemistry 2A-2B; Economics 1A-1B; Statistics 32, 102; or other applied preparatory courses approved by your adviser ..... 7-10
NOTE: Basic knowledge of MATLAB is required in both MAT 67 and 22A. Students can learn it on their own, enroll in ENG 6 or in the one unit course MAT 22AL (can be taken concurrently).

**Depth Subject Matter ..... 48-52**

*A. Entry Level (Optional)* ..... 0-4
(Suggested choices: one course from Mathematics 108, 114, 115A, 141, 145)
*B. Core* ..... 32
Mathematics 150A ..... 4
Mathematics 135A ..... 4
Mathematics 125A ..... 4
Mathematics 125B ..... 4
Mathematics 119A ..... 4
Mathematics 128A ..... 4
Mathematics 128B ..... 4
Mathematics 185A ..... 4
*C. Enrichment Courses* ..... 16
1. Choice of two courses from Mathematics 118A, 118B, 118C, 119B, 124, 128C, 129, 133, 167, 168 ..... 8
2. Choice of one course from Mathematics 111, 114, 115A, 116, 135B, 141, 145, 146, 147, 148, 150B, 165, 185B ..... 4
3. One approved upper division course outside the Department of Mathematics with extensive use of mathematics ..... 4

**Total Units for the Major ..... 90-104**

### Mathematics

### B.S. Major Requirements:

UNITS

**Preparatory Subject Matter ..... 34-42**

Mathematics 12 (or high school equivalent) ..... 0-3
Mathematics 21A, 21B, 21C, 21D, 22B, 25 ..... 23
Mathematics 67, or 22A and 108 ..... 4-7
Computer Science Engineering 30 and Mathematics 22AL (or equivalent basic knowledge of MATLAB) or Engineering 6 or 5, Physics 9A (Plans 1 and 2) or one course from Physics 7A, Statistics 13, 32, 100 or 102 (Plan 2) ..... 3-4
NOTE: Basic knowledge of MATLAB is required in both MAT 67 and 22A. Students can learn it on their own, enroll in ENG 6 or in the one unit course MAT 22AL (can be taken concurrently).

**Depth Subject Matter ..... 48-52**

**Choose one plan from the following two:**

**Plan 1: General Mathematics**

*A. Entry Level (Optional)* ..... 0-4
(Suggested choices: one course from Mathematics 108, 114, 115A, 141, 145)
*B. Core* ..... 28
Mathematics 150A ..... 4
Mathematics 150B ..... 4
Mathematics 150C ..... 4
Mathematics 135A ..... 4
Mathematics 125A ..... 4
Mathematics 125B ..... 4
Mathematics 185A ..... 4
*C. Enrichment* ..... 20
1. Choice of four courses from Mathematics 111, 114, 115A, 115B, 116, 135B, 141, 145, 146, 147, 148, 165, 185B ..... 16
2. Choice of one course from Mathematics 119A, 124, 128A, 128B, 129, 133, 167, 168 or one approved upper division course outside the Department of Mathematics with extensive use of mathematics ..... 4

**Plan 2: Mathematics for Secondary Teaching**

*A. Entry Level (Optional)* ..... 0-4
(Suggested choices: one course from Mathematics 108, 114, 145)
*B. Core* ..... 28
Mathematics 150A ..... 4
Mathematics 135A ..... 4
Mathematics 125A ..... 4
Mathematics 125B ..... 4
Mathematics 111 ..... 4
Mathematics 115A ..... 4
Mathematics 141 ..... 4
*C. Enrichment* ..... 20
1. Choice of four courses from Mathematics 114, 116, 118A, 119A, 119B, 128A, 129, 133, 135B, 145, 147, 148, 165, 167, 168, 185A, 185B. Up to four units can be approved upper division units outside the Department of Mathematics with extensive use of mathematics ..... 16
2. Choice of one course from Mathematics 115B, 146, 150B ..... 4

**Total Units for the Major ..... 82-94**

### Mathematical and Scientific Computation

### B.S. Major Requirements:

UNITS

**Preparatory Subject Matter ..... 35-42**

Mathematics 12 (or high school equivalent) ..... 0-3
Mathematics 21A, 21B, 21C or Mathematics 17A, 17B, 17C, 21D, 22B, 25 ..... 23
Mathematics 67, or 22A and 108 ..... 4-7
Mathematics 22AL or equivalent basic knowledge of MATLAB ..... 0-1
Computer Science Engineering 30, 40 ..... 8
NOTE: Basic knowledge of MATLAB is required in both MAT 67 and 22A. Students can learn it on their own, enroll in ENG 6 or in the one unit course MAT 22AL (can be taken concurrently).

