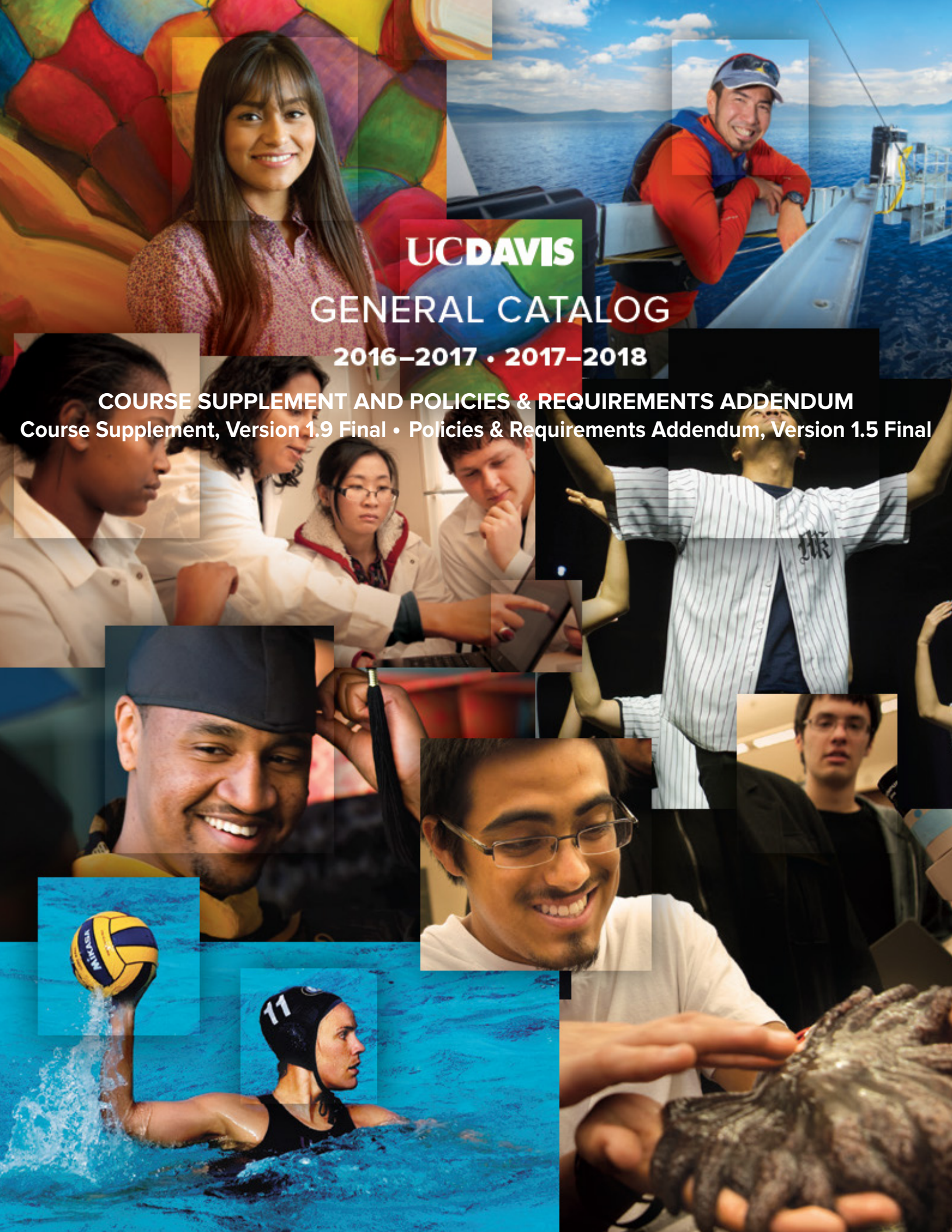

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Version History

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; 6/15/2016

- Agricultural and Resource Economics; ARE 136, 143, 144, 171A-B, 175, 176
- African American and African Studies; AAS 107B
- American Studies; AMS 160
- Animal Science; ANS 129, 136, 137, 147
- Anthropology; ANT 135
- Arabic; ARB 21A
- Art Studio; ART 401
- Avian Science; AVS 13, 198
- Biotechnology; BIT 91
- Chemistry; CHE 107A, 128B-C, 129A
- Design; DES 156
- Economics; ECN 160B
- Ecology; ECL 200AN-BN
- Education Abroad Program; EAP 192
- Engineering: Biomedical; BIM 201, 262
- Engineering: Chemical; ECH 269
- Engineering: Computer Science; ECS 20, 60
- Engineering: Electrical and Computer; EAE 10
- Environmental Science and Policy; ESP 175
- Epidemiology; EPI 224
- Global Disease Biology; GDB 90
- History; HIS 3
- Human Rights; HMR 190
- Hydrology; HYD 145
- Italian; ITA 8A, 8AS, 8B, 8BS
- Mathematics; MAT 21B-D
- Medicine: Ophthalmology; OPT 499
- Native American Studies; NAS 133, 133A-B
- Physics; PHY 12
- Plant Pathology; PLP 90
- Political Science; POL 11A-D, 12A-B
- Russian; RUS 142
- Science and Society; SAS 14
- Soil Science; SSC 112
- Statistics; STA 194HA-HB
- Textiles and Clothing; TXC 108A-B
- Veterinary Medicine: Preventive Veterinary Medicine; MPM 212
- Wildlife, Fish, and Conservation Biology; WFC 122, 130, 134, 134L, 136, 141, 152, 154

Version 1.1; 9/19/2016

- American Studies; AMS 158, 160
- Animal Genetics; ANG 111
- Animal Science; ANS 139
- Anthropology; ANT 1Y, 2, 125A, 133, 147
- Art History; AHI 122, 148
- Art Studio; ART 10
- Biophotonics; BPT 201
- Biophysics; BPH 241
- Biotechnology; BIT 98, 198
- Cell Biology and Human Anatomy; CHA 102, 202, 493
- Cinema & Digital Media; CDM 105, 163
- Cinema & Technocultural Studies; CTS 146B
- Chemistry; CHE 2A, 103A-B, 128A, 129B, 150
- Chinese; CHN 107, 108
- Classics; CLA 40, 170
- Clinical Research; CLH 205, 214A-B, 244
- Communication; CMN 10V, 10Y, 110, 124, 140, 147, 172, 253, 260, 299R
- Design; DES 198F, 199F, 299
- Dramatic Art; DRA 21A, 40B, 146A-B, 256
- Ecology; ECL 204, 211, 213, 215
- Economics; ECN 115BY, 125, 233
- Education; EDU 310, 320
- Engineering; ENG 3, 102, 105, 111
- Engineering: Applied Science—Davis; EAD 285D
- Engineering: Biological Systems; EBS 268
- Engineering: Biomedical; BIM 102, 215, 227, 231, 264
- Engineering: Chemical; ECH 1, 5, 60, 145A-B, 190X, 268
- Engineering: Chemical and Materials Science; ECM 1, 5, 6, 94H, 189A-R, 194HA-HC, 229, 281
- Engineering: Civil and Environmental; ECI 143, 147A-B, 246
- Engineering: Computer Science; ECS 30, 40, 50, 140A, 154A, 161, 162, 193A-B, 253
- Engineering: Electrical and Computer; EEC 10, 165
- Engineering: Mechanical; EME 165
- Engineering: Mechanical and Aerospace; 208, 215, 227, 231, 236, 253, 261, 264
- English; ENL 4, 157, 275
- Environmental Science and Policy; ESP 151
- Epidemiology; EPI 205A, 232, 280
- Evolution and Ecology; EVE 17
- Exercise Science; EXS 227
- 102A, 202
- Geology; GEL 2, 115, 185B, 186
- Geography (A Graduate Group); GEO 252, 270, 271
- Hebrew; HEB 11, 12
- History; HIS 109
- Horticulture; HRT 203
- Hydrology; HYD 143
- International Agricultural Development; IAD 201, 202N, 203N
- Japanese; JPN 7S, 117S, 130, 138, 151
- Landscape Architecture; LDA 182, 183, 184, 240, 250, 260
- Law; LAW 200BT-DT, 207, 207A, 208A, 210, 221, 239, 248CT, 255, 258BT, 263A-B, 277, 285C, 446, 446A
- Linguistics; LIN 131
- Management; MGT/MGB/MGP 12Y, 224, 412, 431, 440, 440C
- Maternal and Child Nutrition; MCN 260, 261, 262, 264A, 264C
- Mathematics; MAT 16B-C, 17B, 22A, 22AL, 67, 116, 125B
- Medical Sciences; MDS 400, 415
- Medicine: Anesthesiology and Pain Medicine; ANE 435
- Medicine: Family and Community Medicine; FAP 405, 431
- Medicine: Human Physiology; HPH 115
- Medicine: Internal Medicine; IMD 290C, 493
- Medicine: Internal Medicine—Infectious Diseases; IDI 493
- Medicine: Neurosurgery; NSU 464
- Medicine: Pathology; PMD 298
- Medicine: Pediatrics; PED 475
- Medicine: Psychiatry; PSY 420
- Medicine: Public Health Sciences; SPH 175W, 190, 211, 244, 280, 290
- Medicine: Radiology—Diagnostic; RDI 477
- Medicine: Surgery; SUR 493
- Medicine: Urology; URO 499
- Middle East/South Asia Studies; MSA 131B
- Music; MUS 101A, 102
- Neurobiology, Physiology, and Behavior; NPB 100, 100L, 101L, 108Y, 110A-C, 111L, 127, 163, 212
- Nursing, School of; NRS 212, 222A, 224, 225, 493A-C
- Nutrition; NUT 10Y, 104, 260, 261, 262, 264A, 246C
- Persian; PER 2, 3, 21, 22, 23
- Philosophy; PHI 118, 119, 133
- Plant Sciences; PLS 110A, 110L, 111, 173, 206
- Psychology; PSC 1, 1Y, 51, 192
- Science and Society; SAS 35, 109, 192
- Sociology; SOC 6, 146, 149, 162, 163, 164
- Spanish; SPA 151N, 230
- Statistics; STA 131B
- University Writing Program; UWP 102N
- Veterinary Medicine: Medicine and Epidemiology; VME 158, 201, 225
- Veterinary Medicine: Molecular Biosciences; VMB 101V, 101Y
- Veterinary Medicine: Pathology, Microbiology, and Immunology; PMI 206
- Veterinary Medicine: Preventive Veterinary Medicine; MPM 209, 210, 410
- UC Davis Washington Center; WAS 175
- Women's Studies; WMS 165

Version 1.2; 10/24/2016

- Anthropology; ANT 144
- Business Analytics; BAX 401, 402, 403, 411, 421, 422, 423, 431, 441, 442, 443, 452, 461, 462, 463, 464
- Chemistry; CHE 118A
- Chinese; CHN 107, 108
- Communication; CMN 192
- Dramatic Art; DRA 146C
- Engineering; ENG 15, 35
- Engineering: Chemical; ECH 90X
- Engineering: Chemical and Materials Science; ECM 90X
- Engineering: Materials Science and Engineering; EMS 162
- Engineering: Mechanical; EME 165
- English; ENL 100F, 100NF, 460A
- Environmental Horticulture; ENH 100, 120, 125, 133, 160
- Geology; GGG 225
- Linguistics; LIN 103A-B, 112, 121, 127, 141, 150, 151, 152, 163, 166, 173, 175, 177, 180
- Management; MGT/MGB/MGP 120, 140, 150, 160, 170, 180, 421
- Music; MUS 17B, 105, 106, 123
- Medicine: Pediatrics; PED 430TA-TB, 460A
- Medicine: Pharmacology and Toxicology; PHA 225
- Plant Sciences; PLS 105, 130, 162
- Psychology; PSC 51, 146
- University Writing Program; UWP 23

Version 1.3; 1/30/2017

- Agricultural and Resource Economics; ARE 100A-B, 106, 112, 121, 155, 166
- American Studies; AMS 120
- Animal Behavior (A Graduate Group); ANB 203
- Animal Biology (A Graduate Group); ABG 203, 205, 211
- Animal Science; ANS 135
- Anthropology; ANT 181L, 191
- Arabic; ARB 21, 21C, 21L, 22, 22C, 23C, 98, 99
- Art History; AHI 163D, 175, 187
- Art Studio; ART 143
- Asian American Studies; ASA 2, 189I
- Biophysics; BPH 255, 271, 288
- Biotechnology; Design Emphasis; DEB 282
- Business Analytics; BAX 453
- Chemistry; CHE 107A, 110A, 118A-C, 130B-C
- Chinese; CHN 110, 111, 297
- Cinema & Technocultural Studies; CTS 124E
- Classics; CLA 175
- Cognitive Science; CGS 199
- Letters & Science, College of; LTS 98, 198
- Communication; CMN 142, 144, 148, 150V, 172, 233, 235, 251, 251Y
- Community and Regional Development; CRD 151, 242, 242S, 248, 248A-B, 250, 290, 440
- Comparative Literature; COM 100, 110
- Design; DES 107, 128, 161
- Dramatic Art; DRA 40A, 41A, 124E, 156C, 170, 257
- Ecology; ECL 242
- Economics; ECN 100A-B, 125, 140
- Engineering: Biomedical; BIM 102, 110A, 140L, 143L, 161A, 167, 221, 254, 255, 258, 288
- Engineering: Chemical; ECH 140, 152A, 155, 261
- Engineering: Chemical and Materials Science; ECM 261, 290
- Engineering: Civil and Environmental; ECI 40, 193A-B, 258
- Engineering: Computer Science; ECS 30, 60, 124, 174
- Engineering: Electrical and Computer; EEC 10, 150A
- Engineering: Materials Science and Engineering; EMS 147, 288, 290
- English; ENL 154
- Environmental Science and Policy; ESP 151, 166, 166N, 168A, 396
- Epidemiology; EPI 202, 203, 204, 231
- Exercise Biology; EXB 126
- Fine Arts & Humanities; FAH 98, 198

- Food Science and Technology; FST 3V, 50, 101A, 104L, 107, 109, 110, 110L, 115, 117, 119, 123, 159, 230
- Genetics (A Graduate Group); GGG 296
- Geology; GEL 91, 110, 185A
- Hebrew; HEB 21, 22, 23, 98, 99
- Hindi; HIN 21, 22, 23, 98, 99, 396
- History; HIS 107, 109A-B, 115D, 171B, 187
- Hydrology; HYD 201A-B
- Integrated Pest Management; IPM 201, 201A-B, 209, 298, 299
- Italian; ITA 31, 32, 120A
- Japanese; JPN 106, 114A, 297
- Landscape Architecture; LDA 180A-P, 181A-Q
- Law; LAW 200DT, 209AT, 209DT, 210ET-FT, 219, 222CT, 222T, 223, 226ET, 228, 236CT, 240, 241, 241T, 243BT, 247, 248DT, 251, 253T, 254A, 258, 258A, 263, 266A, 269, 270, 276, 283, 290CT, 296D, 411A-C, 416, 418, 495
- Linguistics; LIN 253
- Management; MGT/MGB/MGP 11A, 190, 401, 404, 405, 406, 407, 410, 411, 414, 416, 417, 418, 419, 420, 421, 422, 423, 425, 426, 427, 432
- Maternal and Child Nutrition; MCN 263, 264B
- Mathematics; MAT 25
- Medicine: Anesthesiology and Pain Medicine; ANE 464
- Medicine: Biological Chemistry; BCM 230
- Medicine: Human Physiology; HPH 115
- Medicine: Internal Medicine; IMD 90
- Medicine: Public Health Sciences; SPH 102, 105, 233, 235
- Medieval Studies; MST 98F, 198F, 199FA-FB
- Molecular and Cellular Biology; MCB 182
- Music; MUS 107B, 112A-C, 140
- Neurobiology, Physiology, and Behavior; NPB 101D, 111C, 112, 121L, 125, 160L, 163, 164, 211, 287A
- Neuroscience; NSC 211, 287A
- Nursing, School of; NRS 222B, 223
- Nutrition; NUT 263, 264B
- Persian; PER 98, 198, 396
- Philosophy; PHI 21, 22, 145
- Physics; PHY 10CY
- Plant Sciences; PLS 100A-C, 110, 110C, 131, 170A-B
- Psychology; PSC 41S, 104, 126, 180D, 205A, 211, 390
- Sociology; SOC 178
- Spanish; SPA 98F, 198F, 199FA-FB
- Statistics; STA 32, 100, 103, 141
- Technocultural Studies; TCS 100
- Veterinary Medicine: Population Health and Reproduction; PHR 242
- Veterinary Medicine: Preventive Veterinary Medicine; MPM 208
- Wildlife, Fish, and Conservation Biology; WFC 51, 160

Version 1.4; 5/1/2017

- African American and African Studies; AAS 12
- Agricultural and Resource Economics; ARE 112, 136, 240A
- American Studies; AMS 101D
- Anthropology; ANT 181, 211
- Applied Biological Systems Technology; ABT 181N
- Arabic; ARB 22L, 23
- Art Studio; ART 103C
- Asian American Studies; ASA 198F
- Astronomy; AST 25
- Atmospheric Science; ATM 116
- Biological Sciences; BIS 2B, 132
- Chemistry; CHE 135
- Chicana/o Studies; CHI 181, 241
- Chinese; CHN 111
- Classics; CLA 103, 111, 176
- Cognitive Science; CGS 1, 138
- Communication; CMN 102, 145, 161, 201
- Design; DES 37, 111, 113, 144, 155A, 160, 165, 166, 167, 169, 178, 225
- Ecology; ECL 211, 212A
- Economics; ECN 102, 240A
- Education; EDU 122, 130, 180A-C, 183
- Engineering; ENG 102, 105, 122
- Engineering: Aerospace Science and Engineering; EAE 127, 129, 130A-B, 138
- Engineering: Biomedical; BIM 110L, 126, 135, 170, 171, 214
- Engineering: Biological Systems; EBS 216
- Engineering: Chemical; ECH 51
- Engineering: Chemical and Materials Science; ECM 268, 290
- Engineering: Civil and Environmental; ECI 100, 136, 140A-B, 140L, 145, 150, 175, 254
- Engineering: Computer Science; ECS 150, 174
- Engineering: Electrical and Computer; EEC 70, 110A, 181A
- Engineering: Materials Science and Engineering; EMS 290
- Engineering: Mechanical; EME 5, 50, 108, 109, 121, 134, 150A-B, 151, 152, 161, 163, 171, 172, 185A-B
- English; ENL 182
- Entomology; ENT 105
- Environmental Policy & Management; ENV 200A, 200C, 202, 203, 296, 297
- Environmental Science and Policy; ESP 165, 165N, 212A
- Food Science and Technology; FST 3, 50, 201
- Geography (A Graduate Group); GEO 279
- Geology; GEL 183
- Global Disease Biology; GDB 90
- Greek; GRK 106, 279
- Hebrew; HEB 2, 3
- History; HIS 2, 15B, 115E, 126Y, 180C, 193A, 195C
- Human Rights; HMR 162Y, 396
- Humanities; HUM 10, 10D
- Japanese; JPN 109, 111, 114A, 155, 160
- Landscape Architecture; LDA 21, 23, 31, 60, 70, 101, 120, 161, 170
- Law; LAW 200A-E, 219, 220A, 226, 228, 245, 253A, 254A, 258, 263, 273BT, 277A, 208B, 281, 283, 285G, 288B, 291A, 291T, 445A
- Management; MGT/MGB/MGP 101, 103, 105, 107, 170, 200B, 202B, 203B, 223, 224, 234, 239, 241, 243, 244, 248, 249, 250, 251, 260, 261, 266, 270, 271, 272, 276, 282, 416
- Medical Sciences; MDS 411, 411A-B
- Medicine: Emergency Medicine; EMR 92C, 299, 450
- Medicine: Family and Community Medicine; FAP 430FA-FF, 430K, 430KA-KD, 431KA-KD, 430R, 430RA-RD
- Medicine: Human Physiology; HPH 157
- Medicine: Internal Medicine; IMD 430FA-FC & FE-FF, 430R, 430RA-RD
- Medicine: Obstetrics and Gynecology; OBG 430F, 430R, 430RA-RD
- Medicine: Pathology; PMD 290C
- Medicine: Pediatrics; PED 430FA-FD, 430R, 430RA-RD
- Medicine: Public Health Sciences; SPH 105, 205
- Medicine: Psychiatry; PSY 430FA-FE, 430R, 430RA-RD
- Medicine: Surgery; SUR 430F, 430R, 430RA-RD
- Molecular and Cellular Biology; MCB 163, 256
- Neurobiology, Physiology, and Behavior; NPB 134, 157, 172
- Nutrition; NUT 112
- Persian; PER 101
- Philosophy; PHI 10
- Physics; PHY 256, 256A-B
- Plant Biology; PLS 102
- Plant Sciences; PLS 102
- Psychology; PSC 41, 131, 138, 139, 151
- Religious Studies; RST 1E
- Russian; RUS 120
- Science and Society; SAS 7V, 15, 90C-D, 91A-C, 135S, 140
- Science and Technology Studies; STS 2, 101, 152
- Spanish; SPA 21, 22
- Statistics; STA 141A
- University Writing Program; UWP 28, 29
- Viticulture and Enology; VEN 127L, 216

General Catalog Update, Version 1.5; 6/12/2017

- Communication; CMN 114, 165, 178, 251Y
- Design; DES 126, 199F, 199FA
- Economics; ECN 103, 132
- Engineering: Biomedical; BIM 283
- Engineering: Computer Science; ECS 40, 188
- Energy (A Graduate Group); EGG 299
- Entomology; ENT 253
- Environmental Policy & Management; ENV 201
- Evolution and Ecology; EVE 100, 101
- History; HIS 15, 15A, 115A-C, 171C, 172
- Human Development; HDE 100A
- Hydrologic Science (A Graduate Group); HYD 273
- Japanese; JPN 116, 162
- Landscape Architecture; LDA 3, 102
- Law; LAW 228A, 243A, 270, 275
- Mathematics; MAT 141
- Management; MGT/MGB/MGP 127, 127S, 170, 263, 265
- Medical Sciences; MDS 445
- Music; MUS 17B, 107B, 127, 127S
- Neurobiology, Physiology, and Behavior; NPB 160
- Neuroscience; NSC 160
- Physics; PHY 9A, 110A, 122A-B, 157
- Psychology; PSC 130
- Religious Studies; RST 5
- Soil Science; SSC 202
- Spanish; SPA 127, 127S
- Statistics; STA 130A
- Technocultural Studies; TCS 121
- Viticulture and Enology; VEN 123, 123L, 125, 128, 128L, 135

Version 1.6; 9/25/2017

- Agricultural and Resource Economics; ARE 120
- American Studies; AMS 55
- Animal Science; ANS 136
- Anthropology; ANT 15
- Applied Biological Systems Technology; ABT 212
- Arabic; ARB 23L
- Art Studio; ART 114A-C
- Astronomy; AST 10L
- Biological Sciences; BIS 11L, 101
- Biotechnology; Design Emphasis; DEB 294
- Chemistry; CHE 280
- Chinese; CHN 112
- Cinema & Digital Media; CDM 72
- Communication; CMN 3, 3Y, 151, 204
- Community and Regional Development; CRD 243
- Design; DES 199FA
- Dramatic Art; DRA 124A-E, 160A
- Ecology; ECL 212B
- Economics; ECN 1AV, 110B, 140
- Engineering: Chemical; ECH 158C, 294
- Engineering: Chemical and Materials Science; ECM 280
- Engineering: Civil and Environmental; ECI 140C-D, 148B, 173, 273
- Engineering: Computer Science; ECS 124, 225
- Engineering: Electrical and Computer; EEC 146, 189W, 289W
- Engineering: Materials Science and Engineering; EMS 2
- English; ENL 51, 52, 72
- Education; EDU 65A-C
- Environmental Policy & Management; ENV 200B, 201
- Environmental Science and Policy; ESP 212B
- Evolution and Ecology; EVE 100, 101
- Exercise Biology; EXB 101, 110
- Food Science and Technology; FST 55
- Geology; GEL 9
- Greek; GRK 131
- Health Informatics; MHI 289E & I
- Hebrew; HEB 11, 12
- History; HIS 13, 18A, 20, 158, 178A
- Human Development; HDE 130
- Integrated Studies; IST 9
- Italian; ITA 31Y
- Latin; 122, 135
- Law; LAW 208E-H, 214, 235B, 267, 269B, 274A, 258E, 258ET, 285F, 400E, 411D, 445B
- Management; MGT/MGB/MGP 11A-B, 100, 120, 140, 150, 160, 170, 180, 252
- Mathematics; MAT 127A-C
- Microbiology; MIC 172
- Molecular and Cellular Biology; MCB 120, 120L, 263, 294
- Medical Sciences; MDS 415, 449, 490A-D
- Medicine: Anesthesiology and Pain Medicine; ANE 455
- Medicine: Emergency Medicine; EMR 455A-B, 470
- Medicine: Internal Medicine; IMD 470
- Medicine: Neurology; NEU 460, 462
- Medicine: Pathology; PMD 296, 298
- Medicine: Public Health Sciences; SPH 113, 208, 213, 277, 291, 292A-B
- Music; MUS 117
- Neurobiology, Physiology, and Behavior; NPB 18, 100, 104L, 106, 110A, 110C, 111L, 113, 114, 117, 121, 123, 130, 140, 150, 152, 161, 162, 165, 166, 167, 168, 171, 267

- Neuroscience; NSC 267
- Philosophy; PHI 112
- Physics; PHY 80, 280
- Plant Sciences; PLS 7
- Professional Accountancy; ACC 455
- Psychology; PSC 242, 391
- Religious Studies; RST 123
- Science and Technology Studies; STS 112, 122
- Sociology; SOC 224, 254
- Statistics; STA 32, 200A-C
- University Writing Program; UWP 13, 18, 19, 101, 102A-M, 104A-F & FY & I-J & T, 395
- Viticulture and Enology; VEN 210
- Women's Studies; WMS 102, 104, 146, 174, 187

Version 1.7; 10/30/2017

- Agricultural and Resource Economics; ARE 100A, 113, 115A, 120, 121, 139, 150, 165
- Animal Biology; ABI 189, 189D
- Applied Biological Systems Technology; ABT 150, 182
- Art Studio; ART 105B
- Atmospheric Science; ATM 111, 149
- Biological Sciences; BIS 101
- Chicana/o Studies; CHI 192
- Communication; CMN 102, 141, 142, 143, 145, 165, 176
- Economics; ECN 100A, 101, 102, 106, 110B, 115, 162, 121A-B, 134, 135, 140, 160B, 162
- Engineering: Civil and Environmental; ECI 140C, 141, 146, 149, 193A
- Engineering: Computer Science; ECS 158
- Engineering: Materials Science and Engineering; EMS 160, 162, 164, 170, 174, 180, 181
- English; ENL 10A-C, 40, 43, 92, 98, 106, 110A, 113B, 117, 122, 149, 156, 159, 165, 166, 179, 180, 181A, 192, 198, 199FA,
- Environmental Science and Policy; ESP 1, 110, 162, 168A
- Fiber and Polymer Science; FPS 100
- Global Disease Biology; GBD 90, 101
- Human Development; HDE 100A-B, 110, 120, 220
- Italian; ITA 31
- Hydrology; HYD 182
- Japanese; JPN 130, 131, 132, 133, 134, 135, 136, 137, 138
- Landscape Architecture; LDA 150, 180H
- Law; LAW 219, 222B, 222T, 248BT, 253, 253T, 269E, 279, 282A, 282AT, 287, 290T, 292A, 292T
- Linguistics; LIN 106, 160, 192
- Management; MGT/MGB/MGP 433
- Medical Sciences; MDS 445
- Medicine: Biological Chemistry; BCM 499
- Medicine: Internal Medicine—Nephrology; NEP 499
- Medicine: Internal Medicine—Pulmonary Medicine; PUL 499
- Medicine: Neurology; NEU 499
- Medicine: Ophthalmology; OPT 499
- Medicine: Otolaryngology; OTO 499
- Medicine: Pathology; PMD 499
- Medicine: Pediatrics; PED 499
- Medicine: Pharmacology and Toxicology; PHA 499
- Medicine: Physical Medicine and Rehabilitation; PMR 499
- Medicine: Psychiatry; PSY 419, 421, 499
- Medicine: Public Health Sciences; SPH 499
- Medicine: Radiology—Diagnostic; RDI 499
- Medicine: Radiology—Nuclear Medicine; RNU 430, 499
- Medicine: Surgery; SUR 499
- Nutrition; NUT 10, 10V, 10Y
- Psychology; PSC 100, 101, 103A-B, 121, 126, 130, 131, 132, 135, 140, 143, 151, 154, 157, 162, 168, 170, 185
- Science and Society; SAS 70A
- Sociology; SOC 192, 199
- Soil Science; SSC 100, 102, 111, 112, 118
- Spanish; SPA 31
- Statistics; STA 103, 104, 106, 108
- University Writing Program; UWP 92, 98, 99, 106, 192, 198

Version 1.8; 1/29/2018

- Agricultural and Resource Economics; ARE 115B, 147, 147M
- Anthropology; ANT 154A & C, 159
- Art History; AHI 121
- Art Studio; ART 129
- Biological Sciences; BIS 132
- Biotechnology; BIT 150
- Cell Biology and Human Anatomy; CHA 103
- Chicana/o Studies; CHI 21S, 40, 40S, 135S, 145S, 192S
- Cognitive Science; CGS 107, 138
- Communication; CMN 3, 3V, 3Y, 174
- Community and Regional Development; CRD 164
- Design; DES 40A, 199FB
- Economics; ECN 107, 100, 110A, 111A-B, 115B, 133Y, 137, 145, 152, 171, 216
- Energy (A Graduate Group); EGG 202
- Education; EDU 173
- Engineering; ENG 7, 17, 45H
- Engineering: Biological Systems; EBS 147
- Engineering: Biomedical; BIM 117, 125, 126, 142, 210, 211, 228
- Engineering: Civil and Environmental; ECI 17, 126, 127, 128, 147A, 147B, 162, 163, 171, 190, 268
- Engineering: Computer Science; ECS 10, 30, 32A-B, 36A & C, 40, 60, 113, 124, 174, 253
- Engineering: Electrical and Computer; EEC 10, 100, 140A
- Engineering: Materials Science and Engineering; EMS 147, 182, 244
- Engineering: Mechanical and Aerospace; MAE 229, 253
- English; ENL 41, 42, 44, 45, 98F, 105, 107, 110B, 111, 113A, 115, 120, 123, 125, 130, 133, 1367, 138, 138, 139, 140, 141, 142, 143, 144, 146, 147, 150A-B, 153, 154, 155A-C, 157, 158A-B, 160, 161A-B, 162, 163, 167, 168, 171A-B, 175, 178, 181B, 182, 183, 184, 185A-C, 186, 199F, 199FB
- Environmental Policy & Management; ENV 297
- Environmental Science and Policy; ESP 163, 165, 167, 168A
- Exercise Biology; EXB 103, 122
- Food Science and Technology; FST 107, 109
- French; FRE 160, 161, 162
- Geography (A Graduate Group); GEO 281
- Geology; GEL 9
- German; GER 114
- Hebrew; HEB 23
- Human Development; HDE 100C, 121, 132, 161, 163
- Hydrology; HYD 147
- Italian; ITA 31Y, 32Y
- Law; LAW 209AT, 209B, 209C, 209 CT, 209E, 210F, 210FT, 221A, 221AT, 227C, 227CT, 230A, 243B, 243BT, 247A, 248C, 248CA, 248CT, 248DT, 250A, 250AT, 250B, 250BT, 253, 262B, 262T, 274H, 274T, 279, 280BT, 285T, 290C, 290CT
- Linguistics; LIN 3, 20, 27, 28, 166, 171, 173, 180, 229, 253
- Mathematics; MAT 135A, 160
- Medical Sciences; MDS 411B
- Medicine: Emergency Medicine; EMR 465
- Medicine: Human Physiology; HPH 440
- Medicine: Neurology; NEU 103, 440, 493F
- Medicine: Public Health Sciences; SPH 113, 213
- Medicine: Surgery; SUR 474
- Medieval Studies; MST 20A-B
- Middle East/South Asia Studies; MSA 192, 198, 199
- Molecular and Cellular Biology; MCB 140, 160
- Music; MUS 10
- Native American Studies; NAS 46, 109, 125
- Nematology; NEM 150
- Neurobiology, Physiology, and Behavior; NPB 109, 121, 173
- Nutrition; NUT 112, 219, 252
- Persian; PER 103
- Professional Accountancy; ACC 490
- Psychology; PSC 51, 100Y, 104, 107, 120, 133, 136, 137, 138, 139, 146, 148, 152, 153, 158, 159, 161, 165, 175
- Religious Studies; RST 6
- Science and Technology Studies; STS 110
- Spanish; SPA 8, 28
- Statistics; STA 141A, 190X
- Sustainable Agriculture and Food Systems; SAF 43, 90
- Textiles and Clothing; TXC 173
- Transportation Technology and Policy; TTP 200
- University Writing Program; UWP 10, 19, 18, 20, 25, 26, 49, 100, 102N
- Veterinary Medicine: Medicine and Epidemiology; VME 57V
- Wildlife, Fish, and Conservation Biology; WFC 122
- Women's Studies; WMS 130, 136, 137, 158

Version 1.9; FINAL; 4/23/2018

- Agricultural and Resource Economics; ARE 100B, 106, 107, 112, 121, 130, 132, 136, 138, 139, 140, 143, 144, 155, 156, 166, 171, 171A-B, 172, 173, 176, 200A-C, 202A, 254, 258
- Applied Biological Systems Technology; ABT 212
- Animal Biology; ABI 187
- Anthropology; ANT 154CL, 155
- Biochemistry, Molecular, Cellular and Developmental Biology; BCB 256
- Biological Sciences; BIS 124
- Chinese; CHN 160
- Cinema & Digital Media; CDM 105
- Communication; CMN 131, 212, 213, 214
- Community and Regional Development; CRD 162
- Comparative Literature; COM 22, 112
- Design; DES 165, 167
- Economics; ECN 200A-D
- Energy (A Graduate Group); EGG 200
- Engineering; ENG 3
- Engineering: Biological Systems; EBS 216
- Engineering: Biomedical; BIM 88V
- Engineering: Chemical; ECH 141, 142, 143, 151, 169, 390
- Engineering: Electrical and Computer; EEC 133, 192, 224
- Engineering: Mechanical and Aerospace; MAE 256
- Environmental Horticulture; ENH 160
- Environmental Science and Management; ESM 47, 131
- Food Science and Technology; FST 50, 100A, 101A, 102A, 110, 110L
- Forensic Science; FOR 201A-C, 208
- German; GER 1A
- Hydrology; HYD 47, 124, 145
- Mathematics; MAT 22A, 111, 146
- Management; MGT 170
- Medicine: Anesthesiology and Pain Medicine; ANE 462, 499
- Medicine: Internal Medicine; IMD 493
- Medicine: Otolaryngology; OTO 465
- Medicine: Physical Medicine and Rehabilitation; PMR 470
- Medicine: Public Health Sciences; SPH 202, 205AY
- Molecular and Cellular Biology; MCB 23
- Native American Studies; NAS 134
- Neurobiology, Physiology, and Behavior; NPB 124, 124L
- Nutrition; NUT 113, 201, 203, 204, 257
- Physical Education; PHE 1A, 1AQ, 1F, 1G, 1I, 1M, 1R, 1RC, 1S, 1T
- Physics; PHY 9A
- Plant Pathology; PLP 224, 228
- Political Science; POL 219A-B
- Portuguese; POR 1, 2, 3, 21, 22, 23
- Psychology; PSC 124, 124L, 145, 151
- Religious Studies; RST 21
- Science and Technology Studies; STS 11, 113, 210
- Statistics; STA 209
- University Writing Program; UWP 102N
- Veterinary Medicine: Pathology, Microbiology, and Immunology; PMI 127, 127L, 200
- Veterinary Medicine: Preventive Veterinary Medicine; MPM 403
- Women's Studies; WMS 165

Policies and Requirements Addendum—Version History

Version 1.0; 6/15/2016

- The Minor

Version 1.1; 9/19/2016

- Undergraduate Education
- Communication
- Community and Regional Development
- Computer Science
- English
- Managerial Economics
- Mathematics
- Native American Studies
- Physics
- Political Science
- Sustainable Agriculture and Food Systems
- Wildlife, Fish, and Conservation Biology

Version 1.2; 5/1/2017

- Advanced Placement (AP) Examinations
- American History and Institutions
- Graduation Honors
- Programs Offered By UC Davis
- The Minor
- Undergraduate Education
- African American and African Studies
- Anthropology
- Cinema and Digital Media
- Computer Science
- Economics
- English
- Engineering
- Engineering: Chemical Engineering
- Engineering: Civil and Environmental
- Engineering: Computer Science
- Engineering: Materials Science and Engineering
- Engineering: Mechanical and Aerospace Engineering
- Environmental Horticulture and Urban Forestry
- International Commercial Law (A Graduate Group)
- Managerial Economics
- Management, Graduate School of
- Music
- Political Science
- Sociology
- Statistics
- Viticulture and Enology

General Catalog Update, Version 1.3; 6/12/2017

- Anthropology
- Geographic Studies
- Middle East/South Asia Studies
- Native American Studies
- Natural Sciences
- Physics
- Political Science
- Psychology
- Theatre and Dance

General Catalog Update, Version 1.4; 9/25/2017

- Programs Offered By UC Davis
- General Education Requirement
- Biological Sciences
- Design
- Earth and Planetary Sciences
- Ecological Management and Restoration
- Economics
- Energy (A Graduate Group)
- Evolution and Ecology
- Political Science
- Public Health Sciences

Version 1.5; 7/12/2018

- Economics

Table of Contents

The 2016-2018 UC Davis General Catalog Supplement contains updated information regarding requirements and courses for the 2016-2018 academic years. Use this document in conjunction with the *2016-2018 UC Davis General Catalog*. If a department is not listed in this document, there are no changes to that department's programs.

Introduction

The 2016-2018 General Catalog Course Supplement and Policies & Requirements Addendum addresses important changes to the *UC Davis* 2016-2018 *General Catalog*. Changes are contained in two sections; the Course Supplement and Policies & Requirements Addendum.

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

12. Introduction to African Studies (4)
Lecture—3 hours; discussion—1 hour. Introduction to African Studies which will focus on the various disciplinary perspectives through which African society and culture are generally studied. A survey of methods, resources and conceptual tools for the study of Africa. GE credit: ArtHum, Div, Wrt|AH, SS, WC, WE.—*W. (W.)* Adebanwi, Adejunmobi

(change in existing course—eff. fall 17)

Upper Division

107B. African Descent Communities and Culture in North America (4)
Lecture/discussion—4 hours. Prerequisite: upper division standing. Study of the origin and development of African descent communities and cultures in the U.S.A., Canada, and Mexico. GE credit: ArtHum or SocSci, Div, Wrt|AH or SS, DD.—*F, W. (F, W.)* White

(change in existing course—eff. winter 17)

Agricultural and Resource Economics

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

Upper Division

100B. Intermediate Microeconomics: Imperfect Competition, Markets and Welfare Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A C- or better; Economics 1A C- or better or Economics 1AV C- or better; Economics 001B C- or better; (Mathematics 16A C- or better, Mathematics 16B C- or better, Mathematics 16C C- or better) or (Mathematics 17A C- or better, Mathematics 17B C- or better) or (Mathematics 21A C- or better, Mathematics 21B C- or better). Pass One open to Managerial Economics Majors (AMGE) and Agricultural and Resource Economics (GARE) Graduate Majors. Price determination, and employment of resources under conditions of monopoly, oligopoly, and monopolistic competition. GE credit: QL, SS.

(change in existing course—eff. summer 18)

106. Econometric Theory and Applications (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A C- or better; Statistics 13 C- or better or Statistics 13Y C- or better); Statistics 103 C- or better. Pass One open to Managerial Economics Majors (AMGE) and Agricultural and Resource Economics (GARE) Graduate Majors. 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: QL, SS.

(change in existing course—eff. summer 18)

107. Econometrics for Business Decisions (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 106; course 100A C- or better; Statistics 13 C- or better or Statistics 13Y C- or better; Statistics 103 C- or better. Pass One open to Managerial Economics majors; Pass Two open to majors in the College of Agricultural and Environmental Sciences. Covers state-of-the art econometric and statistical methods for causal and predictive modeling with applications to finance and marketing. GE credit: SS.

(change in existing course—eff. fall 18)

112. Fundamentals of Organization Management (4)
Lecture—4 hours. Prerequisite: Upper-division standing recommended. Pass One restricted to Managerial Economics (AMGE) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. 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: SS.

(change in existing course—eff. summer 18)

113. Fundamentals of Marketing Management (4)
Lecture—4 hours. Prerequisite: Economics 1A or Economics 1AV; 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. Offered irregularly. GE credit: SocSci|SS.

(change in existing course—eff. winter 18)

115A. Economic Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A or Economics 1AV; Economics 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.—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 18)

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

(change in existing course—eff. spring 18)

120. Agricultural Policy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A C- or better. Pass One open to Managerial Economics (AMGE), Animal Science and Management (AANM) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. Analytical treatment of historical and current economic problems and governmental policies influencing American agriculture. Uses of economic theory to develop historical and conceptual understanding of the economics of agriculture; how public policy influences the nature and performance of American agriculture. GE credit: SocSci|ACGH, SS.—*S. (S.)*

(change in existing course—eff. winter 18)

121. Economics of Agricultural Sustainability (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A 1A C- or better or Economics 1AV C- or better. Pass One open to Majors in the College of Agricultural and Environmental Sciences and Graduate Majors. Application of economic concepts to agro-environmental issues relevant to agricultural sustainability. Topics include market efficiency, production externalities, government policies, agricultural trade, product differentiation, all linked to

sustainability issues. Case studies include biofuels, genetically modified foods and geographically differentiated products. GE credit: SS.

(change in existing course—eff. fall 18)

130. Agricultural Markets (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 106; course 100A C- or better; Statistics 13 C- or better or Statistics 13Y C- or better; Statistics 103 C- or better. Pass One open to Managerial Economics (AMGE), Animal Science and Management (AANM) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. Nature, function, organizational structure, and operation of agricultural markets; prices, costs, and margins; market information, regulation, and controls; cooperative marketing. GE credit: SS.

(change in existing course—eff. fall 18)

132. Cooperative Business Enterprises (4)
Lecture—4 hours. Prerequisite: Economics 1A C- or better or Economics 1AV C- or better; University Writing Program 104A or University Writing Program 101. Pass One open to Managerial Economics (AMGE) and Animal Science and Management Majors (AANM) and Agricultural and Resource Economics (GARE) Graduate Majors. Study of cooperative business enterprise in the United States and elsewhere; economic theories of behavior, principles of operation, finance, decision-making, and taxation. GE credit: SS.

(change in existing course—eff. fall 18)

136. Managerial Marketing (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100B; course 106; course 100A C- or better; Statistics C- or better or Statistics 13Y C- or better; Statistics 103 C- or better. Pass One open to Managerial Economics (AMGE), Animal Science and Management (AANM) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. Application of economic theory and econometrics to the study of marketing and consumer research. Emphasis on industry structure, history, regulatory aspects, integrated brand promotion, market segmentation, optimal product mix, message placement. GE credit: SS.

(change in existing course—eff. summer 18)

138. International Commodity and Resource Markets (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100B; course 100A C- or better. Pass One open to Managerial Economics (AMGE), Animal Science and Management (AANM) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. Basic nature and scope of international trade in agricultural commodities, agricultural inputs, and natural resources. Market dimensions and policy institutions. Case studies to illustrate import and export problems associated with different regions and commodities. GE credit: SS.

(change in existing course—eff. fall 18)

139. Futures and Options Markets (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A C- or better; Statistics 13 C- or better or Statistics 13Y C- or better; Statistics 103 C- or better. Pass One open to Managerial Economics (AMGE) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. History, mechanics, and economic functions of futures and options markets; hedging; theory of inter-temporal price formation and behavior of futures and options prices; price forecasting; futures and options as policy tools. GE credit: SS.

(change in existing course—eff. fall 18)

140. Farm Management (4)
Lecture—4 hours. Prerequisite: Economics 1A C- or better or Economics 1AV C- or better. Pass One open to Managerial Economics majors. Farm organization and resources; economic and technological principles in decision making; analytical techniques and management control; problems in organizing and managing the farm business. GE credit: SS.