**Depth Subject Matter ..... 48-52**

*A. Entry Level (Optional)* ..... 0-4
(Suggested choices: one course from Mathematics 108, 114, 115A, 141, 145)
*B. Core* ..... 28
Mathematics 150A ..... 4
Mathematics 150A ..... 4
Mathematics 135A ..... 4
Mathematics 125A ..... 4
Mathematics 125B ..... 4
Mathematics 128A ..... 4
Mathematics 128B ..... 4
Mathematics 128C ..... 4
*C. Enrichment* ..... 12
1. Choice of two courses from Mathematics 118A, 118B, 118C, 119A, 119B, 129, 133, 167, 185A ..... 8
2. Choice of one course from Mathematics 111, 114, 115A, 116, 135B, 141, 145, 146, 147, 148, 150B, 165 ..... 4
*D. Choose one Emphasis from the following two* ..... 8

**Computational and Mathematical Biology Emphasis**

Mathematics 124 ..... 4
One approved upper division course in Biology ..... 4

**Computational and Mathematics Emphasis**

Mathematics 168 ..... 4
One approved upper division course involving extensive computation or theory of computation ..... 4

**Total Units for the Major ..... 83-94**

# Medicine, School of

## PREPARING FOR THE STUDY OF MEDICINE

When you apply to the School of Medicine, you must submit the results from the Medical College Admission Test (MCAT), so it is recommended that you take the MCAT by the spring before application. Information can be obtained at your undergraduate institution or directly from MCAT Program, Box 4056, Iowa City, IA 52243 (319) 337-1357. To be acceptable for the fall entering class, the MCAT must be taken no later than the previous fall. No scores older than three years from June of the year you apply will be accepted. Applicants must also meet the following academic requirements.

A. Completed at least three years of study in an accredited college or university in the United States. A minimum of 90 semester hours or 135 quarter units of college-level work is required. Courses in highly specialized fields are acceptable only at the discretion of the medical school.

B. Physicians should have a broad college level education in the natural, social, and behavioral sciences and the humanities. We require the MCAT and three years (90 semester hours or 135 quarter hours) in an accredited college or university that include the specific requirements listed below.

C. Required college-level courses (verified by AMCAS):

- Biological Sciences: 1 year
- Chemistry, general and organic

sequence: 2 years

- Physics: 1 year

Technical, Non-Academic Standards are also required. Please click here for more information.

Also see *Premedical Requirements*.

D. Demonstrate the potential to perform academically at least as well as the average of the current first year class. This reflects the School of Medicine's generally higher standards and our emphasis on potential as judged from the application as a whole, including but not limited to MCAT and GPA scores.

For additional information, contact the School of Medicine Admissions Office at (916) 734-4800.

## APPLYING FOR ADMISSION

**Applicant Selection.** The class entering in the fall will be limited to 105 students selected on the basis of academic achievement, academic promise and personal characteristics. The Admissions Committee uses these criteria to determine if a candidate will be able to complete satisfactorily the requirements of the medical curriculum and become excellent medical practitioners. Factors taken into consideration include scholastic records, Medical College Admission Test performance and reports of teachers, advisers and interviewers with regard to intellectual capacity, motivation, emotional stability and personal dedication.

The majority of openings in the entering class will be awarded to students who are California residents. However, the School of Medicine participates in the program of the Western Interstate.

Also see *Admissions Criteria*.

## PROGRAM OF STUDY

**Combined Degree Program.** In addition to the Doctor of Medicine degree, the School of Medicine at UC Davis offers a variety of dual-degree programs through coordination with other graduate groups and divisions. These advanced degrees can couple the M.D. degree with the M.P.H., Ph.D. and M.B.A. that train physicians to meet, respond to and solve the broad diversity of problems and dilemmas facing current and future health care. A new five-year program for students interested in telecommunications-enhanced rural medicine is available.

We also have three Underserved Communities Leadership Tracks in rural, valley, and urban. For more information, see *http://www.ucdmc.ucdavis.edu/mdprogram/rural_prime/* & *http://www.ucdmc.ucdavis.edu/mdprogram/sjvprime/index.html*.

# Medieval and Early Modern Studies

### Changes to Medieval and Early Modern Studies Major Program Requirements

### A.B. Major Requirements:

UNITS

**Preparatory Subject Matter.....22**

Medieval Studies 20A, 20B ..... 10
Three additional courses chosen from: Art History 1B, 1C, 1E; Comparative Literature 2, 10A, 10B, 10C, 10D, 10E; English 10A, 46A; German 48; History 4A, 4B; Humanities 1*, 9; Philosophy 21, 22 ..... 12
Language proficiency is a desideratum. Courses in Latin and other European languages are strongly recommended, particularly for students planning to pursue graduate studies in the medieval or early modern field.

# Microbiology and Molecular Genetics

### Change to department name & Related Courses.

Formerly Microbiology

**Related Courses.** The offerings of the Department of Microbiology and Molecular Genetics are augmented by courses in Food Science and Technology; Medical Microbiology; Molecular and Cellular Biology; Pathology, Microbiology, and Immunology; Plant Pathology; and Soil Science.

Faculty of the Department of Microbiology and Molecular Genetics also teach or participate in the following courses: Biological Sciences 2A, 101 104 and 181.

# Music

### Changes to the Music Undergraduate Major, Honors & Minor Program Requirements

### A.B. Major Requirements:

UNITS

**Preparatory Subject Matter.....27-45**

Music 6A, 6B, 6C..... 9
plus Music 2A, 2B, 2C .....(0-6)*
and Music 16A, 16B, 16C .....(0-6)*
Music 7A, 7B, 7C..... 9
plus Music 17A, 17B, 17C .....(0-6)*
Music 24A, 24B, 24C..... 9
* May be excused by diagnostic examination at the beginning of each quarter.

**Depth Subject Matter .....36-40**

Choose upper division courses from one of the following tracks:

*Track 1: Music Composition*.....39
Music 124A, 124B.....6
Music 121 or 122 .....4
Music 131 (one year).....6
Music 195 .....2
At least 6 units selected from Music 140-150.....6
Music 101A, 101B.....8
Music 103 .....3
At least 4 further units selected from Music 102, 107A, 107B, 108A, 108B, 113, 114, 121, 122,192, 198, 199 .....4

*Track 2: Music History, Theory, and Ethnomusicology*.....40
Music 124A, 124B.....6
Music 121 and/or 122.....8
(Need 8 units of seminar courses chosen from above in any combination. Note: Music 121 and 122 may be repeated for credit.)
Music 131 (one year).....6
Music 195 .....2
At least 6 units selected from Music 140-150.....6
At least 12 further units selected from Music 101A, 101B, 102, 108A, 108B, 113, 114, 121, 122,192, 198, 199 .....12

*Track 3: Music Performance*.....37
Music 124A, 124B.....6
Music 121 or 122 .....4
Music 131 (one year).....6
Music 195 .....2
At least 13 units selected from Music 131, 140-150.....13
At least 6 further units selected from Music 101A, 101B, 102, 108A, 108B, 113, 114, 121, 122,192, 198, 199 .....6

**Total Units for the Major .....64-85**

**Note:** A maximum of 19 units in performance courses (Music 131, 140-150) apply toward the degree; see Unit Credit Guidelines, College of Letters and Science degree requirements section. Academic Senate By-Law 51c makes it possible for students to take more than 19 units of performance classes without those additional units counting toward the 225-unit cap on units:

*Composition Honors* .....43-47
Music 101A, 101B.....6
Music 124A, 124B.....8
Music 103 .....3
Music 121 or 122 .....4
Music 131 (one year).....6
At least 6 units selected from Music 140-150.....6
Two quarters of Music 194H for a total of at least 6 units resulting in a Senior thesis.....6
At least 4-8 further units from Music 102, 103, 107A, 107B, 107C, 108A, 108B, 113, 114,121.122, 192, 198, 199 .....4-8

*Music History, Theory and Ethnomusicology Honors* .....44
Music 124A, 124B.....6
Music 121 or 122 (twice).....8
Music 131 (one year).....6
At least 6 units selected from Music 140-150.....6
Two quarters of Music 194H for a total of at least 6 units resulting in a Senior thesis.....6
At least 12 further units selected from Music 101A, 101B, 102,108A,108B, 113, 114, 121, 122, 192, 198, 199 .....12

A student becomes eligible for graduation with honors by meeting the minimum GPA and course requirements established by the College of Letters and Science. To qualify for high or highest honors, students must also complete the Music Department honors program with a GPA of 3.500 or above and

write a thesis or submit a portfolio that meets the criteria for high honors or highest honors. Students apply to participate in the department honors program during the latter part of their junior year. Admission to the program is based on GPA, a thesis proposal, examples of previous writing, and the recommendation of a faculty member who is willing to sponsor the student's project. Students who anticipate seeking admission to the honors program are urged to complete at least one offering of Music 121 or 122 before the end of their junior year. Interested students are urged to consult with faculty in their field early in their junior year.

**Major Advisers.** J. Thomas (A-F), A. Triest (G-M), M. Pelo (N-Z)

### Minor Program Requirements:

UNITS

**Music ..... 22**

A minimum of 16 units of upper division Music courses ..... 16
Courses chosen from: Music 105, 106, 107A, 107B, 110A-G, 115, 126, 129A-D
A minimum of 6 units in upper division music performance courses ..... 6
Courses chosen from: Music 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150

# Neurobiology, Physiology, and Behavior

### Changes to Neurobiology, Physiology, and Behavior B.S. 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 ..... 44-49**