(change in existing course—eff. fall 18)

143. Investments (4)
Lecture—4 hours. Pass One open to upper-division Managerial Economics (AMGE) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. 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. Not open for credit to students who completed ARE 171 or ARE 171A. GE credit: SS.

(change in existing course—eff. summer 18)

144. Real Estate Economics (4)
Lecture—4 hours. Prerequisite: course 100A C- or better. Pass One open to Managerial Economics (AMGE) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. Economic theory, analysis, and institutions of real estate markets and related financial markets. Techniques for appraising property values. Cases drawn from the raw land, single family, multifamily, industrial and office real estate markets. GE credit: SS.

(change in existing course—eff. spring 19)

146. Business, Government Regulation, and Society (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100B; course 100A C- or better. Pass One open to Managerial Economics (AMGE) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. Variety, nature and impact of government regulation: anti-trust laws and economic and social regulation. Nature of the legislative process, promulgation of regulations, and their impact, especially as analyzed by economists. GE credit: ACGH, SS.

(change in existing course—eff. fall 18)

147. Resource and Environmental Policy Analysis (3)
Lecture—3 hours. Prerequisite: Economics 1A or Economics 1AV. Open to non-majors only. Natural resource use problems with emphasis on past and current policies and institutions affecting resource use; determinants, principles, and patterns of natural resource use; property rights; conservation; private and public resource use problems; and public issues. Students who have had or are taking course 100A, Economics 100, or the equivalent, may receive only 2 units of credit, so must enroll in course 147M instead. GE credit: SocSci | SS.

(change in existing course—eff. spring 18)

147M. Resource and Environmental Policy Analysis (2)
Lecture—3 hours. Prerequisite: Economics 1A or Economics 1AV. 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: Soc | SS.—*W. (W.)*

(change in existing course—eff. spring 18)

150. Agricultural Labor (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A C- or better. Pass One open to Managerial Economics (AMGE) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. Analysis of labor markets with focus on U.S. and world agriculture. Labor supply, demand, market equilibrium; why farm labor markets are different; global trends in farm labor; U.S. farm labor history; unions and collective bargaining; immigration policy. GE credit: SocSci, Div, Wrt|SS.—*S. (S.)*

(change in existing course—eff. winter 18)

155. Operations Research and Management Science (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A C- or better; Statistics 13 C- or better or Statistics 13Y C- or better; Statistics 103 C- or better. Pass One open to Managerial Economics (AMGE) and Animal Science and Management (AANM) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. Introduction to quantitative methods used to analyze business and economic processes: decision analysis for management, mathematical programming, competitive analysis, and other methods. GE credit: SS, QL.

(change in existing course—eff. fall 18)

156. Introduction to Mathematical Economics (4)
Lecture—4 hours. Prerequisite: course 100B; course 155; course 100A C- or better; Statistics 13 C- or better or Statistics 13Y C- or better); Statistics 103 C- or better. Pass One open to Managerial Economics (AMGE) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. Linear algebra for economists; necessary and sufficient conditions in static optimization problems; implicit function theorem; economic methodology and mathematics; comparative statics; envelope theorem; Le Chatelier principle; applications to production and consumer models. GE credit: QL, SS.

(change in existing course—eff. fall 18)

157. Analysis for Operations and Production Management (4)
Lecture—4 hours. Prerequisite: course 155; course 100A C- or better; Statistics 13 C- or better or Statistics 13Y C- or better; Statistics 103 C- or better. Pass One open to Managerial Economics (AMGE), Animal Science and Management (AANM) Majors and Agricultural and Resource Economics (GARE) Graduate 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: SS.

(change in existing course—eff. fall 18)

165. Emerging Economies and Globalization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A C- or better; course 115A; course 115B; completion of course 106 and Economics 162 strongly recommended. Pass One open to Managerial Economics and graduate majors. Economic drivers and policy challenges in the major emerging markets, with an emphasis on the effects of rising incomes, population growth, urbanization, and relative wages on world markets and natural resources. GE credit: SocSci|SS.—*F. (F.)*

(change in existing course—eff. winter 18)

166. The Economics of Global Poverty Reduction: What Works and Why (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100B or Economics 100 or Economics 100B; course 106 or Economics 140; course 115A or Economics 115A. Pass One open to Managerial Economics (AMGE) and Economics (LECN) majors only. Application of microeconomic theory and econometrics to understand causes of poverty and critically evaluate poverty alleviation policies in low income countries. GE credit: SS, QL.

(change in existing course—eff. fall 18)

171. Principles of Finance (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A C- or better; course 106; Management 11A; Management 11B. Pass One open to Managerial Economics Majors and Agricultural and Resource Economics Graduate Majors. Principles of corporate financial management. Time value of money, interest rates, principles of valuation, NPV, risk and return, and cost of capital. Not open for credit to students who have completed Economics 134.

(new course—eff. summer 18)

171A. Financial Management of the Firm (4)
(cancelled course—eff. summer 18)

171B. Financial Management of the Firm (4)
(cancelled course—eff. summer 18)

172. Financial Management of the Firm (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 171A or course 171; course 106; course 100A C- or better; Management 11A; Management 11B. Pass One open to Managerial Economics Majors and Agricultural and Resource Economics Graduate Majors. Financial analysis at the firm level: optimizing capital structure; minimizing the cost of capital; dividend policies; mergers and acquisitions; real options; and risk management.
(new course—eff. summer 18)

173. Capital Markets (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 171A or course 171); course 106; course 100A C- or better; Management 11A; Management 11B. Pass One Open to Managerial Economics majors and Agricultural and Resource Economics graduate majors. Introduction to asset pricing. Valuation and risk characteristics of financial assets, including stocks, bonds, futures, and options. Investors' attitudes toward risk, capital allocation, portfolio selection, the capital asset pricing model, and the efficient market hypothesis.—*S. (S.)*
(change in existing course—eff. fall 18)

175. Natural Resource Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100B or Economics 100 or the equivalent. Pass One open to Managerial Economics (AMGE) and Environmental Policy Analysis and Planning (AEPP) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. Economic concepts and policy issues associated with natural resources, renewable resources, (ground water, forests, fisheries, and wildlife populations) and nonrenewable resources (minerals and energy resources, soil). (Same course as Environmental Science and Policy 175.) GE credit: SocSci|SS.—*S. (S.)*
(change in existing course—eff. winter 17)

176. Environmental Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A C- or better or Economics 100A C- or better or Economics 100 C- or better. Pass One open to Managerial Economics (AMGE) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. Role of the environment in economic activity and methods for protecting and enhancing environmental quality; implications of market failures for public policy; design of environmental policy; theory of welfare measurement; measuring the benefits of environmental improvement. GE credit: SS.
(change in existing course—eff. fall 18)

Graduate

200A. Microeconomic Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: graduate standing. Linear and non-linear optimization theory applied to develop the theory of the profit-maximizing firm and the utility-maximizing consumer. (Same course as Economics 200A.)
(change in existing course—eff. winter 18)

200B. Microeconomic Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A. Characteristics of market equilibrium under perfect competition, simple monopoly and monopsony. Emphasis on general equilibrium and welfare economics; the sources of market success and market failure. (Same course as Economics 200B.)
(change in existing course—eff. fall 18)

200C. Microeconomic Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200B. Uncertainty and information economics. Individual decision making under uncertainty. Introduction to game theory, with emphasis on applications to markets with firms that are imperfect competitors or consumers that are imperfectly informed. (Same course as Economics 200C.)
(change in existing course—eff. fall 18)

202A. Introduction to Applied Research Methods (3)
Lecture/discussion—3 hours. Prerequisite: course 204A; course 200A (can be concurrent); course 256A. Study of philosophy and methodology of applied research in agricultural economics. Methods of conceptualization of researchable topics. Method of communication and constructive criticism.
(change in existing course—eff. fall 18)

240A. Econometric Methods (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 239; or consent of instructor. Least squares, instrumental variables, and maximum likelihood estimation and inference for single equation linear regression model; linear restrictions; heteroskedasticity; autocorrelation; lagged dependent variables. (Same course as Economics 240A.)—*W. (W.)*
(change in existing course—eff. fall 17)

254. Dynamic Optimization Techniques with Economic Applications (4)
Lecture—4 hours. Prerequisite: Elementary knowledge of ordinary differential equations. Necessary and sufficient conditions in the calculus of variations and optimal control, economic interpretations, the dynamic envelope theorem and transversality conditions, infinite horizon problems and phase diagrams, local stability and comparative statics of the steady state, comparative dynamics.
(change in existing course—eff. fall 18)

258. Demand and Market Analysis (4)
Lecture—4 hours. Prerequisite: course 204B; course 256B; or consent of instructor. Application of theoretical material covered in 204A/B, with particular focus on production theory/factor demand and imperfect competition/market power. Use of theoretical models as a foundation for empirical economic analysis, and empirical exercises. Independent research on chosen topics, with empirical application.
(change in existing course—eff. fall 18)

American Studies

New and changed courses in American Studies (AMS)

Lower Division

55. Food in American Culture (4)
Lecture—3 hours; discussion—1 hour. Relationship between food and culture; relationship between food and the social order; influences on eating habits and the tensions between them including identity, convenience, and responsibility; multiple disciplines and genres. (Same course as Food Science & Technology 55.) GE credit: ArtHum or SocSci, Div, Wrt|ACGH, AH or SS, DD, WE.—*W. (W.)* Biltekoff
(change in existing course—eff. winter 18)

Upper Division

101D. Special Topics: American National Character (4)
(cancelled course—eff. spring 17)

120. American Folklore and Folklife (4)
(cancelled course—eff. winter 17)

160. Undergraduate Seminar in American Studies (4)
Seminar—3 hours; term paper. Pass One restricted to American Studies majors; limited enrollment. Intensive reading, discussion, research, and writing by small groups in selected topics of American Studies scholarship; emphasis on theory and its application to American material. May be repeated for credit up to one time when content differs.—*W, S. (W, S.)*
(change in existing course—eff. winter 17)

Animal Behavior (A Graduate Group)

New and changed courses in Animal Behavior (ABG)

Graduate

203. Advanced Animal Welfare (3)
Lecture—3 hours. Prerequisite: Animal Science 103 or equivalent course. Advanced animal welfare. Key concepts used when evaluating and understanding the welfare of animals kept by humans. Topics include animal pain, stress, cognition, motivation and emotions. Critical discussion of primary literature. May be repeated one time for credit.
(new course—eff. spring 17)

Animal Biology

New and changed courses in Animal Biology (ABI)

Upper Division

187. Animal Biology Seminar (2)
Seminar—1 hour; discussion—1 hour. Prerequisite: junior standing. Seminar leading to development of the Major Proposal for the Animal Biology major.
(change in existing course—eff. fall 18)

189. Senior Practicum (2)
Independent study—6 hours. Prerequisite: course 50A; course 50B; course 50C; course 187; junior standing. The practicum may be an experimental research project, a library research project or some other creative activity that will serve as a capstone experience for the Animal Biology major. May be repeated one time for credit. (P/NP grading only.)—*F, W, S. (F, W, S.)*
(change in existing course—eff. winter 18)

189D. Senior Practicum Discussion (1)
Discussion—1 hour. Prerequisite: course 50A; course 50B; course 50C; course 187; course 189 (can be concurrent); junior standing. Course helps prevent or solve problems during the students' senior practicum activity. (P/NP grading only.)—*F, W, S. (F, W, S.)*
(change in existing course—eff. winter 18)

Animal Biology (A Graduate Group)

New and changed courses in Animal Biology (ABG)

Graduate

203. Advanced Animal Welfare (3)
Lecture—3 hours. Prerequisite: Animal Science 103 or equivalent course. Advanced animal welfare. Key concepts used when evaluating and understanding the welfare of animals kept by humans. Topics include animal pain, stress, cognition, motivation and emotions. Critical discussion of primary literature. May be repeated one time for credit. Offered in alternate years.—*S. (S.)* Tucker
(new course—eff. spring 16)

205. Advanced Nutritional Energetics (3)
Discussion/laboratory—1 hour; lecture—2 hours. Prerequisite: Animal Biology 102, Animal Biology 103, Neurobiology, Physiology, and Behavior 101; or the equivalent courses. Class size limited to 30 students. History of nutritional energetics. Evaluation of energy transformations associated with food utilization. Energy expenditures at cellular, tissue, and animal levels as affected by diet and physiological state. Current and future feeding systems.—*S. (S.)* Sainz

(new course—eff. spring 17)

211. Advances in Animal Biotechnology and Genetics (3)
Lecture/discussion—3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 121; Biological Sciences 101; or consent of instructor. Introduction to advanced techniques used for assisted reproductive technologies in mammals and birds, genetic engineering, gene editing, stem cell biology. Offered in alternate years.—*(S.)* Murray, Ross

(new course—eff. spring 17)

Animal Genetics

New and changed courses in Animal Genetics (ANG)

Upper Division

111. Molecular Biology Laboratory Techniques (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: Biological Sciences 2C; Biological Sciences 101; Biological Sciences 102 or Animal Biology 102; Biological Sciences103 or Animal Biology 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.—*F. (F.)* Kueltz, Murray

(change in existing course—eff. winter 17)

Animal Science

New and changed courses in Animal Science (ANS)

Upper Division

129. Environmental Stewardship in Animal Production Systems (3)
Lecture—3 hours. Prerequisite: course 2, Biological Sciences 2A, 2B, 2C; Chemistry 8A and 8B or 118A and 118B. 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. Offered in alternate years. GE credit: SciEng|SE, SL.—*W. (W.)* Meyer

(change in existing course—eff. winter 17)

135. Production Animal Laboratory (3)
Lecture/discussion—1 hour; laboratory—3 hours; fieldwork—3 hours. Prerequisite: Animal Biology 102; Animal Biology 103; Neurobiology, Physiology, and Behavior 101 or course 100. Pass One restricted to Animal Science and Animal Science and Management students. Biochemical methods for developing and conducting research with production animals, and interpreting and presenting data. Laboratory focus course which uses sheep as model. There may be one or two mandatory all day Saturday field trips. GE credit: SciEng|SL.—*F. (F.)* Sainz

(new course—eff. spring 17)

136. Techniques and Practices of Fish Culture (3)
Lecture—1 hour; laboratory—6 hours. Prerequisite: course 2; Biological Sciences 2A; Biological Sciences 2B; Biological Sciences2C; Chemistry 8A and Chemistry 008B or Chemistry 118A and Chemistry 118B. Restricted to upper division standing. 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 including growth trials and biochemical assays. Not open for credit to students who have previously completed course 136A or 137. GE credit: SciEng, Wrt|QL, SL, VL, WE.—*F. (F.)* Hung

(change in existing course—eff. winter 17)

137. Techniques and Practices of Avian Culture (3)
Lecture—1 hour; laboratory—6 hours. Prerequisite: course 2, Biological Sciences 2A, 2B, 2C; Chemistry 8A and 8B or 118A and 118B. Restricted to upper division standing. 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 and biochemical assays. Not open for credit to students who have previously completed course 136B or 137. GE credit: SciEng|QL, SE, SL, VL, WE.—*S. (S.)* Hung

(change in existing course—eff. winter 17)

139. Experimental Animal Physiology (3)
Lecture—1 hour; laboratory—3 hours; fieldwork—3 hours. Prerequisite: Animal Biology 102, Biological Sciences 101, or consent of instructor. Restricted to seniors in the Animal Science and Animal Science and Management majors. Combination of theory and hands-on experiences in animal physiology using various experimental techniques. Practical laboratory skill development from cellular level to whole animal, in areas such as genetics, endocrinology, histology and physiological function. GE credit: SciEng|SE, WE.—*W. (W.)* Todgham

(change in existing course—eff. spring 16)

147. Dairy Processing and Marketing (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 2 or consent of instructor. Restricted to upper division standing. 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 17)

Anthropology

New and changed courses in Anthropology (ANT)

Lower Division

1Y. Human Evolutionary Biology (Hybrid Version) (4)
Web virtual lecture—1.5 hours; lecture/discussion—1.5 hours; discussion/laboratory—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, SL, WE.—*W. (W.)* Weaver

(change in existing course—eff. winter 17)

2. Cultural Anthropology (5)
Lecture—3 hours; discussion—1 hour; term paper. Introduction to cultural diversity in its many forms and methods used by anthropologists to account for it. Relational dynamic of culture, history, and power in constituting "social facts" and "realities." Critical thinking of contemporary concerns. GE credit: SocSci, Div, Wrt|ACGH, DD, SS, WC, WE.—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 17)

15. From Birth to Death: The Evolution of the Human Life Cycle (5)
Lecture—3 hours; discussion—1 hour; term paper—3 hours. Introduction to the biology of birth, childhood, marriage, the family, old age, and death. Examines comparative characteristics of nonhuman primates and other animals as well as cross-cultural variation in humans by study of selected cases. GE credit: SciEng, Div, Wrt|SE, SL, WC, WE.—*F. (F.)* Crofoot

(change in existing course—eff. winter 18)

Upper Division

125A. Structuralism and Symbolism (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Survey of anthropological approaches to understanding the logic of structuralism and symbolism in cultural analysis. Focus on how structural and symbolic interpretations relate to cultural and linguistic universals and to the philosophical basis of relativism in the social sciences. (Former course 125.) Offered in alternate years. GE credit: SocSci, Div | SS, WC, WE. GE credit: SocSci, Div|SS, WC, WE.

(change in existing course—eff. winter 17)

133. Anthropology of Ocean Worlds (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Exploration of various oceanic cultures and their engagement with the sea. Piracy, smuggling, exchange, maritime legal regimes, offshore policing, media infrastructures, and ocean ecologies. GE credit: SS, WC, WE.— Kahn

(change in existing course—eff. winter 17)

135. Media Anthropology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing. Examining human practices through their inscription in old and new media; evaluating the emergent fields of "cyber" and "digital" anthropology; and problematizing terms and concepts routinely deployed in studies of media worlds—platform, social media, hologram, algorithm, remediation, curation, animation. GE credit: AH or SS, VL, WC.—*S. (S.)* Elhaik

(change in existing course—eff. winter 17)

144. Contemporary Societies and Cultures of Latin America (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Introduction to contemporary social structure of Latin America. Origins, maintenance and changes in inequality: economic responses to poverty, sociocultural responses to discrimination, and political responses to powerlessness. GE credit: SocSci, Div, Wrt|SS, WC, WE.—de la Cadena

(change in existing course—eff. winter 17)

147. Modern South Asia Cinema (4)
Lecture/discussion —3 hours; film viewing—3 hours. Prerequisite: upper-division standing or consent of instructor. South Asian cinema of last 100 years in the context of cultural, social, and political changes. South Asian history, Independence, Partition, urban life, class, migration, postcolonial identity, diaspora, gender, sexuality, religion, sport, performance, etc. (Same course as Middle East/South Asia Studies 131B and Cinema & Technocultural Studies 146B) Offered in alternate years. GE credit: SocSci|AH, SS, VL, WC, WE.

(change in existing course—eff. winter 17)

154A. The Evolution of Primate Behavior (5)
Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: course 1 or course 54 or Evolution and Ecology 10 recommended. Examines ecological diversity and evolution of social systems of prosimians, monkeys, and apes, placing the social behavior

of the primates in the context of appropriate ecological and evolutionary theory. GE credit: SciEng, Wrt | SE, WE.—*F. (F.)* Isbell

(change in existing course—eff. fall 18)

154C. Behavior and Ecology of Primates (2)
Lecture/discussion—2 hours. Prerequisite: course 54 or course 154A or course 154B or Neurobiology, Physiology, and Behavior 102; Statistics 13 or Statistics 13Y or Statistics 32 or Statistics 100 or Sociology 46B; course 154CL (can be concurrent). Pass One restricted to upper division ANT majors; concurrent enrollment in course 154CL required. Scientific methods of studying, describing and analyzing the behavior and ecology of primates. (P/NP grading only.) GE credit: SciEng | QL, SE, SL.—*S. (S.)* Crofoot

(change in existing course—eff. spring 18)

154CL. Laboratory in Primate Behavior (4)
Laboratory—6 hours; term paper. Prerequisite: course 54 or course 154A or course 154B or Neurobiology, Physiology, and Behavior 102; Statistics 13 or Statistics 13Y or Statistics 32 or Statistics 100 or Sociology 46B; course 154C (can be concurrent); concurrent enrollment with course 154C required. Pass One restricted to upper division Anthropology majors only. Design and conduct of scientific "field studies" of the behavior of group-living primates at the California National Primate Research Center. GE credit: OL, SE, WE.

(change in existing course—eff. fall 18)

155. Primate Conservation Biology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or 54 recommended. Study of the taxonomic, ecological and cultural diversity of Primates and how human activities impact tropical ecosystems. Emphasis on case studies and applied research methods. Includes discussion about career opportunities in conservation. GE credit: QL, SL.

(new course—eff. spring 18)

159. Molecular Anthropology of Native America (4)
Seminar—3 hours; term paper. Prerequisite: course 1 or course 1Y or Biological Sciences 2B; 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. Offered irregularly. GE credit: SciEng | QL, SE.

(change in existing course—eff. spring 18)

181. Field Course in Archeological Method (9)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 3. Survey of archeological field methods and techniques. Strategies for survey and site location, mapping of artifacts and features, geophysical techniques, and hand excavation and analysis of stratigraphy. GE credit: SciEng|DD, SE, SL, SS.—*S. (S.)*

(change in existing course—eff. fall 17)

181L. Field Course in Archeological Methods (4)
Fieldwork—18 hours; lecture/discussion—2 hours. Prerequisite: course 181; or consent of instructor. On-site course using archaeological methods and techniques held at a field location in the western United States, generally California or Nevada. Incorporates basic methods of archaeological survey, mapping, and excavation. GE credit: SE.—*Su. (Su.)*

(new course—eff. spring 17)

191. Topics in Anthropology (4)
Lecture/discussion—3 hours; term paper. Prerequisite: upper division standing. Intensive treatment of a special anthropological topic or problem. May be repeated for credit.

(change in existing course—eff. fall 17)

Graduate

211. Advanced Topics in Cultural Ecology (4)
(cancelled course—eff. spring 17)

Applied Biological Systems Technology

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

Upper Division

150. Introduction to Geographic Information Systems (4)
Lecture—3 hours; laboratory—3 hours. Pass One restricted to Landscape Architecture and Sustainable Environmental Design majors. Basic concepts, principles, and methods of GIS are presented. Data structures, database design, GIS data creation, GPS, and spatial analysis. 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.—*F. (F.)* Greco, Upadhyaya

(change in existing course—eff. winter 18)

181N. Concepts and Methods in Geographic Information Systems (4)
Lecture/laboratory—8 hours.Prerequisite: course 150; Landscape Architecture 150; 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.—*W.* Hijmans

(change in existing course—eff. winter 18)

Graduate

212. Path to Zero Net Energy (4)
Lecture—3 hours; term paper/discussion—3 hours. Prerequisite: consent of instructor. Open to upper division or graduate students. Zero Net Energy concepts and social, technical, economic, and environmental considerations. Multidisciplinary research and analysis for clients.

(change in existing course—eff. fall 18)

Arabic

New and changed courses in Arabic (ARB)

Lower Division

21. Intermediate Arabic 21 (4)
Lecture/discussion—4 hours. Prerequisite: course 3; or consent of instructor. 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, OL, WC.—*F. (F.)* Hassouna

(change in existing course—eff. spring 17)

21A. Accelerated Intensive Intermediate Arabic (15)
Lecture/discussion—15 hours. Prerequisite: course 3 or with consent of instructor. Special 12-week accelerated, intensive summer session course that combines the work of courses ARB 21, 22, and 23. 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 21, 22 or 23. Offered irregularly. GE credit: ArtHum|AH, WC.—*Su. (Su.)*

(new course—eff. summer 17)

21C. Colloquial Egyptian Arabic (4)
Lecture/discussion—3 hours; lecture/laboratory—3 hours. Prerequisite: course 3; or consent of instructor. Continuation of the Colloquial Egyptian Arabic covered in the first year of Arabic; courses 1, 2, and 3. May be repeated for credit up to one time if instruction material changes. GE credit: ArtHum|AH.—*F, Su. (F, Su.)* Hassouna, Radwan, Sharlet

(change in existing course—eff. spring 17)

21L. Colloquial Levantine Arabic (4)
Lecture/discussion—4 hours. Prerequisite: course 3; or consent of instructor. Continuation of colloquial Levantine Arabic presented in Arabic 1,2 and 3. Integrated presentation of speaking and listening skills in colloquial Levantine Arabic, with reading and writing in Modern Standard Arabic that is related to Levantine cultural production and social life. GE credit: ArtHum, Div|AH, OL, WC.—*F. (F.)* Al-Shatarat, Sharlet

(new course—eff. fall 17)

22. Intermediate Arabic 22 (4)
Lecture/discussion—4 hours. Prerequisite: course 21; or consent of instructor. Continuation of course 21. Interactive and integrated presentation of listening, speaking, reading, and writing, including idiomatic expression. Focus on standard Arabic with limited use of Egyptian and/or one other colloquial dialect. GE credit: ArtHum|AH, OL, WC.—*W. (W.)* Hassouna

(change in existing course—eff. spring 17)

22C. Colloquial Egyptian Arabic (4)
Lecture/discussion—3 hours; lecture/laboratory—1 hour. Prerequisite: course 21C; or consent of instructor. Continuation of the Colloquial Egyptian Arabic covered in first year of Arabic; courses 1, 2, and 3 and the first quarter of Colloquial Arabic course 21C. May be repeated for credit up to one time if instruction material changes. GE credit: ArtHum|AH, OL, WC.—*W, Su. (W, Su.)* Hassouna, Radwan, Sharlet

(change in existing course—eff. spring 17)

22L. Colloquial Levantine Arabic (4)
Lecture/discussion—4 hours. Prerequisite: course 21L; or consent of instructor. Continuation of colloquial Levantine Arabic presented in Arabic 021L. Integrated presentation of speaking and listening skills in colloquial Levantine Arabic; reading and writing in Modern Standard Arabic related to Levantine social life. Offered in alternate years. GE credit: ArtHum, Div|AH, OL, WC.—*F. (F.)* Al-Shatarat, Sharlet

(new course—eff. winter 18)

23. Intermediate Arabic 23 (4)
Lecture/discussion—4 hours. Prerequisite: course 22; or consent of instructor. Continuation of courses 21 and 22. Interactive and integrated presentation of Arabic listening, speaking, reading, and writing skills, including idiomatic expression. GE credit: ArtHum|AH, OL, WC.—*S. (S.)* Hassouna

(change in existing course—eff. fall 17)

23C. Colloquial Egyptian Arabic (4)
Lecture/discussion—3 hours; lecture/laboratory—1 hour. Prerequisite: course 21C; or consent of instructor. Continuation of Colloquial Egyptian Arabic covered in course 22C. May be repeated for credit up to one time if instruction material changes. GE credit: ArtHum|AH, OL, WC.—*W, Su. (W, Su.)* Hassouna, Radwan, Sharlet

(change in existing course—eff. spring 17)

23L. Colloquial Levantine Arabic (4)
Lecture/discussion—4 hours. Prerequisite: course 22L; or with consent of instructor. Continuation of colloquial Levantine Arabic presented in Arabic 022L. Integrated presentation of speaking and lis-

tening skills in colloquial Levantine Arabic; reading and writing in Modern Standard Arabic related to Levantine social life. GE credit: ArtHum, Div|AH, OL, WC.—*(S.)* Al-Shatarat, Sharlet

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Directed group study. May be repeated for credit. (P/NP grading only.)

(new course—eff. winter 17)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. Special study. May be repeated for credit. (P/NP grading only.)

(new course—eff. winter 17)

Art History

New and changed courses in Art History (AHI)

Upper Division

122. Sex and Space (4)
Lecture/discussion—4 hours. Relationship between space and sexuality. Sexual metaphors in art and architecture, gender identity formation via images and space. Diverse intersections of sexuality and art history. GE credit: AH, DD, VL, WE.—*F. (F.)* Grigor

(new course—eff. fall 16)

129. Advanced Printmaking (4)
Studio—6 hours. Prerequisite: course 11; course 125A or course 125B or course 125C or course 125D. Pass One restricted to Art Studio majors. Development of intermedia printmaking. Advanced modes in print technologies: relief, serigraphy, intaglio, surface, as well as addition of digitized imagery. Production of prints using multi-plate prints and other methods. May be repeated for credit two times. GE credit: ArtHum | AH, VL.

(change in existing course—eff. fall 18)

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.—Pardee

(change in existing course—eff. winter 17)

163D. Art from China 1900 to the Present (4)
Lecture/discussion—4 hours. Forms of modern and avant-garde expression from China's industrialization to the 21st century. Interactions of art and politics, individual and state, art for the free market versus art for the state, expressions of modernity; China on the world stage. Offered in alternate years. GE credit: ArtHum, Div, Wrt|AH, VL, WC, WE.—Burnett

(change in existing course—eff. spring 17)

175. Architecture and Urbanism in Mediterranean Antiquity (4)
Lecture—3 hours; extensive writing. 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.—Roller

(change in existing course—eff. spring 17)

187. Contemporary Architecture (4)
Lecture—3 hours; term paper. Introduction to world architecture and urban design since circa 1966. Relation of influential styles, buildings, and architects to postmodern debates and to cultural, economic, technological and environmental change. Offered in alternate years. GE credit: ArtHum, Div, Wrt|AH, VL, WE.

(change in existing course—eff. spring 17)

Art Studio

New and changed courses in Art Studio (ART)

Lower Division

10. Fine Art Appreciation (4)
Lecture—3 hours; discussion—1 hour. Survey of contemporary artists since 1970. Topics explore contemporary thought within the visual arts using the forms and strategies of painting, sculpture, installation, performance, photography, and video in collaborative, ephemeral and multimedia approaches. Intended for Art and non-Art majors. GE credit: ArtHum|AH, VL.

(change in existing course—eff. winter 17)

Upper Division

103C. Intermediate Drawing: 3 Dimensions (4)
Studio—12 hours. Prerequisite: courses 2. Pass One restricted to Art Studio Major. Intermediate study of drawing composition using three dimensional media. Offered in alternate years. GE credit: ArtHum|AH, VL.—Pardee

(new course—eff. fall 17)

105B. Advanced Drawing: Figure (4)
Studio—6 hours. Prerequisite: course 103A or course 103B; course 2. Pass One restricted Art Studio majors. Study of the figure through drawing of the model. Exploration of different methods and process of figure-drawing. May be repeated for credit one time. GE credit: ArtHum|AH, VL.—Pardee, Werfel

(change in existing course—eff. winter 18)

114A. Intermediate Video: Animation (4)
Studio—6 hours. Prerequisite: course 12 or Cinema & Technocultural Studies 20; one drawing course. Pass One restricted to Art Studio majors. 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. GE credit: ArtHum|AH, VL.—Martin

(change in existing course—eff. winter 18)

114B. Intermediate Video: Experimental Documentary (4)
Studio—6 hours. Prerequisite: course 12 or Cinema & Technocultural Studies 20. Pass One restricted to Art Studio majors. 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. GE credit: ArtHum|AH, VL.—Martin

(change in existing course—eff. winter 18)

114C. Intermediate Video: Performance Strategies (4)
Studio—6 hours. Prerequisite: course 12 or Cinema & Technocultural Studies 20. Pass One restricted to Art Studio majors. 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. GE credit: ArtHum|AH, VL.—Martin

(change in existing course—eff. winter 18)

129. Advanced Printmaking (4)
Studio—6 hours. Prerequisite: course 11; course 125A or course 125B or course 125C or course 125D. Pass One restricted to Art Studio majors. Development of intermedia printmaking. Advanced modes in print technologies: relief, serigraphy, intaglio, surface, as well as addition of digitized imagery. Production of prints using multi-plate prints and other methods. May be repeated for credit two times. GE credit: ArtHum | AH, VL.

(change in existing course—eff. fall 18)

143. Advanced Ceramic Sculpture: Studio Projects (4)
Studio—12 hours. Prerequisite: course 8; course 142A or course 142B or course 142C. Pass One restricted to Art Studio majors. Experimentation with all techniques learned in prerequisite ceramics classes. Course will include class projects in consultation with faculty. May be repeated for credit up to two times; consent of instructor required for students taking the course a third time. GE credit: ArtHum|AH, VL.—Rosen

(change in existing course—eff. spring 17)

Professional

401. Museum Training: Curatorial Principles (4)
Seminar—3 hours; papers. Approved for graduate degree credit. Study of private and public collections. Museum personalities. Appraisal of works of art; ethics of appraisal. Auction and sales: methods and catalogues. Registration. Technical problems of the museum. Connoisseurship. Collateral reading. Visits to museums. Offered in alternate years.

(change in existing course—eff. fall 17)

Asian American Studies

New and changed courses in Asian American Studies (ASA)

Lower Division

2. Contemporary Issues of Asian Americans (4)
Lecture—3 hours; discussion—1 hour. 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.—*F, W, S.*

(change in existing course—eff. spring 17)

Upper Division

189I. Topics in Asian American Studies: Politics and Social Movements (4)
Lecture—4 hours. Intensive treatment of a topic in Asian American Studies: politics and social movements. May be repeated for credit. Offered irregularly. GE credit: ArtHum or SocSci|ACGH, AH or SS, DD, OL, WE.

(change in existing course—eff. spring 17)

198F. Student Facilitated Course (1-4)
Student-facilitated (taught) course intended for upper division students. Offered irregularly. (P/NP grading only.)

(change in existing course—eff. fall 17)

Astronomy

New and changed courses in Astronomy (AST)

Lower Division

10L. Observational Astronomy Laboratory (1)
Laboratory—2.5 hours. Not open for credit to students who have taken Astronomy 2 or Astronomy 10. Introduction to observations of the night sky using small telescopes in nighttime laboratory. Not

open for credit to students who have completed course 2 or 10. GE credit: SciEng|SE, VL.—*F, W, S. (F, W, S.)* Boeshaar

(change in existing course—eff. winter 18)

25. Introduction to Modern Astronomy and Astrophysics (4)
Lecture—3 hours; discussion/laboratory—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.—*F. (F.)* Fassnacht, Lubin

(change in existing course—eff. spring 17)

Atmospheric Science

New and changed courses in Atmospheric Science (ATM)

Upper Division

111. Weather Analysis and Prediction (3)
Lecture—3 hours. Prerequisite: course 110; course 121B; course 111L (can be concurrent) or course 111LY (can be concurrent); 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. Offered in alternate years. GE credit: SciEng|QL, SE, VL.—*W.* Grotjahn

(change in existing course—eff. winter 18)

116. Modern Climate Change (4)
Lecture—3 hours. Factors that determine the Earth's climate, including natural and human-caused changes. Impacts of climate change. Possible future climates and policies to reduce human emissions of greenhouse gases. GE credit: SciEng|QL, SE, SL, VL.—*S. (S.)* Anastasio

(change in existing course—eff. fall 17)

149. Air Pollution (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 21D; Mathematics 22B; Chemistry 2B C- or better; Atmospheric Science 121A or Engineering 103 C- or better or Civil and Environmental Engineering 100 C- or better. 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.—*F. (F.)* Cappa

(change in existing course—eff. winter 18)

Avian Science

New and changed courses in Avian Science (AVS)

Lower Division

13. Birds, Humans and the Environment (3)
Lecture—2 hours; discussion—1 hour. Restricted to students with lower division standing. Interrelationships of the worlds of birds and humans. Lectures, discussions, field trips and projects focus on ecology, avian evolution, physiology, reproduction, flight, behavior, folklore, identification, ecotoxicology and conservation. Current environmental issues are emphasized. Half-day field trip. GE credit: SciEng, Wrt|SE, SL.

(change in existing course—eff. winter 17)

Upper Division

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. Restricted to upper division students. (P/NP grading only.)

(change in existing course—eff. winter 17)

Biochemistry, Molecular, Cellular and Developmental Biology

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

Graduate

256. Cell and Molecular Biology of Cancer (3)
Lecture—1.5 hours; seminar—1.5 hours. Prerequisite: course 210; course 212; course 213; course 214. Analysis of the pathologic alterations of cancer cells and therapeutic opportunities; with emphasis on animal models, tumor immunotherapy, stress response, metabolism, epigenetics, microRNAs and non-coding RNAs, and microbiota and inflammation.

(new course—eff. spring 18)

Biological Sciences

New and changed courses in Biological Sciences (BIS)

Lower Division

2B. Introduction to Biology: Principles of Ecology and Evolution (5)
Lecture—3 hours; discussion—1 hour; laboratory—3 hours. 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.—*F, W, S, Su. (F, W, S, Su.)*

(change in existing course—eff. fall 17)

11L. Basic Life Sciences Laboratory (1)
Laboratory—3 hours. Prerequisite: consent of instructor. Limited to Biology Undergraduate Scholars Program (BUSP) students. Basic laboratory skills in life sciences research, including microbiology, molecular biology, and genetics.—*S. (S.)*

(change in existing course—eff. winter 18)

Upper Division

101. Genes and Gene Expression (4)
Lecture—4 hours. Prerequisite: course 2A C- or better, course 2B C- or better; Chemistry 8A or Chemistry 118A or Chemistry 128A; Statistics 13 or Statistics 13Y or Statistics 100 or Statistics 102 or Statistics 130A; Statistics 100 preferred. Nucleic acid structure and function; gene expression and its regulation; replication; transcription and translation; transmission genetics; molecular evolution. GE credit: SciEng|QL, SE, SL.—*F, W, S, Su. (F, W, S, Su.)* Brady, Comai, Dvorak, Ellefson-Crowder, Engebrecht, Kliebenstein, Langley, Lott, Nord, Rodriguez, Ross-Iberra, Turelli

(change in existing course—eff. winter 18)

124. Coastal Marine Research (6)
Laboratory—12 hours; fieldwork—12 hours; laboratory/discussion—2 hours. Prerequisite: Evolution and Ecology 114 (can be concurrent) or Evolution and Ecology 106 (can be concurrent) or Environmental Science and Policy 152 (can be concurrent) or Environmental Science and Policy 124 (can be concurrent); concurrent enrollment in one of the above listed courses required; upper division standing or consent of instructor. Student must complete the application at http://www.bml.ucdavis.edu. Independent research on topics related to an accompanying core Bodega Marine Laboratory summer course. Students will receive training in generating hypotheses, designing experiments, collecting and analyzing data, and scientific communication. May be repeated for credit up to two times. GE credit: OL, QL, SE, VL, WE.

(change in existing course—eff. summer 18)

132. Introduction to Dynamic Models in Modern Biology (4)
Lecture—3 hours; laboratory—2 hours. Prerequisite: Mathematics 16C; Statistics 13 or Statistics 13Y; or equivalents and one lower division course in biology or equivalent. 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 | QL, SE, SL, VL, WE.

(change in existing course—eff. spring 18)

Biophotonics

New and changed courses in Biophotonics (BPT).

Graduate

201. Current Topics in Biophotonics and Bioimaging Research (1)
Lecture/discussion —1 hour. Prerequisite: consent of instructor. Designed to help graduate students develop and maintain familiarity with the current and past literature in the field of Biophotonics and Bioimaging research and related areas. May be repeated for credit when topics differ. May be repeated for credit up to four times when subject differs.—*F, W, S. (F, W, S.)* Marcu

(new course—eff. fall 16)

Biophysics

New and changed courses in Biophysics (BPH)

Graduate

241. Membrane Biology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 102, 103, 104 or consent of instructor. Advanced topics on membrane biochemistry and biophysics. Relationship of the unique properties of biomembranes to their roles in cell biology and physiology.—*S. (S.)* Crowe, Longo, Voss

(change in existing course—eff. winter 17)

255. Nanoscale Imaging for Molecular Medicine (3)
Lecture/discussion—3 hours. Prerequisite: Biomedical Engineering 202 highly recommended; graduate standing. Current and emerging technologies to visualize biological structures and processes at size scales = 100 nanometers – and their application towards the advancement of molecular medicine. Technologies include superresolution optical microscopy, electron microscopy and tomography. Emphasis on quantitative imaging. Same course as Biomedical Engineering 255.—*S. (S.)* Cheng, Chuang

(change in existing course—eff. spring 17)

271. Optical Methods in Biophysics (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: Biological Sciences 102; Applied Science Engineering 108B; Chemistry 110A; or equivalents. Principal optical techniques used to study biological structures and their related functions. Specific optical techniques useful in the studies of protein-nucleic acid, protein-membrane and protein-protein interactions. Biomedical applications of optical techniques.

(change in existing course—eff. spring 17)

288. Living Matter: Physical Biology of the Cell (3)
Lecture—3 hours. Open to any student possessing general background in any disciplines of physical or biological sciences and engineering. Introduction to the origin, maintenance, and regulation of the dynamic architecture of the cell, including cellular modes of organization, dynamics and energy dissipation, molecular transport, motility, regulation, and adaptability. Same course as Materials Science and Engineering 288 and Biomedical Engineering 288.—*W. (W.)* Parikh

(new course—eff. winter 17)

Biotechnology

New and changed courses in Biotechnology (BIT)

Lower Division

91. Undergraduate Seminars in Biotechnology (1)
Seminar—1 hour. Undergraduate oriented seminar series focused on biotechnology research and product development. Speakers from campus and the private sectors discuss ongoing research, product development and biotechnology careers. (P/NP grading only.)—*W. (W.)* Yoder

(new course—eff. winter 17)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Directed group study. May be repeated for credit. GE credit: SE.—*F, W, S, Su. (F, W, S, Su.)*

(new course—eff. fall 16)

Upper Division

150. Applied Bioinformatics (4)
Lecture—2 hours; laboratory/discussion—2 hours. Prerequisite: Biological Sciences 101; Computer Science Engineering 10 or Computer Science Engineering 15 or Plant Science 21; Plant Science 120 or Statistics 13 or Statistics 13Y or Statistics 100; or consent of instructor. Limited enrollment. 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. Two units of credit for students who have completed Computer Science Engineering 124. GE credit: SE, VL.—Runcie

(change in existing course—eff. spring 18)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. Directed group study. May be repeated for credit. Offered in alternate years. GE credit: SE.—*F, W, S, Su. (F, W, S, Su.)*

(new course—eff. fall 16)

Biotechnology; Design Emphasis

New and changed courses in Biotechnology; Design Emphasis (DEB)

Graduate

282. Biotechnology Internship (7-12)
Internship—21-36 hours. Prerequisite: graduate standing and consent of instructor. Open only to students participating in the Designated Emphasis in Biotechnology program. Research at a biotechnology company or interdisciplinary cross-college lab for a minimum of 3 months as part of the Designated Emphasis in Biotechnology Program.—*F, W, S, Su. (F, W, S, Su.)* Dandekar, Kjelstrom

(new course—eff. winter 17)

294. Current Progress in Biotechnology (1)
Seminar—3 hours. Prerequisite: graduate standing. Seminars presented by guest lecturers on subjects of their own research activities. May be repeated for credit. (Same course as Same course as Chemical Engineering 294.) (S/U grading only.)—*F, W, S. (F, W, S.)* Kjelstrom, McDonald, Rodriguez

(change in existing course—eff. winter 18)

Business Analytics

New and changed courses in Business Analytics (BAX)

Professional

401. Introduction to Business Analytics (2)
Lecture—2 hours. Introduction to the process of analyzing raw data to gain profitable business insight. Applications selected across organizational functions include prediction, process improvement, and general operational decision-making.

(new course—eff. fall 17)

402. Organizational Issues in Implementing Analytics (2)
Lecture—2 hours. Review the evolution of analytics in business, how to assemble and manage analytics teams, and the decision life-cycle. Emphasis on structuring communications to improve buy-in from peers and non-quantitatively-inclined colleagues.