Biological Sciences 101, 105 (or 102 + 103), 104 ..... 10-13
Neurobiology, Physiology, and Behavior 100, 101, 102 ..... 12
Select three or more units of laboratory course work from the following list: ..... 3-5
Neurobiology, Physiology, and Behavior 100L, 101L, 104L, 106, 111L, 124, 141P, 150, 194H; other courses with the approval of the master adviser.
Statistics 100 ..... 4
Additional Neurobiology, Physiology, and Behavior depth unit requirement ..... 12
All other Neurobiology, Physiology, and Behavior courses not used in satisfaction of any other requirement; or Anthropology 154A, 154BN; or Entomology 104; or Exercise Biology 101, 102, 111. Courses 192, 197T, 199 may not be used to satisfy the depth unit requirement.
One course from Anthropology 151, Evolution and Ecology 100, Geology 107 ..... 3-4

**Total Units for Major ..... 99-115**

### Changes to Neuroscience Minor Program Requirements

### Minor Program Requirements:

**Neuroscience ..... 18**

Neurobiology, Physiology, & Behavior 100 ..... 4
*Five courses from:*
*Choose at least four from the following:*
Neurobiology, Physiology, & Behavior 107, 112, 124, 126, 160, 161, 162, 164, 165, 166, 167, 168, 169
One of the following may be completed to fulfill the course requirement:
Psychology 113, 121, 129, 135, Linguistics 175, Philosophy 103, Human Development 163
The following courses are cross-listed and either offering can be used to fulfill the course requirement: Neurobiology, Physiology, & Behavior 124/Neuroscience 124, Neurobiology, Physiology, & Behavior 160/Neuroscience 160

# Physics

### Changes to Applied Physics Major Program Requirements

### B.S. Major Requirements:

UNITS

**Preparatory Subject Matter ..... 49-56**

Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE ..... 19-25
Mathematics 21A, 21B, 21C, 21D, 22A, 22B ..... 22
Computer Science Engineering 30 (or equivalent programming course) ..... 4
Depending on area of concentration:
Chemistry 2A or 2HA (2B-2C or 2HB-2HC highly recommended)
or
Computer Science Engineering 40
or
Mathematics 22AL ..... 4-5

# Psychology

### Changes to Psychology Major Program Requirements

**Preparatory Requirements.** Before declaring a major in psychology, students must complete the following courses with a combined grade point average of at least 2.500. All courses must be taken for a letter grade. (Students in the Bachelor of Science, Biology program must complete Biological Sciences 2A.):

UNITS

Psychology 1, 41 ..... 8
Statistics 13 or 102 ..... 4
Biological Sciences 2A
**or**
Biological Sciences 10 and one course from Anthropology 1, Molecular and Cellular Biology 10, Neurobiology, Physiology, and Behavior 10 ..... 4 or 8

# Repeating Courses

### Changes to the Repeating Courses

Undergraduate students may only repeat courses in which they received a *D*, *F* or *NP*. Courses in which students received a grade of *D* or *F* may not be repeated on a *P/NP* grading basis. (Courses in which a grade of *NP* was received may be repeated on a *P/NP* grading basis.)

Degree credit for a repeated course will be given only once, but the grades assigned for both the first and second time a course is taken will appear on the student's transcript. In computing the GPA of undergraduates who have received a grade of *D* or *F*, only the grade and corresponding grade points earned the second time a course is taken will be used, up to a maximum of 16 units for all repeated courses. After the 16-unit maximum is reached, the GPA shall be based on all grades assigned and total units attempted.

Repeating a course more than once requires approval by the appropriate college dean. Departments may restrict the repetition of a course if it is a prerequisite to a course the student has already completed with a grade of *C*– or better.

Graduate students, with the consent of the appropriate graduate adviser and the dean of Graduate Studies, may repeat any course in which they received a *C*, *D*, *F* or *U*, up to a maximum of 9 units for all courses repeated. Courses in which a grade of *C*, *D* or *F* has been earned may not be repeated on an *S/U* basis. Courses in which a grade of *U* as received may be repeated on an *S/U* basis.

Degree credit for a repeated course will be given only once, but the grades assigned for both the first and second time a course is taken will appear on the student's transcript. In computing the GPA of graduate students who have received a grade of *C*, *D* or *F*, only the most recently earned grade for each course and corresponding grade points will be used, up to a maximum of 9 units for all courses repeated. After the 9-unit maximum is reached, the GPA shall be based on all grades assigned and total units attempted.