(new course—eff. winter 18)

403. Organizational Effectiveness Workshop (2)
Lecture—2 hours. Examine leadership, communication, and project management within the business, legal and societal contexts in which analytics is applied. Emphasis on privacy, data security, responsibility, and ethics.—*F. (F.)*

(new course—eff. fall 17)

411. Problem Structuring (2)
Lecture—2 hours. Synthesize data-rich business challenges using analytic frameworks and techniques for modeling business problems. Emphasis on modeling uncertainty, optimizing multiple criteria, and building consensus.—*F. (F.)*

(new course—eff. fall 17)

421. Data Management (2)
Lecture—2 hours. Introduction to the extraction, assembly, storage and organization of data in IT systems.—*F. (F.)*

(new course—eff. fall 17)

422. Big Data (2)
Lecture—2 hours. Introduction to business applications involving standard, streaming, and network data. Emphasis on scalable technologies for processing and analyzing big data for diverse applications.—*F. (F.)*

(new course—eff. fall 17)

423. Data Design and Representation (2)
Lecture—2 hours. Students learn computational reasoning about data representations by mapping conceptual data models to relational structures and analyzing database architectures and design tradeoffs.—*F. (F.)*

(new course—eff. fall 17)

431. Data Visualization (2)
Lecture—2 hours. Extract insights using visualization tools in R, Python, ManyEyes, HTML/CSS, etc. Standard (histograms, boxplots, and dashboards) and specialized (3D, animation, word clouds) formats are covered.—*F. (F.)*

(new course—eff. fall 17)

441. Statistical Exploration and Reasoning (2)
Lecture—2 hours. Introduction to statistical reasoning and inference extraction from large data-sets. Students learn to obtain preliminary insights and form initial hypotheses through exploratory data analysis (EDA).—*F. (F.)*

(new course—eff. fall 17)

442. Advanced Statistics (3)
Lecture—3 hours. Continue exploring statistical reasoning using maximum likelihood estimation, Bayesian models, nonparametric models, Monte Carlo Markov Chain, time series, model specification, model selection, and dimension reduction.—*F. (F.)*

(new course—eff. fall 17)

443. Analytic Decision Making (3)
Lecture—3 hours. Using spreadsheets and specialized modeling tools, explore structured problem solution through meta-heuristics, Monte Carlo simulation, and mathematical optimization.—*F. (F.)*

(new course—eff. fall 17)

452. Machine Learning (3)
Lecture—3 hours. Construct algorithms for learning from data and analyze the process for deriving business intelligence. Coverage of supervised and unsupervised learning, neural networks, etc.—*F. (F.)*

(new course—eff. fall 17)

453. Application Domains (3)
Lecture—3 hours. Students explore contemporary and emerging domains for high-yield applications of analytics. Topics: social network analytics, search analytics, health care analytics, internet of things, supply chain/operations analytics, and marketing analytics.—*F. (F.)*

(new course—eff. winter 17)

461. Practicum Initiation (2)
Lecture—2 hours. Students form teams, scope their project in light of team capability and business opportunity, create a preliminary structure and solution approach for the core problem, and assess data quality and project risks.—*F. (F.)*

(new course—eff. fall 17)

462. Practicum Elaboration (2)
Lecture—2 hours. Building on problems chosen in course 461, teams refine the business opportunity and draw insights from exploratory data analysis.—*F. (F.)*

(new course—eff. fall 17)

463. Practicum Analysis (2)
Lecture—2 hours. Implement selected analytic approaches through iteratively refining assumptions and analysis, synchronizing client requirements with model results, and creating minimum viable prototypes. Offered irregularly.—*F. (F.)*

(new course—eff. fall 17)

464. Practicum Implementation (4)
Lecture—2 hours; project—2 hours; term paper—2 hours; discussion—1 hour. Project teams complete analysis, plan deployment and obtain client buy-in. The course culminates in a project presentation, preferably including representatives from the client organization.—*F. (F.)*

(new course—eff. fall 17)

Cell Biology and Human Anatomy

New and changed courses in Cell Biology and Human Anatomy (CHA)

Upper Division

102. Human Microscopic Anatomy: Structure and Function of Human Tissues and Organ Systems (4.5)
Lecture—3 hours; discussion/laboratory—4 hours. Prerequisite: Biological Sciences 104. Limited enrollment. Course complements Gross Anatomy by extending the study of structure to the microscopic level. Shows how cells are assembled into tissues, and tissues into organs, with an emphasis on demonstrating how microscopic structure explains function. GE credit: SE.—*W. (W.)* Beck, FitzGerald, Simo

(new course—eff. winter 17)

103. Human Clinical Neuroanatomy (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 101; or consent of instructor. Open to upper division students. Clinically relevant anatomy of the normal human nervous system, including external and internal anatomy of the brain, spinal cord, and cranial nerves. Blood supply to the brain and spinal cord. Functional neuroanatomy of motor, sensory, and cognitive systems. Application of neuroanatomical principles relevant to clinical problem solving for students entering health care professions. (Same course as Neurology 103.) GE credit: SciEng | SE.—*S. (S.)* Watson

(new course—eff. spring 18)

Graduate

202. Microscopic Anatomy for Researchers (3)
Lecture—2 hours; discussion/laboratory—3 hours. Open to graduate students in the biomedical sciences (no consent required); advanced undergraduates seeking research careers in the biomedical sciences (consent of instructor required). The growing importance of the use of gene knock-out studies and imaging technology requires significant understanding of basic anatomy. Designed to familiarize students in diverse fields with anatomical, cellular and tissue organization of typical animal models.—*W. (W.)* Beck

(change in existing course—eff. spring 17)

Professional

493. Clinically-Oriented Anatomy Special Study Module (6)
(cancelled course—eff. fall 17)

Chemistry

New and changed courses in Chemistry (CHE)

Lower Division

2A. General Chemistry (5)
Lecture—3 hours; laboratory/discussion—4 hours. Prerequisite: high school chemistry and physics, and concurrent enrollment in mathematics at or above the level of Mathematics 12 strongly recommended; any one of the following: (A) SAT Mathematics score = 600+; (B) ACT Mathematics score = 27+; (C) AP Chemistry exam score of = 3+; (D) SAT Chemistry subject test score = 700+; (E) UC Davis Chemistry Placement Examination score = 24+ on first attempt; in lieu of A-E, either completion of ALEKS online Preparatory Chemistry course with 100% Pie Mastery or completion of Workload 41C with a grade of C or better (Workload 41C offered in fall quarter only to students who do not meet A-E). Periodic table, stoichiometry, chemical equations, physical properties and kinetic theory of gases, atomic and molecular structure and chemical bonding. Laboratory experiments in stoichiometric relations, properties and collection of gases, atomic spectroscopy, and introductory quantitative analysis. Not open for credit to students who have taken course 2AH. GE credit: SciEng|QL, SE, SL.—*F, W. (F, W.)*

(change in existing course—eff. fall 16)

Upper Division

103A. Chemistry for Life Sciences: Determining Organic Structures and Properties (5)
Lecture—3 hours; discussion—1 hour; laboratory—1 hour. Prerequisite: course 2C C- or better or course 2CH C- or better; course 8A or 118A or 128A. Continuation of course 3C. Core concepts of organic structure, nomenclature, functional groups, organic acids and bases, resonance and delocalization, aromaticity, intermolecular forces, three-dimensional structure and conformational analysis, spectroscopy. Only 3 units of credit for students who have completed course 8A with a C- or better; only 2 units of credit for students who have completed 118A or 128A with a C- or better; not open for credit to students who have completed courses 8B, 118B, 118C, 128B, 128C with a C- or better. GE credit: SciEng|SE, SL.—*F. (F.)*

(new course—eff. fall 16)

103B. Chemistry for Life Sciences: Predicting and Controlling Organic Pathways (5)
Lecture—3 hours; discussion—1 hour; laboratory—1 hour. Prerequisite: course 103A C- or better. Continuation of course 103A. Core concepts of functional group transformations, synthesis, mechanisms, sustainable chemistry, structure and function of biomolecules, organic reactions in biological systems, molecular design, detection, separation, and identification of organic molecules. Not open for credit to students who have completed course 8B, 118B, 118C, 128B, or 128C. GE credit: SciEng|SE, SL. GE credit: SciEng|SE, SL.—*W. (W.)*

(new course—eff. fall 16)

107A. Physical Chemistry for the Life Sciences (3)
Lecture—3 hours. Prerequisite: course 2C or course 2CH; Mathematics 16C or Mathematics 17C or Mathematics 21C; Physics 7C or Physics 9C or Physics 9HC. Physical chemistry intended for majors in the life science area. Introductory development of classical and statistical thermodynamics including equilibrium processes and solutions of both nonelectrolytes and electrolytes. The thermodynamic basis of electrochemistry and membrane potentials. GE credit: SciEng|SE.—*F, W. (F, W.)*

(change in existing course—eff. spring 17)

110A. Physical Chemistry: Introduction to Quantum Mechanics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Physics 7C or Physics 9C or Physics 9HC; course 2C or course 2CH; Mathematics 16C or Mathematics 17C or Mathematics 21C; completion of Mathematics 21D, 22A, and 22AL, and Physics 9C or 9HC, strongly recommended. 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.—*F, S. (F, S.)*

(change in existing course—eff. spring 17)

118A. Organic Chemistry for Health and Life Sciences (4)
Lecture—3 hours; laboratory/discussion—1.5 hours. Prerequisite: course 2C C- or better or course 2CH C- or better. The 118A, 118B, 118C series is for students planning professional school studies in health and life sciences. A rigorous, in-depth presentation of basic principles with emphasis on stereochemistry and spectroscopy and preparations and reactions of nonaromatic hydrocarbons, haloalkanes, alcohols and ethers. Only 2 units credit for students who have completed course 8A. Not open for credit to students who have completed course 8B or course 128A. GE credit: SciEng|SE SL.—*F, W. (F, W.)*

(change in existing course—eff. spring 17)

118B. Organic Chemistry for Health and Life Sciences (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 118A or 128A. Continuation of course 118A, with emphasis on spectroscopy and the preparation and reactions of aromatic hydrocarbons, organometallic compounds, aldehydes and ketones.—*W, S. (W, S.)*

(change in existing course—eff. spring 17)

118C. Organic Chemistry for Health and Life Sciences (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 118B or courses 128B and 129A. Open to students changing from the Chemistry 128 course sequence only if they have completed prior organic laboratory work (at least course Chemistry 129A). Continuation of course 118B, with emphasis on the preparation, reactions and identification of carboxylic acids and their derivatives, alkyl and acyl amines, ß-dicarbonyl compounds, and various classes of naturally occurring, biologically important compounds.—*F, S. (F, S.)*

(change in existing course—eff. spring 17)

128A. Organic Chemistry (3)
Lecture—3 hours. Prerequisite: course 2C C or better or course 2CH C or better. Introduction to the basic concepts of organic chemistry with emphasis on stereochemistry and the chemistry of hydrocarbons. Designed primarily for majors in chemistry. Chemistry majors should enroll in course 129A concurrently. Only two units credit allowed for students who have completed course 8A; not open for credit to students who have completed courses 8B or 118A. GE credit: SciEng|SE.

(change in existing course—eff. winter 17)

128B. Organic Chemistry (3)
Lecture—3 hours. Prerequisite: course 128A or consent of instructor. Continuation of course 128A with emphasis on the chemistry of alcohols, ethers, their sulfur analogs, and carbonyl compounds. Introduction to the application of spectroscopic methods to organic chemistry. Introduction to synthesis of moderately complex organic molecules. Full credit to students who completed 8B or 118A; not open for credit to students who have completed course 118B. GE credit: SciEng|SE.—*F, S. (F, S.)*

(change in existing course—eff. winter 17)

128C. Organic Chemistry (3)
Lecture—3 hours. Prerequisite: course 128B. Continuation of course 128B with emphasis on enolate condensations and the chemistry of amines, phenols, and sugars; selected biologically important compounds. Full credit to students who completed course 118B; Not open for credit to students who have completed course 118C. GE credit: SciEng|SE.—*F, S. (F, S.)*

(change in existing course—eff. winter 17)

129A. Organic Chemistry Laboratory (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: C or better in course 2C or 2CH; course 128A (can be concurrent). Introduction to laboratory techniques of organic chemistry. Emphasis on methods used for separation and purification of organic compounds.

Full credit to students who completed course 8B; not open for credit to students who have completed course 118B.—*F, W. (F, W.)*

(change in existing course—eff. winter 17)

129B. Organic Chemistry Laboratory (2)
Laboratory—6 hours. Prerequisite: courses 129A; CHE 128B (can be concurrent). Continuation of course 129A. Emphasis on methods used for synthesis and isolation of organic compounds. Not open for credit to students who have completed course 118C. Not open for credit to students who have completed course 118C. GE credit: SciEng|SE.—*F, S. (F, S.)*

(change in existing course—eff. winter 17)

130B. Pharmaceutical Chemistry (3)
Lecture—2 hours; lecture/laboratory—1 hours. Prerequisite: course 130A (can be concurrent). Continuation of course 130A with emphasis on case studies of various drugs and the use of computational methods in drug design.—*S. (S.)*

(change in existing course—eff. spring 17)

130C. Case Studies in Pharmaceutical Chemistry (1)
Seminar—2 hours; independent study. Prerequisite: courses 130A (can be concurrent);130B (can be concurrent). 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.)—*S. (S.)*

(change in existing course—eff. spring 17)

135. Advanced Bio-organic Chemistry Laboratory (3)
Lecture—1 hour; laboratory—6 hours. Prerequisite: course 130B (can be concurrent). Separation, purification, identification and biological evaluation of organic compounds using modern methods of synthesis, computational chemistry and instrumentation. Emphasis on pharmaceutical and medicinal substances.—*F, S. (F, S.)*

(change in existing course—eff. fall 17)

Graduate

280. Seminar in Ethics for Scientists (2)
(cancelled course—eff. fall 17)

Chicana/o Studies

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

Lower Division

21S. Chicana/o and Latina/o Health Care Issues (4)
Lecture—4 hours. Prerequisite: Spanish 3 or the equivalent. Overview of health issues of Chicanas/os and Latinas/os in the State of California; role of poverty/lack of education and limited access to health care. All course instruction for this course will be in Spanish. Course is taught abroad. Not open for credit to students who have completed course 21. GE credit: Div | OL, WC, WE.—Flores, de la Torre

(change in existing course—eff. spring 18)

40. Comparative Health: Top Leading Causes of Death (4)
Lecture/discussion—3 hours; discussion—1 hour. Prerequisite: Statistics 13 or Statistics 13Y; or consent by instructor. Introduction to the epidemiology of the leading causes of death for ethnic/racial minorities. Assessment of disproportionate rates at which ethnic/racial minorities suffer and die from chronic and infectious diseases and injuries and statistical methods used to calculate these rates. Not open for credit to students who have completed course 40S. GE credit: SciEng, Div, Wrt | QL, SE, WE.—Deeb-Sossa, Rojas

(change in existing course—eff. spring 18)

40S. Comparative Health: Leading Causes of Death (4)
Lecture—4 hours. Prerequisite: Statistics 13 or Statistics 13Y; or consent by instructor. Introduction to epidemiology of leading causes of death for ethnic/racial minorities. Assessment of disproportionate rates at which ethnic/racial minorities suffer & die from chronic and infectious diseases & injuries & statistical methods used to calculate these rates. Offered abroad. Not open for credit to students who have completed course 40. GE credit: SciEng, Div, Wrt | QL, SE, WC, WE.

(change in existing course—eff. spring 18)

92. Internship (1-12)
Internship—3-36 hours. Prerequisite: course 10 or course 21 or course 50; Spanish 3 or Spanish 3V); or equivalent of Spanish 3. Academic guidance combined with internship in community agencies serving Mexican/Latina/Latino/Chicana/Chicano clients. Use of bilingual skills and knowledge of history, culture, economics, politics and social issues. May be repeated for credit up to 12 units. (P/NP grading only.)

(change in existing course—eff. winter 18)

Upper Division

135S. Transnational Latina/o Political Economy (4)
Lecture—3 hours; term paper. Prerequisite: Spanish 3 or Spanish 3V or Spanish 3Y; or consent of instructor; or equivalent; Economics 1A and Economics 1B recommended. Intensive reading, discussion and research on selected topics from Latin America and the US with regard to immigrant and native communities. Topics include comparative immigration and macroeconomic policies in the US and Latin America. Offered in a Spanish speaking country. Offered irregularly. GE credit: OL, WC, WE.

(change in existing course—eff. spring 18)

145S. Bi-National Health (5)
Lecture—5 hours. Prerequisite: Biological Sciences 1A; Biological Sciences 1B; Biological Sciences 1C; Spanish 21 or Spanish 21V or Spanish 21Y or Spanish 31; or consent of instructor; upper division standing only. Examination of health status and intervention strategies presented in public health care settings, private clinics and by indigenous healers in Mexico. Analysis of impact of high risk diseases. Offered in a Spanish speaking country under supervision of UC Davis faculty/lecturer. GE credit: OL, WC, WE.—Flores, de la Torre

(change in existing course—eff. spring 18)

181. Chicanas and Latinas in the U.S.: Historical Perspectives (4)
Lecture/discussion—4 hours. Prerequisite: course 10 or Women's Studies 50. Historical issues in the lives of Chicanas and Latinas in the U.S. and their diverse countries of origin. GE credit: ArtHum or SocSci, Div, Wrt|ACGH, AH or SS, DD, WE.

(change in existing course—eff. fall 17)

192S. Internship (1-12)
Internship. Prerequisite: course 10 or course 21 or course 50; Spanish 3 or Spanish 3V or Spanish 3Y; and consent of instructor; or equivalent of Spanish 3, Spanish 3V, Spanish 3Y. May be repeated for credit (P/NP grading only.)

(change in existing course—eff. spring 18)

Graduate

241. Community Based Health Research (4)
Lecture/discussion—3 hours; term paper. Provides knowledge and skills to plan and implement public health projects that highlight the intersection of social determinants of health within a community empowerment framework.—*S. (S.)* Deeb-Sossa, Flores

(new course—eff. fall 17)

Chinese

New and changed courses in Chinese (CHN)

Upper Division

107. Traditional Chinese Fiction (in English) (4)
Lecture—3 hours; discussion—1 hour. English-language course studying the dawn of Chinese fiction and its development down to modern times. Combines survey history with close reading of representative works such as The Story of the Stone and famous Ming-Qing short stories. GE credit: GE credit: ArtHum, Div, Wrt | AH, WC.—II. (II.) Halperin, He

(change in existing course—eff. spring 16)

108. Poetry of China and Japan (in English) (4)
Lecture—3 hours; discussion—1 hour. A comparative approach to Chinese and Japanese poetry, examining poetic practice in the two cultures; includes a general outline of the two traditions, plus study of poetic forms, techniques, and distinct treatments of universal themes: love, nature, war, etc. Offered in alternate years. (Same course as Japanese 108.) GE credit: ArtHum, Div, Wrt | AH, WC.—Yeh

(change in existing course—eff. fall 17)

110. Great Writers of China: Texts and Context (in English) (4)
Lecture—3 hours; discussion—1 hour. Examination of major theoretical concepts and interpretive methods in the study of literature by using examples from the Chinese tradition; discussions of classical and modern works with an emphasis on the relations between literature, author, society, and culture. GE credit: ArtHum, Div, Wrt|AH, WC.—Yeh, He

(change in existing course—eff. spring 17)

111. Modern Chinese: Reading and Discussion (12)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 6 C- or better or course 3BL C- or better or course 4A C- or better; or placement exam or consent of instructor. 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.—*F. (F.)*

(change in existing course—eff. spring 17)

112. Modern Chinese: Reading and Discussion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 111; or placement exam or consent of instructor. Further development of communication skills from course 111 in Modern Standard Mandarin-speaking environments. Reading dialogues/articles pertaining to contemporary China issues and discussing ethical, moral, aesthetic, social, and cultural concerns. GE credit: ArtHum|AH, OL, WC.—*W. (W.)*

(change in existing course—eff. winter 18)

Graduate

297. Directed Independent Study (4)
Term paper; independent study—8 hours; conference—1 hour. Prerequisite: consent of instructor. Restricted to graduate students. Directed independent study on a topic culminating in a term paper. Independent studies may only be arranged with consent of the instructor and when graduate seminars are unavailable. May be repeated for credit up to five times.—*F, W, S. (F, W, S.)* Chen, Chu, Halperin, He, Yeh

(new course—eff. winter 17)

Cinema & Digital Media

New and changed courses in Cinema & Digital Media (CDM)

Lower Division

72. Introduction to Games (4)
Lecture—3 hours; extensive writing/discussion—3 hours. Introduction to the history, theory, and practice of play. Survey of both analog and digital games. Overview of gaming cultures, aesthetics, industries, and technologies. Offered irregularly. (Same course as English 72.) GE credit: AH, VL.
(new course—eff. fall 17)

Upper Division

105. Feminist Media Production (6)
Lecture/discussion—3 hours; laboratory—3 hours; fieldwork—6 hours. Prerequisite: Cinema & Technocultural Studies 20 or courses 20; or two Women and Gender Studies courses. Media production as a mode of cultural criticism, furthering feminist and social justice goals. Fundamentals of camera, editing and distribution via a social engagement model. Study and hands-on response to key historic and contemporary feminist and social justice media discourses. (Same course as Women's Studies 165.) GE credit: AH, SS, ACGH, DD, VL.
(change in existing course—eff. fall 18)

124E. Costume Design for Film (4)
Lecture/discussion—4 hours. Prerequisite: Dramatic Art 24; or consent of instructor. Pass One restricted to Theatre and Dance majors. 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.—*W. (W.)* Morgan
(change in existing course—eff. spring 17)

160. The Chinese Language (4)
Lecture/discussion—4 hours. Prerequisite: course 6 (can be concurrent) or course 3BL (can be concurrent) or course 3CN (can be concurrent) or course 4A (can be concurrent); or placement exam or consent of instructor; Linguistics 1 recommended. Introduction to structural features of Chinese (Mandarin) sounds, lexicon, grammar, and writing (characters), as well as relevant dialectal and sociolinguistic issues of the language. GE credit: AH, WC.
(change in existing course—eff. fall 18)

163. Art & Cinema: Between the White Cube and the Black Box (4)
Lecture—3 hours; film viewing—3 hours. Current debates between cinema studies and contemporary art. Issues covered include, experimental modes of filming, montaging, installing, screening, and displaying images between the White Cube (gallery/museum) and the Black Box (cinema). Offered in alternate years. GE credit: AH, OL, VL, WE.—*W. (W.)* di Montezemolo
(new course—eff. winter 17)

Cinema & Technocultural Studies

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

Upper Division

146B. Modern South Asia Cinema (4)
Lecture/discussion —3 hours; film viewing—3 hours. Prerequisite: upper-division standing or consent of instructor. South Asian cinema of last 100 years in the context of cultural, social, and political changes. South Asian history, Independence, Partition, urban life, class, migration, postcolonial identity, diaspora, gender, sexuality, religion, sport, performance, etc. (Same course as Middle East/South Asia Studies 131B and Anthropology 147) Offered in alternate years. GE credit: SocSci|AH, SS, VL, WC, WE.
(new course—eff. winter 17)

Classics

New and changed courses in Classics (CLA)

Lower Division

10Y. Greek, Roman, and Near Eastern Mythology—Hybrid (3)
Lecture—2 hours; web virtual lecture—1 hour. Examination of major myths of Greece, Rome, and the Ancient Near East; their place in the religion, literature and art of the societies that produced them; their subsequent development, influence and interpretation. GE credit: ArtHum|AH, VL, WC.—F, W, S. (F, W, S.) Brelinski, Rundin, Seal, Stem, Uhlig
(new course—eff. winter 16)

40. Life and Economy in the Ancient Mediterranean World (4)
Lecture/discussion—3 hours; term paper. Characterization of ancient Mediterranean economies, with emphasis on Greece and Rome. Utilization of archaeological, art historical, and literary evidence. Craft production, labor specialization, trade networks, ancient technology, urban growth, agricultural productivity, coinage systems, and household economies. Offered in alternate years. GE credit: AH, VL, WC, WE.—Stem
(new course—eff. fall 16)

Upper Division

103. Love and Beauty in the Ancient World (4)
Lecture/discussion—3 hours; extensive writing—3 hours. Philosophical and literary traditions connecting love, beauty, and goodness in ancient thought. Moral and ethical implications, ideologies of sexuality and gender; transmission into the medieval and modern world. Offered in alternate years. GE credit: ArtHum, Wrt|AH, WC, WE.—*F, W, S. (F, W, S.)* Chin
(new course—eff. fall 17)

111. Forms of Knowledge in the Ancient World (4)
Extensive writing—3 hours; lecture/discussion—3 hours. History of knowledge preservation and transfer in the ancient Mediterranean. Oral tradition, technology, innovations, forms of writing, libraries, ancient scholarship, cultural exchange and influence. Offered in alternate years. GE credit: ArtHum, Wrt|AH, VL, WC, WE.—*F, W, S.* Uhlig, Webster
(new course—eff. fall 17)

170. Cultural Interactions in the Ancient Mediterranean World (4)
Lecture/discussion—3 hours; term paper. Exploration of the role of colonial encounters in the spread of ideas throughout the ancient Mediterranean from an archaeological and artistic perspective. Emphasis on material and literary expressions of culture, trade routes, and theories pertaining to culture contact. Offered in alternate years. GE credit: AH, VL, WC, WE.—Stem
(new course—eff. fall 16)

175. Architecture and Urbanism in Mediterranean Antiquity (4)
Lecture—3 hours; extensive writing. 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.) GE credit: ArtHum, Div, Wrt|AH, VL, WC, WE.—Roller
(change in existing course—eff. spring 17)

176. Roman Religions (4)
Lecture/discussion—3 hours; extensive writing—3 hours. Roman religion from republic to empire. Gods, rituals, and festivals at Rome; sacrifice, sacred places, magic. Gender roles, social status, national identity. Influences from other cultures, especially Egypt and the eastern Mediterranean. Offered in alternate years. GE credit: ArtHum, Wrt|AH, WC, WE.—*F, W, S. (F, W, S.)* Chin, Seal, Sofroniew, Stem
(new course—eff. fall 17)

Clinical Research

New and changed courses in Clinical Research (CLH)

Graduate

205. Introduction to Medical Statistics (4)
(cancelled course—eff. winter 17)

214A. Biodesign I (2)
Lecture—2 hours. Prerequisite: consent of instructor. Prior approval by instructor required; student must commit to taking both courses; Biodesign I and Biodesign II. Focuses on the principles of needs identification and invention of biomedical technologies. Two part course provides a basic understanding of the elements of the innovation process and how to translate these principles into biomedical device design.—*F. (F.)* Tran
(new course—eff. fall 16)

214B. Biodesign II (2)
Lecture—2 hours. Prerequisite: course 214A; consent of instructor. Prior approval by instructor required; student must commit to taking both courses; Biodesign I and Biodesign II. Focuses on the implementation of biomedical technologies and translational process. Two part course provides a basic understanding of the elements of the innovation process and how to translate these principles into biomedical device design.—*W. (W.)* Tran
(new course—eff. winter 17)

244. Introduction to Medical Statistics (4)
Lecture—4 hours. Introduction to statistical methods and software in clinical, laboratory and population medicine. Graphical and tabular presentation of data, probability, binomial, Poisson, normal, t-, F-, and Chi-square distributions, elementary nonparametric methods, simple linear regression and correlation, life tables. Only one unit of credit for students who have completed Statistics 100 or Preventive Veterinary Medicine 402. (Same course as Public Health Sciences 244.)—*F. (F.)* Beckett
(new course—eff. winter 17)

Cognitive Science

New and changed courses in Cognitive Science (CGS)

Lower Division

1. Introduction to Cognitive Science (4)
Lecture/discussion—4 hours. Pass One open to Cognitive Science majors only. Introduction to the interdisciplinary cognitive scientific approach to the study of mind, drawing concepts and methods from psychology, philosophy, linguistics, artificial intelligence, and other disciplines. (Same course as Philosophy 10.) GE credit: SciEng|SE, SL.—*F. (F.)* Drayson, Molyneux

(new course—eff. fall 17)

Upper Division

107. Neuroeconomics/Reinforcement Learning and Decision Making (4)
Lecture—3 hours; term paper. Prerequisite: Psychology 100 or Psychology 100Y or Psychology 135 or Economics 100A or Agricultural & Resource Economics 100A or Neurobiology, Physiology, and Behavior 162 or Neurobiology, Physiology, and Behavior 163; Statistics 13 or Statistics 13Y or Statistics 100 or Psychology 103A; or consent of instructor. Theoretical and empirical approaches to neuroeconomics (neuroscience of decision making) from psychology, neuroscience, economics, and computer science. Neuroscience of judgment and decision making, behavioral economics, and reinforcement learning. (Same course as Economics 107 and Psychology 133.) GE credit: SocSci | SS, SL.—Boorman

(new course—eff. spring 18)

138. Consciousness and Cognition (4)
Lecture—4 hours. Prerequisite: Psychology 1 or Psychology 1Y; Psychology 41; Psychology 100 Psychology 100Y or Psychology 135. Current theoretical and empirical evidence in the study of cognition and consciousness. Theories of consciousness, psychological and neural basis of conscious and unconscious processes such as attention, intentionality, and dreams. (Same course as Psychology 138.)—*W. (W.)* Isham

(change in existing course—eff. spring 18)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. Special study for advanced undergraduates. May be repeated for credit (P/NP grading only.)—*F, W, S. (F, W, S.)*

(new course—eff. winter 17)

Communication

New and changed courses in Communication (CMN)

Lower Division

1. Introduction to Public Speaking (4)
Lecture—2 hours; discussion—2 hours. Practice in the preparation and delivery of speeches based on principles and strategies of informing and persuading audiences drawn from the social sciences and humanities. GE credit: Wrt|AH, OL, SS, WE.—*F, W, S, Su. (F, W, S, Su.)* Shubb

(change in existing course—eff. winter 17)

3. Interpersonal Communication Competence (4)
Lecture—2 hours; discussion—2 hours. Communication competence in professional settings. Managing face-to-face and virtual teams. Leadership, conflict management and negotiation skills. Communication in diverse organizations. Leveraging communication networks. Effective interviewing. Offered irregularly. GE credit: SocSci | SS, WE. —*Su. (Su.)* Ruiz

(change in existing course—eff. spring 18)

3V. Interpersonal Communication Competence (4)
Web virtual lecture—2 hours; discussion—2 hours. Communication competence in professional settings. Managing face-to-face and virtual teams. Leadership, conflict management and negotiation skills. Communication in diverse organizations. Leveraging communication networks. Effective interviewing. GE credit: SocSci | SS, WE. —*F, W, S. (F, W, S.)* Ruiz

(new course—eff. spring 18)

3Y. Interpersonal Communication Competence (4)
Web virtual lecture—2 hours; discussion—2 hours. Communication competence in professional settings. Managing face-to-face and virtual teams. Leadership, conflict management and negotiation skills. Communication in diverse organizations. Leveraging communication networks. Effective interviewing. GE credit: SocSci | SS, WE.—*F, W, S. (F, W, S.)* Ruiz

(change in existing course—eff. spring 18)

10V. Introduction to Communication (4)
Web virtual lecture—3 hours; web electronic discussion—1 hour. Basic principles of communication and communication processes; models of communication; foundations of empirical research in communication; contexts of communication and communication research, including interpersonal, intercultural, news, entertainment, mediated, and others. Not open for credit to students who have taken course 10Y. GE credit: SS.—*F, W, S, Su. (F, W, S, Su.)* Ruiz, Taylor

(new course—eff. fall 16)

10Y. Introduction to Communication (4)
Web virtual lecture—3 hours; discussion—1 hour. Basic principles of communication and communication processes; models of communication; foundations of empirical research in communication; contexts of communication and communication research including interpersonal, intercultural, news, entertainment, mediated, and others. Not open for credit to students who have taken course 10V. GE credit: SocSci|SS.—*F, W, S, Su. (F, W, S, Su.)* Ruiz, Taylor

(change in existing course—eff. winter 17)

Upper Division

102. Empirical Methods in Communication (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Statistics 13 or Statistics 13Y; or equivalent of Statistics 13. Social scientific research methods employed in Communication. Topics include research design, measurement, sampling, questionnaire construction, survey research, experimental design, content analysis and qualitative field methods. GE credit: SocSci|SS.—*F, W, S. (F, W, S.)* Bell, Palomares, Yegiyan

(change in existing course—eff. winter 18)

110. Communication Networks (4)
Lecture/discussion—3 hours; discussion/laboratory—1 hour. Theoretical approaches to communication networks, practical applications of network studies, and network analysis tools. Friendship, political discussion, social support, organizational, social media, and disease transmission networks are examined. Impact of emerging technologies on network creation, maintenance, and expansion. GE credit: SocSci|SS.—*F. (F.)* Barnett, Shen

(change in existing course—eff. fall 17)

114. Communication and Cognition (4)
Lecture/discussion—4 hours. Pass One open to Communication majors only. Relationship between communication and cognition in interpersonal and mediated contexts. Discourse comprehension and production, impact of language attitudes on social judgments, the effects of information processing on decision making. Not open for credit to students who have completed course 138. GE credit: SocSci|SS, WE.—*S. (S.)* Yegiyan

(change in existing course—eff. winter 18)

124. Family Communication (4)
Lecture/discussion—4 hours. Theories and research on family communication. Communication in courtship, marriage, and relational dissolution. Processes and outcomes of parent-child, sibling, family roles, and inter-generational communication. Interaction patterns associated with marital/family satisfaction, maintenance, divorce, and dysfunction. Cultural influences on family communication. GE credit: SS.—*S.(S.)*

(new course—eff. fall 17)

131. Strategic Communication in Public Relations (4)
Lecture/discussion—4 hours. Principles, evolution, and professional practice of public relations. Planning and execution of effective, ethical communication strategies and campaigns. Distribution of messages through traditional and new media, including social media. Cultivation of relationships between organizations and their publics. Crisis communication management. GE credit: SS, WE.

(change in existing course—eff. fall 18)

132. Social Media for Public Relations (4)
Lecture/discussion—4 hours. Prerequisite: course 131. Uses of social media technologies in contemporary public relations practice. Social and behavioral theories of social media processes and effects. Strategies and tools for authoring content that builds relationships and creates conversations with key publics. GE credit: SS.—Hether

(new course—eff. fall 16)

140. Introduction to Mass Communication (4)
Lecture—3 hours; discussion—1 hour. History of mass media and media research traditions. Organization and economics of the media industry. Media policy, law, regulation and ethics. Impact of the media on individuals and society. Traditional, new and emerging communication technologies. GE credit: SocSci|SS.—*F, W, S, Su. (F, W, S, Su.)* Cho, Taylor, Yegiyan

(change in existing course—eff. fall 17)

141. Media Effects: Theory and Research (4)
Lecture/discussion—4 hours. Pass One open to Communication majors only. Social scientific studies of the effects of mass media messages on audience members' actions, attitudes, beliefs, and emotions. Topics include the cognitive processing of media messages, television violence, political socialization, cultivation of beliefs, agenda-setting, and the impact of new technologies. GE credit: SocSci|SS.—*W, S. (W, S.)* Cho, Taylor

(change in existing course—eff. winter 18)

142. Newsmaking (4)
Lecture/discussion—4 hours. Pass One open to Communication majors only. The making of news. How journalists construct news and how consumers and newsmakers use it. Effects of news, technology's challenges to journalism, and the relationship of news to other institutions. GE credit: SocSci|ACGH, SS.—*W, S. (W, S.)* Cho, Theobald

(change in existing course—eff. winter 18)

143. Analysis of Media Messages (4)
Lecture/discussion—3 hours; term paper. Pass One open to Communication majors only. Examination of alternative approaches to the analysis, interpretation, and evaluation of media messages, including those disseminated through broadcasting, print, and new technologies. GE credit: SocSci, Wrt|ACGH, SS, Wrt.—*F, W, S. (F, W, S.)* Cho

(change in existing course—eff. winter 18)

144. Media Entertainment (4)
Lecture/discussion—3 hours; term paper. 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.—*S. (S.)* Taylor

(change in existing course—eff. spring 17)

145. Political Communication (4)
Lecture/discussion—3 hours; extensive writing—3 hours. Pass One open to Communication majors only. Relationships among the mass media, citizens, and politics, production of political news, campaign strategies, and citizens' attitudes and behaviors. Frameworks for mediated politics, the news, and elite discourse and campaign messages. GE credit: SocSci|SS, ACGH, WE.—*F, W, S. (F, W, Su.)* Cho

(change in existing course—eff. winter 18)

147. Children, Adolescents, and the Media (4)
Lecture/discussion—4 hours. Open to Communication majors only on Pass 1. Research on the adaptive and maladaptive effects of media (e.g., television, movies, video games, social media) on the social, emotional, cognitive, and physical development of youth, considering the protective role of parents, teachers, ethics, and policy. GE credit: SocSci|SS.—*F, W. (F, W.)* Cingel

(new course—eff. fall 16)

148. Contemporary Trends In Media (4)
Lecture/discussion—4 hours. Pass One open to Communication Major 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. GE credit: SocSci|SS, OL, WC.—*F, W, S. (F, W, S.)* Theobald

(change in existing course—eff. spring 17)

150V. Computational Social Science (4)
Web virtual lecture—2 hours; web electronic discussion—2 hours. Nontechnical survey of modern computational research methods. Web scraping, artificial intelligence, visualizing social networks, and computer simulations. Hands-on use of diverse software applications. Professors from all ten UC campuses contribute. GE credit: QL, SS.—*F, S. (F, S.)* Hilbert

(new course—eff. winter 17)

151. Simulating Communication Processes (4)
Lecture/discussion—3 hours; term paper—3 hours. Simulations of communication and sociality using agent-based models. Focus on strategic behavior, cooperation, coordination, self-organization, information diffusion, and other communication phenomena. No programming skills assumed. GE credit: QL, SS, WE.—*W.* (*W.*) Frey

(new course—eff. fall 17)

161. Health Communication (4)
Lecture/discussion—3 hours; extensive writing—3 hours. Health communication theories and research. Health literacy, social support and coping, doctor-patient interaction, health communication campaigns, media influences on health, and applications of new technologies in health promotion. GE credit: SocSci|SS, WE.—*F, S. (F, S.)* Bell

(change in existing course—eff. fall 17)

165. Media and Health (4)
Lecture/discussion—4 hours. Content and effects of health messages in the media. Topics include health news reporting; portrayals of disease, disability, death and health-related behaviors; promotion of drugs and other health products; and tobacco and alcohol advertising. GE credit: SocSci|SS, WE.—*W, S. (W, S.)* Taylor, Yegiyan

(change in existing course—eff. winter 18)

172. Computer-Mediated Communication (4)
Lecture—3 hours; discussion—1 hour. Pass One open to Communication majors only. Theories and research findings on how people use technologies for interpersonal and relational purposes, including impression formation, self-presentation, deception, anonymity, friendship maintenance, online dating, and emotional expression. GE credit: SocSci|SS.—*S. (S.)* Peña

(change in existing course—eff. fall 16)

174. Social Media (4)
Lecture/discussion—4 hours. Application of communication theories to the study and design of social media. Examination of social media in contexts such as political activism and collaboration. Topics include online credibility, participatory culture, viral media and privacy. GE credit: ACGH, SS, WE.—*F, S. (F, S.)* Shen

(change in existing course—eff. spring 18)

176. Video Games Theory and Research (4)
Lecture/discussion—2 hours; laboratory/discussion—2 hours. Communication theory and research on the uses and effects of video games. Research methods available for investigating game use and the impact of games on behavior. Application of those methods in a research project. GE credit: SS.—*W. (W.)* Peña

(change in existing course—eff. winter 18)

178. Persuasive Technologies (4)
Lecture/discussion—3 hours; term paper. Designing and testing ethical, technology-based communication interventions in the domains of health, marketing, education, and environment. Social media, mobile apps, wearable devices, recommendation systems, serious games, and augmented reality. GE credit: SS, WE.—*S. (S.)* Zhang

(new course—eff. fall 17)

192. Internship in Communication (1-12)
Internship—3-36 hours. Prerequisite: communication majors who have completed 20 units of upper division communication courses; consent of instructor. Open to Communication majors only. Supervised work experience requiring the application of communication principles and strategies or the evaluation of communication practices in a professional setting. Relevant experiences include public relations, advertising, sales, human resources, health promotion, political campaigns, journalism, and broadcasting. May be repeated up to 12 units of credit. (P/NP grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(change in existing course—eff. fall 16)

Graduate

201. Theoretical Perspectives on Communication (4)
Lecture/discussion—4 hours. Prerequisite: consent of instructor; graduate standing in Communication. Open to Communication graduate students only. Social scientific study of Communication. Research on interpersonal, organizational, mass, political, and health communication; communication technologies (e.g., video games, social media, persuasive technologies); and communication network analysis.—*F. (F.)* Feng

(change in existing course—eff. fall 17)

204. Biological Foundations of Communication (4)
Lecture/discussion—3 hours; term paper—3 hours. Communibiological, evolutionary, neuroscience, and neurophysiological perspectives on communication. Methodologies for examining human physiological responses to messages, such as heart rate, skin conductance, electromyography, and cortical activity. Offered in alternate years.—*(S.)* Yegiyan

(new course—eff. fall 17)

212. Web Science Research Methods (4)
Lecture/discussion—4 hours. Prerequisite: consent of instructor. Applications of data science to web-based communication research. Design, implementation, analysis, and reporting of studies using online data. Use of Python to scrape, organize, analyze, and visualize web data.

(new course—eff. spring 18)

213. Simulation Methods in Communication Research (4)
Lecture/discussion—4 hours. Prerequisite: consent of instructor. Simulation methods for modeling human communication. Single and multiple agent approaches to developing process theories of cooperation, coordination, strategic behavior, information and innovation diffusion, and other aspects of sociality.

(change in existing course—eff. fall 18)

214. Analysis of Communication Networks (4)
Lecture/discussion—3 hours; term paper. Theoretical and analytic issues pertaining to network perspectives on communicating and organizing. Consideration of structural and dynamic features of communication networks. Introduction to network analysis software and various analysis techniques.

(change in existing course—eff. fall 18)

233. Persuasive Technologies for Health (4)
Lecture/discussion—3 hours; term paper. Theorizing, designing and evaluating ethical technology-based health communication interventions. Uses of social media, mobile communication apps, wearable devices, computer-generated tailored messages, educational games, and computational approaches in health promotion and healthcare delivery. (Same course as Public Health Sciences 233.) Offered in alternate years.—*S.* Zhang

(change in existing course—eff. fall 17)

235. Health Communication Campaigns (4)
Lecture/discussion—3 hours; term paper. Prerequisite: consent of instructor. Restricted to graduate students. Principles of health communication campaign planning, implementation and evaluation. Strategies for changing health behaviors, shaping policy, and improving healthcare organizations' relations with stakeholders. (Same course as Public Health Sciences 235.) Offered in alternate years.—*W.* Hether

(new course—eff. fall 17)

251. Digital Technology and Social Change (4)
Seminar—9 hours; term paper. Conceptual, theoretical, and international consideration of how digital communication technologies transform social organization and development. Topics include social media, big data, political revolutions, e-democracy, digital divide, e-education, e-health, entrepreneurship, public policies, poverty reduction, technological innovations, microfinance, and entertainment. Not open to students who have taken course 251Y. Offered in alternate years.—*(S.)* Hilbert

(change in existing course—eff. spring 17)

251Y. Digital Technology and Social Change (4)
Web virtual lecture—2 hours; discussion—2 hours. Discussion and research on how digital technologies transform our lives through social media, mobility, big data, global connectivity, and artificial intelligence; changing business, health, democracy, globalization, families, dating, and education. Not open to students who have taken course 251. Offered in alternate years.—*S. (S.)* Hilbert

(change in existing course—eff. fall 17)

253. Children, Adolescents, and the Media (4)
Lecture/discussion—3 hours; term paper. Theory and research on the uses and effects of traditional and new media on children and adolescents, emphasizing social, emotional, cognitive, and physical development. Methodological approaches and ethical issues in studies of underage populations. Parent and family mediation of effects. Offered in alternate years.—*S. (S.)* Cingel

(change in existing course—eff. winter 17)

260. Political Communication (4)
Lecture/discussion—3 hours; term paper. Theories and research on the connections between media, politics, and citizens in the digital age. Critical framework for understanding the nature of mediated politics by assessing inter-relationships between production of news, political elites' campaign strategies, and behaviors of citizens. Offered in alternate years.—*S. (S.)* Cho

(change in existing course—eff. winter 17)

299R. Thesis/Dissertation Research and Writing (1-12)
Independent study—3-36 hours. Prerequisite: consent of instructor; graduate standing in Communication. Students in the Department of Communication graduate programs conduct dissertation research and writing under the supervision of a faculty member. May be repeated for credit up to twenty one times Across campus, students use the course 299 numbers to reach the 12-unit requirement for full time student status. In saying that students may repeat this "course" 21 times, we assumed that students would complete their doctoral programs within seven years (five is the norm). The value 21 was based on the calculation 3 quarters * 7 years. (S/U grading only.)