# Sociology

## Changes to the Sociology Major Program Requirements

## Sociology

### A.B. Degree Requirements:

### General emphasis:

UNITS

**Preparatory Subject Matter..... 28-29**

Sociology 1; 46A, and 46B ..... 13
Sociology 2, 3, 4, 5, 11, 25, 30A, or 30B..... 3-4
Anthropology 2 or 20..... 4
Select from History 4A, 4B, 4C, 6, 7A, 7B, 7C, 8, 9A, 9B, 10C, 15, 17A, 17B..... 4
Select from Philosophy 5, 14, 24 ..... 4

**Depth Subject Matter ..... 44**

*(A)* Sociology 100..... 4
*(B)* Select one course from each of the following four categories:
*Individual, Culture and Society:* Sociology 125, 126, 135..... 4
*Stratification and Social Differentiation:* Sociology 130, 132, 140..... 4
*Organizations and Institutions:* Sociology 118, 131, 146, 180A ..... 4
*Social Dynamics:* Sociology 104, 141, 143A, 170 ..... 4
*(C)* Select three upper division courses from one of the following clusters, not counting courses taken to fulfill requirement B ..... 12
*(1) Individual, Culture and Society:* Sociology 102, 120, 122, 125, 126, 127, 128, 129, 131, 132, 134, 135, 137, 143B, 148, 150, 152, 153, 172, 173, 174, 175, 176
*(2) Stratification and Social Differentiation:* Sociology 118, 128, 129, 130, 132, 133, 134, 140, 145A, 145B, 171, 172, 185, 188, and not more than one of the following courses: African American and African Studies 123; Asian American Studies 100; Chicana/o Studies 110; or Native American Studies 115
*(3) Organizations and Institutions:* Sociology 118, 124, 131, 133, 139, 144, 146, 149, 150, 151, 154, 155, 159, 160, 180A, 180B, 181, 182, 183, 185
*(4) Social Dynamics:* Sociology 104, 123, 125, 138, 141, 143A, 145A, 145B, 147, 148, 156, 157, 158, 170
*(5) Student-Initiated Thematic Cluster:* developed with a faculty adviser and approved by the Sociology Undergraduate Curriculum Committee
*(D)* Eight units of Sociology beyond courses taken to fulfill above requirements, and outside of the course cluster used to fulfill requirement C..... 8
*(E)* One additional elective upper division Sociology course not already used to fulfill other major requirements. May use SOC 190X, 191, 192/193, 194HA-194HB, 195..... 4

**Total Units for the Major ..... 72-73**

### Law and Society emphasis:

UNITS

**Preparatory Subject Matter..... 29**

Sociology 1; 3, 4, or 11; 46A and 46B..... 17
Anthropology 2 or 20; Political Science 1, 3, 4, 7..... 4
Select from History 4A, 4B, 4C, 6, 7A, 7B, 7C, 8, 9A, 9B, 10C, 15, 17A, 17B..... 4
Philosophy 5, 14, 24..... 4

**Depth Subject Matter ..... 43-44**

Sociology 100 and 155 ..... 8
Select courses from the following categories:
*Individual Culture and Society:* Sociology 125, 126, 135 ..... 4
*Stratification and Social Differentiation:* Sociology 130, 132, 140..... 4
*Organizations and Institutions:* Sociology 118, 131, 146, 160, 180A ..... 4
Crime and Social Dynamics: Sociology 120, 150, 151, 152, 171 ..... 12
*Stratifications and Social Dynamics:* Sociology 118, 137, 148, 156, 157, 158; African American and African Studies 123, 145A, 145B; Chicana/o Studies 130, 132; Native American Studies 117, 118. ..... 4
*Legal Studies:* Asian American Studies 155; Chicana/o Studies 182; English 107; Environmental Science and Policy 161; Environmental Toxicology 138; Hydrology 150; Philosophy 119; Political Science 122, 150, 151, 152, 154; Psychology 153; Women's Studies 140 .....3-4
One additional elective upper division Sociology course not already used to fulfill other major requirements. May use Sociology 190X, 191, 192/193, 194HA-194HB, 195 ..... 4

**Total Units for the Major ..... 72-73**

### Social Services emphasis:

**Preparatory Subject Matter..... 26-28**

Sociology 2; 3; 46A and 46B..... 16
Psychology 1..... 4
Select from African American and African Studies 10, 15; Asian American Studies 1, 2; Chicana/o Studies 10, 50; Native American Studies 1, 10; Sociology 4, 11, 30A, or 30B .....6-8

**Depth Subject Matter ..... 44**

Sociology 131, 140, 185 ..... 12
Psychology 140, 142, 151, or 168..... 4
Select courses from the following categories:
*Social Issues:* Sociology 104, 120, 122, 124, 139, 143A, 144, 146, 149, 150, 152, 153, 154, 155, 156, 158, 160, 170, 171 ..... 8
*Social Interaction:* Sociology 126, 127, 128, 143B, 148, 157..... 4
*Race and Ethnicity:* African American and African Studies 100; Asian American Studies 110, 111, 150; Chicana/o Studies 110; Community and Regional Development 176; Native American Studies 115; Sociology 129, 130, 134, 137, 172 ..... 4
*Gender:* Sociology 132, 133, 145B, 172 ..... 4
*Organizational Behavior:* Sociology 139, 146, 151, 154, 159, 180A, 180B, 181, 182, 183 ..... 4
One additional elective upper division Sociology course not already used to fulfill other major requirements. May use Sociology 190X, 191, 192/193, 194HA-194HB, 195 ..... 4