(change in existing course—eff. winter 17)

Community and Regional Development

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

Upper Division

151. Community Field Research: Theory and Analysis (4)
Lecture—4 hours; extensive writing; project. Prerequisite: course 1; Statistics 13 or Statistics 13Y or Sociology 46B; any upper division Community and Regional Development course is recommended. Emphasis on the design and analysis of community research considering the relationship between theory and practice. Study of community research methods, including structural analysis, elite interviewing, and ethnographic approaches. Course requires design and completion of field research project. GE credit: SocSci, Div, Wrt|ACGH, DD, OL, SS, VL, WE.—*S. (S.)* Tarallo

(change in existing course—eff. fall 17)

162. People, Work and Technology (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 1 or Sociology 1 or Anthropology 1; upper division standing recommended. Analysis of the relationship between work, technology, and the human experience. Theories of the causes and consequences of labor process, changes under capitalism and globalization, impacts of race/ethnicity, class, gender, and citizenship status on work in the United States and globally; responses of workers, communities, and policy-makers to workplace changes. GE credit: ACGH, DD, SS, WE.

(change in existing course—eff. fall 18)

164. Theories of Organizations and Their Roles in Community Change (5)
Lecture—4 hours; laboratory—2 hours. Prerequisite: Statistics 13 or Statistics 13Y or Sociology 46B; course 1 or course 2 or Sociology 1 or Anthropology 2. 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.—*W. (W.)* Brinkley

(change in existing course—eff. spring 18)

Graduate

242. Community Development Organizations (4)
Seminar—4 hours. Prerequisite: course 240. Class size limited to 15 students. Theory and praxis of organizations with social change agendas at the community level. Emphasis on non-profit organizations and philanthropic foundations.—*S. (S.)*

(change in existing course—eff. spring 17)

242S. Community Development Organizations (International) (4)
Fieldwork—10 hours; lecture—5 hours; workshop—5 hours. Prerequisite: course 240. Class size limited to 10 students. Theory and praxis of organizations with social change agendas at the community level. Emphasis on local governance, non-profit organizations and philanthropic foundations at an international level.—*Su. (Su.)*

(change in existing course—eff. spring 17)

243. Critical Environmental Justice Studies (4)
Seminar—9 hours; extensive writing—3 hours. Prerequisite: consent of instructor. Open to graduate students only. Application of social science theories of race, ethnicity, class, gender, and power to understand the production and contestation of environmental inequities.—*F. (F.)* London

(new course—eff. fall 17)

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.—*(S.)*

(change in existing course—eff. spring 17)

248A. Social Policy, Welfare Theories and Communities I (2)
Seminar—2 hours. Prerequisite: graduate standing. Theories and comparative histories of modern welfare states. Theories of welfare and social policy in relation to normative, organizational, and administrative aspects of welfare and social policy. Offered in alternate years.

(change in existing course—eff. spring 17)

248B. Social Policy, Welfare Theories and Communities II (2)
Seminar—2 hours. Prerequisite: graduate standing. Concurrent enrollment in course 248A. Analysis of a specific set of social issues within the U.S./California context. Issues may include poverty, hunger, housing, health, family, disability, economic opportunity, affirmative action orientations, gender, old age, or special social groups. Offered in alternate years.

(change in existing course—eff. spring 17)

250. Professional Skills for Community Development (4)
Lecture/discussion—2 hours; project—2 hours; fieldwork; extensive writing or discussion. Prerequisite: course 240. Priority enrollment for Masters and Ph.D. students in Community and Regional Development. Help students develop the practical skills needed to work professionally in organizations that are involved in community development. Provides an overview of community development planning, project management, and consultation skills.—*W. (W.)* London

(change in existing course—eff. spring 17)

290. Seminar (1)
Seminar—1 hour. Analysis of research in applied behavioral sciences. (S/U grading only.)—*F, W, S. (F, W, S.)*

(change in existing course—eff. spring 17)

Professional

440. Professional Skills for Community Development (4)
(cancelled course—eff. winter 17)

Comparative Literature

New and changed courses in Comparative Literature (COM)

Lower Division

22. Literature of the Abnormal Psyche (4)
Lecture/discussion—3 hours; term paper. Prerequisite: completion of Entry Level Writing Requirement. Representations of the human psyche in literature and other media (film, visual arts, music) spanning cultures and historical contexts. Depictions of abnormal psychological states, including madness, obsession, and self-fragmentation. Textual interpretation informed by psychological theories. Rhetorical persuasion and nuanced argumentation. GE credit: AH, WC, WE.

(new course—eff. spring 18)

Upper Division

112. Japanese Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: consent of instructor; upper-division standing. Introduction to Japanese cinema from early silent films to the present. Explores important directors, genres, stars, themes and techniques in relation to specific historical and cultural contexts. Lectures and readings in English. Films in Japanese with English subtitles. GE credit: AH, VL, WC, WE.

(new course—eff. spring 18)

Upper Division

100. World Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: completion of entry level writing requirement, upper division standing, or consent of instructor. Comparative, cross-cultural study of a topic, theme, or movement in world cinema beyond the boundary of a single national tradition. Topics may include "postsocialist cinemas in East Europe and Asia," "cinema and globalization," and "popular Asian cinemas." May be repeated for credit up to three times the topic differs. GE credit: ArtHum, Div, Wrt|AH, VL, WC, WE.—Lu

(change in existing course—eff. spring 17)

110. Hong Kong Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: completion of entry level writing requirement, upper division standing, or consent of instructor. Hong Kong cinema, its history, industry, styles, genres, directors, and stars. Special attention to its polyglot, multicultural, transnational, colonial, and postcolonial environment. GE credit: ArtHum, Div, Wrt|AH, VL, WC, WE.—Lu

(change in existing course—eff. spring 17)

Design

New and changed courses in Design (DES)

Lower Division

31. Photography for Designers (4)
(cancelled course—eff. fall 17)

37. Coding for Designers (4)
(cancelled course—eff. spring 18)

40A. Energy, Materials, and Design Over Time (4)
Lecture—3 hours; discussion—1 hour. 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. (Same course as Science and Society 43.) GE credit: ArtHum | AH, WC.—*W. (W.)* Cogdell

(change in existing course—eff. spring 18)

Upper Division

107. Advanced Structural Design for Fashion (4)
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1; course 14 or course 21; course 15; course 16; course 77; or consent of instructor. Priority given 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.—*S. (S.)* Koo

(change in existing course—eff. winter 17)

111. Coding for Designers (4)
Studio—12 hours. Prerequisite: course 1; course 15; course 16; or consent of instructor. Pass One restricted to Design majors. Programming concepts/skills for design. Algorithm-based design and development flowcharts. Pseudo-code entry level programming. Principles of coding logic syntax structure. Analysis of history. Development iteration presentation of design projects. Not open for credit to students who completed course 37. GE credit: SE, VL.—*F, W, S. (F, W, S.)* Drew

(change in existing course—eff. spring 18)

113. Photography and Digital Imaging (4)
Studio—12 hours. Prerequisite: course 1; course 15; course 16. Pass One restricted to Design majors. Digital imaging techniques using black/white and color. Critical analysis of photographs and the role of photography in society. Explore use and meaning of single, sequence and single composite images. Not open for credit to students who have taken Design 31. GE credit: ArtHum|AH, VL.—*F, W, S. (F, W, S.)* Drew

(change in existing course—eff. fall 17)

126. Design Ethnography (4)
Lecture/laboratory—12 hours. Prerequisite: course 1; or consent of instructor. Pass One restricted to Design majors. Practical introduction to design ethnography through project-based work. Tools and methods, observation, interviews, fieldnotes, and synthesis of qualitative data. Exploration of participatory design. Examination of the ethical questions. GE credit: AH.—*S. (S.)* Maiorana

(new course—eff. spring 17)

128. BioDesign Theory and Practice (4)
Lecture/discussion—3 hours; term paper. Pass One restricted to Design and Art History majors. Recent biological theories and their influence upon design theory and practice; includes bio-based materials in contemporary design. GE credit: VL.—Cogdell

(change in existing course—eff. winter 17)

144. History of Interior Architecture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: consent of instructor. 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.—Housefield

(change in existing course—eff. fall 17)

155A. Pattern, Form and Surface (4)
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1; course 115; course 14 or course 21; course 15; course 16; course 31 or course 113; 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.—*W. (W.)* Verba

(change in existing course—eff. fall 17)

156. Graphitecture: Architecture in the Age of New Media (4)
Studio—6 hours. Prerequisite: course 1, 14, 15, 16. Priority to Design majors. New media and its impact on environmental design; analysis of contemporary projects at the intersection of architecture and new media; time-based strategies of representation; digital narrative. GE credit: ArtHum|AH, VL.—*S. (S.)* Snyder

(new course—eff. fall 16)

160. Textile Surface Design: Patterns and Resists (4)
Studio—12 hours. Prerequisite: course 1; course 14 or course 21; course 15; or consent of instructor. Pass one restricted 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, and surface additives. GE credit: ArtHum|AH, VL.—*F. (F.)* Avila

(change in existing course—eff. fall 17)

161. Textile Surface Design: Screen and Digital Printing (4)
Studio—12 hours. Prerequisite: course 1; course 14 or course 21; course 15; course 16. Pass One restricted 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.—*S. (S.)* Avila

(change in existing course—eff. winter 17)

165. Studio Practices in Industrial Design (4)
Studio—6 hours. Prerequisite: course 1; course 14 or course 21; course 15; course 50; or consent of instructor. Pass One restricted to Design majors. 3D studio methods for design, including: historic and contemporary developments in industrial design; innovation in material and fabrication technology; design based projects for everyday objects including soft goods, electronics, transportation. GE credit: SE, VL.

(change in existing course—eff. fall 18)

166. Human Centered Design (4)
Studio—12 hours. Prerequisite: course 1; course 14; course 15. Pass one restricted to Design majors. Human-centered approach to problem solving, ethnography, ideation, project framing, rapid prototypes, visual communication, and experiential learning. Creative approaches to graphic design, industrial design, fashion, business, and entrepreneurship. GE credit: AH, VL.—*F, S. (F, S.)* Maiorana

(new course—eff. fall 17)

167. Prototyping: From Objects to Systems (4)
Studio—12 hours. Prerequisite: course 1; course 14 or course 21; course 15; or consent of instructor. Pass One restricted to Design majors. Exploration of rapid prototyping techniques for objects, interactive experiences, services and organizations. Understanding of additive manufacturing, foam models, digital interfaces and business models. GE credit: SE, VL.

(change in existing course—eff. fall 18)

169. Advanced Explorations in Textile Design (4)
Studio—12 hours. Prerequisite: course 1; course 14 or course 21; course 15; course 16; course 160 or course 161; or consent of instructor; course 70 recommended. Pass One restricted to Design majors. Advanced exploration of textile design aimed at developing unique textiles for a specific end product such as a fashion collection, functional interior design, art textile or surface design competition. May be repeated for credit up to one time with consent of instructor; topics and themes change yearly; criteria is 1) space with first priority to students not previously taken the course and 2) course content must be sufficiently different from the previous time the student took the course. GE credit: AH.—*W. (W.)* Avila

(new course—eff. spring 17)

178. Design and Wearable Technology (4)
Studio—6 hours. Prerequisite: course 1; course 14; course 15; course 16; or consent of instructor. Pass One restricted to Design majors. Introduction to wearable technology and related technologies. Emphasis on designing, and fabricating prototypes of wearable technology for value-added designs and to improve quality of life. GE credit: AH, VL.—*S. (S.)* Koo

(new course—eff. spring 17)

198F. Student-Taught Course (1-4)
Student-facilitated (taught) course intended for upper division students. Offered irregularly. (P/NP grading only.)

(new course—eff. fall 16)

199F. Student Facilitated Course Development (1-4)
(cancelled course—eff. spring 18)

199FA. Student Facilitated Course Development (1-4)
Prerequisite: consent of instructor. Planning and development for student led course 198F under the supervision of a faculty member. Offered irregularly. (P/NP grading only.)

(new course—eff. fall 17)

199FB. Student Facilitated Teaching (1-4)
Prerequisite: course 199FA; consent of instructor. Student-facilitated course under the supervision of a faculty member, an undergraduate student teaching a course under 98F/198F. Offered irregularly. (P/NP grading only.)

(new course—eff. spring 18)

Graduate

225. Studio Practice in Design (4)
Studio—12 hours. Prerequisite: course 221. Restricted 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. May be repeated for credit up to two times.—*W. (W.)*

(change in existing course—eff. fall 17)

299. Individual Focused Study (1-12)
Prerequisite: graduate standing in Design or consent of instructor. Advanced study in studio practice on independent projects with faculty consultation. May be repeated for credit. (S/U grading only.)—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 17)

Dramatic Art

New and changed courses in Dramatic Art (DRA)

Lower Division

21A. Fundamentals of Acting (4)
Lecture—2 hours; laboratory—4 hours. Open to students planning to major in Theatre and Dance. Physical and psychological resources of the actor. Experience in individual and group contact and communication, theatre games, advanced improvisation, sound and movement dynamics. Viewing of theatre productions. GE credit: OL, VL.—Leavy, Merlin

(change in existing course—eff. fall 16)

40A. Beginning Modern Dance (2)
Laboratory/discussion—4 hours. 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 for credit up to two times 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.

(change in existing course—eff. spring 17)

40B. Intermediate Modern Dance (2)
Laboratory/discussion—4 hours. Prerequisite: course 40A or consent of instructor. Modern dance techniques. Basic anatomy, dance terminology and a general overview of modern dance history. May be repeated one time for credit. For Dance majors, further repeats negotiated with faculty adviser in dance. GE credit: ArtHum|AH, VL.

(change in existing course—eff. fall 16)

41A. Beginning Jazz Dance (2)
Laboratory/discussion—4 hours. Fundamentals of jazz dance; includes warm-ups, dance techniques and combinations. Basic anatomy, dance terminology and general overview of jazz dance history. May be repeated for credit up to one time.

(change in existing course—eff. spring 17)

Upper Division

124A. Principles of Theatrical Design: Scenery (4)
Lecture/discussion—4 hours. Prerequisite: consent of instructor. Pass One restricted to Theatre and Dance majors. Scene design processes, working drawings, sketching techniques, scale models, methods and materials of scenery construction. GE credit: ArtHum|AH, VL.—Iacovelli

(change in existing course—eff. winter 18)

124B. Principles of Theatrical Design: Scenery (4)
Lecture/discussion—4 hours. Prerequisite: consent of instructor. Pass One restricted to Theatre and Dance majors. Analysis of plays in terms of scene design, elements of design, execution of designs for modern and period plays. GE credit: ArtHum|AH, VL.—Iacovelli

(change in existing course—eff. winter 18)

124C. Principles of Theatrical Design: Lighting (4)
Lecture/discussion—4 hours. Prerequisite: consent of instructor. Pass One restricted to Theatre and Dance majors. Theories of lighting the stage, equipment and control systems, execution of lighting plots. GE credit: ArtHum|AH, VL.

(change in existing course—eff. winter 18)

124D. Principles of Theatrical Design: Costume (4)
Lecture/discussion—4 hours. Prerequisite: consent of instructor. Pass one restricted to Theatre and Dance majors. 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.—Morgan

(change in existing course—eff. winter 18)

124E. Costume Design for Film (4)
Lecture/discussion—4 hours. Prerequisite: or consent of instructor. Pass One restricted to Theatre and Dance majors. 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.—Morgan

(change in existing course—eff. winter 18)

146A. Professional Track Modern Dance I (4)
Lecture/laboratory—6 hours. Prerequisite: consent of instructor. Professionally oriented performance training. Rigorous, consistent training regimen based on traditional modern dance technique. Breath and voice, skeletal and muscular placement, moving from the spine, contraction technique, movement intention. May be repeated two times for credit. GE credit: VL.—Grenke

(change in existing course—eff. fall 16)

146B. Professional Track Modern Dance II (4)
Lecture/laboratory—6 hours. Prerequisite: courses 146A; consent of instructor. Body and space relationships in solos, duets and group work; stylistic variations of Graham technique; works of Paul Taylor. May be repeated one time for credit. GE credit: VL.—Grenke

(change in existing course—eff. fall 16)

146C. Professional Track Modern Dance III (4)
Lecture/laboratory—6 hours. Prerequisite: course 146A; course 146B; consent of instructor. Continuation of course 146B. Time as a theatrical device, sustaining movement and non-movement, phrasing, musicality. May be repeated one time for credit. Offered irregularly. GE credit: VL.—Grenke

(change in existing course—eff. winter 17)

156C. Modern Aesthetic Movements in Performance (4)
Laboratory/discussion—3 hours; discussion—1 hour. 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.

(change in existing course—eff. spring 17)

160A. Principles of Playwriting (4)
Lecture/discussion—4 hours. Prerequisite: consent of instructor. Analysis of dramatic structure; preparation of scenarios; the composition of plays. GE credit: WE.—Rossini

(change in existing course—eff. winter 18)

170. Media Theatre (4)
Lecture—1 hour; rehearsal—2 hours; performance instruction—1 hour. 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.

(change in existing course—eff. spring 17)

Graduate

256. Visual Language for Performance (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: consent of instructor. Restricted to graduate students. Exploration of different approaches and methods to the visual elements of performance. Focus on design and style for different media and genres, storytelling through visual elements of performance. Offered in alternate years.—Morgan

(change in existing course—eff. winter 17)

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

(change in existing course—eff. spring 17)

Ecology

New and changed courses in Ecology (ECL)

Graduate

200AN. Principles and Applications of Ecology (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: First course in Ecology (e.g., Environmental Science and Policy 100), Statistics 102, Mathematics 16A, 16B or consent of instructor. Pass One open to graduate majors. Course covers principles of community structure and functioning, species diversity patterns, ecosystem ecology and biogeochemistry, landscape ecology, biogeography and phylogenetics.—*F. (F.)* Harrison

(new course—eff. fall 16)

200BN. Principles and Applications of Ecology (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: First course in Ecology (e.g., Environmental Science and Policy 100), Statistics 102, Mathematics 16A, 16B or consent of instructor. Pass One open to graduate majors. Provides a broad background in the principles and applications of ecology, and serves as a foundation for advanced ecology courses. Topics include ecophysiology, behavioral ecology, population ecology, genetics and evolution. Emphasis on historical developments, current understanding, and real world applications.—*W. (W.)*

(new course—eff. winter 17)

204. Population and Community Ecology (4)
(cancelled course—eff. fall 16)

211. Advanced Topics in Cultural Ecology (4)
(cancelled course—eff. spring 17)

212A. Environmental Policy Process (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course in public policy (e.g., Environmental Science and Policy 160); environmental law (e.g., Environmental Science and Policy 161); course in statistics (e.g., Sociology 106 or Agricultural and Resource Economics 106). Introduction to selected topics of the policy process and applications to the field of environmental policy. Develops critical reading skills, understanding of policy theory, and an ability to apply multiple theories to the same phenomena. (Same course as Environmental Science and Policy 212A, Environmental Policy and Management 200C.)—*S. (S.)* Arnold

(change in existing course—eff. fall 17)

212B. Environmental Policy Evaluation (4)
Lecture—2 hours; discussion—1 hour; seminar—2 hours. Prerequisite: Statistics 108 or Agricultural and Resource Economics 106; Agricultural and Resource Economics 176; Intermediate microeconomics (e.g., Economics 100); policy analysis (e.g., Environmental Science and Policy 168A or the equivalent). Method and practice, philosophical basis, and political role of policy analysis. Reviews basic concepts from economic theory; how and why environmental problems emerge in a market economy; and tools necessary for solving environmental problems. (Same course as Environmental Science and Policy 212B & Environmental Policy & Management 200B.)—*W. (W.)* Springborn

(change in existing course—eff. winter 18)

213. Population, Environment, and Social Structure (4)
(cancelled course—eff. fall 16)

215. Social Ecological Systems (3)
Lecture/discussion—3 hours. Prerequisite: completion of core courses for specific graduate programs, for example courses 200A/B. Overview of social-ecological systems that links environmental policy and decision-making to ecological processes. Delves deeper into different social science topics related to this broader idea. Applying of course readings to case studies chosen by students and a final paper.—*W. (W.)* Lubell

(new course—eff. fall 16)

242. Ecological Genetics: Applied Genetics for Ecology, Health, and Conservation of Natural Populations (3)
Lecture—2 hours; discussion—0.5 hours; laboratory—0.5 hours. Prerequisite: undergraduate genetics and ecology/conservation biology courses recommended. Restricted to graduate students, 2nd or 3rd year veterinary students; advanced undergraduate students with consent of instructor. Introduction to the field of applied ecological genetics to include applications in conservation ecology, population genetics, population biology, wildlife health and disease ecology.

(change in existing course—eff. spring 17)

Economics

New and changed courses in Economics (ECN)

Lower Division

1AV. Principles of Microeconomics (4)
Web virtual lecture—3 hours; web electronic discussion—1 hour. Analysis of the allocation of resources and the distribution of income through a price system; competition and monopoly; the role of public policy; comparative economic systems. GE credit: SocSci|ACGH, QL, SS.

(new course—eff. fall 17)

Upper Division

100. Intermediate Micro Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A C- or better or course 1AV C- or better; course 1B C- or better; (Mathematics 16A C- or better, Mathematics 16B C- or better) or (Mathematics 21A C- or better, Mathematics 21B C- or better) or (Mathematics 17A C- or better, Mathematics17B C- or better). Price and distribution theory under conditions of perfect and imperfect competition. General equilibrium and welfare economics. Not open for credit to students who have completed Agricultural and Resource Economics 100A or 100B.—F, W, S. (*F, W, S.*)

(change in existing course—eff. spring 18)

100A. Intermediate Micro Theory: Consumer and Producer Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A C - or better or course 1AV C- or better; course 1B C- or better; Mathematics 16A C- or better or Mathematics 17A C- or better or Mathematics 021A C- or better; Mathematics 16B C- or better or Mathematics 17B C- or better or Mathematics 021B C- or better. Consumer and producer theory. Equilibrium and welfare analysis. Topics include competitive markets, consumer and producer surplus at an intermediate level. Not open for credit to students that have taken Agricultural and Resource Economics 100A or course 100.

(change in existing course—eff. winter 18)

100B. Intermediate Micro Theory: Imperfect Competition and Market Failure (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A. Imperfect competition and market failure. Topics include exchange, monopoly, game theory, uncertainty, asymmetric information, and public goods. Not open for credit to students that have taken Agricultural and Resource Economics 100B.

(new course—eff. fall 17)

101. Intermediate Macro Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A C- or better or course 1AV C- or better); course 1B C- or better; Mathematics 16A C- or better, Mathematics 16B C- or better or Mathematics 21A C- or better, Mathematics 21B C- or better or Mathematics 17A C- or better, Mathematics 17B C- or better. Theory of income, employment and prices under static and dynamic conditions, and long term growth.

(change in existing course—eff. winter 18)

102. Analysis of Economic Data (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A or course 1AV; course 1B; Statistics 13 or Statistics 13Y or Statistics 32; Mathematics 16A or Mathematics 17A or Mathematics 21A; Mathematics 16B or Mathematics 17B or Mathematics 21B; or consent of instructor. Analysis of economic data to investigate key relationships emphasized in introductory micro and macro economics. Obtaining, transforming, displaying data; statistical analysis of economic data; basic univariate and multivariate regression analysis. Only two units of credit for students who have completed course 140 or Agricultural and Resource Economics 106, and Statistics 108. GE credit: VL.—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 18)

103. Economics of Uncertainty and Information (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or Agricultural and Resource Economics 100A, Agricultural and Resource Economics 100B; Mathematics 16A or Mathematics 17A or Mathematics 21A; Mathematics 16B or Mathematics 17B or Mathematics 21B. Optimal decisions under uncertainty, expected utility theory, economics of insurance, asymmetric information, signalling in the job market, incentives and Principal-Agent theory, optimal search strategies and the reservation price principle.

(change in existing course—eff. winter 18)

106. Decision Making (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 16A-B C- or better or Mathematics 17A-B C- or better or Mathematics 21A-B C- or better; Statistics 13 C- or better or Statistics 13Y C- or better or Statistics 32 C- or better; or consent of the instructor. Descriptive and normative analysis of individual decision making, with applications to personal, professional, financial, and public policy decisions. Emphasis on decision making under uncertainty and over time. Heuristics and biases in the psychology of decisions; overcoming decision traps. Offered irregularly.

(change in existing course—eff. winter 18)

107. Neuroeconomics/Reinforcement Learning and Decision Making (4)
Lecture—3 hours; term paper. Prerequisite: Psychology 100 or Psychology 100Y or Psychology 135 or Economics 100A or Agricultural & Resource Economics 100A or Neurobiology, Physiology, and Behavior 162 or Neurobiology, Physiology, and Behavior 163; Statistics 13 or Statistics 13Y or Statistics 100 or Psychology 103A; or consent of instructor. Theoretical and empirical approaches to neuroeconomics (neuroscience of decision making) from psychology, neuroscience, economics, and computer science. Neuroscience of judgment and decision making, behavioral economics, and reinforcement learning. (Same course as Psychology 133 and Cognitive Studies 107.) GE credit: SocSci | SS, SL.—Boorman

(new course—eff. spring 18)

110A. World Economic History Before the Industrial Revolution (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A or course 1AV; course 1B. Development and application of analytical models to explain the nature and functioning of economies before the Industrial Revolution. Examples will be drawn from a variety of societies, including England, China, Polynesia, and Pre-Columbian America. GE credit: SocSci | SS.

(change in existing course—eff. spring 18)

110B. World Economic History Since the Industrial Revolution (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A or course 1AV; course 1B. Development and application of analytical models to explain the nature and functioning of economies since the Industrial Revolution. Examples will be drawn from a variety of societies, including England, China, Germany, and India. GE credit: SocSci|SS.

(change in existing course—eff. winter 18)

115A. Economic Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A or course 1AV; course 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: SS, WC.

(change in existing course—eff. winter 18)

115B. Economic Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A or course 1AV; course 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.

(change in existing course—eff. spring 18)

115BY. Economic Development (4)
Lecture—1.5 hours; web virtual lecture—1.5 hours; term paper. Prerequisite: courses 1A, 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. GE credit: SS.

(new course—eff. fall 16)

121A. Industrial Organization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A or course 1AV; course 1B; course 100 or Agricultural and Resource Economics 100A-B; or consent of the instructor. Appraisal of the role of competition and monopoly in the American econ-

omy; market structure, conduct, and economic performance of a variety of industries. GE credit: SocSci|SS.

(change in existing course—eff. winter 18)

121B. Industrial Organization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A or course 1AV; course 1B; course 100 or Agricultural and Resource Economics 100A-B; or consent of instructor. The study of antitrust and economic regulation. Emphasis on applying theoretical models to U.S. industries and case studies, including telecommunications, software, and electricity markets. Topics include natural monopoly, optimal and actual regulatory mechanisms, deregulation, mergers, predatory pricing, and monopolization. GE credit: ACGH.

(change in existing course—eff. winter 18)

125. Energy Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or Agricultural and Resource Economics 100A, Agricultural and Resource Economics 100B; or consent of Instructor. ass 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.

(change in existing course—eff. spring 17)

132. Health Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or Agricultural and Resource Economics 100A, Agricultural and Resource Economics 100B; course 102 or course 140 or Agricultural and Resource Economics 106 or Statistics 108; or consent of instructor. The health care market, emphasizing the role and use of economics. Individual demand, provision of services by doctors and hospitals, health insurance, managed care and competition, the role of government access to health care.—*W. (W.)* Cameron

(change in existing course—eff. winter 18)

133Y. Poverty, Inequality and Public Policy (4)
Web virtual lecture—2 hours; discussion—2 hours. Prerequisite: course 1A or course 1AV; or course 1B. Class size limited to 99; 3 sections of 33 each. Examination of the economics of poverty and inequality in the United States, including measurement, trends, and related policies.—Stevens

(change in existing course—eff. spring 18)

134. Financial Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A or course 1AV; course 1B; course 100 or Agricultural and Resource Economics 100A-B, Mathematics 16A or Mathematics 17A or Mathematics 21A; Statistics 13. General background and rationale of corporation; finance as resource allocation over time; decision making under uncertainty and the role of information; capital market and interest rate structure; financial decisions. Students who have completed Agricultural and Resource Economics 171A may not receive credit for this course.

(change in existing course—eff. winter 18)

135. Money, Banks and Financial Institutions (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or Agricultural and Resource Economics 100A-B, Agricultural and Resource Economics 101, Statistics 13 or Statistics 13Y. Banks and the banking system. Uncertainty and asymmetric information in the lending process; efficiency of competitive equilibrium in lending markets. Regulation and the conduct of monetary policy.

(change in existing course—eff. winter 18)

137. Macroeconomic Policy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or Agricultural and Resource Economics 100A and Agricultural and Resource Economics 100B; course 101; Statistics 13 or Statistics 13Y. Theory and practice of macroeconomic policy, both monetary and fiscal.

(change in existing course—eff. spring 18)

140. Econometrics (4)
Lecture—3 hours; discussion—1 hours. Prerequisite: course 100 or Agricultural and Resource Economics 100A-B, course 101, Statistics 13 or Statistics 13Y, Mathematics 16A or Mathematics 17A or Mathematics 21A, Mathematics 16B or Mathematics 17B or Mathematics 21B. Pass One open to Economics Majors. Problems of observation, estimation and hypotheses testing in economics through the study of the theory and application of linear regression models. Critical evaluation of selected examples of empirical research and exercises in applied economics. Only two units of credit allowed to students who have completed two or more of the following courses: Economics 102, Agricultural and Resource Economics 106 or Statistics 108. GE credit: SocSci|SS.—*W. (W.)*

(change in existing course—eff. winter 18)

145. Transportation Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or Agricultural and Resource Economics 100A and Agricultural and Resource Economics 100B; Mathematics 16A, Mathematics 16B or Mathematics 17A, Mathematics 17B; Statistics 13 or Statistics 13Y; course 102; course 140; Agricultural and Resource Economics 106 or Statistics 108; or consent of instructor. Intended for advanced Economics undergraduates. Examination of fundamental problems of planning and financing transportation "infrastructure" (roads, ports, airports). The economics of the automobile industry, as well as the impact of government regulation and deregulation in the airlines and trucking industries.

(change in existing course—eff. spring 18)

152. Economics of Education (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 C- or better or Agricultural and Resource Economics 100A C- or better and Agricultural and Resource Economics 100B C- or better; course 102 C- or better, Mathematics 16B C- or better or Mathematics 17B C- or better or Mathematics 21B C- or better; Statistics 13 C- or better or Statistics 13Y C- or better or Statistics 32 C- or better; or consent of instructor. Application of theoretical and empirical tools of economics to the education sector. Demand for Education; Education Production and Market Structures in Education. Policy applications: class size reduction, school finance equalization, accountability, and school choice.

(change in existing course—eff. spring 18)

160B. International Macroeconomics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A or 1AV; course 1B; course 100 or Agricultural and Resource Economics 100A-B, course 101; or consent of instructor. Macroeconomic theory of an open economy. Balance of payments adjustment mechanism, international monetary economics issues; international financial institutions and their policies. Only 2 units of credit allowed to students who have completed course 162.

(change in existing course—eff. winter 18)

162. International Economic Relations (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A or course 1AV; course 1B; or consent of instructor. International trade and monetary relations, trade policy, exchange rate policy, policies toward international capital migration and investment. Emphasis on current policy issues. Course intended especially for non-majors. Not open for credit to students who have completed course 160A or 160B. GE credit: SS, WC.

(change in existing course—eff. winter 18)

171. Economy of East Asia (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A or course 1AV; course 1B; or consent of instructor. Intensive reading, discussion and research on selected topics from the economies of the countries of East Asia. Consult department for course scheduling.

(change in existing course—eff. spring 18)

Graduate

200A. Microeconomic Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: graduate standing. Linear and non-linear optimization theory applied to develop the theory of the profit-maximizing firm and the utility-maximizing consumer. (Same course as Agricultural and Resource Economics 200A.)

(change in existing course—eff. fall 18)

200B. Microeconomic Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A. Characteristics of market equilibrium under perfect competition, simple monopoly and monopsony. Emphasis on general equilibrium and welfare economics; the sources of market success and market failure. (Same course as Agricultural and Resource Economics 200B.)

(change in existing course—eff. fall 18)

200C. Microeconomic Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200B. Uncertainty and information economics. Individual decision making under uncertainty. Introduction to game theory, with emphasis on applications to markets with firms that are imperfect competitors or consumers that are imperfectly informed. (Same course as Agricultural and Resource Economics 200C.)

(change in existing course—eff. fall 18)

200D. Macroeconomic Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 101; Mathematics 21A; Mathematics 21B; Mathematics 21C; or equivalent courses. Macro static theory of income, employment, and prices.

(change in existing course—eff. fall 18)

216. Energy and Climate Policy (4)
Lecture—3 hours; extensive writing/discussion—3 hours. Prerequisite: course 100A or Agricultural and Resource Economics 100A; or consent of instructor. Pass One restricted to graduate students in the following programs: Economics, Energy Graduate Group, and Transportation Technology and Policy Graduate Group. Fundamentals of energy technology, economics, and policy. Survey and analysis of current and prospective climate policies at the local and global level, including but not limited to cap-and-trade, emissions offsets, intensity standards, technology standards, mandates and subsidies. (Same course as Energy Graduate Group 202.)

(new course—eff. spring 18)

233. Poverty and Public Policy (4)
Lecture/discussion—4 hours. Interdisciplinary course covering qualitative and quantitative U.S. based poverty research. Topics include measurement, statistics, theories and evidence on the causes and consequences of poverty, and the history and efficacy of major anti-poverty programs.

(new course—eff. fall 16)

235D. Macroeconomics (4)
Lecture—3 hours; discussion—1 hour. Selected topics in Macroeconomics. May be repeated for credit. Offered irregularly.

(new course—eff. winter 17)

240A. Econometric Methods (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 239; or consent of instructor. Least squares, instrumental variables, and maximum likelihood estimation and inference for single equation linear regression model; linear restrictions; heteroskedas-

ticity; autocorrelation; lagged dependent variables. (Same course as Agricultural and Resource Economics 240A.)

(change in existing course—eff. fall 17)

Education

New and changed courses in Education (EDU)

Lower Division

65A. Foundations for University Success; Introduction to the University System (2)
Lecture/discussion—3 hours; field work—1 hour. Prerequisite: consent of instructor; student must be a part of an approved Foundations for University Success program. Introduction to resources supporting first year student academic success and transition to a tier one research university. (P/NP grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(new course—eff. summer 17)

65B. Foundations for University Success; Introduction to Research at a Tier 1 University (2)
Lecture/discussion—3 hours; field work—1 hour. Prerequisite: consent of instructor; student must be a part of an approved Foundations for University Success program. Development of important skills necessary for research including critical thinking, study skills, writing skills, and presentation skills. (P/NP grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(new course—eff. summer 17)

65C. Foundations for University Success; Internships, Graduate School and Careers (2)
Lecture/discussion—3 hours; field work—1 hour. Prerequisite: consent of instructor; student must be a part of an approved Foundations for University Success program. Resources to explore academic and career connections and opportunities including internships, volunteer opportunities, graduate schools and careers. (P/NP grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(new course—eff. summer 17)

Upper Division

122. Children, Learning and Material Culture (4)
Lecture/discussion—3 hours; extensive writing or discussion—1 hour; fieldwork. How material artifacts shape what and how children learn in school, at home, and in the community. Artifacts examined include books, computers, household appliances, toys and games, entertainment media, collectibles, sports equipment, clothing, folk arts and crafts, and neighborhood space. GE credit: SocSci, Div, Wrt | SS, VL, WE.—*F, S. (F, S.)* Watson-Gegeo, White

(change in existing course—eff. summer 17)

130. Issues in Higher Education (4)
Discussion—3 hours; field work—3 hours. 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.—*S. (S.)* Cuellar, Gonzalez

(change in existing course—eff. summer 17)

173. Language Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Linguistics 1 or Linguistics 1Y, or consent of instructor; Linguistics 103A, Linguistics 103B recommended. 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.

(change in existing course—eff. spring 18)

180A. Computers in Education (1)
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.)—*F. (F.)*

(change in existing course—eff. fall 13)

180B. Computers in Education (1)
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.)

(change in existing course—eff. fall 13)

180C. Computers in Education (1)
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.)

(change in existing course—eff. fall 13)

183. Teaching High School Mathematics and Science (3)
Lecture/discussion—2 hours; field work. Prerequisite: major in mathematics, science, or engineering; or consent of instructor with completion of a one-year sequence of science or calculus. 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.—*F, W, S. (F, W, S.)* Stevenson

(change in existing course—eff. fall 17)

Professional

310. Teaching as Reflective Practice (1)
Lecture/discussion—1 hour. Prerequisite: consent of instructor. Acceptance in Teacher Credential Program. Presentation of issues related to classroom instruction and professional practice, reflections on classroom instruction and other documentation related to student teaching experience. May be repeated up to 6 times.—*F, W, S. (F, W, S.)*

(new course—eff. fall 16)

320. Creating Classroom Communities (1)
Lecture/discussion—2 hours; fieldwork—30 hours. Acceptance in Teacher Credential Program. Observation of classrooms at beginning of academic year for first-hand experience with teachers' approaches to creating communities and setting routines. Candidates are placed with students they will teach during student teaching. Candidates may take on teaching tasks as appropriate.—*Su. (Su.)*

(new course—eff. fall 16)

Education Abroad Program

New and changed courses in Education Abroad Program (EAP)

Upper Division

192. Internship in Education Abroad (1-12)
Internship—3-36 hours. Prerequisite: participation in a study abroad program. Internship with Education Abroad program, potentially either at university or abroad. May be repeated for up to 12 units of credit. (P/NP grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(change in existing course—eff. winter 17)

Energy (A Graduate Group)

New and changed courses in Energy Systems (EGG)

Graduate

200. Energy Systems (4)
Lecture/discussion—4 hours. Prerequisite: Engineering 105; or equivalent. Theory and application of energy systems. Systems analysis, energy conversion technologies, environmental considerations, economics and system optimization. (Same course as Biological Systems Engineering 216.)

(change in existing course—eff. spring 18)

202. Energy and Climate Policy (4)
Lecture—3 hours; extensive writing/discussion—3 hours. Prerequisite: Economics 100A or Agricultural and Resource Economics 100A; or consent of instructor. Pass One restricted to graduate students in the following programs: Economics, Energy Graduate Group, and Transportation Technology and Policy Graduate Group. Fundamentals of energy technology, economics, and policy. Survey and analysis of current and prospective climate policies at the local and global level, including but not limited to cap-and-trade, emissions offsets, intensity standards, technology standards, mandates and subsidies. (Same course as Economics 216.)

(new course—eff. spring 18)

299. Research (1-12)
Prerequisite: consent of instructor. Research. May be repeated for credit. (S/U grading only.)

(new course—eff. fall 17)

Engineering

New and changed courses in Engineering (ENG)

Lower Division

3. Introduction to Engineering Design (4)
Lecture—2 hours; studio—2 hours; project—2 hours. Prerequisite: Must have satisfied the Entry Level Writing Requirement (ELWR). Pass One restricted to lower division College of Engineering students; Pass Two restricted to lower division students. Introduction to the engineering design process that incorporates the development of oral and written communication skills integral to the design process. Conducted in workshop format with hands-on engagement in the design process. GE credit: OL, SE or SS.

(change in existing course—eff. fall 18)

7. Technology and Culture of the Internet (4)
(change in existing course—eff. fall 18)

17. Circuits I (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 21C 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.—*F, S. (F, S.)*

(change in existing course—eff. fall 18)

35. Statics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Physics 9A C- or better; Mathematics 21D C- or better (can be concurrent). Force systems and equilibrium conditions with emphasis on engineering problems. GE credit: SciEng | SE.—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 17)

45H. Honors Properties of Materials (1)
Discussion—1 hour. Prerequisite: course 45 (can be concurrent) or course 45Y (can be concurrent); Enrollment in the Materials Science and Engineering Honors Program; course 45 or course 45Y required concurrently. Examination of special materials science and engineering topics through additional readings, discussions, collaborative work, or special activities which may include projects, laboratory experience or computer simulations. Open only to students in the Materials Science and Engineering Honors program.—*W. (W.)*

(change in existing course—eff. spring 18)

Upper Division

102. Dynamics (4)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 35 C- or better; Mathematics 22B C- or better. 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|SE, VL.—*F, W, S. (F, W, S.)* Cheng, Eke, Hess, Joshi

(change in existing course—eff. fall 17)

105. Thermodynamics (4)
Lecture—4 hours; discussion—1 hour. Prerequisite: Mathematics 22B C- or better; Physics9B C- or better. 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|SE, VL.—*F, W, S. (F, W, S.)* Aldredge, D'Souza, Erickson

(change in existing course—eff. fall 17)

111. Electric Machinery Fundamentals (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 17 C- or better. 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 in alternate years. GE credit: SciEng|QL, SE, SL, VL.—Delwiche

(change in existing course—eff. winter 17)

122. Introduction to Mechanical Vibrations (4)
Lecture—4 hours. Prerequisite: Engineering 102 C- or better; Engineering 6 C- or better or Engineering 5 C- or better or Computer Science Engineering 30 C- or better); 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|SE.—*F. (F.)*

(change in existing course—eff. fall 17)

Engineering: Aerospace Science and Engineering

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

Lower Division

10. From the Wright Brothers to Drones and Quadcopters (2)
Lecture—2 hours. History of aircraft and its influence on society. Topics covered will include Unmanned Aerial Vehicles, safety considerations, economics and privacy issues. Aerodynamics, stability and control will also be introduced. GE credit: SciEng or SocSci|SE or SS.—*Su. (Su.)*

(change in existing course—eff. fall 16)

Upper Division

127. Applied Aircraft Aerodynamics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mechanical Engineering 106 C- or better. Principles, governing equations, and predictive theories for aircraft aerodynamics. Lift and drag of 2D airfoils, 3D wings, and high-lift devices. GE credit: SciEng|SE, WE.—*F. (F.)* Robinson

(change in existing course—eff. fall 17)

129. Stability and Control of Aerospace Vehicles (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 102 C- or better. Restricted to upper division standing. Aircraft and spacecraft stability and control. Derivation of fundamental equations of motion for aircraft/spacecraft. Fundamentals of feedback. Aircraft flight control systems. Spacecraft attitude control systems. GE credit: SciEng|SE.—*W. (W.)* Hess, Kong

(change in existing course—eff. fall 17)

130A. Aircraft Performance and Design (4)
Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: course 127 C- or better; course 129 C- or better (can be concurrent). 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.—*W. (W.)* van Dam

(change in existing course—eff. fall 17)

130B. Aircraft Performance and Design (4)
Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: course 130A C- or better. Restricted to upper division standing. Major aircraft design experience including detailed design, cost analysis, analysis of aircraft structure, propulsion system, aerodynamics, aircraft handling qualities, manufacturing, or meeting relevant engineering standards. GE credit: SciEng|OL, SE.—*S. (S.)* van Dam

(change in existing course—eff. fall 17)

135. Aerospace Structures (4)
Lecture—4 hours. Prerequisite: Engineering 104 C- or better; course 126 or course 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.—*W. (W.)* La Saponara

(change in existing course—eff. fall 17)

138. Aircraft Propulsion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mechanical Engineering 106 C- or better. Analysis/design of modern aircraft gas turbine engines. Development/application of cycle performance prediction techniques. Introduction to design of inlets, compressors, burners, turbines, and nozzles. Cycle design for specific applications. GE credit: SciEng|SE.—*W. (W.)* R. Davis

(change in existing course—eff. fall 17)

Engineering: Applied Science—Davis

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

Graduate

285D. Physics and Technology of Microwave Vacuum Electron Beam Devices IV (4)
(cancelled course—eff. fall 16)

Engineering: Biological Systems

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

Upper Division

147. Runoff, Erosion and Water Quality Management (3)
Lecture/laboratory—8 hours; fieldwork—1 hour. Prerequisite: Physics 7B or Physics 9B; Mathematics 16C or Mathematics 17C or Mathematics 21C; Civil and Environmental Engineering 142 or Hydrologic Science 141 or Environmental Science & Management 100; or equivalent. Practical hydrology and runoff water quality management from disturbed watersheds. Development of hillslope and soils restoration concepts and practice, modeling and application. (Same course as Hydrologic Science 147.) GE credit: SciEng | SE.—*F. (F.)* Grismer

(change in existing course—eff. spring 18)

Graduate

216. Energy Systems (4)
Lecture/discussion—4 hours. Prerequisite: Engineering 105; or equivalent. Theory and application of energy systems. Systems analysis, energy conversion technologies, environmental considerations, economics and system optimization. (Same course as Energy Systems 200.)

(change in existing course—eff. spring 18)

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. (Same course as Engineering: Chemical 268.) Offered in alternate years.—*F. (F.)* Jeoh

(change in existing course—eff. winter 17)

Engineering: Biomedical

New and changed courses in Biomedical Engineering (BIM)

Lower Division

88V. Introduction to Research (2)
Web virtual lecture—2 hours. Introduction to types of research, including the basics of joint research with a faculty mentor. Self-assessments to identify areas of interest, priorities, and fit. Literature search and library skills used in early stages of research. Research safety, integrity, and intellectual property.—*S. (S.)* Louie

(new course—eff. winter 18)

Upper Division

102. Cellular Dynamics (4)
Lecture/discussion—4 hours. Prerequisite: Biological Sciences 2A; Chemistry 8B or Chemistry 118B. Open to College of Engineering students only. 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. GE credit: SciEng|QL, SE, VL.—*F. (F.)* Yamada

(change in existing course—eff. spring 17)

110A. Biomedical Engineering Senior Design Experience (3)
Lecture/discussion—1 hour; project—6 hours. Prerequisite: course 110L (can be concurrent); course 111 (can be concurrent). 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.—*W. (W.)* Passerini

(change in existing course—eff. spring 17)

110L. Biomedical Engineering Senior Design Lab (2)
Laboratory—3 hours; laboratory/discussion—2 hours. Prerequisite: course 105; course 108; course 109. Restricted to Biomedical Engineering majors. Manufacturing processes, safety, computer-aided design techniques applied to fabrication of biomedical devices. Application of engineering principles & design theory to build a functional prototype to solve a biomedical problem. Continues in 110AB. (Deferred grading only, pending completion of sequence.) GE credit: SE.—*F, W. (F, W.)* Passerini

(change in existing course—eff. fall 17)

117. Modeling Strategies for Biomedical Engineering (4)
Lecture—2 hours; lecture/discussion—2 hours. Prerequisite: Biological Sciences 2A C- or better; Mathematics 22A C- or better. Restricted to upper division standing. Non-simulation strategies for modeling biomedical engineering systems, including natural and synthetic systems at the cell and molecular level. Formulating and testing hypotheses by translating real-world problems into appropriate mathematical models, translating mathematical results into real-world understanding, and gaining appreciation for how models contribute to the development cycle of biomedical engineering applications. GE credit: SciEng | SE.—*F. (F.)* Savageau

(change in existing course—eff. spring 18)

125. Introduction to Design and Analysis of Experiments for BME (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 105 or Statistics 100. Basic concepts and methods in design of experiments with biomedical engineering applications. Statistical concepts and methods to study strategies to design efficient industrial experiments that can improve data quality and simplify data analysis. GE credit: SE.—*F. (F.)* Duan

(new course—eff. winter 18)

126. Tissue Mechanics (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Exercise Biology 103 or Engineering 45 or Engineering 45Y. Structural and mechanical properties of biological tissues, including bone, cartilage, ligaments, tendons, nerves, and skeletal muscle. Offered irregularly. GE credit: SE.

(change in existing course—eff. spring 18)

140L. Protein Engineering Laboratory (2)
Discussion—1 hour; lecture—3 hours. Prerequisite: course 140 (can be concurrent); concurrent enrollment in course 140 required. Optional hands-on laboratory for BIM 140. Students use the engineering design process to design, build, and test a solution to a practical problem in the field of protein engineering. Problems change each offering. Offered in alternate years. GE credit: SE.—*S.* Facciotti

(new course—eff. spring 17)

142. Principles and Practices of Biomedical Imaging (4)
Lecture—4 hour. Prerequisite: course 108 (can be concurrent); Mathematics 22B. 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 | SE.—*S. (S.)* Cherry

(change in existing course—eff. spring 18)

143L. Synthetic Biology Laboratory (2)
Discussion—1 hour; lecture—3 hours. Prerequisite: course 143 (can be concurrent); concurrent enrollment in course 143 required. Optional hands-on laboratory for BIM 143. Students solve a practical problem in the field of synthetic biology by designing, building, and testing an appropriate solution or product. Problems change each offering. Offered in alternate years. GE credit: SE.—*(S.)* Facciotti

(new course—eff. spring 17)

144. Fundamentals of Biophotonics and Bioimaging (4)
Lecture/discussion—4 hours. Prerequisite: Mathematics 22B; Physics 9B; or consent of instructor; course 108 or equivalent helpful; Biology or Physiology course recommended. Biophotonics and bioimaging, emphasizing quantitative description of light propagation & light tissue interactions. Key technologies and illustrative applications in basic research, clinical diagnostics and therapy. GE credit: SE.—*W. (W.)* Srinivasan

(new course—eff. spring 17)

161A. Biomolecular Engineering (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 2A; Chemistry 8B or Chemistry 118B. Restricted to upper division standing. Introduction to the basic concepts and techniques of biomolecular engineering such as recombinant DNA technology, protein engineering, and molecular diagnostics. Three units of credit for students who have taken course 161S. Offered in alternate years. GE credit: SciEng|QL, SE.—*(F.)* Tan

(change in existing course—eff. spring 17)

167. Biomedical Fluid Mechanics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 106 C- or better; Neurobiology, Physiology, and Behavior 101 or course 116. Theories of fluid mechanics, including Navier Stokes Equation and Conservation Laws, will be presented to understand dynamics of human circulatory systems. Fluid dynamics will be analyzed using partial differential equations. GE credit: SciEng|SE.—*S. (S.)* Tan

170. Aspects of Medical Device Design and Manufacturing (2)
Lecture—2 hours. Prerequisite: consent of instructor. Open to upper division Biomedical Engineering majors only. Survey of medical device design & impact on manufacturing operations. Introduction to medical device design process & product lifecycle. Principles of Design for Manufacturability, Design for Lean Manufacturing, and quality management systems. GE credit: SciEng|SE.—*W. (W.)* Chigazola

(new course—eff. winter 17)

171. Clinical Applications for Biomedical Device Design (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 116 C- or better or Neurobiology, Physiology, and Behavior 101 C- or better; Neurobiology, Physiology, and Behavior 101 recommended. Restricted to Biomedical Engineering majors only. Clinical applications for biomedical devices with emphasis in the pathophysiology of common diseases as it relates to the biodesign process, biosensors principles, in vitro diagnostics, needs assessment, and regulatory considerations. GE credit: SE.—*F. (F.)* Tran

(new course—eff. fall 17)

Graduate

201. Scientific Communication for Biomedical Engineers (1)
Lecture/discussion—1 hour. Prerequisite: consent of instructor. Course is designed to improve the written and oral communication skills of first-year graduate students through writing fellowship proposals, analyzing data, and critically reviewing research papers, product development and biotechnology careers. (S/U grading only.)—*F. (F.)* Leach

(new course—eff. fall 16)

210. Introduction to Biomaterials (4)
Lecture—4 hours. Prerequisite: Engineering 45 or Engineering 45Y; or consent of instructor. Mechanical and atomic properties of metallic, ceramic, and polymeric implant materials of metallic, ceramic, and polymeric implant materials; corrosion, degradation, and failure of implants; inflammation, wound and fracture healing, blood coagulation; properties of bones, joints, and blood vessels; biocompatibility of orthopaedic and cardiovascular materials.

(change in existing course—eff. spring 18)

211. Design of Polymeric Biomaterials and Biological Interfaces (4)
Lecture—4 hours. Prerequisite: Engineering 45 or Engineering 45Y; or consent of instructor. Open to upper division undergraduates or graduate students. Design, selection and application of polymeric biomaterials. Integration of the principles of polymer science, surface science, materials science and biology.

(change in existing course—eff. spring 18)

214. Continuum Biomechanics (4)
Lecture—4 hours. Prerequisite: course 141; Engineering 102; or equivalent. Continuum mechanics relevant to bioengineering. Concepts in tensor calculus, kinematics, stress and strain, and constitutive theories of continua. Selected topics in bone, articular cartilage, blood/circulation, and cell biomechanics will illustrate the derivation of appropriate continuum mechanics theories.—*W. (W.)* Athanasiou

(change in existing course—eff. fall 17)

215. Biomedical Fluid Mechanics and Transport Phenomena (4)
(cancelled course—eff. fall 16)

221. Drug Delivery Systems (4)
Lecture/discussion—4 hours. Prerequisite: course 204 recommended but not required. Fundamental engineering and biotechnology principles critical for the formulation and delivery of therapeutic agents, including peptide/protein drugs and small molecules.—*S. (S.)* Silva

(new course—eff. winter 17)

228. Skeletal Muscle Mechanics: Form, Function, Adaptability (4)
Lecture—4 hours. Prerequisite: Engineering 35; Engineering 45 or Engineering 45Y; Mathematics 21D; basic background in biology, physiology, and engineering; Neurobiology, Physiology, and Behavior 101 recommended. Basic structure and function of skeletal muscle examined at the microscopic and macroscopic level. Muscle adaptation in response to aging, disease, injury, exercise, and disuse. Analytic models of muscle function are discussed.

(change in existing course—eff. spring 18)

254. Statistical Methods in Genomics (4)
Lecture—4 hours. Statistical approaches to problems in computational molecular biology and genomics; formulation of questions via probabilistic modeling, statistical inference methods for parame-

ter estimation, and interpretation of results to address biological questions; application to high-impact problems in functional genomics and molecular biology.—*F. (F.)* Aviran

(new course—eff. winter 17)

227. Research Techniques in Biomechanics (4)
(cancelled course—eff. fall 16)

231. Musculo-Skeletal System Biomechanics (4)
(cancelled course—eff. fall 16)

255. Nanoscale Imaging for Molecular Medicine (3)
Lecture/discussion—3 hours. Prerequisite: course 202 highly recommended; graduate standing. Current and emerging technologies to visualize biological structures and processes at size scales = 100 nanometers – and their application towards the advancement of molecular medicine. Technologies include superresolution optical microscopy, electron microscopy and tomography. Emphasis on quantitative imaging. Same course as Biophysics 255.—*S. (S.)* Cheng, Chuang

(change in existing course—eff. spring 17)

258. Advanced Biophotonics and Bioimaging (4)
Lecture—4 hours. Prerequisite: course 108; Physics 108; or an equivalent undergraduate optics course to Physics 108. Quantitative basis for biophotonics and bioimaging, with an emphasis on the physical and mathematical description of optics, light propagation, and light-tissue interactions. Advantages and limitations of various optical imaging and sensing technologies. Illustrative applications in diagnostics, basic research, and therapy.—*F. (F.)* Srinivasan

(new course—eff. winter 17)

262. Cell and Molecular Biophysics for Bioengineers (4)
Lecture—4 hours. Prerequisite: course 284 or equivalent; graduate standing; undergraduate students by consent of instructor. Introduction to fundamental mechanisms governing the structure, function, and assembly of bio-macromolecules. Emphasis is on a quantitative understanding of the nano-to-microscale interactions between and within individual molecules, as well as of their assemblies, in particular membranes. Not open for credit to students who have completed Biomedical Engineering 162. (Same course as Chemical Engineering 269.)—*F. (F.)* Heinrich

(change in existing course—eff. winter 17)

264. Synthetic and Systems Engineering of Cells (4)
Lecture—4 hours. Introduction to the design, engineering, and control of biological systems for biotechnological applications and biological studies. Offered in alternate years.—*F. (F.)* Tan

(new course—eff. fall 16)

283. Advanced Design of Experiments for Biomedical Engineers (4)
Lecture—4 hours. Open to graduate students only. Provides biomedical engineering graduate students with the tools to properly design experiments, collect and analyze data, and extract, communicate and act on information generated. Not open for credit to students who have taken Biological Systems Engineering 265.—*S. (S.)* Lewis

(new course—eff. spring 17)

288. Living Matter: Physical Biology of the Cell (3)
Lecture—3 hours. Open to any student possessing general background in any disciplines of physical or biological sciences and engineering. Introduction to the origin, maintenance, and regulation of the dynamic architecture of the cell, including cellular modes of organization, dynamics and energy dissipation, molecular transport, motility, regulation, and adaptability. Same course as Materials Science and Engineering 288 and Biophysics 288.—*W. (W.)* Parikh

(new course—eff. winter 17)

Engineering: Chemical

New and changed courses in Engineering: Chemical (ECH)

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 students who have completed Chemical and Materials Science Engineering 1, Chemical and Materials Science Engineering 5, or course 5. GE credit: SciEng|SE, SL, VL.—*F, W, S. (F, W, S.)*

(new course—eff. spring 17)

5. Introduction to Analysis and Design in Chemical Engineering (3)
Lecture—2 hours; laboratory—2 hours. Prerequisite: Mathematics 21A; Mathematics 21B (can be concurrent). Quantitative introduction to the engineering principles of analysis and design. Applications of differential and integral calculus. Laboratory experiments using coffee to illustrate chemical engineering concepts and to conduct an engineering design competition. Only two units of credit to students who have completed Chemical and Materials Science Engineering 1 or course 1; not open for credit to students who have completed Chemical and Materials Science Engineering 5. GE credit: SciEng|SE, QL.—*W. (W.)*

(new course—eff. winter 17)

51. Material Balances (4)
Lecture—4 hours. Prerequisite: Mathematics 21C C- or better; Mathematics 21D (can be 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, phase change, and reaction stoichiometry. Not open for credit to students who have completed course 151. GE credit: SciEng|SE.—*F. (F.)*

(change in existing course—eff. fall 17)

60. Engineering Problem Solving Using MATLAB (4)
Lecture/discussion—4 hours. Prerequisite: Mathematics 21C. Problem solving in chemical, biochemical and materials engineering using MATLAB. Programming styles, data structures, working with lists, functions and rules. Applications drawn from material balances, statistics, numerical methods, bioinformatics, transport phenomena, kinetics, and computational analysis. GE credit: SciEng|SE, QL.—*S. (S.)*

(new course—eff. fall 17)

90X. Honors Discussion Section (1)
Discussion—1 hour. Open only to students in the Chemical Engineering or Biochemical Engineering Honors Programs. Examination of special topics covered in selected lower-division courses through additional readings, discussions, collaborative work, or special activities which may include projects, laboratory experience or computer simulations. Repeat credit allowed if topic differs. May be repeated for credit. Offered irregularly. GE credit: SciEng.—*W, S. (W, S.)*

(new course—eff. fall 17)

Upper Division

140. Mathematical Methods in Biochemical and Chemical Engineering (4)
Lecture/discussion—3 hours; laboratory—1 hour. Prerequisite: Mathematics 22B; course 60 or Engineering 6; or equivalents of course 60 or Engineering 6. 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|SE.—*F. (F.)*

(change in existing course—eff. spring 17)

141. Fluid Mechanics for Biochemical and Chemical Engineers (4)
Lecture/discussion—4 hours. Prerequisite: course 51 C- or better; course 140. Principles and applications of fluid mechanics in chemical and biochemical engineering. Hydrostatics. The stress tensor and Newton's law of viscosity. Not open for credit to students who have completed course 150B. GE credit: QL, SE.

(change in existing course—eff. winter 19)

142. Heat Transfer for Biochemical and Chemical Engineers (4)
Lecture/discussion—4 hours. Prerequisite: course 141. Conduction, convection, and radiation of thermal energy in applications to chemical and biochemical engineering. Derivation of thermal and mechanical energy equations. Thermal boundary layers. Macroscopic balances. Applications: heat transfer in tubes, channels, and integrated circuits, and analysis of heat exchangers. Not open for credit to students who have completed course 153. GE credit: QL, SE.

(change in existing course—eff. spring 19)

143. Mass Transfer for Biochemical and Chemical Engineers (4)
Lecture/discussion—4 hours. Prerequisite: course 141. Derivation of species conservation equations describing convective and diffusive mass transfer. Fick's law and the Stefan-Maxwell constitutive equations. Mass transfer coefficients. Multicomponent mass transfer across gas/liquid interfaces. Applications include drying, heterogeneous chemical reactions, and membrane separations. GE credit: SE.

(change in existing course—eff. spring 19)

145A. Chemical Engineering Thermodynamics Laboratory (3)
Laboratory—2 hours; discussion—2 hours; extensive writing. Prerequisite: course 152A; course 152B (can be concurrent). Open to majors in Chemical Engineering, Chemical Engineering/Materials Science, & Biochemical Engineering. Laboratory experiments in chemical engineering thermodynamics. GE credit: SciEng|SE, WE.—*W. (W.)*

(change in existing course—eff. winter 17)

145B. Chemical Engineering Transport Lab (3)
Laboratory—2 hours; discussion—2 hours; extensive writing. Prerequisite: courses 141; course 145A. Open to majors in Chemical Engineering, Chemical Engineering/Materials Science, & Biochemical Engineering. Laboratory experiments in chemical engineering transport phenomena. GE credit: SciEng|SE, WE.—*S. (S.)*

(change in existing course—eff. spring 17)

152A. Chemical Engineering Thermodynamics (3)
Lecture—3 hours. Prerequisite: course 60 or Engineering 6; or equivalents. 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.—*F. (F.)*

(change in existing course—eff. spring 17)

155. Chemical Engineering Kinetics and Reactor Design Laboratory (4)
Laboratory—6 hours; discussion—1 hour; term paper. Prerequisite: course 145B; course 148A; course 148B (can be concurrent); course 157 (can be concurrent); upper division English composition requirement (can be concurrent). 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.—*W, S. (W, S.)*

(change in existing course—eff. spring 17)

158C. Plant Design Project (4)
Discussion/laboratory—2 hours; project—6 hours. Prerequisite: course 158B or course 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|SE, SS, VL.—*S. (S.)*

(change in existing course—eff. winter 18)

169. The Design of Cocktails: Applied Thermodynamics and Transport Phenomena in Mixed Drinks (1)
Discussion/laboratory—1 hour. Prerequisite: course 145B; course 152B; and consent of instructor. Enrollment by permission of instructors only; limited to students over 21 years old. Scientific and engineering principles underlying the preparation of mixed drinks. Thermodynamics and kinetics of ice crystallization; phase diagram of ethanol-water-ice mixtures; mass transfer of aromatics; solubility of sucrose and carbon dioxide; colloidal behavior of dispersed solids and emulsified oils. Corresponding laboratory experiments testing the effect of design choices on the sensory quality of cocktails. GE credit: SE.

(change in existing course—eff. spring 18)

190X. Honors Discussion Section (1)
Discussion—1 hour. Open only to students in the Chemical Engineering or Biochemical Engineering Honors Programs. Examination of special topics covered in selected upper division courses through additional readings, discussions, collaborative work, or special activities which may include projects, laboratory experience or computer simulations. May be repeated for credit. Offered in alternate years.—*F, W, S. (F, W, S.)*

(change in existing course—eff. fall 17)

Graduate

261. Molecular Modelling of Soft and Biological Matter (4)
Lecture/discussion—4 hours. Prerequisite: Materials Science and Engineering 247 or Chemical Engineering 252; or equivalent course in advanced thermodynamics/statistical mechanics. Modern molecular simulation techniques with a focus on soft matter like polymers, biologically relevant systems, and glasses. Offered irregularly.

(new course—eff. winter 17)

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. (Same course as Engineering: Biological Systems 268.) Offered in alternate years.—*F. (F.)* Jeoh

(new course—eff. winter 17)

269. Cell and Molecular Biophysics for Bioengineers (4)
Lecture—4 hours. Prerequisite: Biomedical Engineering 284 or equivalent; graduate standing; undergraduate students by consent of instructor. Introduction to fundamental mechanisms governing the structure, function, and assembly of bio-macromolecules. Emphasis is on a quantitative understanding of the nano-to-microscale interactions between and within individual molecules, as well as of their assemblies, in particular membranes. (Same course as Biomedical Engineering 162.)—*F. (F.)* Heinrich

(new course—eff. winter 17)

294. Current Progress in Biotechnology (1)
Seminar—3 hours. Prerequisite: graduate standing. Seminars presented by guest lecturers on subjects of their own research activities. May be repeated for credit. (Same course as Same course as Designated Emphasis, Biotechnology 294.) (S/U grading only.)—*F, W, S. (F, W, S.)* Kjelstrom, McDonald, Rodriguez

(change in existing course—eff. winter 18)

Professional

390. Teaching of Chemical Engineering (1)
Discussion—1 hour. Prerequisite: consent of instructor; qualifications and acceptance as teaching assistant and/or associate-in in chemical engineering. Participation as a teaching assistant or associate-in in a designated engineering course. Methods of leading discussion groups or laboratory sections, writing and grading quizzes, use of laboratory equipment, and grading laboratory reports. May be repeated for credit. (S/U grading only.)

(change in existing course—eff. fall 18)

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)
(cancelled course—eff. fall 16)

5. Analysis in Biochemical, Chemical and Materials Engineering (3)
(cancelled course—eff. fall 16)

6. Computational Methods for Bio/Chemical/ Materials Engineers (4)
(cancelled course—eff. fall 16)

90X. Honors Discussion Section (1)
(cancelled course—eff. fall 2017)

94H. Honors Seminar (1)
(cancelled course—eff. winter 17)

Upper Division

189A. Special Topics in ECM; Fluid Mechanics (1-5)
(cancelled course—eff. fall 16)

189B. Special Topics in ECM; Nonlinear Analysis and Numerical Methods (1-5)
(cancelled course—eff. fall 16)

189C. Special Topics in ECM; Process Control (1-5)
(cancelled course—eff. fall 16)

189D. Special Topics in ECM; Chemistry of Catalytic Processes (1-5)
(cancelled course—eff. fall 16)

189E. Special Topics in ECM; Biotechnology (1-5)
(cancelled course—eff. fall 16)

189F. Special Topics in ECM; Interfacial Engineering (1-5)
(cancelled course—eff. fall 16)

189G. Special Topics in ECM; Thermodynamics (1-5)
(cancelled course—eff. fall 16)

189H. Special Topics in ECM; Membrane Separations (1-5)
(cancelled course—eff. fall 16)

189I. Special Topics in ECM; Novel Experimental Methods (1-5)
(cancelled course—eff. fall 16)

189J. Special Topics in ECM; Transport Phenomena (1-5)
(cancelled course—eff. fall 16)

189K. Special Topics in ECM; Biomolecular Engineering (1-5)
(cancelled course—eff. fall 16)

189L. Special Topics in ECM; Electronic Materials (1-5)
(cancelled course—eff. fall 16)

189M. Special Topics in ECM; Ceramics and Minerals (1-5)
(cancelled course—eff. fall 16)

189N. Special Topics in ECM; Physics and Chemistry of Materials (1-5)
(cancelled course—eff. fall 16)

189O. Special Topics in ECM; Materials Processing (1-5)
(cancelled course—eff. fall 16)

189P. Special Topics in ECM; Materials Science and Forensics (1-5)
(cancelled course—eff. fall 16)

189Q. Special Topics in ECM; Biomaterials (1-5)
(cancelled course—eff. fall 16)

189R. Special Topics in ECM; Surface Chemistry of Metal Oxides (1-5)
(cancelled course—eff. fall 16)

190X. Honors Discussion Section (1)
(cancelled course—eff. fall 17)

194HA. Special Study for Honors Students (2)
(cancelled course—eff. fall 17)

194HB. Special Study for Honors Students (1-5)
(cancelled course—eff. spring 17)

194HC. Special Study for Honors Students (1-5)
(cancelled course—eff. fall 17)

Graduate

229. Computational Molecular Modeling (4)
(cancelled course—eff. fall 16)

261. Molecular Modelling of Soft and Biological Matter (4)
(cancelled course—eff. winter 17)

268. Process Monitoring and Data Analysis (3)
(cancelled course—eff. spring 17)

280. Seminar in Ethics for Scientists (2)
(cancelled course—eff. fall 17)

281. Green Engineering: Theory and Practice (3)
(cancelled course—eff. fall 16)

290. Chemical Engineering & Materials Science Seminar (1)
(cancelled course—eff. fall 17)

Engineering: Civil and Environmental

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

Lower Division

17. Surveying (2)
(cancelled course—eff. spring 18)

Upper Division

100. Introduction to Fluid Mechanics for Civil and Environmental Engineers (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 35 C- or better; Mathematics 22B C- or better; Physics 9B C- or better. Pass One restricted to Civil Engineering, Environmental Engineering and Hydrology majors. Fluid flow in civil & environmental engineering, basis for design, buoyancy, hydrostatics, gravity dams, hydraulic modeling: similarity & scaling, conservation laws, flow in bends, nozzles, pipes, pumps, turbines, complimentary lab experiments. Not open for credit to students who have taken Engineering 103. GE credit: SE.—*F, W. (F, W.)* Bombardelli, Forrest, Oldroyd, Schladow, Younis

(new course—eff. fall 17)

126. Integrated Planning for Green Civil Systems (4)
(cancelled course—eff. spring 18)

127. Integrated Design for Green Civil Systems: Senior Design Experience (4)
(cancelled course—eff. spring 18)

128. Integrated Construction for Green Civil Systems (4)
(cancelled course—eff. spring 18)

136. Building Design (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 130 or 131; course 135 or 132. Design of a building structure for a specific need under the multiple constraints of safety, serviceability, cost and aesthetics. GE credit: SciEng|SE.—*S. (S.)*

(change in existing course—eff. fall 17)

140. Environmental Analysis of Aqueous Systems (3)
(cancelled course—eff. winter 18)

140A. Environmental Analysis of Aqueous Systems (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Chemistry 2B C- or better. Pass One restricted to Environmental Engineering majors. Introduction to "wet chemical" and instrumental techniques commonly used in the examination of water and wastewater and associated data analysis. Not open for credit to students who have taken Civil and Environmental Engineering 140 or Chemistry 100. GE credit: SE.—*F. (F.)* Darby

(new course—eff. fall 17)

140B. Chemical Principles for Environmental Engineers (4)
Lecture—4 hours. Prerequisite: Chemistry 2B C- or better. Aqueous chemistry; equilibrium relationships; carbonate system; thermodynamics; kinetics & rate laws; precipitation, adsorption, & volatilization phenomenon; oxidation & reduction reactions; pH, pE and predominance diagrams; organic chemicals. Not open for credit to students who have taken Civil and Environmental Engineering 140. GE credit: SE.—*F. (F.)* Darby

(new course—eff. fall 17)

140C. Biological Principles for Environmental Engineering (4)
Lecture—4 hours. Prerequisite: course 40A C- or better or course 140B C- or better. Fundamental microbiology concepts for environmental engineers; provides background needed for the application of water and wastewater treatment, bioremediation, air pollution control and biotransformations in environmental engineered systems. Only two units of credit for students who have taken Microbiology 101 or 102. GE credit: SE.—*W. (W.)* Kinyua

(change in existing course—eff. winter 18)

140D. Water and Wastewater Treatment System Design (4)
Lecture—3 hours; discussion—3 hours. Prerequisite: Engineering 103 C- or better or course 100 C- or better; course 140 C- or better or course 140A C- or better or course 140B C- or course or course 140C C- or better or course 148A C- or better. Evaluation and design of water and wastewater treatment systems. Not open for credit to students who have taken Civil & Environmental Engineering 148B. GE credit: SE.—*S. (S.)* Darby

(new course—eff. winter 18)

140L. Environmental Analysis of Aqueous Systems Laboratory (1)
(cancelled course—eff. winter 18)

141. Engineering Hydraulics (3)
Lecture—3 hours. Prerequisite: Engineering 103 C- or better or course 100 C- or better. 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.—*F, W. (F, W.)* Bombardelli, Schladow, Younis

(change in existing course—eff. winter 18)

143. Green Engineering Design and Sustainability (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing. Restricted to upper division standing; Pass One restricted to Civil Engineering majors. Application of concepts, goals and metrics of sustainability, green engineering and industrial ecology to engineering design. Other course topics include life-cycle assessments, analysis of environmental management systems, and economics of pollution prevention and sustainability. GE credit: SciEng|QL, SE, SL, WE.—*W. (W.)* Bronner

(change in existing course—eff. winter 17)

145. Hydraulic Structure Design (4)
Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: course 141 C- or better. Project-based course on the design of an integrated urban drainage system with focus on consideration of design alternatives, multiple realistic constraints, quantification of uncertainty, codes and standards, technical drawing and cost analysis. GE credit: SciEng|SE.—*S. (S.)* Younis

(change in existing course—eff. fall 17)

146. Water Resources Simulation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103 C- or better or course 100 C- or better. 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.—*W. (W.)* Bombardelli, Younis

(change in existing course—eff. winter 18)

147A. Environmental Engineering Senior Design Experience I (4)
(cancelled course—eff. winter 18)

147B. Environmental Engineering Senior Design Experience II (4)
(cancelled course—eff. spring 18)

148B. Water and Wastewater Treatment System Design: Senior Design Experience (4)
(cancelled course—eff. winter 18)

149. Air Pollution (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 21D; Mathematics 22B; Chemistry 2B C- or better; Atmospheric Science 121A or Engineering 103 C- or better or course 100 C- or better. 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.—*F. (F.)* Cappa

(change in existing course—eff. winter 18)

150. Air Pollution Control System Design (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 149 C- or better or Atmospheric Science 149 C- or better. Design and evaluation of air pollution control devices and systems. GE credit: SciEng|SE.—*W. (W.)* Cappa

(change in existing course—eff. fall 17)

155. Water Resources Engineering Planning (4)
Lecture—4 hours. Prerequisite: Engineering 106 or Economics 1A or Economics 1AV); 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.—*S. (W.)* Herman, Lund

(change in existing course—eff. winter 18)

162. Transportation Land Use Sustainable Design: Senior Design Experience (4)
(cancelled course—eff. spring 18)

163. Energy and Environmental Aspects of Transportation (4)
Lecture—3 hours; extensive writing. Prerequisite: Economics 1A or Economics 1AV 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, SocSci, Wrt | SE or SS, SL, WE.—*F.* Sperling

(change in existing course—eff. spring 18)

171. Soil Mechanics (4)
Lecture—4 hours. Prerequisite: Engineering 103 (can be concurrent) or course 100 (can be concurrent); Engineering 104 C- or better; course 171L (can be concurrent; course 171L required concurrently. Restricted to Civil Engineering and Environmental 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.—*W, S. (W, S.)* DeJong, Martinez, Ziotopoulou

(change in existing course—eff. spring 18)

173. Foundation Design (4)
Lecture—4 hours. Prerequisite: course 171. Foundation analysis and design, including site characterization, evaluation of shallow and deep foundation alternatives, evaluation of bearing capacity and settlements, design of retaining structures, and case-based design experiences. GE credit: SciEng|SE.—*S. (S.)* Boulanger

(change in existing course—eff. winter 18)

175. Geotechnical Earthquake Engineering (4)
Lecture—4 hours. Prerequisite: course 171 C- or better. Tectonics, faults, site response, and probabilistic ground motion prediction equations. Cyclic loading and liquefaction of soil elements and layers. Empirical procedures and field tests for evaluation of triggering and consequences, of liquefaction. GE credit: SciEng|SE.—*F. (F.)* Boulanger, Kutter

(change in existing course—eff. fall 17)

190. The Civil Engineer in Society (2)
(cancelled course—eff. spring 18)

193A. Civil and Environmental Engineering Senior Design (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 140D C- or better or course 171 C- or better, course 171L C- or better or course 132 C- or better or course 135 C- or better or course 161 C- or better or course 163 C- or better or course 141 C- or better, course 141L C- or better; consent of instructor; one ECI major depth course with a C- or better; students must be in final year of study. Culminating design experience for civil engineering and environmental engineering majors. Student teams work closely with faculty, city officials or consulting clients to propose, implement and validate a unique solution to a real-world problem. (Deferred grading only, pending completion of sequence.) GE credit: OL, SE, WE.—*W. (W.)* Bronner, Niemeier

(change in existing course—eff. winter 18)

193B. Civil and Environmental Engineering Senior Design (4)
Lecture—1 hours; laboratory—9 hours. Prerequisite: course 193A. Open to seniors in Civil Engineering and Environmental Engineering only. Culminating design experience for civil engineering and environmental engineering majors. Student teams work closely with faculty, city officials or consulting clients to propose, implement and validate a unique solution to a real-world problem. (Deferred grading only, pending completion of sequence.) GE credit: OL, SE, VL, WE.—*S. (S.)* Bronner, Niemeier

(new course—eff. fall 17)

Graduate

246. Pilot Plant Laboratory (4)
(cancelled course—eff. fall 16)

254. Exploring Data from Built Environment Using R (4)
Lecture—3 hours; laboratory—3 hours. Introduction to modern data science, specifically data acquisition, exploratory data analysis, visualization, and beginning data analysis using R. Emphasizes computational reasoning and working with tabular and non-standard data. Focus will be on data generated in the built environment. (Same course as Geography 279.)—*W. (W.)* Niemeier

(change in existing course—eff. fall 17)

258. Transportation Planning in Developing Countries (3)
(cancelled course—eff. fall 16)

268. Infrastructure Economics (3)
Lecture—3 hours. Prerequisite: Economics 1A or Economics 1AV; Engineering 106; or the equivalent. Economics applied to infrastructure engineering planning, operations, maintenance, and management problems; microeconomic and macroeconomic theories; benefit-cost analysis; effect of uncertainty; optimization economics; non-classical economics; public finance. Offered in alternate years.—*(W.)* Lund

(change in existing course—eff. spring 18)

273. Water Resource Systems Engineering (4)
Lecture—4 hours. Prerequisite: course 114; course 153; or the equivalent. Planning and management of water resource systems. Deterministic and stochastic simulation and optimization techniques. Capacity design and operation of reservoir systems for water supply, hydropower, flood control, and environmental objectives.—*W. (W.)* Lund, Herman

(change in existing course—eff. winter 18)

Engineering: Computer Science

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

Lower Division

10. Introduction to Programming (4)
(cancelled course—eff. fall 18)

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. Pass One open to Computer Science, Computer Science Engineering, Computer Engineering, and Cognitive Science Majors only. 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.—*F, W, S. (F, W, S.)* D'Souza, Filkov, Koehl

(change in existing course—eff. winter 17)

30. Programming and Problem Solving (4)
(cancelled course—eff. fall 18)

32A. Introduction to Programming (4)
Lecture—3 hours; discussion—1 hour. Not open to students who have completed course 36A. Introduction to programming and problem solving in Python. Aimed primarily at non-major students. No credit to students who completed previous course 10, course 30 or higher. GE credit: SciEng | SE.—*F, W, S. (F, W, S.)*

(new course—eff. fall 18)

32B. Introduction to Data Structures (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 10 C- or better or course 30 C- or better or course 32A C- or better or course 36A C- or better. Design and analysis of data structures using Python; trees, heaps, searching, sorting, and graphs. No credit to students who completed course 36C or course 60 or higher. GE credit: SciEng | SE.—*F, W, S. (F, W, S.)*

(new course—eff. fall 18)

36A. Programming and Problem Solving (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Prior experience with basic programming concepts (variable, loops, conditional statements) required; must satisfy computer science placement exam, or C- or better in course 32A. Pass One restricted to Computer Science, Computer Science and Engineering, Computer Engineering, Electrical Engineering, and Cognitive Science majors only. Computers and computer programming for students with some prior experience, algorithm design, and debugging. Good programming style. Use of basic UNIX tools. Two units if completed course 32A; no credit for students who have completed course 32B or previous course 30. GE credit: SciEng | SE.—*F, W, S. (F, W, S.)*

(new course—eff. fall 18)

36C. Data Structures, Algorithms, and Programming (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 40 C- or better or course 36B C- or better. Design and analysis of data structures for a variety of applications; trees, heaps, searching, sorting, hashing, and graphs. Extensive programming. Not open for credit to students who have taken course 32B or previous course 60. GE credit: SciEng | SE.—*F, W, S. (F, W, S.)*

(new course—eff. fall 18)

40. Software Development and Object-Oriented Programming (4)
(cancelled course—eff. fall 18)

50. Computer Organization and Machine-Dependent Programming (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 40 C- or better. Pass One open to Computer Science, Computer Science Engineering, Computer Engineering, and Cognitive Science Majors only. 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.—*F, W, S. (F, W, S.)* Butner, Eiselt

(change in existing course—eff. winter 17)

60. Data Structures and Programming (4)
(cancelled course—eff. fall 18)

Upper Division

113. Computer Security for Non-Majors (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: programming skill at the level of course 15. Principles, mechanisms, implementation, and sound practices of computer security and data protection. Cryptography, authentication and access control. Internet security. Malicious software. Common vulnerabilities. Practical security in everyday life. Course not intended for CS or CSE majors. No credit allowed to students who have completed course 153 or 155. GE credit: SciEng | SE.—*F. (F.)* Bishop, Chen, Levitt

(new course—eff. spring 18)

124. Theory and Practice of Bioinformatics (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: course 10 or course 30 or Engineering 6; Statistics 12 or Statistics 13 or Statistics 13Y or Statistics 32 or Statistics 100 or Statistics 131A or Mathematics 135A or Biomedical Engineering 105; Biological Sciences 2A or Molecular and Cellular Biology 10. Pass One open to Computer Science, Computer Science Engineering, and Biotechnology majors only. 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: SE.—*F. (F.)* Tagkopoulos

(change in existing course—eff. spring 18)

140A. Programming Languages (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 50 or Electrical Computer Engineering 70; course 60. Pass One open to Computer Science, Computer Science Engineering, Computer Engineering, and Cognitive Science Majors only. 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.—*F, W,S. (F, W.)* Nitta, Olsson, Su

(change in existing course—eff. winter 17)

150. Operating Systems and System Programming (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 40; course 50 or Electrical and Computer Engineering 70 or Electrical and Computer Engineering 170. Pass One open to Computer Science, Computer Science Engineering, and Computer Engineering Majors only. 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.—*W, S. (W, S.)* Levitt, Wu

(change in existing course—eff. fall 17)

154A. Computer Architecture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 50 or Electrical and Computer Engineering 70. Pass One open to Computer Science and Computer Science Engineering Majors only. Introduction to digital design. Interfacing of devices for I/O, memory and memory management. Input/output programming, via wait loops, hardware interrupts and calls to operating system services. Hardware support for operating systems software. Only one unit of credit allowed for students who have taken Electrical and Computer Engineering 170. GE credit: SciEng|SE.—*F, W. (F, W.)* Butner, Davis

(change in existing course—eff. winter 17)

158. Programming on Parallel Architectures (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 150; course 154B recommended. Pass One open to Computer Science and Computer Science Engineering Majors only. 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.—*F. (F.)* Gygi

(change in existing course—eff. winter 18)

161. Modern Programming Tools (4)
Lecture—3 hours; laboratory—2 hours. Prerequisite: course 40; or equivalent. Pass One open to Computer Science and Computer Science Engineering Majors only. Concepts and practice of collaborative software development using modern software tools. GE credit: SE.—Devanbu

(new course—eff. fall 17)

162. Web Programming (4)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 30 or equivalent programming experience in C and the Unix environment. Pass One open to Computer Science and Computer Science Engineering Majors only. Technical aspects of building websites, including both server-side and client-side software development. GE credit: SE, VL.—Amenta

(new course—eff. fall 17)

174. Computer Vision (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 60; Statistics 32 or Statistics 131A or Mathematics 135A or Electrical and Computer 161 or Computer Science Engineering 132; Mathematics 22A or Mathematics 67 recommended. Pass One open to Computer Science and Computer Science and Engineering Majors only. Computer vision is the study of enabling machines to "see" the visual world (e.g., understand images and videos). Explores several fundamental topics in the area, including feature detection, grouping and segmentation, and recognition. GE credit: SciEng | SE.—Lee

(change in existing course—eff. spring 18)

188. Ethics in an Age of Technology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing. Pass One open to Computer Science and Computer Science Engineering Majors only. 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.—*F, W, S. (F, W, S.)* Davidson, Eiselt, Gusfield, Koehl, Matloff, Rogaway

(change in existing course—eff. winter 18)

193A. Senior Design Project (3)
Lecture/discussion—3 hours. Prerequisite: course 160 (can be concurrent); senior standing in Computer Science or Computer Science and Engineering or consent of instructor. Pass One open to Computer Science Engineering Majors only; Pass Two open to Computer Science and Computer Science Engineering Majors only. Responding to real-life client design challenges, student teams plan, implement, and evaluate large-scale projects 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.—*W. (W.)* Liu

(change in existing course—eff. winter 17)

193B. Senior Design Project (3)
Lecture/discussion—3 hours. Prerequisite: course 193A IP or better. Pass One open to Computer Science Engineering Majors only; Pass Two open to Computer Science and Computer Science Engineering Majors only. Responding to real-life client design challenges, student teams plan, implement, and evaluate large-scale projects 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.—*S. (S.)* Liu

(change in existing course—eff. winter 17)

Graduate

253. Network Theory and Applications (4)
Lecture/discussion—4 hours. Prerequisite: Mathematics 22A; Mathematics 22B; Statistics 13 or Statistics 13Y or Statistics 120; experience with computer software, or consent of instructor. Pass One and Pass Two open to Graduate Students in Mechanical and Aerospace Engineering and Computer Science only. Develops the mathematical theory underlying growth, structure and function of networks with applications to physical, social, biological and engineered systems. Topics include network growth, resilience, epidemiology, phase transitions, software and algorithms, routing and search control, cascading failures. (Same course as Mechanical & Aeronautical Engineering 253.) Offered in alternate years.—(*S.*) D'Souza

(change in existing course—eff. spring 18)

Engineering: Electrical and Computer

New and changed courses in Engineering: Electrical and Computer (EEC)

Lower Division

10. Introduction to Digital and Analog Systems (4)
Lecture—2 hours; laboratory—3 hours; project. Prerequisite: Physics 9C (can be concurrent) or Physics 9HD (can be concurrent); Computer Science Engineering 30 or Computer Science Engineering 36B or course 7; Engineering 17; consent of instructor. 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.—*S. (S.)*

(change in existing course—eff. winter 19)

40. Introduction to Environmental Engineering (4)
Lecture—4 hours. Prerequisite: Chemistry 2B. Pass One open to students in the College of Engineering. Introduction to topics in environmental engineering; discussion on influence of literary work, art, and media on the evolution of environmental engineering practice, relevant laws, and regulations; presentations of historical case studies. GE credit: AH.—*F. (F.)* Bronner

(new course—eff. winter 17)

70. Computer Structure and Assembly Language (4)
(cancelled course—eff. spring 17)

Upper Division

100. Circuits II (5)
Laboratory—3 hours; lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 17 C- or better; Mathematics 22B. Restricted to the following majors: Electrical Engineering, Computer Engineering, Computer Science & Engineering, Electronic Materials Engineering, Electrical Engineering/Materials Science, Optical Science & Engineering, Biomedical Engineering, Applied Physics, Electrical & Computer Engineering graduate students. Theory, application, and design of analog circuits. Methods of analysis including frequency response, SPICE simulation, and Laplace transform. Operational amplifiers and design of active filters. Students who have completed Engineering 100 may receive 3.5 units of credit. GE credit: SciEng | QL, SE, VL.—*F, W. (F, W.)*

(change in existing course—eff. fall 18)

110A. Electronic Circuits I (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100; course 140A (can be concurrent). 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.—*W, S. (W, S.)*

(change in existing course—eff. fall 17)

133. Electromagnetic Radiation and Antenna Analysis (4)
Lecture—3 hours; discussion—1 hours. Prerequisites: course 130B. Properties of electromagnetic radiation; analysis and design of antennas: ideal cylindrical, small loop, aperture, and arrays; antenna field measurements. GE credit: SE.