**Total Units for the Major ..... 70-72**

### Comparative Studies and World Development emphasis:

**Preparatory Subject Matter..... 29-59**

Sociology 1; 5; 46A and 46B..... 17
Economics 1B..... 4
Anthropology 2 or 20 ..... 4
History 10C or Political Science 2..... 4
Course work in one modern foreign language at the two-year level or provide proof of proficiency.....27-30

**Depth Subject Matter ..... 48**

Sociology 100, 104, 141, 145A, 170 .. 20
Anthropology 126A, 126B, or Economics 115A ..... 4
Anthropology 127; Sociology 118, 130, 131, 143A, 144, 145B, 156, 158 .....12
Regional focus, three courses from one of the following groups.....12
*(1) Africa:* African American and African Studies 110, 111, 162; Anthropology 140A, 140B; History 115A, 115B, 115C, 116; Political Science 134, 149
*(2) Latin America:* African American and African Studies 107A, 180; Anthropology 144, 146; History 159, 161A, 161B, 162, 163A, 163B, 164, 165, 166A, 166B, 167, 168; Native American Studies 120, 133; Political Science 143; Sociology 158; Spanish 170, 172, 173
*(3) Middle East:* Anthropology 142; History 112A, 112B, 113, 190A, 190B, 190C, 193A, 193B; Jewish Studies (see an advisor); Middle Eastern Studies (see an advisor); Religious Studies 162; Women's Studies 184
*(4) Asia-China & Japan:* African American and African Studies 107C; Anthropology 148A, 148B, 148C, 149A, 149B; East Asian Studies 113; Economics 171; History 191 (series), 194A, 194B, 194C; Political Science 148A, 148B; Religious Studies 165, 170, 172; Sociology 147, 188
*(5) Southeast Asia/Pacific:* Anthropology 143A, 143B, 145, 147; Economics 171; History 191 (series), 195B, 196A, 196B; Political Science 148B, 148C; Religious Studies 165, 170, 172

**Total Units for the Major ..... 77-107**

### Sociology—Organizational Studies

### A.B. Degree Requirements:

UNITS

**Preparatory Subject Matter..... 29**

Sociology 1; 2; 5 or 11; 46A and 46B .....21
Economics 1A and 1B.....8

**Depth Subject Matter ..... 44**

Sociology 100 .....4
Sociology 180A .....4
Sociology 106 (or its equivalent) .....4
Select from Communication 134, 136, 172; Sociology 126 .....4
Select five courses from below, at least three courses from Sociology.....20
Agricultural and Resource Economics 112, 130; American Studies 125; Community and Regional Development 151, 152, 154, 156, 158, 162, 164, 168; Economics 116, 121A, 121B, 151A, 151B; History 185B, 194D; Political Science 107, 180, 187; Sociology 103, 124, 138, 139, 141, 154, 159, 160, 180B, 181, 183, 185
Select from Sociology 128, 130, 132, 134, 140, 145A, 145B, 172 .....4
One additional elective upper division Sociology course not already used to fulfill other major requirements. May use Sociology 190X, 191, 192/193, 194HA-194HB, 195 .....4

**Total Units for the Major ..... 73**

**Major Advisers.** Consult the Departmental Advising office in 1282 Social Sciences and Humanities Building.

**Quarter Offered: I**=Fall, **II**=Winter, **III**=Spring, **IV**=Summer; 2013-2014 offering in parentheses
**Pre-Fall 2011 General Education (GE): ArtHum**=Arts and Humanities; **SciEng**=Science and Engineering; **SocSci**=Social Sciences; **Div**=Domestic Diversity; **Wrt**=Writing Experience
**Fall 2011 and on General Education (GE): AH**=Arts and Humanities; **SE**=Science and Engineering; **SS**=Social Sciences;
**ACGH**=American Cultures; **DD**=Domestic Diversity; **OL**=Oral Skills; **QL**=Quantitative; **SL**=Scientific; **VL**=Visual; **WC**=World Cultures; **WE**=Writing Experience

# Statistics

### Changes to the Statistics Major Program Requirements; Computational Statistics option

### B.S. Major Requirements:

### Computational Statistics option

UNITS

**Preparatory Subject Matter ..... 30-31**
- Mathematics 21A, 21B, 21C, 21D ..... 16
- Mathematics 22A ..... 3
- Computer Science Engineering 30 and 40 ..... 8
- Any one introductory statistics course except Statistics 10 ..... 3-4

**Depth Subject Matter ..... 52**
- Statistics 106, 108, 141 ..... 12
- Statistics 131A, 131B ..... 8
- Two courses from Statistics 104, 135, 137, 138, 142, 144, 145 ..... 8
- Programming, Data Management & Data Technologies: Computer Science Engineering 130 or 145; and 165A or 166 ..... 8
- Two courses on Scientific Computational Algorithm and Visualization from: Computer Science Engineering 122A, 129, 140A, 158, 163 ..... 8
- Two courses from Mathematics 124, 128A, 128B, 129, 145, 148, 160, 165, 167, 168 ..... 8

**Total Units for the Major ..... 82-83**

**Major Adviser.** A. Aue

Students are encouraged to meet with an adviser to plan a program as early as possible. Sometime before or during the first quarter of the junior year, students planning to major in Statistics should consult with a faculty adviser to plan the remainder of their undergraduate programs.