(change in existing course—eff. fall 18)

140A. Principles of Device Physics I (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 17 (can be concurrent); Physics 9D or 9HE. 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: SciEng | SE, SL.—*F, W. (F, W.)*

(change in existing course—eff. fall 18)

146A. Integrated Circuits Fabrication (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 140A. Theoretical and experimental study of basic fabrication processes for metal oxide semiconductor integrated circuits, including oxidation, photolithography, impurity diffusion, metallization, wet chemical etching, and characterization. GE credit: SciEng|SE.—*F. (F.)*

(change in existing course—eff. winter 18)

150A. Introduction to Signals and Systems I (4)
Lecture—4 hours. Prerequisite: course 100; Engineering 6 (can be concurrent) or Mathematics 22AL (can be concurrent). 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.—*W, S. (W, S.)*

(change in existing course—eff. fall 13)

165. Statistical and Digital Communication (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 160; course 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.—*W. (W.)*

181A. Digital Systems Design Project (3)
Workshop—1 hour; laboratory—6 hours. Prerequisite: course 180B; course 170. 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.—*W. (W.)*

(change in existing course—eff. winter 18)

189V. Special Topics in Electrical Engineering and Computer Science; Computer Networks (1-5)
(cancelled course—eff. winter 18)

189W. Special Topics in Electrical and Computer Engineering; Computer Networks (1-5)
Prerequisite: consent of instructor. Special topics Computer Networks. May be repeated for credit. Offered irregularly. GE credit: SciEng|SE.—*F, W, S. (F, W, S.)*

(new course—eff. winter 18)

192. Internship in Electrical and Computer Engineering (1-6)
Internship—3-18 hours. Prerequisite: consent of instructor; completion of a minimum of 84 units; project approval before period of internship. Supervised work experience in electrical and computer engineering. May be repeated for credit if project differs. (P/NP grading only.) GE credit: SE.

(change in existing course—eff. fall 18)

195A. Autonomous Vehicle Design Project (3)
Workshop—1 hour; laboratory—6 hours. Prerequisite: Computer Science and Engineering 30; course 180A; and either 110B, 157A (can be concurrent), 180B, or Computer Science and Engineering 60. 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.—*F. (F.)*

(change in existing course—eff. fall 16)

Graduate

224. Terahertz and mm-Wave Integrated Circuit Design (4)
Lecture—3 hours; project. Prerequisite: course 132A; course 112; or consent of instructor. Fundamental theory of RF transmitter and receiver, including noise analysis, transceiver architectures, and antenna arrays. Fundamental limitations, theory and design of amplifiers, oscillators and signal sources at THz and mm-wave frequencies.

(change in existing course—eff. winter 18)

225. Graph Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: graduate standing in electrical engineering or computer science or consent of instructor. Open to Graduate Students in Computer Science only. Fundamental concepts. Planar graphs: Kuratowski's theorem. Packings and coverings. Menger's theorem, representation of cuts, Hamilton graphs, rigid graphs, chordal graphs, graph coloring, graph isomorphism, applications and some algorithms. Offered irregularly.—*W, S. (W, S.)* Gusfield

(change in existing course—eff. winter 18)

289V. Special Topics in Electrical and Computer Engineering; Computer Networks (1-5)
(cancelled course—eff. winter 18)

289W. Special Topics in Electrical and Computer Engineering; Computer Networks (1-5)
Lecture/laboratory—1-5 units. Prerequisite: consent of instructor. Special topics in Computer Networks. May be repeated for credit.—*F, W, S. (F, W, S.)*

(new course—eff. winter 18)

Engineering: Materials Science and Engineering

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

Lower Division

2. Materials Marvels: The Science of Superheroes (3)
Lecture—2 hours; discussion—1 hour. Introduction to science and technology of materials as key engineering ingredients. Explores the relationship between art and materials, and how superheroes are both products and resources of ideas for new materials' technologies. GE credit: SciEng|SE, SL, WE.—*F, S. (F, S.)* Castro

(change in existing course—eff. winter 18)

Upper Division

147. Principles of Polymer Materials Science (3)
Lecture—3 hours. Prerequisite: Chemistry 2A; Chemistry 2B; Chemistry 8A, Chemistry 8B or Engineering 45 or Engineering 45Y; 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.—*S. (S.)* Pan

(change in existing course—eff. spring 18)

160. Thermodynamics of Materials Processes and Phase Stability (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45 C- or better or Engineering 45Y C- or better; Physics 9B C- or better; Mathematics 22B C- or better; 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.

(change in existing course—eff. fall 18)

162. Structure and Characterization of Engineering Materials (4)
Lecture—4 hours. Prerequisite: Engineering 45 C- or better or Engineering 45Y C- or better; Mathematics 22A C- or better; Physics 9B C- or better. 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.—*W. (W.)*

(change in existing course—eff. winter 18)

164. Rate Processes in Materials Science (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45 C- or better or Engineering 45Y C- or better; 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.—*W. (W.)*

(change in existing course—eff. winter 18)

170. Sustainable Energy Technologies: Batteries, Fuel Cells, and Photovoltaic Cells (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45 or Engineering 45Y. 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 irregularly. GE credit: SciEng|SE.—*Su. (Su.)*

(change in existing course—eff. winter 18)

174. Mechanical Behavior of Materials (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45 C- or better or Engineering 45Y C- or better; 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.—*S. (S.)*

(change in existing course—eff. spring 18)

180. Materials in Engineering Design (4)
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: Engineering 45 C- or better or Engineering 45Y C- or better. 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.—*S. (S.)*

(change in existing course—eff. spring 18)

181. Materials Processing (4)
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: Engineering 45 C- or better or Engineering 45Y C- or better; 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.—*W. (W.)*

(change in existing course—eff. spring 18)

182. Failure Analysis (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 45 C- or better or Engineering 45Y C- or better; 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.

Graduate

244. Interaction of Materials and their Environment (3)
Lecture—3 hours. Prerequisite: Engineering 45 or Engineering 45Y; Engineering 105A recommended; or consent of instructor. Thermodynamic and kinetic foundations of the corrosion and oxidation processes. Practical aspects of corrosion control and prevention. Stress-corrosion and gas-embrittlement phenomena. Special topics in corrosion; microbiological and atmospheric corrosion. Offered irregularly.

(change in existing course—eff. spring 18)

288. Living Matter: Physical Biology of the Cell (3)
Lecture—3 hours. Open to any student possessing general background in any disciplines of physical or biological sciences and engineering. Introduction to the origin, maintenance, and regulation of the dynamic architecture of the cell, including cellular modes of organization, dynamics and energy dissipation, molecular transport, motility, regulation, and adaptability. Same course as Biomedical Engineering 288 and Biophysics 288.—*W. (W.)* Parikh

(change in existing course—eff. fall 16)

290. Materials Science and Engineering Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing or consent of instructor. Selected topics of current interest in Materials Science and Engineering. The subjects covered will vary from year to year and will

be announced at the beginning of each quarter. May be repeated for credit. (S/U grading only.)—*F, W, S. (F, W, S.)*

(change in existing course—eff. fall 17)

Engineering: Mechanical

New and changed courses in Engineering: Mechanical (EME)

Lower Division

5. Computer Programming for Engineering Applications (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 16A (can be concurrent) or Mathematics 21A (can be concurrent). Structured programming in C for solving problems in engineering. Introduction to MATLAB and comparison study of C/C++ with MATLAB. GE credit: SciEng|SE.—*F. (F.)* Cheng

(change in existing course—eff. fall 17)

50. Manufacturing Processes (4)
Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: Engineering 4 C- or better; Physics 9A C- or better. 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|SE.—*F, W, Su. (F, W, Su.)* Farouki, Linke, Soshi

(change in existing course—eff. fall 17)

Upper Division

108. Measurement Systems (4)
Lecture—2 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: Engineering 100 C- or better; Engineering 102 C- or better; Engineering 104 recommended. Restricted to Mechanical Engineering, Aerospace Science & Engineering and Mechanical/Materials Science & Engineering. Experiments to illustrate principles of mechanical systems. Signal analysis; Demonstration of basic sensors for mechanical systems; Experimental project design; Experiments involving voltage measurement; strain gauges, dynamic systems of 1st order. Three units of credit for students who have previously taken Biomedical Engineering 111; two units of credit for students who have previously taken Biological Systems Engineering 165; one unit of credit allowed for students who have completed course 107B (former version of course 108). GE credit: SciEng|SE, WE.—*F, W, S. (F, W, S.)* Erickson, Hill, Horsley, La Saponara

(change in existing course—eff. fall 17)

109. Experimental Methods for Thermal Fluids (4)
Lecture—2 hours; laboratory—1.5 hours; discussion—1 hour; extensive writing. Prerequisite: course 106 C- or better. Restricted to Mechanical Engineering, Aerospace Science & Engineering and Mechanical/Materials Science Engineering Majors. Experiments illustrating principles of thermal-fluid systems and related measurement devices. Statistical design of experiments and uncertainty analysis of data; thermodynamic cycles, combustion, compressible and incompressible flows. Three units of credit for students who have previously taken Chemical Engineering 155A; two units of credit for students who have previously taken Chemical Engineering 155B; three units of credit for students who have previously taken Civil and Environmental Engineering 141L; one unit of credit for students who have already completed course 107A (former version of course 109). GE credit: SciEng|SE.—*F, W, S, Su. (F, W, S, Su.)* Erickson, Kennedy, Park, Shaw

(change in existing course—eff. fall 17)

121. Engineering Applications of Dynamics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 102 C- or better; Engineering 6 C- or better or Mechanical Engineering 5 C- or better or Computer Science Engineering 30 C- or better. Technical elective that revisits dynamic principles with emphasis on engineering applications; Equations of motion are derived and put into a format for computer solution; There is a computer laboratory where real engineering systems are simulated. GE credit: SciEng|SE.—*S. (S.)* Margolis

(change in existing course—eff. fall 17)

134. Vehicle Stability (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 102 C- or better. Restricted to Mechanical Engineering, Aerospace Science and Engineering, and Mechanical Engineering/Materials Science Engineering majors. Analytical and experimental studies of the dynamics, stability and control of vehicles such as cars, trailers, airplanes, motorcycles, bicycles and rail cars. GE credit: SciEng|SE.—*S. (S.)* Karnopp

(change in existing course—eff. fall 17)

150A. Mechanical Design (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45 C- or better or Engineering 45Y C- or better; Engineering 104 C- or better, Engineering 50 C- or better (can be concurrent). Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Materials Science and Engineering majors. Principles of mechanics applied to design. Deformation and stress analysis. Structural integrity under static and fluctuating loads. Projects demonstrate progression from concept to engineering analysis, with emphasis on strength and durability. GE credit: SciEng|SE, WE.—*F, S, Su. (F, S, Su.)* Hill, Moore, Ravani, Schaaf

(change in existing course—eff. fall 17)

150B. Mechanical Design (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 150A C- or better. 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. 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. GE credit: SciEng|SE.—*W, S. (W, S.)* Farouki, Linke

(change in existing course—eff. fall 17)

151. Statistical Methods in Design and Manufacturing (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 150A C- or better. Restricted to 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, probabilistic design, systems reliability, and fatigue under random loading. GE credit: SciEng|SE.—*W. (W.)* C. Davis

(change in existing course—eff. fall 17)

152. Computer-Aided Mechanism Design (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 102 C- or better; Mechanical Engineering 5 C- or better or Engineering 6 C- or better or Computer Science Engineering 30 C- or better. 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|SE.—*(F.)* Cheng

(change in existing course—eff. fall 17)

154. Mechatronics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 100 C- or better; Engineering 102 C- or better; course 50 C- or better. Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Materials Science and Engineering. Overview of mechatronics system and control system design concepts, control software architecture, control hardware architecture, microcontroller and interface technology for mechatronics control, sensor for mechatronics systems, actuator drives. GE credit: SciEng|SE.—*S. (S.)* Soshi, Yamazaki

(change in existing course—eff. fall 17)

161. Combustion and the Environment (4)
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: course 106 C- or better. Introduction to combustion kinetics; premixed and diffusion flames; turbulent combustion; pollutant formation; examples of combustion devices such as internal combustion engines, gas turbines, furnaces and incinerators; alternative fuels. Offered in alternate years. GE credit: SciEng|SE.—Shaw

(change in existing course—eff. fall 17)

163. Internal Combustion Engines and Future Alternatives (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Mechanical Engineering 106 C- or better; Mechanical Engineering 050 C- or better. 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. GE credit: SciEng|SE.—*F. (F.)* Erickson, Park

(change in existing course—eff. fall 17)

165. Heat Transfer (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 5 C- or better or Engineering 6 or Computer Science Engineering 30; Engineering 103 C- or better; Engineering 105 C- or better. 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|SE.—*F, S, Su. (F, S, Su.)* R. Davis, Narayanan, Shaw

(change in existing course—eff. winter 17)

171. Analysis, Simulation and Design of Mechatronic Systems (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 100 C- or better; Engineering 102 C- or better. 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|SE.—*F, W. (F, W.)* Assadian, Horsley, Karnopp

(change in existing course—eff. fall 17)

172. Automatic Control of Engineering Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 100 C- or better; Engineering 102 C- or better. Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Materials Science and Engineering. Classical feedback control systems; block diagrams; performance specifications; steady state errors; rise and settling times; root locus; PID controllers; Bode and Nyquist plots; stability; phase and gain margins; advanced topics as time allows. GE credit: SciEng|SE.—*F, W, S, Su. (F, W, S, Su.)* Eke, Horsley, Joshi

(change in existing course—eff. fall 17)

185A. Mechanical Engineering Systems Design Project (4)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 150A C- or better, course 165 C- or better (can be concurrent); Communications 1 or Communications 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, SE, VL.—*W. (W.)* Moore, Velinsky

(change in existing course—eff. fall 17)

185B. Mechanical Engineering Systems Design Project (4)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 185A; 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|SE.—*S. (S.)* Moore, Velinsky

(change in existing course—eff. fall 17)

Engineering: Mechanical and Aerospace

New and changed courses in Engineering: Mechanical and Aerospace (MAE)

Graduate

208. Measurement Methods in Fluid Mechanics and Combustion (4)
(cancelled course—eff. fall 16)

215. Biomedical Fluid Mechanics and Transport Phenomena (4)
(cancelled course—eff. fall 16)

227. Research Techniques in Biomechanics (4)
(cancelled course—eff. fall 16)

229. Design & Analysis of Micro-Electromechanical Systems (4)
Lecture—4 hours. Prerequisite: Engineering 45 or Engineering 45Y; Engineering 100; Engineering 104; and consent of instructor; Engineering 122 recommended. Mechanical design of micro-electronmechanical systems (MEMS). Device modeling: lumped parameter models; energy methods; nonlinearities; electrical and mechanical noise sources. Actuation and measurement methods: capacitive, piezoresistive, thermal, piezoelectric, and optical techniques. Review of basic electronics: bridge circuits, amplitude modulation; lock-in detection. Offered in alternate years.—*S. (S.)* Horsley

(change in existing course—eff. spring 18)

231. Musculo-Skeletal System Biomechanics (4)
(cancelled course—eff. fall 16)

236. Aerodynamics in Nature and Technology (4)
(cancelled course—eff. fall 16)

253. Network Theory and Applications (4)
Lecture/discussion—4 hours. Prerequisite: Mathematics 22A; Mathematics 22B; Statistics 13 or Statistics 120; Statistics 13Y; experience with computer software, or consent of instructor. Develops the mathematical theory underlying growth, structure and function of networks with applications to physical, social, biological and engineered systems. Topics include network growth, resilience, epidemiology, phase transitions, software and algorithms, routing and search control, cascading failures. (Same course as Computer Science Engineering 253.) Offered in alternate years.—*F.* D'Souza

(change in existing course—eff. spring 18)

256. Sustainable Manufacturing and Design (4)
Lecture/discussion—4 hours. Open to graduate students; undergraduate students allowed only with consent of instructor. Definitions, methods, and dimensions of sustainability in manufacturing and product design. Emphasis on resource efficiency and life cycle engineering in the context of the production environment.

(new course—eff. spring 18)

261. Gas Dynamics (4)
(cancelled course—eff. fall 16)

264. Computational Aerodynamics (4)
(cancelled course—eff. fall 16)

266. Advanced Wind-Tunnel Testing (4)
(cancelled course—eff. fall 16)

English

New and changed courses in English (ENL)

Lower Division

4. Critical Inquiry and Literature: Freshman Seminar (4)
Seminar—4 hours. Prerequisite: consent of instructor; completion of Entry Level Writing requirement. Enrollment limited to freshmen. Critical inquiry into significant literary texts. Emphasis on close reading, classroom dialogue, and the writing of several papers or a longer seminar paper. GE credit: ArtHum, Wrt|AH, WE.—*S. (S.)*

(change in existing course—eff. winter 17)

10A. Literatures in English I: To 1700 (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; 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, WE.—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 18)

10B. Literatures in English II: 1700-1900 (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; or equivalent. Historical introduction to English language and literature from 1700-1900. Linguistic borrowing, innovation, colonization, and change. Emergence and development of key literary genres. America, Britain, Ireland, Scotland, and India as important sites of English literary production and consumption. GE credit: AH, WE.

(change in existing course—eff. winter 18)

10C. Literatures in English III: 1900 to Present (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; or equivalent. Historical introduction to English language and literature from 1900-present. Linguistic borrowing, innovation, and change. Emergence and development of key literary genres. Formal experimentation. Modernism as transnational phenomenon. GE credit: AH, WE

(change in existing course—eff. winter 18)

40. Introductory Topics in Literature (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; 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.

(change in existing course—eff. winter 18)

41. Introductory Topics in Literature and Media (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; or the equivalent. Study of a topic centered on the relationships between literature and moving-image media. May be repeated two times for credit when topic differs. GE credit: ArtHum, Wrt | AH, VL, WE.—*S. (S.)*

(change in existing course—eff. spring 18)

42. Approaches to Reading (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; 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. spring 18)

43. Introductory Topics in Drama (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; or 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. winter 18)

44. Introductory Topics in Fiction (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; or the 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. spring 18)

45. Introductory Topics in Poetry (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; or the 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. spring 18)

51. Hot Bars, Supreme Lyrics, and Rhymes for Days: Hip Hop as Poetry (3)
Lecture/discussion—3 hours. Literary approaches to hip hop as poetry. Formal examination of rap lyrics in relation to technology, visual expression, dance, and knowledge production. Historical and cultural consideration of race, ethnicity, gender, urban culture, and politics. Offered irregularly. GE credit: ArtHum|ACGH, AH, DD.

(new course—eff. winter 18)

52. Pop Culture Shakespeare (3)
Lecture/discussion—3 hours. Critical approaches to the study of Shakespeare's afterlife in contemporary American media. Focus on visual, audio, and kinesthetic modes of analysis and presentation. Relation of Shakespeare to contemporary society, politics, media, and economics. Offered irregularly. GE credit: ArtHum|AH, DD, VL.—Bloom

(new course—eff. winter 18)

72. Introduction to Games (4)
Lecture—3 hours; extensive writing/discussion—3 hours. Introduction to the history, theory, and practice of play. Survey of both analog and digital games. Overview of gaming cultures, aesthetics, industries, and technologies. Offered irregularly. (Same course as Cinema and Digital Media 72.) GE credit: AH, VL.

(new course—eff. fall 17)

92. Internship in English (1-12)
Internship—3-36 hours. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; or equivalent. Internships in fields where students can practice their skills. May be repeated for credit for a total of 12 units. (P/NP grading only.)—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 18)

98. Directed Group Study (1-5)
Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; consent of instructor. (P/NP grading only.)—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 18)

98F. Student Facilitated Course (1-4)
Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; consent of instructor. Student facilitated course intended primarily for lower division students. (P/NP grading only.) Offered irregularly.

(change in existing course—eff. spring 18)

Upper Division

100F. Creative Writing: Fiction (4)
Discussion—4 hours. Prerequisite: course 5F or course 5P; course 5NF; consent of instructor. Priority given to English (Creative Writing) majors. Writing of fiction. May be repeated for credit.—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 17)

100NF. Creative Writing: Non-Fiction (4)
Discussion—4 hours. Prerequisite: course 5F or course 5P or course 5NF; consent of instructor. Priority given to English (Creative Writing) majors. Writing of non-fiction. May be repeated for credit.

(change in existing course—eff. winter 17)

100P. Creative Writing: Poetry (4)
Discussion—4 hours. Prerequisite: course 5F or course 5P or course 5NF; consent of instructor. Priority given to English (Creative Writing) majors. Writing of poetry. May be repeated for credit.

(change in existing course—eff. winter 17)

105. History of the English Language (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; or the equivalent. History of the English language. Examination of the language as recorded from Old English to present-day English. Relationship of English to other languages; development of vocabulary, phonology, and grammatical patterns. GE credit: ArtHum, Wrt | AH, WE.

(change in existing course—eff. spring 18)

106. English Grammar (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 or Linguistics 1 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; 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 18)

107. Freedom of Expression (4)
Lecture—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; 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. spring 18)

110A. Introduction to Literary Theory (4)
Lecture/discussion—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. Key theoretical terms, concepts, and thinkers from the Greeks to the modern era. GE credit: ArtHum, Wrt|AH, WE.

(change in existing course—eff. winter 18)

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 or University Writing Program 1V or University Writing Program 1Y. 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.

(change in existing course—eff. spring 18)

111. Topics in Medieval Literature (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; or the equivalent. Historically or thematically focused intensive examination of selected topics in Medieval British literature. GE credit: ArtHum, Wrt | AH, WC, WE.

(change in existing course—eff. spring 18)

113A. Chaucer: Troilus and the "Minor" Poems (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1Y; or the equivalent. Development of the poet's artistry and ideas from his first work to his masterpiece, "Troilus and Criseyde." GE credit: ArtHum, Wrt | AH, WC, WE.

(change in existing course—eff. spring 18)

113B. Chaucer: The Canterbury Tales (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; or equivalent. Literary analysis of the complete "Canterbury Tales." Courtly love, literary forms, medieval science and astrology, theology and dogma as they inform the reading of Chaucer's work. GE credit: ArtHum, Wrt|AH, WC, WE.

(change in existing course—eff. winter 18)

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 or University Writing Program 1V or University Writing Program 1Y. Historically or thematically focused study of works of the Renaissance. GE credit: ArtHum, Wrt | AH, WC, WE.

(change in existing course—eff. spring 18)

117. Shakespeare (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; or equivalent. Historically, generically, or thematically focused study of Shakespeare's works. May be repeated two times for credit. GE credit: ArtHum, Wrt|AH, WC, WE.—*F, W, S*.

(change in existing course—eff. winter 18)

120. Law and Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; or the equivalent. Historically, thematically, or generically focused study of the relationship between law and literature. GE credit: ArtHum, Wrt | ACGH, AH, DD OL, WE.

(change in existing course—eff. spring 18)

122. Milton (4)
Lecture/discussion—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. Selected major works, including Paradise Lost. GE credit: ArtHum, Wrt|AH, WC, WE.

(change in existing course—eff. winter 18)

123. 18th-Century British Literature (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. Historically or thematically focused study of 18th century English literature. GE credit: ArtHum, Wrt | AH, WC, WE.

(change in existing course—eff. spring 18)

125. Topics in Irish Literature (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; or the 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. GE credit: ArtHum, Div, Wrt | AH, WC, WE.

(change in existing course—eff. spring 18)

130. British Romantic Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; 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. spring 18)

133. 19th-Century British Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; 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. spring 18)

137. British Literature, 1900-1945 (4)
Lecture—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; 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. spring 18)

138. British Literature: 1945 to Present (4)
Lecture—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; 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. spring 18)

139. Topics in Global Literatures and Cultures (4)
Lecture—3 hours; extensive writing or discussion. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. Historically or thematically organized study of Anglophone literature at the global scale. Possible emphases: globalization of English and its literatures; the history of "world literature"; literatures of British imperialism; questions of translation. May be repeated two times for credit when content differs. GE credit: ArtHum, Div, Wrt | AH, WC, WE.

(change in existing course—eff. spring 18)

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 University Writing Program 1V or University Writing Program 1Y; 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. GE credit: ArtHum, Div, Wrt | AH, WE.

(change in existing course—eff. spring 18)

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 University Writing Program 1V or University Writing Program 1Y; or the equivalent. Study of literatures, histories, and cultures of one or more diasporic groups. GE credit: ArtHum, Div, Wrt | AH, WE.

(change in existing course—eff. spring 18)

142. Early American Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; 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. spring 18)

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 University Writing Program 1V or University Writing Program 1Y; 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. spring 18)

144. Post-Civil War American Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; 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. spring 18)

146. American Literature 1900-1945 (4)
Lecture—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; 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, DD, WE.

(change in existing course—eff. spring 18)

147. American Literature, 1945 to the Present (4)
Lecture—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; or the 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, DD, WE.

(change in existing course—eff. spring 18)

149. Topics in Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. 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.

(change in existing course—eff. winter 18)

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 University Writing Program 1V or University Writing Program 1Y; or the equivalent. Historically or thematically focused study of works of English drama prior to 1800. GE credit: ArtHum | AH, WC, WE.

(change in existing course—eff. spring 18)

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 University Writing Program 1V or University Writing Program 1Y; 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. spring 18)

153. Topics in Drama (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. Historical or thematic study of drama. May be repeated for credit when topic differs. GE credit: ArtHum, Wrt | AH, WE.

(change in existing course—eff. spring 18)

154. The Graphic Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; or the equivalent. Thematically, historically, and formally focused study of the graphic novel genre. Contents may include any regional, national, or transnational group of graphic novels. Offered irregularly. GE credit: ArtHum, Wrt | AH, VL, WE.

(change in existing course—eff. spring 18)

155A. 18th-Century British Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; 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.

(change in existing course—eff. spring 18)

155B. 19th-Century British Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; 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.

(change in existing course—eff. spring 18)

155C. 20th-Century British Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; 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. spring 18)

154. The Graphic Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1; or equivalent courses. Thematically, historically, and formally focused study of the graphic novel genre. Contents may include any regional, national, or transnational group of graphic novels. Offered irregularly. GE credit: ArtHum, Wrt|AH, VL, WE.

(new course—eff. fall 16)

156. The Short Story (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. The short story as a genre; its historical development, techniques, and formal character as a literary form. European as well as American writers. GE credit: ArtHum, Wrt|AH, WE.

(change in existing course—eff. winter 18)

157. Detective Fiction (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. Historically, formally, and thematically focused study of novels and short stories in the detective fiction genre. GE credit: ArtHum, Wrt|AH, WE.

(change in existing course—eff. spring 18)

158A. The American Novel to 1900 (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; 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.

(change in existing course—eff. spring 18)

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 University Writing Program 1V or University Writing Program 1Y; or the equivalent. Historically or thematically organized examination of important American novelists from 1900 to the present: authors may include Willa Cather, Nathanael West, William Faulkner, Ralph Ellison, Zora Neale Hurston, Thomas Pynchon, Ishmael Reed, Maria Helena Viramontes, Rachel Kushner, and others. GE credit: AH, DD, WE.

(change in existing course—eff. spring 18)

160. Film as Narrative (4)
Lecture—3 hours; film viewing—3 hours. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. Study of modern film (1930 to present) as a storytelling medium. Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WE.

(change in existing course—eff. spring 18)

161A. Film History I: Origins to 1945 (4)
Lecture—3 hours; film viewing—3 hours. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. Cultural and aesthetic history of filmmaking from its origins in the 1890's through 1945. (Courses 161A and 161B need not be taken in sequence.) Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WE.

(change in existing course—eff. spring 18)

161B. Film History II: 1945 to present (4)
Lecture—3 hours; film viewing—3 hours. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. Cultural and aesthetic history of filmmaking from 1945 through the present. (Courses 161A and 161B need not be taken in sequence.) Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WE.

(change in existing course—eff. spring 18)

162. Film Theory and Criticism (4)
Lecture—3 hours; film viewing—3 hours. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. Film theory and criticism, with a study of ten major works of international film art. Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WE.

(change in existing course—eff. spring 18)

163. Literary Study in the British Isles (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. Enrollment by application only through the Education Abroad Center. Literary Study in the British Isles: On-site study of the literature, film, and/or performance of the British Isles. May be repeated two times if subject matter differs. GE credit: ArtHum, Wrt | AH, WC, WE.—*S. (S.)*

(change in existing course—eff. spring 18)

165. Topics in Poetry (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; 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.

(change in existing course—eff. winter 18)

166. Love and Desire in Contemporary American Poetry (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. 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.

(change in existing course—eff. winter 18)

167. Twentieth-Century African American Poetry (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; 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. Offered irregularly. GE credit: ArtHum, Div, Wrt | ACGH, AH, WE.

(change in existing course—eff. spring 18)

168. 20th Century American Poetry (4)
Lecture—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; or the 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. spring 18)

171A. The Bible as Literature: The Old Testament (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. May be taken independently of course 171B. Selected readings from the Old Testament illustrating various literary forms. Emphasis on the Pentateuch, the Historical Books, and the Wisdom Books. GE credit: ArtHum, Div, Wrt | AH, WC, WE.

(change in existing course—eff. spring 18)

171B. The Bible as Literature: Prophets and New Testament (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. May be taken independently of course 171A. Selected readings from the Old Testament prophets and the New Testament. GE credit: ArtHum, Div, Wrt | AH, WC, WE.

(change in existing course—eff. spring 18)

175. American Literary Humor (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; or standing above freshman level. American humorous vision of man, nature, and the supernatural. Includes one or more of the following: colonial humor; southwestern and New England humor; pre- and post-Civil War masters; local colorists; journalistic gadflies; anti-provincialists; modernist poets and prose writers; black humor. Offered irregularly. GE credit: ArtHum, Wrt | ACGH, AH, WE.

(change in existing course—eff. spring 18)

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 University Writing Program 1V or University Writing Program 1Y; or the 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. spring 18)

179. Topics in Comparative American Literatures (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; or standing above freshman level. Comparative study of what constitutes "American" literature. Possible emphases: North American or Latin American literature; Pacific Rim or Circum-Atlantic approaches; interrelations among different modes of racialization within and beyond U.S. borders. May be repeated two times for credit when topic differs. GE credit: ArtHum, Div, Wrt|ACGH, AH, DD, WE.

(change in existing course—eff. winter 18)

180. Children's Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. Historical backgrounds and development of types of children's literature, folklore and oral tradition, levels of interest, criticism and evaluation, illustration and bibliography. GE credit: ArtHum, Wrt|AH, WE.

(change in existing course—eff. winter 18)

181A. African American Literature to 1900 (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. 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.

(change in existing course—eff. winter 18)

181B. African American Literature 1900-Present (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. Major African American writers in the context of cultural history from 1900 to the present. Writers may include Richard Wright, Ann Petry, James Baldwin, Ralph Ellison, Paule Marshall, Toni Morrison, Alice Walker, Clarence Major. GE credit: ACGH, AH, DD, WE.

(change in existing course—eff. spring 18)

182. Literature of California (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. Focus is on the diverse contributions to the rise of California literature. Reading of poetry, fiction, and essays. Emphasis on 19th and 20th century naturalists, turn of the century novelists, the Beats, and writers of the last two decades. GE credit: ArtHum, Div, Wrt|ACGH, AH, DD, WE.

(change in existing course—eff. spring 18)

183. Young Adult Literature (4)
Lecture—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; or the equivalent. Theoretical, critical, and literary issues informing the study and teaching of American young adult literature. GE credit: ArtHum | AH, WE.

(change in existing course—eff. spring 18)

184. Literature and the Environment (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. Historical and/or thematic survey of topics in writing about the environment. GE credit: ArtHum, Wrt | AH, WE.

(change in existing course—eff. spring 18)

185A. Women's Writing I (4)
Lecture/discussion—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. 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. spring 18)

185B. Women's Writing II (4)
Lecture/discussion—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. Women's Writing in English from 1800 to 1900; organized by period, place, genre, or theme. GE credit: ArtHum, Div, Wrt | AH, WE.

(change in existing course—eff. spring 18)

185C. Women's Writing III (4)
Lecture/discussion—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. Women's Writing in English after 1900; organized by period, place, genre, or theme. GE credit: Div, Wrt | AH, WE.

(change in existing course—eff. spring 18)

186. Literature, Sexuality, and Gender (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; or the equivalent. Historically or themat-

ically focused intensive examinations of gender and sexuality in British and American literature. GE credit: ArtHum, Div, Wrt | AH, WE.

(change in existing course—eff. spring 18)

192. Internship in English (1-12)
Internship—3-36 hours. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. Internships in fields where students can practice their skills. A maximum of four units is allowed toward the major in English. May be repeated for credit for a total of 12 units. (P/NP grading only.)—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 18)

198. Directed Group Study (1-5)
Prerequisite: course 3 or course 5F or course 5P or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. (P/NP grading only.)

(change in existing course—eff. winter 18)

198F. Student Facilitated Course (1-4)
Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; consent of instructor. Student facilitated course intended primarily for upper division students. (P/NP grading only.) Offered irregularly.

(change in existing course—eff. spring 18)

199FA. Student Facilitated Teaching (1-4)
Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; consent of instructor. STU FAC. Under the supervision of a faculty member, an undergraduate student teaches a course under 98F/198F. Offered irregularly. (P/N grading only.)

(change in existing course—eff. winter 18)

199FB. Student Facilitated Teaching (1-4)
Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y; consent of instructor. STU FAC. Under the supervision of a faculty member, an undergraduate student teaches a course under 98F/198F. (P/N grading only.) Offered irregularly.

(change in existing course—eff. spring 18)

Graduate

275. Proseminar in Research Practices (2)
Lecture/discussion—2 hours. Must have passed Departmental Preliminary Exam. Study of various practical and technical skills needed to perform research in literary studies. Materials to be selected by the instructor. Evaluation based on student projects that involve hands-on application of skills taught in the proseminar. May be repeated for credit.

(new course—eff. winter 17)

Entomology

New and changed courses in Entomology (ENT)

Upper Division

105. Insect Ecology (4)
Lecture/discussion—3 hours; term paper. Prerequisite: Biological Sciences 2B (can be concurrent); consent of instructor. 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. Offered in alternate years. GE credit: SciEng|SE, OL, SL, WE.—*F.* Yang

(change in existing course—eff. fall 17)

Graduate

253. Advanced Medical Entomology (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: one upper division course in entomology (other than course 153) and one course in microbiology: course 153 strongly recommended. An analysis of several arthropod-borne human diseases with emphasis on the relationships of the biology of the vector to the ecology of the disease. Discussion includes demonstration of vectors and techniques.

(change in existing course—eff. fall 17)

Environmental Horticulture

New and changed courses in Environmental Horticulture (ENH)

Upper Division

100. Urban Forestry (4)
Lecture—2 hours; laboratory—3 hours; term paper. Prerequisite: course1 or Plant Sciences 2 or Biological Sciences 2B. 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.—*F. (F.)* Cadenasso, Volder

(change in existing course—eff. winter 17)

120. Management of Container Media (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Soil Science 10 or Soil Science 100. 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.—*F. (F.)* Evans

(change in existing course—eff. winter 17)

125. Greenhouse and Nursery Crop Production (5)
Lecture—3 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: Plant Sciences 2 or Biological Sciences 2C. 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.—*W. (W.)* Lieth

(change in existing course—eff. winter 17)

133. Woody Plants in the Landscape: Growth, Ecology and Management (4)
Lecture—3 hours; laboratory—2 hours; discussion—1 hour. Prerequisite: Plant Sciences 2 or Biological Sciences 2C. 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.—*W. (W.)* Berry, Volder

(change in existing course—eff. winter 17)

160. Restoration Ecology (3)
Lecture—3 hours. Prerequisite: Plant Biology 117 or Evolution & Ecology 117 or Plant Biology 147; or equivalent course in ecology/plant ecology. Application of ecological complexity to restoration design, implementation and monitoring across variable environments and under changing environmental conditions. Integration of physiology, population, community, ecosystem, and landscape ecology. GE credit: SE, SL.

(change in existing course—eff. fall 18)

Environmental Policy & Management

New and changed courses in Environmental Policy & Management (ENV)

Graduate

200A. Analysis of Environmental Management and Policy (4)
Lecture—4 hours. Prerequisite: graduate standing. Introduction to rational decision making for public policy problems. Modeling natural/human system interactions, data gathering and hypothesis testing. Predicting outcomes of policy options.—*F. (F.)*

(new course—eff. fall 17)

200B. Environmental Policy Evaluation (4)
Lecture—2 hours; discussion—1 hour; seminar—2 hours. Prerequisite: Statistics 108 or Agricultural and Resource Economics 106; Agricultural and Resource Economics 176; Intermediate microeconomics (e.g., Economics 100); policy analysis (e.g., Environmental Science and Policy 168A or the equivalent). Method and practice, philosophical basis, and political role of policy analysis. Reviews basic concepts from economic theory; how and why environmental problems emerge in a market economy; and tools necessary for solving environmental problems. (Same course as Ecology 212B & Environmental Policy & Management 200B.)—*W. (W.)* Springborn

(new course—eff. winter 18)

200C. Environmental Policy Process (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course in public policy (e.g., Environmental Science and Policy 160); environmental law (e.g., Environmental Science and Policy 161); course in statistics (e.g., Sociology 106 or Agricultural and Resource Economics 106). Introduction to selected topics of the policy process and applications to the field of environmental policy. Develops critical reading skills, understanding of policy theory, and an ability to apply multiple theories to the same phenomena. (Same course as Ecology 212A, Environmental Science and Policy 212A.)—*S. (S.)* Arnold

(change in existing course—eff. fall 17)

201. Environmental Law (3)
Lecture—3 hours. Prerequisite: graduate standing. Roles of legislatures, agencies, and courts in creating and interpreting law; legal strategies for addressing environmental problems; major environmental statutes; and the relationship between federal and state/local legal authority.—*F. (F.)*

(change in existing course—eff. spring 18)

202. Strategies of Environmental Administration and Management (4)
Lecture—4 hours. Bureaucracy and public management, organizational theory, analysis of environmental management by US agencies, NGOs, and business. Overview of natural resource management, analyzes the strengths and limitations of different administrative approaches.—*F. (F.)*

(new course—eff. fall 17)

203. Environmental Policy Clinic (4)
Laboratory—12 hours. Prerequisite: graduate standing. Teams of students analyze an environmental policy problem from scientific, legal, and economic perspectives. Hands-on learning partnering with rotating clients. May be repeated for credit up to one time - once in winter and once in spring.—*W, S. (W, S.)*

(new course—eff. winter 18)

296. Environmental Policy and Management Practicum (2-6)
Internship—6-18 hours. Prerequisite: consent of instructor. Practicum experience integrating coursework into an applied professional setting. May be repeated for credit. (S/U grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(new course—eff. fall 17)

296. Environmental Policy and Management Practicum (2-6)
Internship—6-18 hours. Prerequisite: consent of instructor. Practicum experience integrating coursework into an applied professional setting. May be repeated for credit. (S/U grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(new course—eff. winter 18)

297. Professional Development Seminar (1)
Seminar—3 hours. Prerequisite: graduate standing. Weekly seminar inviting policy and management professionals to come and discuss their challenges and achievements. May be repeated for credit up to six units. (S/U grading only.)—*F, W, S. (F, W, S.)*

(new course—eff. winter 18)

Environmental Science and Management

New and changed courses in Environmental Science and Management (ESM)

Lower Division

47. Watershed Processes and Water Quality in the Tahoe Basin (2)
(cancelled course—eff. spring 18)

Upper Division

131. Air as a Resource (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Chemistry 10 or Chemistry 2A); Chemistry 2B. Degradation of the atmospheric resource, historical aspects and effects of air pollution examined. Evaluation of primary gaseous and particulate pollutants and discussion of their impact. Not open to students who have successfully completed Environmental and Resource Sciences 131. (Formerly Environmental and Resource Sciences 131.) GE credit: QL, SE, SL.

(change in existing course—eff. winter 19)

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 001 (can be concurrent) or University Writing Program 1Y (can be concurrent) or University Writing Program 1V (can be concurrent) or English 3 (can be concurrent); 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.—*F. (F.)* Arnold, Holyoak

(change in existing course—eff. winter 18)

Upper Division

110. Principles of Environmental Science (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Physics 1A or Physics 7A); Mathematics 16B or Mathematics 17B or Mathematics 21B; Biological Sciences 2A or Biological Sciences 10 recommended; upper division standing. 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.—*W. (W.)* Largier.

(change in existing course—eff. winter 18)

151. Limnology (4)
Lecture—3 hours; discussion—1 hour; special project. Prerequisite: Biological Sciences 2A; Biological Sciences 2B; Biological Sciences 2C and course 100 or Evolution and Ecology 101 recommended. Biology and productivity of inland waters with emphasis on the physical and chemical environment. Offered irregularly. GE credit: SciEng|SE.

(change in existing course—eff. spring 17)

162. Environmental Policy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A or Economics 1AV. 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.—*W. (W.)* Springborn

(change in existing course—eff. winter 18)

163. Energy and Environmental Aspects of Transportation (4)
Lecture—3 hours; extensive writing. Prerequisite: Economics 1A or Economics 1AV 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, SocSci, Wrt | SE or SS, SL, WE.—*F.* Sperling

(change in existing course—eff. spring 18)

165. Climate Policy (3)
Lecture—3 hours. Prerequisite: course 1 or Economics 1A or Economics 1AV; 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.—*S. (S.)* Springborn

(change in existing course—eff. spring 18)

165N. Climate Policy (3)
(cancelled course—eff. fall 17)

166. 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. Offered in alternate years. GE credit: SocSci|SS.—*W. (W.)* Sanchirico

(new course—eff. fall 17)

166N. Ocean and Coastal Policy (3)
(cancelled course—eff. winter 17)

167. Energy Policy (4)
Lecture—4 hours; term paper. Prerequisite: Economics 1A or Economics 1AV; Mathematics 16B or Mathematics 17B or Mathematics 21B; 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.—*(S.)* Ogden

(change in existing course—eff. spring 18)

168A. Methods of Environmental Policy Evaluation (5)
Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: course 1 or course 10; Statistics 13 or Statistics 13Y or Statistics 100; Economics 1A or Economics 1AV; Economics 100 recommended. 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.—*F. (F.)* Ogden

(change in existing course—eff. spring 18)

175. Natural Resource Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Agricultural and Resource Economics 100B or Economics 100 or the equivalent. Pass One open to Managerial Economics (AMGE) and Environmental Policy Analysis and Planning (AEPP) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. Economic concepts and policy issues associated with natural resources, renewable resources (ground water, forests, fisheries, and wildlife populations) and non-renewable resources (minerals and energy resources, soil). (Same course as Agricultural and Resource Economics 175.) GE credit: SocSci|SS.—*S. (S.)* Lin

(change in existing course—eff. winter 17)

Graduate

212A. Environmental Policy Process (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course in public policy (e.g., course 160); environmental law (e.g., course 161); course in statistics (e.g., Sociology 106 or Agricultural and Resource Economics 106). Introduction to selected topics of the policy process and applications to the field of environmental policy. Develops critical reading skills, understanding of policy theory, and an ability to apply multiple theories to the same phenomena. (Same course as Ecology 212A, Environmental Policy and Management 200C.)—*S. (S.)* Arnold

(change in existing course—eff. fall 17)

212B. Environmental Policy Evaluation (4)
Lecture—2 hours; discussion—1 hour; seminar—2 hours. Prerequisite: Statistics 108 or Agricultural and Resource Economics 106; Agricultural and Resource Economics 176; Intermediate microeconomics (e.g., Economics 100); policy analysis (e.g., course 168A or the equivalent). Methods and practices of policy analysis; philosophical and intellectual bases of policy analysis and the political role of policy analysis. (Same course as Ecology 212B & Environmental Policy & Management 200B.)—*W. (W.)* Springborn

(change in existing course—eff. winter 18)

Professional

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: consent of instructor. Teaching assistant training practicum. May be repeated for credit. (S/U grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(new course—eff. spring 17)

Epidemiology

New and changed courses in Epidemiology (EPI)

Graduate

202. Quantitative Epidemiology I: Probability (5)
Lecture—4 hours; laboratory—2 hours. Prerequisite: Mathematics 16A-16B or Mathematics 17A-B) or Mathematics 21A-B; Statistics 102; Statistics 108; or Population Health and Reproduction 402 and 403 or equivalent of any listed course; 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.

(change in existing course—eff. winter 17)

203. Quantitative Epidemiology II: Statistical Inference (4)
Lecture—3 hours; laboratory/discussion—1 hour. Prerequisite: course 202 or Statistics 130A or Statistics 131A or Statistics 133; course 205; a basic course in Epidemiology (Epidemiology 205 or equivalent). Provides the mathematical statistics foundation for statistical models, methods, and data analysis.

(change in existing course—eff. winter 17)

204. Quantitative Epidemiology III: Statistical Models (4)
Lecture—3 hours; laboratory/discussion—1 hour. Prerequisite: course 203 or Statistics 130B or Statistics 131B or Statistics 133); course 205; Statistics 108 recommended; a basic course in Epidemiology (course 205 or equivalent); consent of instructor. Introduces statistical models, methods, and data analysis in the areas of generalized linear model and survival analysis methodology.

(change in existing course—eff. winter 17)

205A. Principles of Epidemiology (4)
(cancelled course—eff. winter 17)

224. Health and Ecological Risk Analysis (4)
Lecture—2 hours; laboratory—4 hours. Methodological approach to risk analysis for human and animal-related health and ecological issues. Basic principles of risk analysis, including perception, communication, assessment and management. Emphasis on the assessment of risk.—*S. (S.)*

(change in existing course—eff. winter 17)

231. Infectious Disease Epidemiology (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: introductory epidemiology course (e.g., course 205). Infectious disease epidemiology and prevention, with emphasis on human and veterinary diseases of global health importance. Major global health epidemics and challenges of infectious diseases, by mode of transmission.—*W. (W.)* DeRiemer

(change in existing course—eff. spring 17)

232. Advanced Data Analysis with SAS (3)
Lecture—3 hours. Prerequisite: course 202; course 203; course 204; or the equivalent, or consent of instructor. Provide an overview of common advanced statistical methods as well as a treatment of how to use SAS to implement them. Learn the ideas of reproducible research and reporting of statistical analyses.—*W. (W.)* Iosif

(new course—eff. winter 17)

280. Introduction to SAS Programming (3)
Lecture—2 hours; discussion/laboratory—1 hour. Prerequisite: introductory statistics course (e.g., Preventive Veterinary Medicine 402, Statistics 102). Conduction, convection, and radiation heat transfer. Computational modeling of heat transfer in engineering. Applications to engineering equipment with the use of digital computers. (Same course as Public Health Sciences 280.)—Qi

(new course—eff. fall 16)

Evolution and Ecology

New and changed courses in Evolution and Ecology (EVE)

Lower Division

17. Dining with Darwin: Evolutionary Insights Into Your Diet (3)
Lecture—3 hours. Crave salty, fatty, sugary foods? Want to know why? Evolution of cravings, metabolism and dentition, and of cooking our food. Relate Paleo, South Beach, and vegan diets to ancestral and global diets and current metabolism. For majors and nonmajors. GE credit: SE, SS, WC.—*S. (S.)*

(new course—eff. winter 17)

Upper Division

100. Introduction to Evolution (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 2A, Biological Sciences 2B, Biological Sciences 2C; Mathematics 16A or Mathematics 17A or Mathematics 21A; Mathematics 16B or Mathematics 17B or Mathematics 21B; Statistics 100 recommended. General survey of the origins of biological diversity and evolutionary mechanisms. GE credit: SciEng|QL, SE, SL.—*F, W, S, Su. (F, W, S, Su.)* Begun, Coop, Ramirez

(change in existing course—eff. winter 18)

101. Introduction to Ecology (4)
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: Biological Sciences 2A, Biological Sciences 2B, Biological Sciences 2C; Mathematics 16A or Mathematics 17A or Mathematics 21A; Mathematics 16B or Mathematics 17B or Mathematics 21B; or the equivalent. General survey of the principles of ecology. GE credit: SciEng|QL, SE, SL, VL.—*F, W, S, Su. (F, W, S, Su.)* Gaylord, Rejmanek, Schoener, Strong

(change in existing course—eff. winter 18)

Exercise Biology

New and changed courses in Exercise Biology (EXB)

Upper Division

101. Exercise Physiology (4)
Lecture—4 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101 or Neurobiology, Physiology, and Behavior 110C. 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.—*F, S. (F, S.)* Bodine, Shaffrath

(change in existing course—eff. winter 18)

103. Analysis and Control of Human Movement (4)
(cancelled course—eff. spring 18)

110. Exercise Metabolism (3)
Lecture—3 hours. Prerequisite: course 101 or Neurobiology, Physiology, and Behavior 101 or Neurobiology, Physiology, and Behavior 110C. 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.—*S. (S.)* Gomes

(change in existing course—eff. winter 18)

122. Psychological Effects of Physical Activity (3)
Lecture—3 hours. Prerequisite: Psychology 1 or Psychology 1Y. Upper division standing. Physical activity is evaluated in terms of its ability to enhance the quality of life. Topics studied include: individual factors (self concept, type A); special populations (elderly, cardiovascular); and mental health changes (depression, anxiety).—*S. (S.)* Salitsky

(change in existing course—eff. spring 18)

126. Tissue Mechanics (3)
(cancelled course—eff. fall 17)

Exercise Science

New and changed courses in Exercise Science (EXS)

Graduate

227. Research Techniques in Biomechanics (4)
(cancelled course—eff. fall 16)

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; Chemistry 2B; Chemistry 8A, Chemistry 8B or Engineering 45 or Engineering 45Y; introductory physics. 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.—*W. (W.)* Pan

(change in existing course—eff. winter 18)

Fine Arts & Humanities

New and changed courses in Fine Arts & Humanities (FAH)

Lower Division

98. Directed Group Study (1-4)
Prerequisite: consent of instructor. Directed group study. May be repeated for credit. (P/NP grading only.) Offered irregularly.

(new course—eff. winter 17)

Upper Division

198. Directed Group Study (1-4)
Prerequisite: consent of instructor. Directed group study. May be repeated for credit. (P/NP grading only.) Offered irregularly.
(new course—eff. winter 17)

Food Science and Technology

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

Lower Division

3. Introduction to Brewing and Beer (3)
Lecture—3 hours. Basic description of brewing and associated processes, from raw materials to final product; history of brewing and brewing science; types of beer worldwide; world beer markets; basics of beer quality, including wholesomeness; role of scientist in brewing. Not open for credit to students who have taken course 3V. GE credit: SciEng|SE, SL.—*F, W, S. (F, W, S.)* Bamforth
(change in existing course—eff. fall 17)

3V. Introduction to Brewing and Beer (3)
Web virtual lecture—1 hour; web electronic discussion—1 hour; project—1.5 hours. Basic description of brewing and associated processes, from raw materials to final product; history of brewing and brewing science; types of beer worldwide; world beer markets; basics of beer quality, including wholesomeness; role of scientist in brewing. Not open for credit to students who have taken course 3. GE credit: SciEng|SE, SL.—*S. (S.)* Bamforth
(new course—eff. spring 17)

50. Introduction to Food Preservation (3)
Lecture—2 hours; laboratory—2 hours. Prerequisite: Chemistry 2A; Biological Sciences 2A (can be concurrent); Statistics 13 (can be concurrent) or Statistics 13Y (can be concurrent) or Statistics 100. Pass One restricted to Food Science majors; Pass Two open to all students. Introduction to modes of fresh food preservation including use of chemicals and microbes, heat and energy, control of water and atmosphere, and by indirect approaches such as packaging, hygienic design and sanitation. GE credit: QL, SE.
(change in existing course—eff. fall 18)

55. Food in American Culture (4)
Lecture—3 hours; discussion—1 hour. Relationship between food and culture; relationship between food and the social order; influences on eating habits and the tensions between them including identity, convenience, and responsibility; multiple disciplines and genres. (Same course as American Studies 55.) GE credit: ArtHum or SocSci, Div, Wrt|ACGH, AH or SS, DD, WE.—*S. (S.)* Biltekoff
(change in existing course—eff. winter 18)

Upper Division

100A. Food Chemistry (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 8B or Chemistry 118B or Chemistry 128B; Biological Sciences 2A recommended. Open to Food Science, Clinical Nutrition, and Nutrition Science majors only. Chemical aspects of food composition. Emphasis on the functional properties and chemical reactions of the major components of foods: carbohydrates, lipids, proteins, and water. GE credit: SE, VL.
(change in existing course—eff. fall 18)

101A. Food Chemistry Laboratory (3)
Discussion—1 hour; lecture—1 hour; laboratory—3 hours. Prerequisite: course 100A (can be concurrent). Open to Food Science and Clinical Nutrition majors only. Study of basic chemical and physical properties that influence the reactivity and functional properties of components in food systems. GE credit: QL, SE, VL, WE.
(change in existing course—eff.

102A. Malting and Brewing Science (4)
Lecture—4 hours. Prerequisite: (Biological Sciences 102, Biological Sciences 103) or Biological Sciences 105; senior standing recommended. The technology of the malting, brewing and fermentation processes is integrated with the chemistry, biochemistry and microbiology that determine industrial practices and product quality. Not open for credit to students who have taken course 102. GE credit: SE.
(change in existing course—eff. fall 18)

104L. Food Microbiology Laboratory (4)
Lecture—1 hour; discussion—1 hour; laboratory—6 hours. Prerequisite: Biological Sciences 2A; Biological Sciences 103; 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.—*S. (S.)* Young
(change in existing course—eff. spring 17)

107. Food Sensory Science (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 117 (can be concurrent); Statistics 13 or Statistics 13Y. 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.—*F. (F.)* O'Mahony
(change in existing course—eff. spring 18)

109. Principles of Quality Assurance in Food Processing (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Statistics 13 or Statistics 13Y. 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.—*S. (S.)* O'Mahony
(change in existing course—eff. spring 18)

110. Food Processing (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Physics 7A; Physics 7B; Physics 7C (can be concurrent); Mathematics 16C or Mathematics 17C or Mathematics 21C. 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. Not open for credit to students enrolled in College of Engineering. GE credit: QL, SE, VL.
(change in existing course—eff. fall 18)

110L. Food Processing Laboratory (2)
Laboratory—3 hours; discussion—1 hour. Prerequisite: course 110 (can be concurrent). 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: QL, SE, SL, VL.
(change in existing course—eff. fall 18)

115. Fermented Foods (4)
Lecture—3 hours; term paper/discussion—3 hours. Prerequisite: Biological Sciences 103; Microbiology 102; or consent of instructor. Pass One restricted to upper division or graduate level Food Science and Viticulture and Enology majors. Physiology, biochemistry, and genetics of microorganisms important in food fermentations. How microorganisms are used in fermentations and how raw materials are converted into finished fermented foods and beverages.—*S. (S.)* Mills
(new course—eff. spring 17)

117. Design and Analysis for Sensory Food Science (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Statistics 13. 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.—*F. (F.)* O'Mahony
(change in existing course—eff. spring 17)

119. Chemistry and Technology of Milk and Dairy Products (4)
Lecture—4 hours; demonstrations and a field trip. Prerequisite: Biological Sciences 2A; Biological Sciences 102; 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.—*S. (S.)* Rosenberg
(change in existing course—eff. spring 17)

123. Introduction to Enzymology (3)
Lecture—3 hours. Prerequisite: course 123L (can be concurrent); Biological Sciences 102; 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.—*S. (S.)* G. Smith
(change in existing course—eff. spring 17)

159. New Food Product Ideas (3)
Lecture—3 hours. Prerequisite: course 50; Biological Sciences 2A; Physics 7A, 7B, 7C; 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.—*F. (F.)* Biltekoff
(change in existing course—eff. spring 17)

Graduate

201. Food Chemistry and Biochemistry (4)
Lecture—4 hours. Prerequisite: undergraduate courses in organic chemistry and biochemistry; undergraduate course in food chemistry is recommended. Restricted to Food Science graduate level standing or consent of instructor. Advanced topics in food chemistry and biochemistry, emphasizing the application of the basic principles of chemistry and biochemistry to food composition, properties, preservation and processing. Chemical structures, interactions, reaction mechanisms and experimental methods are stressed.—*F. (F.)* Barile
(change in existing course—eff. fall 17)

202. Physical Chemistry of Foods (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 107A; Chemistry 107B; Biological Sciences 102 recommended. Fundamental principles of chemistry and physics are applied to a study of changes in water binding properties and activity, changes in proteins, nutrients, toxic constituents, and other compounds during storage, heating, freezing, dehydrating, and concentrating of food materials.—*S. (S.)* Dungan
(change in existing course—eff. winter 17)

230. Food & Gut Microbiota (4)
Lecture—1.5 hours; discussion—1.5 hours; term paper. Prerequisite: Microbiology and molecular biology undergraduate coursework or consent of instructor. Upper division or graduate standing.

Impact of specific food structures on the structure and function of the animal gut microbiota. How food is transformed by, and modulates, the gut microbiota to provide the host with nutrients and protection.—*S. (S.)* Mills

(new course—eff. spring 17)

Forensic Science

New and changed courses in Forensic Science (FOR)

Graduate

201A. Forensic Science Fundamentals-A (3)
Lecture—3 hours. Prerequisite: consent of instructor; enrolled in the Forensic Science Graduate Program. Open to Forensic Science Graduate Program students only. Professional responsibilities and ethics, physical evidence concepts, drug chemistry and toxicology, controlled substances and analytical chemistry and instrumentation as practiced in the forensic sciences. First of three courses that, in part, covers the curriculum requirements of the Forensic Education Program Accreditation Committee (FEPAC).

(new course—eff. spring 18)

201B. Forensic Science Fundamentals-B (3)
Lecture—3 hours. Prerequisite: consent of instructor; enrolled in the Forensic Science Graduate Program. Arson and explosives, quality assurance and accreditation, the law and science interface and court testimony as practiced in the forensic sciences. This course is the third in a series of three courses that covers the curriculum requirements of the Forensic Education Program Accreditation Committee (FEPAC).

(new course—eff. spring 18)

201C. Forensic Science Fundamentals-C (3)
Lecture—3 hours. Prerequisite: consent of instructor; enrolled in the Forensic Science Graduate Program. Open to Forensic Science Graduate Program students only. Forensic biology and DNA, microscopy and materials analysis and pattern evidence as practiced in the forensic sciences. Second in a series of three courses which covers the curriculum requirements of the Forensic Education Program Accreditation Committee (FEPAC).

(new course—eff. spring 18)

208. Forensic Toxicology (3)
Lecture—3 hours. Forensic toxicology as related to driving under the influence of drugs (DUID) investigations, detection, and evaluation through the use of standardized field sobriety tests and drug recognition protocols.

(new course—eff. spring 18)

French

New and changed courses in French (FRE)

Upper Division

160. Linguistic Study of French-Sound and Form (4)
Seminar—3 hours; term paper. Prerequisite: course 100 or Linguistics 1 or Linguistics 1Y. Introduction to the linguistic study of modern French, with focus on sound structure and form, inflection and derivation. GE credit: ArtHum, SocSci | AH or SS, WE.—Russell

(change in existing course—eff. spring 18)

161. Linguistic Study of French—Form and Meaning (4)
Seminar—3 hours; term paper. Prerequisite: course 100 or Linguistics 1 or Linguistics 1Y. Introduction to the linguistic study of modern French, with focus on sentence construction and constituency, meaning and discourse functions. GE credit: ArtHum, SocSci | AH or SS.—Russell

(change in existing course—eff. spring 18)

162. History of the French Language (4)
Lecture—3 hours; term paper. Prerequisite: course 100 or Linguistics 1 or Linguistics 1Y. Main periods in development of the French language, from Latin to contemporary popular aspects, with emphasis on relationship between socio-cultural patterns and evolution of the language. GE credit: ArtHum, SocSci | AH or SS, WC, WE.—Russell

(change in existing course—eff. spring 18)

Genetics (A Graduate Group)

New and changed courses in Genetics (A Graduate Group) (GGG)

Graduate

225. Gene and Cellular Therapies (3)
Lecture/discussion—3 hours. Gene therapy from basic concepts to clinical applications. Topics include the human genome and genetic variation, genetic diseases, methods to manipulate gene expression, viral and non-viral delivery vectors, history and progress of gene therapy, case studies, and ethical issues. (Same course as Pharmacology & Toxicology 225.)—*S. (S.)* Anderson

(change in existing course—eff. winter 17)

296. Scientific Professionalism and Integrity (2)
Lecture—1 hour; seminar—3 hours. 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. (P/NP grading only.)—*F. (F.)* Yoder

(change in existing course—eff. spring 17)

Geography (A Graduate Group)

New and changed courses in Geography (GEO)

Graduate

252. Landscape and Power (4)
(cancelled course—eff. fall 16)

270. Experimental Design and Analysis (5)
(cancelled course—eff. fall 16)

271. Applied Multivariate Modeling in Agricultural and Environmental Sciences (4)
(cancelled course—eff. fall 16)

279. Exploring Data from Built Environment Using R (4)
Lecture—3 hours; laboratory—3 hours. Introduction to modern data science, specifically data acquisition, exploratory data analysis, visualization, and beginning data analysis using R. Emphasizes computational reasoning and working with tabular and non-standard data. Focus will be on data generated in the built environment. (Same course as Civil and Environmental Engineering 254.)—*W. (W.)* Niemeier

(change in existing course—eff. fall 17)

281. Transportation Survey Methods (4)
Lecture—4 hours. Prerequisite: Statistics 13 or Statistics 13Y; 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.)—*W. (W.)*

(change in existing course—eff. spring 18)

Geology

New and changed courses in Geology (GEL)

Lower Division

2. Earth System Science (3)
Lecture—3 hours. Solid and fluid earth and its place in the solar system. How the solid earth interacts with the atmosphere, hydrosphere, biosphere, and extraterrestrial environment. Only 2 units credit for students who have taken course 50; only 2 units credit for students who have taken course 1. GE credit: SciEng|SE, SL.—*W. (W.)* Montañez

(change in existing course—eff. winter 17)

9. Geology Field Experience (1)
Fieldwork—1 session. Prerequisite: consent of instructor; at least one previous Geology class, or concurrent enrollment. Pass One open to non-Geology Majors only. Exposure to geologic features and earth processes in the field. Experiential instruction in earth-science concepts, spatial visualization, landscape evolution, deep time, critical thinking skills, and integrative scientific themes. One 4-5 day field trip. May be repeated for credit up to one time when field trip destination differs. (P/NP grading only.) GE credit: SE.—*F, S. (F, S.)* Osleger, Pinter

(change in existing course—eff. spring 18)

91. Geology of Campus Waterways (1)
(cancelled course—eff. fall 16)

Upper Division

110. Summer Field Geology (8)
Fieldwork. Prerequisite: course 60; course 103; course 109; course 105 recommended. Advanced application of geologic and geophysical field methods to the study of rocks. Includes development and interpretation of geologic maps and cross sections; gravity, magnetic, electrical resistivity and seismic surveys; and field analysis of plutonic and volcanic rock suites. Eight hours/day, six days/week for six weeks. GE credit: SciEng, Wrt|SE, VL, WE.—*Su. (Su.)* Oskin, Cowgill

(change in existing course—eff. spring 17)

115. Earth Science, History, and People (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or course 50. Study of interplay between the Earth and its human inhabitants through history, including consideration of acute events such as earthquakes and eruptions as well as the geology of resources, topography, and water. GE credit: SciEng or SocSci, Wrt|OL, SE, WE.—*S. (S.)* Verosub

(change in existing course—eff. winter 17)

183. Teaching High School Mathematics and Science (3)
Lecture/discussion—2 hours; field work. Prerequisite: major in mathematics, science, or engineering; or consent of instructor with completion of a one-year sequence of science or calculus. 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.—*F, W, S. (F, W, S.)* Pinter, Stevenson

(change in existing course—eff. fall 17)

185A. Conceptual Integrated Science for Non-Science Majors: The Physical World (2)
Lecture—1 hour; discussion/laboratory—3 hours. Conceptual, inquiry-based integrated science course. Topics in the Next Generation Science Standards. Elementary school level teaching practice. Physics, chemistry, and science inquiry. GE credit: SE, SL.—*W. (W.)* Pinter

(new course—eff. winter 17)

185B. Conceptual Integrated Science for Non-Science Majors: Earth System Science (2)
Lecture—1 hour; discussion/laboratory—3 hours. Conceptual, inquiry-based integrated science course. Topics in the Next Generation Science Standards. Elementary school level teaching practice. Earth, space and environmental science, and science inquiry. GE credit: SE, SL.—*S. (S.)* Pinter

(new course—eff. fall 16)

186. Facilitating Learning in STEM Classrooms (2)
Lecture/discussion—1 hour. STEM Learning Assistant Seminar. Theoretical and practical issues of effective teaching in discussion/labs: student-centered, active, cooperative learning environments, responsive teaching, and differentiated classroom instruction. GE credit: SS.—*F, W, S. (F, W, S.)* Stevenson

(new course—eff. fall 16)

German

New and changed courses in German (GER)

Lower Division

1A. Accelerated Intensive Elementary German (15)
Lecture/discussion—12.5 hours. Special 12 week accelerated, intensive summer session course that combines the work of courses 1, 2, and 3. Introduction to German grammar and development of all language skills in a cultural context with emphasis on communication. Not open to students who have completed German 1, 2, or 3. GE credit: AH, WC.

(change in existing course—eff. summer 18)

Upper Division

114. From Marlene Dietrich to Run, Lola Run: German Women and Film (4)
Lecture/discussion—3 hours; extensive writing—3 hours. Prerequisite: Anthropology 1 (can be concurrent). Knowledge of German not required. Women in German film from the Weimar Republic to present, with special emphasis on conceptualizations of gender, historical and political context, aesthetic and filmic innovations. Offered in alternate years. GE credit: ArtHum, Wrt | AH, OL, VL, WC, WE.—S. Krimmer

(change in existing course—eff. spring 18)

Global Disease Biology

New and changed courses in Global Disease Biology (GDB)

Lower Division

90. Introduction to Global Disease Biology (1)
Seminar—3 hours. Open to Global Disease Biology majors only. Introduction to the Global Disease Biology major, research and internship opportunities, and potential career paths in human, animal, and plant health. Communication, ethics and the nature of science. (P/NP grading only.)—*F, W, S. (F, W, S.)* Rizzo

(change in existing course—eff. fall 17)

Upper Division

101. Epidemiology (4)
Lecture—2 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: Science and Society 13; Biological Science 2A; Biological Science 2B; Biological Science 2C; Statistics 13 or Statistics 13Y; Statistics 100 or Plant Sciences 120. Principles and practice of epidemiology as applied to human, animal, and plant populations and the environment in which these populations co-exist. Quantitative analysis of both infectious and non-infectious disease. Interdependence between epidemiological analysis, decision-making and policy formulation will be highlighted. GE credit: SciEng|SE, QL.—*W. (W.)* McRoberts, Papageorgiou

(change in existing course—eff. winter 18)

Greek

New and changed courses in Greek (GRK)

Upper Division

106. Greek Hexameter Poetry (4)
Lecture/discussion—3 hours; extensive writing—3 hours. Prerequisite: course 100; or consent of instructor. Selected readings from ancient Greek hexameter poetry. Wisdom poetry, hymns, epyllia, idylls, epic, natural history and other texts from the hexameter tradition. May be repeated for credit. GE credit: ArtHum, Wrt|AH, WC, WE.—*F, W, S. (F, W, S.)* Brelinski, Uhlig

(new course—eff. fall 17)

131. Readings in Ancient Greek Philosophy and Science (4)
Extensive writing—3 hours; lecture/discussion—3 hours. Prerequisite: course 100 (can be concurrent); or consent of instructor. Selected readings from ancient Greek philosophical and scientific writers. Texts on logical truth and empirical sense data, material and social contexts of ancient Greek philosophy and science. May be repeated for credit. Offered in alternate years. GE credit: ArtHum, Wrt|AH, WC, WE.—*F, W, S. (F, W, S.)* Webster

(new course—eff. fall 17)

Health Informatics

New and changed courses in Health Informatics (MHI)

Graduate

289E. Clinical Knowledge for the Health Informaticist (3)
Lecture—2 hours; laboratory—2 hours. Prerequisite: consent of instructor. Basic clinical knowledge for health informatics students. Human systems, disease states and conditions, treatments and prognosis.—*W. (W.)*

(change in existing course—eff. winter 18)

289I. Programming in Health Informatics (3)
Lecture—2 hours; laboratory—2 hours. Prerequisite: consent of instructor. Basics of computer programming essential to the study of informatics. Impacts on systems within healthcare, public health, nursing, research, and others.—*W. (W.)*

(change in existing course—eff. winter 18)

Hebrew

New and changed courses in Hebrew (HEB)

Lower Division

2. Elementary Hebrew (5)
Lecture/discussion—4 hours; laboratory—2 hours. Prerequisite: course 1; or the equivalent. Speaking, listening, comprehension, reading and writing fundamentals of modern Hebrew. GE credit: ArtHum|AH, OL, WC.—*W. (W.)* Franco

(change in existing course—eff. fall 17)

3. Elementary Hebrew (5)
Lecture/discussion—4 hours; laboratory—2 hours. Prerequisite: course 2; or the equivalent. Speaking, listening comprehension, reading and writing fundamentals of modern Hebrew. GE credit: ArtHum|AH, OL, WC.—*S. (S.)* Franco

(change in existing course—eff. fall 17)

11. Introduction to Biblical Hebrew (3)
Lecture/discussion—3 hours. Prerequisite: course 10. Continuation of course 10. Biblical text reading, simple/literal translation, verb and noun patterns, compounding of prepositions and nouns. GE credit: AH, WC.—*W. (W.)* Franco

(change in existing course—eff. winter 18)

12. Introduction to Biblical Hebrew (3)
Lecture/discussion—3 hours. Prerequisite: course 11. Continuation of course 11. Biblical text reading, simple/literal translation, verb and noun patterns, compounding of prepositions and nouns. GE credit: AH, WC.—*S. (S.)* Franco

(change in existing course—eff. winter 18)

21. Intermediate Modern Hebrew I (4)
Lecture/discussion—4 hours. Prerequisite: course 3; consent of instructor. Development and refinement of grammar, composition, and language skills required for reading literary texts and conversing about contemporary topics at an advanced level. History of the Hebrew language. Not open to students who have taken course 100 or 100A. GE credit: ArtHum|AH, OL, WC.—*F. (F.)* Franco

(change in existing course—eff. fall 17)

22. Intermediate Modern Hebrew II (4)
Lecture/discussion—4 hours. Prerequisite: course 21; consent of instructor. Continued development and refinement of grammar, composition, and language skills required for reading literary texts and conversing about contemporary topics at an advanced level. History of the Hebrew language.

Not open to students who have taken course 101 or 100B. GE credit: ArtHum|AH, OL, WC.—*W. (W.)* Franco

(change in existing course—eff. fall 17)

23. Intermediate Modern Hebrew III (4)
Lecture/discussion—4 hours. Prerequisite: course 22; consent of instructor. Continued development of grammar, composition, language skills required for reading literary texts and conversing about contemporary topics at an advanced level. History of the Hebrew language. Further development of writing and translating skills. Not open to students who have taken course 100C or course 102. GE credit: ArtHum | AH, OL, WC.—*S. (S.)*

(change in existing course—eff. spring 18)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Directed group study. May be repeated for credit. (P/NP grading only.)

(new course—eff. winter 17)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. Special study. May be repeated for credit. (P/NP grading only.)

(new course—eff. winter 17)

Hindi

New and changed courses in Hindi (HIN)

Lower Division

21. Intermediate Hindi/Urdu I (4)
Lecture/discussion—4 hours. Prerequisite: course 3. 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, OL, WC.—*F. (F.)* Chauhan

(change in existing course—eff. fall 17)

22. Intermediate Hindi/Urdu II (4)
Lecture/discussion—4 hours. Prerequisite: course 21. 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, OL, WC.—*W. (W.)* Chauhan

(change in existing course—eff. fall 17)

23. Intermediate Hindi/Urdu III (4)
Lecture/discussion—4 hours. Prerequisite: course 22. 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, OL, WC.—*S. (S.)* Chauhan

(change in existing course—eff. fall 17)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Directed group study. May be repeated for credit. (P/NP grading only.)

(new course—eff. winter 17)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. Special study. May be repeated for credit. (P/NP grading only.)

(new course—eff. winter 17)

Professional

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: consent of instructor. Restricted to graduate students. Teaching practicum. May be repeated for credit up to eighteen times. (S/U grading only.)—*F, W, S. (F, W, S.)*

(new course—eff. winter 17)

History

New and changed courses in History (HIS)

Lower Division

2. Introduction to the History of Science and Technology (4)
Lecture—3 hours; discussion—1 hour. Introduction to topics and methods of the history of science and technology. Emphasis on understanding the role of science and technology in the modern world through a long-term historical perspective. (Same course as Science and Technology Studies 2.) GE credit: AH, SL, SS, WC, WE.

(new course—eff. fall 17)

3. Cities: A Survey of World Cultures (4)
Lecture—3 hours; lecture/discussion—1 hour. Survey of urban world cultures, focusing on up to ten cities selected by the instructor. Offered irregularly. GE credit: ArtHum or SocSci, Div, Wrt|AH or SS, WC.

(change in existing course—eff. winter 17)

5. Modernist Culture (2)
Lecture/discussion—2 hours. Modernist culture in global perspective. Introduction to early 20th century- innovations in visual arts, music, literature, film, and architecture in Europe, the Americas, Asia, and Africa. GE credit: ArtHum | AH, VL, WC.

(new course—eff. fall 18)

13. Global Sexualities (4)
Lecture—3 hours; discussion—1 hour. Global history of sexualities, including comparative study of gender, marriage, and fertility before 1800, followed by the modern history of sexualities worldwide as it intersects with imperialism, race, population control, law, and globalization. GE credit: AH, DD, SS, VL, WC.

(new course—eff. fall 17)

14. History of Global Capitalism (4)
Lecture—3 hours; discussion—1 hour. History of institutions, workers, commodity chains, and the social and cultural context of capitalism around the world from 1500-present. Emphasis on transnational and comparative histories of political economies and individual human lives. Offered in alternate years. GE credit: SocSci | DD, SS, WC.

(new course—eff. spring 18)

15. Introduction to African History (4)
(cancelled course—eff. spring 18)

15A. Africa to 1900 (4)
Lecture—3 hours; discussion—1 hour. Introduction to African history to 1900. Origins and impact of early human history, precolonial states and societies, slavery and the slave trade, religious and cultural movements, and the foundations of European colonialism. GE credit: AH, SS, WC.

(new course—eff. spring 18)

15B. Africa Today (4)
Lecture—3 hours; discussion—1 hour. Survey of major themes in colonial and postcolonial sub-Saharan African history, including colonialism, decolonization, nationalism and politics, economic history and labor, urbanization, popular culture, gender, marriage, and family life. GE credit: AH, SS, WC.

(new course—eff. fall 17)

18A. Race in America to 1865 (4)
Lecture—3 hours; discussion—1 hour. Introduction to history of race and racial formation in the United States to the Civil War through a comparative approach. Examines the experiences of African Americans, Asian Americans, Native American, Mexican Americans and other Latino/a groups. One unit of credit to students who have previously completed History 178A. GE credit: ACGH, AH or SS, DD.

(new course—eff. fall 17)

20. The Vietnam War (4)
Lecture—3 hours; extensive writing—3 hours. A history of the Vietnam War, including its origins, fighting, and repercussions. GE credit: ACGH, AH or SS, DD, VL, WC, WE.

(new course—eff. fall 17)

80. The History of the United States in the Middle East (2)
Lecture—2 hours. History of the United States in the Middle East from 1900 to the present. Examination of U.S. foreign relations toward the Middle East, their regional ramifications and domestic repercussions. GE credit: ArtHum, SocSci | ACGH, AH or SS, WC.

(change in existing course—eff. spring 18)

80W. The History of the United States in the Middle East (2)
Lecture/discussion—1 hour; extensive writing—2 hours. Must enroll in course 80 concurrently. History of the United States in the Middle East from 1900 to the present. Examination of U.S. foreign relations toward the Middle East, their regional ramifications and domestic repercussions with extensive writing. GE credit: ArtHum, SocSci | AH or SS, WE.

(new course—eff. spring 18)

92. Internship in History (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Supervised internship and study as a historian, archivist, curator, or an in another history-related capacity, in an approved organization or institution. May be repeated for credit. (P/NP grading only.)

(new course—eff. fall 17)

Upper Division

107. Medicine's Histories: Human and Veterinary Medicine from the Ancient World to One Health (4)
Lecture/discussion—3 hours; project—3 hours. Global, comparative study of the related histories of human and veterinary medicine from the ancient world to today's interdisciplinary One Health. Emphasis on reintegration of human and veterinary medicine to meet the biggest health challenges today. GE credit: AH, SS.

(new course—eff. spring 17)

109. Environmental Change, Disease and Public Health (4)
Lecture/discussion—3 hours; project. Analysis of environmental changes from pre-history to the present and their influence on disease distribution, virulence and public health. Focus on critical study of many human-driven environmental changes and the accelerated transformation/spread of pathogens under globalization. Not open for credit to students who have taken course 109B. (Same course as Science and Society 109.) GE credit: SciEng or SocSci, Div|SE or SS, SL, WC.—*F. (F.)* Davis

(new course—eff. fall 16)

109A. Global Environmental History (4)
(cancelled course—eff. winter 17)

109B. Environmental Change, Disease and Public Health (4)
(cancelled course—eff. winter 18)

115A. History of West Africa (4)
Lecture—3 hours; term paper. Prerequisite: course 15 recommended. West and Central Africa from 1500 to the present. Origins and impact of precolonial states and societies, the trans-Atlantic slave trade, colonialism, decolonization, nationalism, and changes in religions, politics, economics, gender, and culture. Offered in alternate years. GE credit: ArtHum, Div, Wrt|AH, WC, WE.

(change in existing course—eff. winter 18)

115B. History of East Africa and the Indian Ocean (4)
Lecture—3 hours; term paper. Prerequisite: course 15 recommended. Eastern Africa and the Indian Ocean world from 1500 to the present. Origins and impact of precolonial states and societies, slavery, trade, colonialism, decolonization, nationalism, and changes in religions, politics, economics, gender, and culture. Offered in alternate years. GE credit: ArtHum, SocSci, Div, Wrt|AH, WC, WE.

(change in existing course—eff. winter 18)

115C. History of Southern Africa from Exploration to the Rainbow Nation (4)
Lecture—3 hours; term paper. Prerequisite: course 15 recommended. Southern Africa from 1500 to the present. Origins and impact of precolonial states and societies, European colonization, industrialization, urbanization, nationalism, apartheid, and changes in religions, politics, economics, gender, and culture. GE credit: ArtHum, SocSci, Div, Wrt|AH, WC, WE.

(change in existing course—eff. winter 18)

115D. Postcolonial Africa (4)
Lecture—3 hours; term paper. Prerequisite: course 115A recommended. Survey of social, political, cultural and economic change in African societies since the ending of European colonial rule in the twentieth century. Themes include development, health and medicine, war and conflict, urbanization, global and inter-continental migration, and family and gender. GE credit: ArtHum or SocSci, Div, Wrt|AH or SS, WC, WE.

(change in existing course—eff. spring 17)

115E. Slavery, Africa, and the Atlantic World (4)
Lecture—3 hours; term paper. 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.

(change in existing course—eff. fall 17)

126Y. The History of Human Rights in Europe (4)
Lecture—3 hours; web electronic discussion—1 hour. History of the origins, development, and state of international humanitarian law (IHL) and international human rights law (IHRL) in Europe. Emphasis on Enlightenment-era and modern theories of the source, utility, and limits of human rights. Offered in alternate years. (Same course as Human Rights 162Y.) GE credit: SS, WC.

(new course—eff. fall 17)

133. European Thought and Culture from the Renaissance to the Enlightenment (4)
Lecture—3 hours; term paper. History of European thought on politics, society, science, and religion from 1400 to 1800. Cultural impact of printing press, Protestant Reformation, wars, exploration, and empire. Offered in alternate years. GE credit: AH.

(new course—eff. spring 18)

158. Special Topics in Latin American History (4)
Lecture—3 hours; term paper—3 hours. Topics in the history of Latin America. Topics may be framed geographically (e.g., Central America), chronologically (e.g., The Cold War) or thematically (e.g., environmental history). May be repeated for credit up to three times when topic differs. Offered in alternate years. GE credit: AH, WC, WE.

(new course—eff. fall 17)

171B. Civil War Era (4)
Lecture—3 hours; term paper. Examination of the political and social history of the United States from the Compromise of 1850 to the end of the Civil War in 1865. Causes of the war the war itself and the problems of reconstruction after the war. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt|ACGH, AH or SS, DD, WE.

(change in existing course—eff. spring 17)

171C. Reconstruction, America's Second Founding (4)
Lecture—3 hours; term paper. After the U.S. Civil War, from 1865 to 1876. Emphasis on end of slavery; expansion of civil rights, voting rights, and birthright citizenship; overthrow of biracial Southern governments; segregation and disfranchisement; culture of reconciliation. GE credit: ACGH, AH.

(new course—eff. spring 17)

172. American Environmental History (4)
Lecture—3 hours; term paper. 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.

(change in existing course—eff. winter 18)

178A. Race in America, 1492-1865 (4)
(cancelled course—eff. fall 17)

180C. The Fight for the Right to Vote (4)
Lecture—3 hours; term paper. History of the struggle for voting rights from the colonial period to the present. Emphasis on the struggle for inclusion by African Americans, women, Latinos, and other groups. GE credit: ACGH, AH or SS.

(change in existing course—eff. fall 17)

187. History of US Foreign Relations in the Twentieth Century (4)
Lecture—3 hours; extensive writing—3 hours. Rise of the US to superpower standing during the twentieth century, from colonialism to the war on terror, including political, diplomatic, cultural, and economic activities of both US government and private American agencies beyond US borders. Offered in alternate years. GE credit: SS, WE.

(new course—eff. fall 17)

193A. History of the Modern Middle East, 1750-1914 (4)
Lecture—3 hours; term paper. Prerequisite: course 6 recommended. State and society within the Middle East from 1750 to 1914 under pressure of the changing world economy and European imperialism. Themes: colonialism, Orientalism, intellectual renaissance, Islamic reform, state-formation, role of subaltern groups. Offered irregularly. GE credit: ArtHum, SocSci, Div, Wrt|AH, SS, VL, WC, WE.

(change in existing course—eff. fall 17)

195C. A History of Vietnam (4)
Lecture/discussion—4 hours. Overview of Vietnamese history: early state formation in Southeast Asia; expansion/contention in the 17th and 18th centuries; colonial period; war with the US; and post-war developments (with an emphasis on relations with China and the US). Offered irregularly. GE credit: AH, SS, WC, WE

(new course—eff. fall 17)

Horticulture

New and changed courses in Horticulture (HRT)

Graduate

203. Research Perspectives in Horticulture (3)
Lecture—1 hour; lecture/discussion—2 hours. Prerequisite: graduate standing. Following lectures/discussions of scientific methodology, students develop research proposals aided by classroom discussions and individual interactions with instructors. Lectures and critiques of "classical papers" provide a sense of the evolution of the current concepts in perennial plant biology.—*W. (W.)* Melotto, Zwieniecki

(change in existing course—eff. winter 17)

Human Development

New and changed courses in Human Development (HDE)

Upper Division

100A. Infancy and Early Childhood (4)
Lecture—4 hours. Prerequisite: Psychology 1 or Psychology 1Y); Biological Sciences 2A or Biological Sciences 10 or Biological Sciences 1A or Biological Sciences 10V) or Molecular and Cellular Biology 10 or Neurology, Physiology, and Behavior 10 or Neurology, Physiology, and Behavior 12 or Microbiology 10. Pass One restricted to Human Development majors. Biological, social, and cultural influences in the psychological growth and development of children, prenatal through age six. Two observations of preschool children required.—*F, W, Su. (F, W, Su.)* Hibel

(change in existing course—eff. winter 18)

100B. Middle Childhood and Adolescence (4)
Lecture—4 hours. Prerequisite: course 100A or Psychology 140; Psychology 1 or Psychology 1Y. Interplay of biological and social-cultural factors in the emotional, cognitive and social development from middle childhood through adolescence.—*W, S, Su. (W, S, Su.)* Guyer, Nishina

(change in existing course—eff. winter 18)

100C. Adulthood and Aging (4)
Lecture—4 hours. Prerequisite: Psychology 1 or Psychology 1Y. Development during early, middle, and late adulthood; biological, cognitive, and psychosocial aspects of adult development. Emphasis on normative patterns of development which characterize "successful aging."—*F, S. (F, S.)* Miller, Ober

(change in existing course—eff. spring 18)

110. Contemporary American Family (4)
Lecture—4 hours. Prerequisite: Psychology 1 or Psychology 1Y or Sociology 1 or Sociology 2. Factors currently influencing American families including changing economic conditions, changing sex roles, divorce, and parenthood; theories and research on family interaction.—*W. (W.)* Conger

(change in existing course—eff. winter 18)

120. Research Methods in Human Development (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Statistics 13 or Statistics 13V or Statistics 13Y or Education 114 or Psychology 41 or Sociology 46A and Sociology 46B. Scientific process, research designs, and experimental controls; APA manuscript style and scientific writing; statistical analysis and interpretation of results. Laboratory exercises to collect data, analyze and interpret results, and write scientific papers. GE credit: SS, WE.—*F, S. (F, S.)* Liu, Nishina

(change in existing course—eff. winter 18)

121. Psychological Assessment (4)
Lecture—4 hours. Prerequisite: course 100A or course 100B; Statistics 13 or Statistics 13Y or Psychology 41 or Sociology 46A, Sociology 46B. Current issues and methodology related to the process of psychological assessment with children.