# Sustainable Agriculture and Food Systems

### Changes to the Sustainable Agriculture and Food Systems Major Program Requirements

### 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 ..... 6-9**
- Select 1 course from Plant Sciences 49, Plant Pathology 40, Viticulture and Enology 101A, 101B, 101C, Environmental Horticulture 120, Plant Science 131 ..... 2-3
- Select 1 course from Animal Science 49A-J, Animal Science 41L ..... 2-3
- Select 1 course from Applied Biological Systems Technology 49, 52, 101, 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
- Select 1 course from Philosophy 14, 15, 24 ..... 4
- Select 1 course from Anthropology 2, Political Science 4, Sociology 1, Sociology 3 ..... 4-5

**Depth Subject Matter ..... 34-38**
- Agricultural and Resource Economics 120 or 147 ..... 3-4
- Environmental Science and Policy 161 or 169 ..... 3-4
- Soil Science 100 or Soil Science 109 .... 4-5
- Select 1 course from Animal Science 129, Environmental Horticulture 160 or, Environmental Science and Policy 100, Evolution and Ecology 101, Plant Sciences 105, 142, 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
- Select 1 course from Philosophy 14, 15, 24 ..... 4
- Sociology 46B or Statistics 13 ..... 4
- Select at least 1 course from Community and Regional Development 151, Applied Biological Systems Technology 180, Landscape Architecture 150, Statistics 103, Sociology 106 ..... 3-6
- Chemistry 2A ..... 5
- Biological Sciences 2A or 10 ..... 4
- Plant Sciences 2 ..... 4
- Select 1 course from Evolution and Ecology 2 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
- Select 1 course from Anthropology 2, Sociology 1, Sociology 3 ..... 4-5
- Community and Regional Development 1, 2 ..... 8

**Depth Subject Matter ..... 43-44**
- Agricultural and Resource Economics 112 or 150 ..... 4
- Select 1 course from Agricultural and Resource Economics 147, 176, Environmental Science and Policy 160, 161, 169, 172, 179 ..... 3-4
- Choose 12 units from Anthropology 101, 102, Community and Regional Development 142, 152, Sociology 139, 144, 145A, 145B ..... 12
- Select 1 course from American Studies 101C, 155, History 172 or Philosophy 109 ..... 4
- Additional restricted electives chosen in consultation with an advisor ..... 20

**Track III: Economics and Policy**

Focuses on issues related to agricultural and resource economics, policy and management.

UNITS

**Preparatory Subject Matter ..... 60-63**
- Mathematics 16A, 16B ..... 6
- Sociology 46B or Statistics 13 ..... 4
- Select 1 course from Agricultural and Resource Economics 106, Statistics 103, Sociology 106 ..... 4
- Chemistry 2A ..... 5
- Biological Sciences 2A or 10 ..... 4
- Plant Sciences 2 ..... 4
- Select 1 course from Evolution and Ecology 2, Biological Sciences 2B, Environmental Science and Policy 1, 30, Wildlife, Fish, and Conservation Biology 10, 11 ..... 3-5
- Food Science 1 ..... 3
- Soil Science 10 ..... 3
- Economics 1A, 1B ..... 8
- Political Science 4 ..... 4
- Select 1 course from Anthropology 2, Sociology 1, Sociology 3 ..... 4-5
- Community and Regional Development 1 .. 4
- Select 1 course from Philosophy 14, 15, 24 ..... 4

**Depth Subject Matter ..... 43-44**
- Select 1 course from Agricultural and Resource Economics 112, 150, 157 ..... 4
- Select 11-12 units from Agricultural and Resource Economics 120, 130, 147, 176, Environmental Science and Policy 160, 161, 169, 172, 179 ..... 11-12
- Select 8 units from Anthropology 101, 102, Community and Regional Development 142, 152, Sociology 139, 144, 145A, 145B .. 8
- Additional restricted electives chosen in consultation with an advisor ..... 20

**Total units for the major ..... 139-162**

# Wildlife, Fish, and Conservation Biology

### Changes to the Wildlife, Fish, and Conservation Biology Major Program Requirements

### B.S. Major Requirements:

UNITS

**Written/Oral Expression ..... 8**
- University Writing Program 1 ..... 4
- Communication 1 ..... 4
- Above requirements simultaneously satisfy the College requirements.

**Preparatory Subject Matter ..... 49-50**
- Biological Sciences 2A, 2B, 2C ..... 14
- Chemistry 2A, 2B, 8A, 8B ..... 16
- Mathematics 16A, 16B ..... 6
- Physics 1A, 1B ..... 6
- Statistics 100, 102, or Plant Sciences 120 ..... 4
- Wildlife, Fish, and Conservation Biology 10, 11, or 50 ..... 3-4

**Depth Subject Matter ..... 47-54**
- Students graduating with this major are required to attain at least a C average (2.000) in all courses taken at the university in depth subject matter.
- Environmental Science and Policy 100 or Evolution and Ecology 101 ..... 4
- Evolution and Ecology 100 ..... 4
- Biological Sciences 101 ..... 4

Wildlife, Fish, and Conservation Biology 121 or 130 ..... 4
Neurobiology, Physiology, and Behavior 102 or Wildlife, Fish, and Conservation Biology 141 ..... 4
Wildlife, Fish, and Conservation Biology 122 ..... 4
Wildlife, Fish, and Conservation Biology 154 ..... 4
Choose three lecture courses and two (laboratory) courses from Wildlife, Fish, and Conservation Biology 110, (110L), 111, (111L), 120, (120L), or Evolution and Ecology 134, (134L) ..... 12-15
Choose one course (two recommended) from Statistics 104, 106, or 108 ..... 4
Wildlife, Fish, and Conservation Biology 100, or 101 & 101L, or 102 & 102L .... 4-7
Strongly recommended, but not required
Landscape Architecture 150 ..... 3
Strongly recommended, but not required
Anatomy, Physiology and Cell Biology 100 ..... 4

**Restricted Electives ..... 15-24**

Choose one from the five Areas of Specialization shown below. Students must maintain a *C* average (2.000 GPA) and pass all course work in their chosen specialization.

**Areas of Specialization**

*(1) Conservation Biology:* Complete Wildlife, Fish, and Conservation Biology 155 & 155L.
Choose one course from Environmental Science and Policy 161, 170, or 171.
Choose two courses from Environmental Horticulture 160, Environmental Science and Policy 127, Evolution and Ecology 115, 117, 138, 147, Wildlife, Fish, and Conservation Biology 152, 156, or 157.
Choose one course from Animal Science 103, Nature and Culture 120, 140, or Veterinary Medicine 170.

*(2) Fish Biology:* Complete Wildlife, Fish, and Conservation Biology 120 & 120L.
Choose one course from Entomology 116 or Evolution and Ecology 112 & 112L.
Choose three courses from Animal Science 118, Environmental Science and Policy 116N, 150C, 151, 151L, Evolution and Ecology 115, Environmental Science and Management 100, Hydrology 143, Wildlife, Fish, and Conservation Biology 155 & 155L, or 157.
Choose one course from Hydrology 150, Environmental Science and Policy 161, 169, or Landscape Architecture 150.

*(3) Wildlife Biology:* Complete Wildlife, Fish, and Conservation Biology 151.
Choose one course from Plant Biology 102, Plant Sciences 144, 147 & 147L or 178.
Choose one course from Environmental Horticulture 160, Environmental Science and Policy 155, Plant Sciences 130, Wildlife, Fish, and Conservation Biology 155 & 155L, 156, or 157.
Choose two courses from Animal Science 104, Environmental Science and Policy 121, Environmental Toxicology 101, Evolution and Ecology 107, Landscape Architecture 150, Medical Microbiology 116, Wildlife, Fish, and Conservation Biology 136, 141 (cannot be used to simultaneously satisfy the Depth Subject Matter requirement), or 152.
Note: Students interested in certification as a Wildlife Biologist from The Wildlife Society should consider additional courses in plant sciences. Recommended courses include Plant Biology 108, 117, 118, 119, 148, Plant Sciences 131, 144, 145, or 178.

*(4) Wildlife Health:* Complete either Biological Sciences 102 and 103 or Animal Biology 102 and 103.
Choose one course from Wildlife, Fish, and Conservation Biology 136, 151, 152, or 155 &155L.
Choose one course from Animal Science 103 or 170.
Choose one course from Anatomy, Physiology, and Cell Biology 100, Animal Science 104, Medical Microbiology 115, 116, Microbiology 102, Molecular and Cell Biology 150, Neurobiology, Physiology, and Behavior 101, 126, 127, 128, 140, or Veterinary Medicine and Epidemiology 158. Note that this AOS recommends additional preparatory courses; pre-requisites for admission to Veterinary Medicine vary among schools and students should confirm the specific requirements of the school(s) to which they wish to apply. Additional Preparatory (recommended, not required): Chemistry 2C, 118A, 118B, 118C, Physics 7A, 7B, 7C.

*(5) Individualized:* Students may, with prior approval of their adviser and the curriculum committee, design their own individualized specialization within the major. The specialization will consist of five upper division courses with a common theme.

**Total Units for the Degree ..... 119-136**