(change in existing course—eff. spring 18)

130. Developmental Psychopathology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A and course 100B, or Psychology 140; consent of instructor. Foundational principles and current issues in developmental psychopathology, the study of mental health problems and disorders that originate in childhood and adolescence (e.g., disruptive behavior, mood and anxiety disorders).—*F. (F.)* Choe

(change in existing course—eff. winter 18)

132. Individual Differences in Cognition (4)
Lecture—4 hours. Prerequisite: Psychology 1 or Psychology 1Y; course 100A or course 100B. Individual differences in cognition, including learning disabilities and giftedness. Education implications and neurodevelopmental substrates of individual differences in cognition. Offered irregularly.
(change in existing course—eff. spring 18)

161. Applied Cognition and Aging (4)
Lecture/discussion—4 hours. Prerequisite: Psychology 1 or Psychology 1Y; course 100C. Principles from cognition and aging and applies these to real-world concerns in areas including education, technology, job performance, and health. Considers physical and social changes in later life that impact functioning. GE credit: SocSci, Wrt | SS, WE.—*S.* Miller
(change in existing course—eff. spring 18)

163. Cognitive Neuropsychology in Adulthood and Aging (4)
Lecture/discussion—4 hours. Prerequisite: Psychology 1 or Psychology 1Y; course 100C recommended. Theories, methods, and findings concerning the relationship between cognitive processes and brain functioning. Readings, lectures, and in-class discussions cover research on normal younger and older adults, neuropsychological case studies, and selected patient groups (e.g., amnesia, schizophrenia, Alzheimer's disease). Offered in alternate years.—*(F.)* Ober
(change in existing course—eff. spring 18)

Graduate

220. Research Methods in Human Growth and Development (4)
Lecture—4 hours. Prerequisite: Statistics 13 or Statistics 13Y; or the equivalent and at least two upper division courses in Human Biology or Developmental Psychology. Overview of qualitative and quantitative approaches to empirical inquiry in the social sciences, with a focus on theory and research methods in biological growth and cognitive and social/emotional development from prenatal period to death.—*W. (W.)* Liu
(change in existing course—eff. winter 18)

Human Rights

New and changed courses in Human Rights (HMR)

Upper Division

162Y. The History of Human Rights in Europe (4)
Lecture—3 hours; web electronic discussion—1 hour. History of the origins, development, and state of international humanitarian law (IHL) and international human rights law (IHRL) in Europe. Emphasis on Enlightenment-era and modern theories of the source, utility, and limits of human rights. Offered in alternate years. (Same course as History 126Y.) GE credit: SS, WC.
(new course—eff. fall 17)

190. Seminar (4)
Seminar—4 hours; term paper. Emphasis on current scholarly debate about the methods for analyzing and comparing diverse human rights issues with the intention of integrating disciplined study of the field.
(new course—eff. fall 16)

Professional

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: consent of instructor; graduate standing. Restricted to graduate students. Teaching Assistant Training Practicum. May be repeated for credit. (S/U grading only.)—*F, W, S. (F, W, S.)*
(new course—eff. fall 17)

Humanities

New and changed courses in Humanities (HUM)

Lower Division

10. How to be a Critic: Understanding Cultural Products and Practices (2)
Lecture—2 hours. Introduction to key topics and methodologies of interest to humanists. Series uses a variety of critical approaches to examine the cultural significance of subjects such as: fashion, film, architecture, music, food, dance. May be repeated for credit up to one time if topic differs. GE credit: ArtHum, Wrt|AH.—*F, W, S. (F, W, S.)*
(change in existing course—eff. fall 17)

10D. How to be a Critic: Discussion (2)
Discussion—2 hours. Concurrent enrollment in course 10 required. Optional discussion section can be taken concurrently with HUM 10. Small group discussions and preparation of short papers. GE credit: WE.
(new course—eff. fall 17)

Hydrologic Science (A Graduate Group)

New and changed courses in Hydrologic Science (HYD)

Graduate

201A. Hydrologic Sciences Core Survey (3)
Lecture/discussion—2 hours; project—3 hours. Considers the primary sub-disciplines while reviewing the fundamental scientific concepts/processes of the hydrologic sciences research community, and includes a basic writing component.—Grismer, Harter
(new course—eff. fall 17)

201B. Hydrologic Sciences Core Seminar (1)
Seminar—3 hours. Exposes students to the research underway in the Hydrologic Sciences Graduate Group as well as provide them the opportunity to present and refine their research through interaction with other students in the Graduate Group. (P/NP grading only.)—Harter
(new course—eff. winter 18)

273. Introduction to Geostatistics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Statistics 130A; Statistics 130B; or the equivalent. Statistical treatment of spatial data with hydrologic emphasis. Topics: theory of random functions, variogram analysis, Kriging/co-Kriging, indicator geostatistics, and stochastic simulation of spatial variability. Geostatistical software use. Offered in alternate years.—*F.* Fogg, Puente
(change in existing course—eff. winter 18)

Hydrology

New and changed courses in Hydrology (HYD)

Lower Division

47. Watershed Processes and Water Quality in the Tahoe Basin (2)
(cancelled course—eff. spring 18)

Upper Division

124. Plant-Water-Soil Relationships (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Soil Science 100 (can be concurrent) or Soil Science 107 (can be concurrent); Plant Science 100A (can be concurrent) or PLB 111 (can be concurrent) or consent of instructor. Principles of plant interactions with soil and atmospheric water environments and practical applications to crop management (e.g., irrigation) and plant eco-physiology (e.g., drought). Not open for credit to students who have completed Water Science 104. GE credit: QL, SE, SL.
(change in existing course—eff. fall 18)

143. Ecohydrology (4)
Lecture/discussion—3 hours; course 10 or course 141 or Environmental Science and Policy 1 or Environmental Science and Management 100 or Environmental Science and Management 108 or Environmental Science and Management 120 or Geology 1 or Geology 50 or Soil Science 100; or consent of instructor. Movement and storage of water in individual ecosystems and the integrated functioning of water and biota at the watershed scale. Offered in alternate years. GE credit: SciEng|OL, QL, SE, SL.—*W. (W.)* Pasternack
(change in existing course—eff. winter 17)

145. Water Science and Design (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 141 or Environmental Science and Management 100; Mathematics 16B or Mathematics 21B; or consent of instructor. Introduction to watershed engineering, storm water management, design of hydraulic systems. Topics include hydrological risk analysis, flood routing, design storms, open channel flow, pipes, culverts, spillways, and detention basins. Class project and field trips will apply theory to real-life problems. GE credit: QL, SE, SL.
(change in existing course—eff. fall 18)

147. Runoff, Erosion and Water Quality Management (3)
Lecture/laboratory—8 hours; fieldwork—1 hour. Prerequisite: Physics 7B or Physics 9B; Mathematics 16C or Mathematics 17C or Mathematics 21C; Civil and Environmental Engineering 142 or course 141 or Environmental Science & Management 100; or equivalent. Practical hydrology and runoff water quality management from disturbed watersheds. Development of hillslope and soils restoration concepts and practice, modeling and application. (Same course as Biological Systems Engineering 147.) GE credit: SciEng | SE.—*F. (F.)* Grismer
(change in existing course—eff. spring 18)

Integrated Pest Management

New and changed courses in Integrated Pest Management (IPM)

Graduate

201. Concepts and Systems of Plant Protection and Pest Management (4)
(cancelled course—eff. winter 17)

202A. Diagnosis of Plant Pest Problems and the Control of Causal Agents (4)
(cancelled course—eff. winter 17)

202B. Diagnosis of Plant Pest Problems and the Control of Causal Agents (4)
(cancelled course—eff. winter 17)

290. Seminar (1-2)
(cancelled course—eff. winter 17)

298. Group Study (1-2)
(cancelled course—eff. winter 18)

299. Research (1-12)
(cancelled course—eff. winter 18)

Integrated Studies

New and changed courses in Integrated Studies (IST)

Lower Division

9. Seminar (1)
Lecture—1 hour. Preparation of a research report. Normally taken with course 8. May be repeated for credit. May be repeated for credit. (P/NP grading only.)—*F, W, S. (F, W, S.)*

(change in existing course—eff. fall 17)

International Agricultural Development

New and changed courses in International Agricultural Development (IAD)

Graduate

201. The Economics of Small Farms and Farming Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Agricultural and Resource Economics 100A or Economics 100; or the equivalent. Economic perspective on small farm development. Establishes a basis for predicting farmers' responses to changes in the economic environment, and for proposing government policies to increase small farm production and improve farmer and national welfare.—*W. (W.)* Vosti

(change in existing course—eff. winter 17)

202N. Analysis and Determinants of Farming Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Plant Sciences 110C or Plant Sciences 111; or the equivalent. Unifying concepts of cropping systems in temperate and tropical climatic zones; agroecosystems stability, diversity and sustainability; management strategies, resource use efficiency and their interactions; role of animals, their impact on energy use efficiency, nutrient cycling, and providing food and power. Not open for credit to students who have completed former course 200.—*S. (S.)* Bunn, Van Kessel

(change in existing course—eff. winter 17)

203N. Project Planning and Evaluation (4)
Discussion—1 hour; workshop—3 hours. Prerequisite: course 200N; or consent of instructor. Interdisciplinary setting for application of student skills and specialization to a "real world" development project. Focus on team-building and effective interdisciplinary problem-solving methods, with the objective of producing a project document and presentation within a specified deadline. Not open for credit to students who have completed former course 203.—*S. (S.)*

(change in existing course—eff. winter 17)

Italian

New and changed courses in Italian (ITA)

Lower Division

8A. Italian Conversation (3)
Discussion—3 hours. Prerequisite: course 3 or the equivalent. Italian conversation with peers in classroom setting. GE credit: OL, WC.—*F, S. (F, S.)*

(change in existing course—eff. winter 17)

8AS. Italian Conversation (3)
Discussion—3 hours. Prerequisite: course 3 or the equivalent. Italian conversation in local context outside United States. GE credit: OL, WC.

(change in existing course—eff. winter 17)

8B. Italian Conversation (3)
Discussion—3 hours. Prerequisite: course 8A. Italian conversation with peers in a classroom setting. Offered irregularly. GE credit: WC.

(change in existing course—eff. winter 17)

8BS. Italian Conversation (3)
Discussion—3 hours. Prerequisite: course 8A. Italian conversation in local context outside United States. Offered irregularly. GE credit: OL, WC.—*F. (F.)* Heyer-Caput

(change in existing course—eff. winter 17)

31. Beginning Italian for Spanish Speakers (5)
Lecture/discussion—5 hours. Prerequisite: Spanish 3 or Spanish 3V or Spanish 3Y; or two years of high school Spanish or native or heritage speaker of Spanish. Intensive introductory course on Italian language with emphasis on structural similarities between Italian and Spanish. Not open for credit to students who have completed course 1, course 2; course 1A, course 1S, course 2S. GE credit: AH, OL, WC.—*F. (F.)* Gomez

(change in existing course—eff. winter 18)

31Y. Beginning Italian for Spanish Speakers (5)
Lecture/discussion—3 hours; web electronic discussion—2 hours. Prerequisite: Spanish 3 or Spanish 3V or Spanish 3Y; consent of instructor; Spanish 3 or two years of high school Spanish or native or heritage speaker of Spanish. Intensive Introductory course on Italian language with emphasis on structural similarities between Italian and Spanish. Not open for credit to students who have completed course 1, course 1A, course 1S, course 2, course 2S. GE credit: AH, OL, WC.—*W. (W.)* Gomez

(change in existing course—eff. spring 18)

32Y. Beginning Italian for Spanish Speakers (5)
Lecture/discussion—3 hours; web electronic discussion—2 hours. Prerequisite: course 031 or course 31Y; or consent of instructor. Continuation of course 31. Intensive introductory course to Italian language and grammar with emphasis on oral and written communication. Highlights the structural similarities between Italian and Spanish. Not open for credit to students who have taken course 3, 1A or 3S. GE credit: AH, OL, WC.—*S. (S.)* Gomez

(new course—eff. fall 18)

Upper Division

120A. Italian Literature of the Twentieth Century: The Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9; 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, OL, WC, WE.—Cannon, Heyer-Caput

(change in existing course—eff. spring 17)

Japanese

New and changed courses in Japanese (JPN)

Lower Division

7S. Intensive Intermediate Japanese (20)
Lecture/discussion—20 hours. Prerequisite: course 2 C- or better; or the equivalent language proficiency; consent of Instructor. 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—*S. (S.)*

(change in existing course—eff. winter 17)

Upper Division

106. Japanese Culture Through Film (4)
Lecture/discussion—3 hours; film viewing—3 hours. 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.—Chang, Gundry

(change in existing course—eff. spring 17)

109. Japanese Popular Culture (4)
Film viewing—3 hours; lecture/discussion—3 hours. Japanese popular culture, from its medieval/early modern precedents to contemporary incarnations. Emphasis on major forms of popular culture that emerged in the 20th century, including comics, animation, science fiction, and fantasy. Offered in alternate years. GE credit: ArtHum, Div|AH, VL, WC.

(change in existing course—eff. fall 17)

111. Modern Japanese: Reading and Discussion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 6 C- or better; or the equivalent language proficiency. Readings in modern Japanese short stories, newspaper articles, and essays; conversation practice based on these readings. GE credit: ArtHum|AH, OL, WC.—*F. (F.)*

(change in existing course—eff. spring 16)

114A. Spoken Japanese (2)
Discussion—2 hours. Prerequisite: consent of instructor. Training in spoken Japanese for students with a basic working knowledge of the language. (P/NP grading only.) GE credit: OL.

(change in existing course—eff. spring 17)

116. Culture and History in Kyoto (8)
Lecture/discussion—9 hours; fieldwork—9 hours. Intensive course exploring the historical and cultural riches in Kyoto and its environs. Limited to students enrolled in the corresponding Quarter Abroad program. Takes place on-site in and around Kyoto, Japan. GE credit: AH, WC.—*S.* Sorensen

(new course—eff. fall 17)

117S. Intensive Modern Japanese: Reading and Discussion (17)
Lecture/discussion—17 hours. Prerequisite: course 5 C- or better; or consent of instructor; or the equivalent language proficiency. 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 19 total unit load. GE credit: ArtHum|AH, OL, WC.

(change in existing course—eff. winter 17)

130. Readings in Modern Japanese Literature to 1926 (4)
Lecture/discussion—4 hours. Prerequisite: course 113; or equivalent language proficiency, or consent of instructor. Restricted to completion of course 113 or equivalent as determined by taking a placement exam or consent of instructor. Short stories and essays by Japanese writers of the Meiji and Taishô eras, from 1868 to 1926. Authors include Natsume Sôseki, Izumi Kyôka, Tanizaki Jun'ichirô and Akutagawa Ryûnosuke. Readings and discussion in Japanese with some emphasis on translation into English. GE credit: ArtHum|AH, WC.—Sorensen

(change in existing course—eff. fall 18)

131. Readings in Modern Japanese Literature: 1920-1945 (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 113; or equivalent language proficiency, or consent of instructor. 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.—Chang, Gundry

(change in existing course—eff. fall 18)

132. Readings in Modern Japanese Literature: 1945-1970 (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 113; or equivalent language proficiency, or consent of instructor. 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.—Chang

(change in existing course—eff. fall 18)

133. Readings in Modern Japanese Literature: 1970-Present (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 113; or equivalent language proficiency, or consent of instructor. 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.—Chang

(change in existing course—eff. fall 18)

134. Readings in the Humanities: Traditional Culture (4)
Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: course 113; or equivalent language proficiency, or consent of instructor. 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.—Sorensen

(change in existing course—eff. fall 18)

135. Readings in the Humanities: The Modern Period (4)
Lecture—3 hours; term paper. Prerequisite: course 113; or equivalent language proficiency, or consent of instructor. 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.—Chang

(change in existing course—eff. fall 18)

136. Readings in Newspapers and Magazines (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 113; or equivalent language proficiency, or consent of instructor. Fourth-year level reading of newspaper and magazine reports, articles, and editorials on domestic and international affairs relating to contemporary Japan. GE credit: ArtHum|AH, WC.—Chang

(change in existing course—eff. fall 18)

137. Readings in Contemporary Japanese Literature (4)
Lecture/discussion—4 hours. Prerequisite: course 113; or equivalent language proficiency, or consent of 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. GE credit: AH, WC.—Sorensen

(change in existing course—eff. fall 18)

138. Readings in the Humanities: Japan Today (4)
Lecture/discussion—4 hours. Prerequisite: course 113; or equivalent language proficiency, or consent of instructor. Restricted to completion of course 113 or equivalent as determined by taking a placement exam or consent of instructor. Topical essays focused on contemporary Japan. Themes center on defining Japan today in terms of its future and past such as through its urban society, trends in architecture, "soft power" industries, and "traditional" elements as mainstays of Japan's cultural currency. GE credit: ArtHum|AH, WC.—Sorensen

(change in existing course—eff. fall 18)

151. Japanese Linguistics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 3; or equivalent language proficiency. Introduction to Japanese linguistics, featuring key aspects of the Japanese language. Analysis of Japanese from the perspectives of phonology, syntax, discourse analysis, sociolinguistics and psycholinguistics. GE credit: ArtHum, Div, Wrt|AH, WC, WE.—Koyama

(change in existing course—eff. winter 17)

155. Introduction to Japanese Folklore (4)
Lecture—3 hours; discussion—1 hour. Focus on narrative genres of myth, legend, and folktale, with additional attention paid to festivals, folk art, belief systems, and the development of folklore studies (minzokugaku) as an academic discipline. Examination the relationship of folklore to ethnic and national identity. GE credit: AH, WC.—*W. (W.)*

(change in existing course—eff. fall 16)

160. The Culture of Japanese Food (4)
Discussion—2 hours; lecture—2 hours. Study of Japanese food and the culture of eating and drinking in Japan. Attention to symbolism, historical development, aesthetics, identity and global contexts. Materials examined include critical sources as well as literary texts, art, and films. Offered irregularly. GE credit: AH, SS, WC.—Foster

(new course—eff. fall 17)

162. Japan Travelogue: Ethnographic Writing on Japanese Culture and People (4)
Lecture/discussion—4 hours. Focuses on ethnographic writing about Japan. Includes modern scholarly ethnographies, travel writing, blog posts, etc. Critical analysis of how the Japanese "other" is represented across time. Offered irregularly. GE credit: AH, WC, WE.—Foster

(new course—eff. fall 17)

Graduate

297. Directed Independent Study (4)
Conference—1 hour; term paper; independent study—8 hours. Prerequisite: consent of instructor. Directed independent study on a topic culminating in a term paper. Independent Studies may only be arranged with consent of the instructor and when graduate seminars are unavailable. May be repeated for credit up to five times when no seminars are available and topic differs.—*F, W, S. (F, W, S.)* Chang, Gundry, Koyama, Sorensen

(new course—eff. winter 17)

Landscape Architecture

New and changed courses in Landscape Architecture (LDA)

Lower Division

3. Sustainable Development: Theory and Practice (4)
Lecture—3 hours; discussion—1 hour. Origins, theoretical perspectives, and practical applications of the concept of sustainable development across scales (site, building, neighborhood, city, region, and nation) through lectures, sketch exercises, student projects, walking tours. GE credit: SocSci, Wrt|ACGH, SS, VL, WE.—*S. (S.)* Wheeler

(change in existing course—eff. winter 18)

21. Landscape Representation I (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 1 (can be concurrent); or consent of instructor. Pass One is restricted to Pre-Landscape Architecture and Sustainable Environmental Design majors. Introduction to landscape architectural representation techniques. Fundamentals of orthographic drafting, freehand drawing, photography, and basic digital representation. GE credit: ArtHum|AH, OL, VL.—*F. (F.)* Boults

(change in existing course—eff. fall 17)

23. Landscape Representation II (3)
Studio—6 hours; project—3 hours. Prerequisite: course 21; or consent of instructor. Restricted to Pre-Landscape Architecture and Landscape Architecture majors only. Instruction of methods to explore and communicate landscape design intentions through digital media.—*F. (F.)*

(change in existing course—eff. fall 17)

60. Landform and Grading Studio (6)
Studio—8 hours; extensive problem solving—2 hours; project—8 hours. Prerequisite: course 70. Pass One restricted to Pre-Landscape Architecture majors. Introduction of landform and topography as landscape medium and utilization of grading and drainage to design meaningful and functional spaces. Intro to site analysis and site planning, with specific attention to topography. GE credit: ArtHum, SciEng|AH, OL, VL, SE.—*S. (S.)*

(change in existing course—eff. fall 17)

70. Introduction to Spacemaking (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 21; or consent of instructor. Pass One restricted to Pre-Landscape Architecture and Sustainable Environmental Design majors. Introduction to basic principles of design towards the creation of space. Design methodologies and skills to define, manipulate, and represent the built environment. Workshops in 3D physical modeling for spacemaking. GE credit: ArtHum|AH, OL, VL.—*W. (W.)* Napawan

(change in existing course—eff. fall 17)

Upper Division

101. Advanced Theory in Environmental Design (3)
Lecture/discussion—3 hours. Prerequisite: course 70 (can be concurrent); or consent of instructor. Open to LDA/SED majors only. Provides exploration of contemporary theories and philosophies impacting design of landscapes and the built environment. Includes exploring competing definitions of "landscape," "nature," and "culture". GE credit: AH.—*F. (F.)* Napawan

(new course—eff. fall 17)

102. Methods in Design and Landscape Research (3)
Lecture—3 hours. Prerequisite: course 171; or consent of instructor. Open to Landscape Architecture majors only. Research, design, and planning meth-

ods 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.—*W. (W.)*

(change in existing course—eff. winter 18)

120. Landscape Representation III (3)
Studio—6 hours; project—3 hours. Prerequisite: course 23; or consent of instructor. Restricted to Landscape Architecture majors. Provides hands-on workshop environment to explore advanced representation and modeling skills. Digital drawing explored as an analytical research method and generative design technique for creating presentation graphics.—*W. (W.)* Milligan

(change in existing course—eff. fall 17)

150. Introduction to Geographic Information Systems (4)
Lecture—3 hours; laboratory—3 hours. Pass One restricted to Landscape Architecture and Sustainable Environmental Design 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: SE, VL.

(change in existing course—eff. winter 18)

161. Professional Practice and Construction Documents (6)
Studio—8 hours; project—6 hours; fieldwork. Prerequisite: course 171. Open to Landscape Architecture majors only. Legal and professional aspects of landscape architecture, including the development of construction documents (drawings and specifications), proposal writing, fee calculations, project management, cost estimation, and insurance.—*W. (W.)*

(change in existing course—eff. fall 17)

170. Site Planning and Design Studio (6)
Studio—8 hours; Fieldwork—2 hours. Prerequisite: course 160. 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. GE credit: ArtHum|AH, OL, VL.—*W. (W.)* Boults

(change in existing course—eff. fall 17)

180A. Special Topics in Landscape Architecture: Postmodern Landscapes (2)
(cancelled course—eff. fall 16)

180C. Special Topics in Landscape Architecture: Art of the Environment (2)
(cancelled course—eff. fall 16)

180F. Special Topics in Landscape Architecture: Landscape Ecology (2)
(cancelled course—eff. fall 16)

180G. Special Topics in Landscape Architecture: Landscape and Regional Land Planning (2)
(cancelled course—eff. fall 16)

180H. Special Topics in Landscape Architecture: The Bioregional Landscape (2)
(cancelled course—eff. fall 17)

180I. Special Topics in Landscape Architecture: Regenerative Landscape Systems (2)
(cancelled course—eff. fall 16)

180J. Special Topics in Landscape Architecture: Community Participation in Design (2)
(cancelled course—eff. fall 16)

180K. Special Topics in Landscape Architecture: Social Factors in Landscape Architecture (2)
(cancelled course—eff. fall 16)

180L. Special Topics in Landscape Architecture: Public Open Space (2)
(cancelled course—eff. fall 16)

180M. Special Topics in Landscape Architecture: Urban and Community Design (2)
(cancelled course—eff. fall 16)

180N. Special Topics in Landscape Architecture: Planting Design (2)
(cancelled course—eff. fall 16)

180O. Special Topics in Landscape Architecture: Current Issues in Landscape Architecture (2)
(cancelled course—eff. fall 16)

180P. Special Topics in Landscape Architecture: Water in Community Planning and Design (2)
(cancelled course—eff. fall 16)

180Q. Historic Preservation (2)
(cancelled course—eff. winter 17)

181A. Postmodern Landscapes Design and Planning Studio (3)
(cancelled course—eff. fall 16)

181C. Art of the Environment Design and Planning Studio (3)
(cancelled course—eff. fall 16)

181F. Landscape Ecology Design and Planning Studio (3)
(cancelled course—eff. fall 16)

181G. Special Topics in Landscape Architecture: Landscape and Regional Land Planning Studio (3)
(cancelled course—eff. fall 16)

181H. The Bioregional Landscape Design and Planning Studio (3)
(cancelled course—eff. fall 16)

181I. Regenerative Landscape Systems Design and Planning Studio (3)
(cancelled course—eff. fall 16)

181J. Community Participation in Design: Design and Planning Studio (3)
(cancelled course—eff. fall 16)

181K. Social Factors in Landscape Architecture Design and Planning Studio (3)
(cancelled course—eff. fall 16)

181L. Public Open Space Design and Planning Studio (3)
(cancelled course—eff. fall 16)

181M. Urban and Community Design: Design and Planning Studio (3)
(cancelled course—eff. fall 16)

181N. Planting Design and Planning Studio (3)
(cancelled course—eff. fall 16)

181O. Current Issues Design and Planning Studio (3)
(cancelled course—eff. fall 16)

181P. Special Topics in Landscape Architecture: Water in Community Planning and Design Studio (3)
(cancelled course—eff. fall 16)

181Q. Special Topics in Landscape Architecture: Historic Preservation Studio (3)
(cancelled course—eff. fall 16)

182. Advanced Landscape Architecture Studio I (6)
Studio—8 hours. Prerequisite: course 171. Restricted to Landscape Architecture majors (ALDA) or consent of instructor. Landscape architecture studio featuring advanced studies and applications of creative work, design, technology and/or theory. One day long fieldtrip required.—*F. (F.)*

(new course—eff. fall 16)

183. Advanced Landscape Architecture Studio II (6)
Studio—8 hours. Prerequisite: course 182. Restricted to Landscape Architecture majors (ALDA) or consent of instructor. Landscape architecture studio featuring advanced studies and applications of creative work, design, technology and/or theory. One day long field trip required.—*W. (W.)*

(new course—eff. fall 16)

184. Capstone Landscape Architecture Studio (6)
Studio—8 hours. Prerequisite: course 183. Restricted to Landscape Architecture majors or consent of instructor. Capstone studio that synthesizes learning objectives within the senior-level Landscape Architecture studio sequence. Students required to apply creative problem solving, design theory, technology, and representation skills towards a design approach that addresses complex, real-world environmental design problems.—*S. (S.)*

(new course—eff. fall 16)

Graduate

240. Historic, Cultural Landscapes: Concept, Perception, Preservation (4)
(cancelled course—eff. fall 16)

250. Life-Place: Bioregional Theory and Principles (4)
(cancelled course—eff. fall 16)

260. Landscape and Power (4)
(cancelled course—eff. fall 16)

Latin

New and changed courses in Latin (LAT)

Upper Division

122. Early Christian Writers (4)
Extensive writing—3 hours; lecture/discussion—3 hours. Prerequisite: course 100 (can be concurrent); or consent of instructor. Latin style of selected early Christian writers. Topics may include: Latin translations of Greek and Hebrew scriptures, Christian Latin, with focus on North Africa, Palestine, or Spain; High literary Christian Latin; Christian Latin oratorical style. GE credit: ArtHum, Wrt|AH, WC, WE.—*F, W, S. (F, W, S.)* Albu, Chin, Rundin

(new course—eff. fall 17)

135. Themes in Latin Literature (4)
Extensive writing—3 hours; lecture/discussion—3 hours. Prerequisite: course 100 (can be concurrent); or consent of instructor. Readings in Latin that trace a theme across times, genres, and authors. May be repeated for credit. GE credit: ArtHum, Wrt|AH, WC, WE.—*F, W, S, Su. (F, W, S, Su.)* Albu, Chin, Rundin, Seal, Stem

(new course—eff. fall 17)

Law

New and changed courses in Law (LAW)

Graduate

200A. U S Legal System Seminar (LL.M.) (2)
Discussion—2 hours. History and fundamental principles of the United States legal system. Important current legal issues, developments and trends. Required for LL.M. students who have not attended a U.S. law school. Fall semester only.
(change in existing course—eff. fall 17)

200B. U S Legal Methods I (LL.M.) (3)
Lecture. Course is only offered to LL.M. students. Designed to provide background skills necessary to succeed in both law school and legal practice. Gain an introductory working knowledge of the US legal methods which includes learning various forms of legal writing and speaking.
(new course—eff. fall 17)

200BT. U.S. Legal Methods A (LL.M.) (3)
Lecture/discussion—3 hours. Course is designed to provide background skills necessary to succeed in both law school and legal practice. Students gain an introductory working knowledge of the US legal method which includes learning various forms of legal writing and speaking.
(new course—eff. fall 16)

200C. U S Legal Methods II (LL.M.) (3)
Lecture. Open to LL.M. students only. Designed to provide background skills necessary to succeed in both law school and legal practice. Gain an introductory working knowledge of the US legal method which includes learning various forms of legal writing and speaking.
(new course—eff. fall 17)

200CT. U.S. Legal Methods B (LL.M. (3)
Lecture/discussion—3 hours. Course is designed to provide background skills necessary to succeed in both law school and legal practice. Students gain an introductory working knowledge of the US legal method which includes learning various forms of legal writing and speaking.
(change in existing course—eff. spring 17)

200D. American Legal Concepts I (LL.M.) (3)
Lecture. Prerequisite: consent of instructor. Course is only offered to LL.M. students. Designed to provide basic skills necessary to succeed in both law school and legal practice.
(new course—eff. fall 17)

200DT. Advanced Introduction to American Legal Concepts and Methods (LL.M.) (3)
Lecture—3 hours. Course is only offered to LL.M. students. Building on the Introduction to American Law course, this course will provide additional instruction in American law and legal methods. Students will audit selected substantive courses and will produce a series of legal memoranda.
(change in existing course—eff. spring 17)

200E. American Legal Concepts II (LL.M.) (3)
Lecture. Prerequisite: consent of instructor. Course is only offered to LL.M. students. Designed to provide basic skills necessary to succeed in both law school and legal practice.
(new course—eff. fall 17)

207. Legal Research and Writing I (2)
Discussion/laboratory—2 hours. Fall semester course taught by Wydick Fellowship Program faculty is an integrated legal research and writing skills course. Basic legal research resources and strategies are introduced and practiced.
(change in existing course—eff. fall 17)

207A. Legal Research (LL.M.) (1)
Discussion—1 hour. Restricted to LL.M. students only. Description of the evolution and use of sources of law and secondary authority.
(change in existing course—eff. fall 17)

208A. Legal Research and Writing II (LL.M.) (LLM) (2)
Discussion—2 hours. Persuasive writing and oral advocacy. LL.M. 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.
(change in existing course—eff. spring 17)

208E. Introduction to U.S. Legal Methods A (3)
Lecture. Prerequisite: consent of instructor. Restricted to LL.M. students. Designed to provide foreign students with background skills at a more basic level than U.S. Legal Methods A and B. Students will audit carefully selected courses in the regular curriculum and complete assignments related to those courses.
(new course—eff. fall 17)

208F. Introduction to U.S. Legal Methods B (LLM) (3)
Seminar. Prerequisite: consent of instructor. Restricted to LL.M. students. Designed to provide foreign students with background skills at a more basic level than U.S. Legal Methods A and B. Students will audit carefully selected courses in the regular curriculum and complete assignments related to those courses.
(new course—eff. fall 17)

208G. U.S. Legal Methods A (LL.M.) (3)
Lecture. Restricted to LL.M. students. Designed to provide foreign and other students with background skills necessary to succeed in both law school and legal practice.
(new course—eff. fall 17)

208H. U.S. Legal Methods B (LL.M.) (3)
Seminar. A description of the evolution and use of sources of law and secondary authority.
(new course—eff. fall 17)

209AT. Patent Prosecution and Practice (3)
(cancelled course—eff. fall 17)

209B. Patent Prosecution and Practice (3)
Seminar. Examines core requirements and strategies for drafting and prosecuting a patent application before the U.S. Patent & Trademark Office. Students will interact with real inventors and US PTO examiners to gain the experience of getting a patent issued.
(new course—eff. fall 17)

209C. Patentable Subject Matter: Genes, Methods, and Software (2)
Seminar. In-depth look at recent cases and debates behind genetic patenting, software; business models; diagnostic methods, and others. Reviews the crucial and rapidly evolving field of patent law which affects some of the most important hi-tech industries.
(new course—eff. spring 18)

209CT. Patentable Subject Matter: Genes, Methods, and Software (2)
(cancelled course—eff. spring 18)

209DT. Innovation Law (2)
Seminar—2 hours. Explores range of legal issues that innovation lawyers face, from establishing a start-up to high stakes technology mergers & acquisitions, to data protection and privacy, protecting intellectual property through strategic patent litigation.
(new course—eff. spring 17)

209E. Patent Litigation (1)
Lecture. Introduces the basics of Patent Law and examines the U.S. patent enforcement system. Learn how a patent litigation proceeds, focusing on both pre- and post-trial proceedings and examines substantive patent laws.
(new course—eff. spring 18)

210. Reforming the Police and Criminal Justice (2)
Seminar—2 hours. Limited to 25 students. Focus on major current issues: policing ethnic neighborhoods; use of deadly force; modernizing the work of prosecutors and defense counsel.
(change in existing course—eff. fall 16)

210ET. Race, Mass Incarceration and Policing (2)
Seminar—2 hours. Key issues in the historical development and the current state of modern American imprisonment, policing structures, and the criminal justice system in relation to race.
(new course—eff. spring 17)

210F. Restorative Justice (2)
Seminar. Explore both the theory and practice of restorative justice as an alternative approach to the retributive justice model of our current criminal law system and many other institutions.
(new course—eff. fall 17)

210FT. Restorative Justice (2)
(cancelled course—eff. fall 17)

214. Tax Issues Related to Estate Planning (2)
Discussion—2 hours. Prerequisite: course 221 recommended. Tax issues Related to estate planning.
(change in existing course—eff. fall 17)

219. Evidence (3)
Lecture/discussion. Covers rules regarding the admissibility of proof during 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 18)

220A. State and Local Taxation (3)
Discussion—3 hours. Introduction to fundamentals of state and local taxation. Beginning with historical and constitutional aspects, student analyze recent developments in state and local taxation and their impact on client representation.
(change in existing course—eff. fall 17)

221. Trusts, Wills and Estates (3)
Discussion—3 hours. Study of the law of decedent's estates, wills, and trusts.
(change in existing course—eff. fall 16)

221A. Practical Skills in Will & Trust Drafting and Administration (2)
Seminar —2 hours. Provides the skills to practice law in the area of estate planning and probate/trust administration. Follow an estate planning client and draft actual estate plan documents. A series of related topics will be explored.
(new course—eff. spring 18)

221AT. Practical Skills in Will and Trust Drafting and Administration (2)
(cancelled course—eff. spring 18)

222B. Asian Pacific Americans and Law (3)
Seminar. Examines how American Law has shaped Asian Pacific American demographics, experiences, and status in American society.
(new course—eff. fall 17)

222CT. Anti-Corruption Law in India (2)
Seminar—2 hours. Addresses the impact of large corruption scandals on long term social trust, in light of Indian coal block and 2G spectrum allocation scandals.
(new course—eff. spring 17)

222T. Asian Pacific Americans and Law (3)
(cancelled course—eff. fall 17)

226. Disability Rights Law (3)
Discussion—3 hours. Examines disability law and theory. Devoted to the Americans with Disabilities Act (particularly Titles I, II, and III) as it applies to employment, education, public accommodations, and government services and programs.
(change in existing course—eff. fall 17)

226ET. Mental Disability Law (3)
Lecture/discussion—3 hours. Students will examine the civil and constitutional bases of mental disability law, as well as its history, and explore the role of mental disability in the policing and criminal trial process.
(change in existing course—eff. spring 17)

227C. Topics in California Criminal Practice (2)
Seminar. Advanced criminal law and procedure class aimed at students planning to practice criminal law in California, either as an extern or summer clerk, or after graduation.
(new course—eff. fall 17)

227CT. Topics in California Criminal Practice (2)
(cancelled course—eff. fall 17)

228. Startups and Venture Capital (2)
Lecture/discussion. Prerequisite: course 215; prerequisite will not be waived, do not register for the course unless you have completed course 215. Limited enrollment. Introduction to the various legal and business considerations involved in forming and operating an emerging growth business.
(change in existing course—eff. fall 17)

228A. Mergers and Acquisitions Law (3)
Discussion—3 hours. Prerequisite: course 215. Practical approach to mergers and acquisitions, with an in-depth look at the planning, negotiation, documentation and completion of mergers and acquisitions.
(change in existing course—eff. fall 17)

230A. 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.
(new course—eff. spring 18)

235A. Community Lawyering (3)
Lecture. Study the need for community lawyering including the structural inequalities and privileges embedded in the legal system and society. Skills necessary for community lawyering as well as sites and models for practice will be examined.
(new course—eff. fall 17)

235B. Counseling and Legal Strategy in the Digital Age (2)
Lecture. Explores the complex challenges that entrepreneurs, businesses, and other organizations face when trying to address legal issues relating to technology. The seminar's approach is both practical and multidisciplinary, and it encourages students to explore the roles of a wide range of stakeholders (including lawyers, policy advocates and policymakers, businesspersons, and technologists) in developing legal and business strategies.
(new course—eff. fall 17)

236CT. Securities Enforcement (3)
Lecture—3 hours. Examines civil and criminal enforcement of securities laws by both the Securities and Exchange Commission and Justice Department. Surveys administrative rules and investigative procedures that govern the SEC and the substantive related crimes.
(new course—eff. spring 17)

239. Mediation (3)
Discussion/laboratory—3 hours. Restricted to 24 students. Interactive course focuses on attorney representation of clients in mediation.
(change in existing course—eff. fall 16)

240. Reforming Campaign Finance Law and the Initiative Process (2)
Discussion—2 hours. Limited to 25 students. The recent election exposed many campaign finance and initiative issues. Focuses on reforms as well as the current law.
(change in existing course—eff. spring 17)

241. Voting Rights Seminar (2)
Seminar—2 hours. Seminar investigates the right to vote as a matter of constitutional and statutory law, with emphasis on the voting rights of racial and ethnic minorities.
(new course—eff. spring 17)

241T. Voting Rights Seminar (2)
(cancelled course—eff. spring 17)

243A. Secured Transactions (2)
Discussion—2 hours. Covers secured transactions (where a lender takes an interest in the debtor's property as "collateral," or security, for repayment of a loan) in personal property, such as auto loans and bank loans against business inventory.
(change in existing course—eff. fall 17)

243B. Bankruptcy (3)
Seminar. Introduction to essentials of U.S. law governing bankruptcy of consumers and businesses. The course will address bankruptcy under Chapter 7, Chapter 13, and Chapter 11.
(new course—eff. fall 17)

243BT. Introduction to Bankruptcy Law (2)
(cancelled course—eff. fall 17)

245. Corporate and White Collar Crime (2)
Discussion—2 hours. Covers the law of conspiracy, corporate criminal liability, mail and wire fraud, the Hobbs Act, RICO, money laundering, obstruction of justice, and other white collar crimes and their associated defenses.
(change in existing course—eff. fall 17)

245A. White Working Class and the Law (2)
Seminar—2 hours. Considers the social, cultural, economic, and legal situation of low-income and/or low-education whites in contemporary U.S. society.
(change in existing course—eff. fall 17)

247. Taxation of Partnerships and LLCs (3)
Lecture/discussion—3 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 17)

247A. International Aspects of U.S. Taxation (3)
Discussion—3 hours. Prerequisite: course 220; completion or current enrollment in a course covering the domestic taxation of corporations is suggested but not required; Corporate Tax can be concurrent. Examine the U.S. income tax laws and policies related to the taxation of foreign income of U.S. persons and U.S. income of foreign person.
(change in existing course—eff. fall 18)

248BT. Human Rights in the Former Soviet Union: Legal Tools for Repression and Redress: Part II (2)
(cancelled course—eff. fall 17)

248C. Business and Human Rights (2)
Seminar—2 hours. Explores the human rights responsibilities of businesses from legal, ethical, historical, and comparative perspectives. Equip students with the tools to be sensitive to human rights considerations as legal practitioners or in other fields of endeavor.
(new course—eff. spring 18)

248CA. United Nations Human Rights Practicum I (2-3)
Seminar—2 hours. Prerequisite: consent of instructor. Opportunity to work in support of the mandate of the United Nations Special Rapporteur in the field of cultural rights.
(new course—eff. fall 17)

248CB. United Nations Human Rights Practicum II (2-3)
Seminar—2 hours. Prerequisite: consent of instructor. Build on the knowledge of the workings of the United Nations human rights system they gained in Practicum I, and gain further advanced experience working with UN documents, with individual cases in the field and with thematic reports.
(new course—eff. fall 17)

248CT. United Nations Human Rights Practicum I (3)
(cancelled course—eff. fall 17)

248DT. United Nations Human Rights Practicum II (2-3)
(cancelled course—eff. fall 17)

250A. Aoki Legal Scholarship Seminar (3)
Seminar. For students participating in the Aoki Center for Race and Nation Studies' Immigration Law Journal. Research, and write a note on a topic related to immigration. Expectation is production of papers of publishable quality.
(new course—eff. fall 17)

250AT. Aoki Legal Scholarship Seminar (3)
(cancelled course—eff. fall 17)

250B. Writing Requirement Workshop (2)
Seminar—2 hours. Second- and third-year students produce a piece of academic writing that satisfies the King Hall writing requirement and is of publishable quality. Receive feedback both from the instructor and from one another in a workshop setting. (S/U grading only.) GE credit: WE.
(new course—eff. spring 18)

250BT. Writing Requirement Workshop (2)
(cancelled course—eff. spring 18)

251. Labor Law (2)
Discussion—2 hours. Survey of the legislative, administrative, and judicial regulation of labor relations under federal law. Historical development of labor law, the scope of national legislation, unions, strikes, picketing, and collective bargaining agreements.
(change in existing course—eff. spring 17)

253. Policy Advocacy (2)
Lecture. In-depth examination of the legislative process both within the California Legislature and from the advocates' perspective. Train in key policy advocacy skills by legislative leaders and social justice advocates.
(change in existing course—eff. spring 18)

253T. Policy Advocacy (2)
(cancelled course—eff. fall 17)

254A. Law and Rural Livelihoods Seminar (2)
Seminar—2 hours. Provides broad overview of law as it relates and applies to rural people and places.
(change in existing course—eff. spring 17)

255. Pension and Employee Benefits Law (3)
Discussion—3 hours. Prerequisite: course 220. Federal regulation and taxation of private pensions and employee benefits. This course will cover the Employee Retirement Income Security Act (ERISA) and Internal Revenue Code issues.
(change in existing course—eff. spring 17)

258. Professional Responsibility (3)
Discussion—3 hours. The ABA's Model Rules of Professional Conduct and the Code of Judicial Conduct, which are tested on the MPRE, and the

California Rules of Professional Conduct, which are tested on the California Bar Examination. Students who take Law 258A Legal Ethics and Corporate Practice are not eligible to enroll in this course. Students who take Law 258A Legal Ethics and Corporate Practice are not eligible to enroll in this course.

(change in existing course—eff. fall 17)

258A. Legal Ethics and Corporate Practice (3)
Lecture/discussion—3 hours. Focus on corporate practice to explore the ethical responsibilities of lawyers. Students who take Law 258 Professional Responsibility are not eligible to enroll in this course.

(change in existing course—eff. spring 17)

258BT. Mindfulness and Professional Identity (2)
Seminar—2 hours. Introduction to the practice of meditation and connect it with readings about the legal profession in three key areas.

(change in existing course—eff. fall 16)

262B. Regulated Industries (2)
Seminar. Examines regulation of business in sectors, traditionally described as "common carrier" and "utility" industries, where because of market failures normal competitive mechanism will not protect consumers from exercises of market power.

(new course—eff. fall 17)

262T. Regulated Industries (2)
(cancelled course—eff. fall 17)

263. Criminal Trial Skills (4)
Seminar. Trial advocacy course centered on client relationship building, preparation for trial, and courtroom practice.

(change in existing course—eff. fall 17)

263A. Trial Practice (3)
Discussion—2 hours; laboratory—1 hour. Prerequisite: course 219 (can be concurrent). Limited enrollment. Introduction to the preparation and trial of cases, featuring lectures, videotapes, demonstrations, assigned readings and forensic drills. Laboratory held on Tuesday, Wednesday, and Thursday evening.

(change in existing course—eff. fall 16)

263B. Advanced Trial Practice (2)
Discussion—2 hours. Prerequisite: course 219; course 263A. Class limited to 40 students. Trains students on the organization and presentation of a complex trial, including pretrial preparation, jury selection, strategy considerations, evidentiary issues, and effective handling of plaintiff and defense cases through verdict.

(change in existing course—eff. fall 16)

266A. Cyberlaw (3)
Lecture/discussion—3 hours. Emerging legal issues crucial to the conduct of business in cyberspace. Discussion of the evolution and current administration of the Internet and the World Wide Web.

(new course—eff. spring 17)

267. Civil Rights Law (2)
Discussion—2 hours. Civil remedies for civil rights violations under the primary United States civil rights statute. Specifically, covers actions for constitutional and statutory violations under 42 USC §1983, affirmative defenses, and abstention doctrines.

(change in existing course—eff. fall 17)

269. Basic Finance for Lawyers (3)
Discussion—3 hours. Prerequisite: students with a non-law basic finance course will not be admitted, except with consent of instructor. Basic techniques of analysis that are part of the core curriculum in a good business school. Gives background necessary for understanding and advising your clients and for understanding other business-related law school courses.

(change in existing course—eff. spring 17)

269B. Financial Regulation and Consumer Protection (3)
Lecture. Examines efforts to ensure a "fair" financial marketplace, focusing on the 2010 Dodd-Frank Act and its creation of the Consumer Financial Protection Bureau and regimes enacted to protect consumers.

(new course—eff. fall 17)

269E. Public Finance (2)
Seminar. Introduction to the basic concepts of public finance, the underlying law governing public finance: in particular state law, federal tax law and federal securities law.

(change in existing course—eff. fall 17)

270. International Business Transactions (2)
Lecture/discussion—2 hours. Select legal problems arising from international business transactions.

(change in existing course—eff. fall 17)

273BT. Special Education Law and Policy (2)
Lecture. Introduction to the law of special education including the Individuals with Disabilities in Education Act (IDEA), Section 504 of the Rehabilitation Act, and federal regulations governing special education law.

(new course—eff. fall 17)

274A. International Intellectual Property and Development (3)
Discussion—3 hours. Examines international trade law, national customs law, intermediary liability rules, claims for rights in traditional knowledge and genetic resources, protections for geographical indications, technology transfer, and intellectual property piracy.

(change in existing course—eff. fall 17)

274H. Theory and History of Intellectual Property (2)
Seminar. Seminar traces development of intellectual property law in the U.S. and Europe because it is not possible to understand the logic and shape of current Intellectual Property concepts outside of their messy history.

(new course—eff. fall 17)

274T. Theory and History of Intellectual Property (2)
(cancelled course—eff. fall 17)

275. Complex Litigation in a Civil Rights Context (2)
Discussion—2 hours. Study of the issues that frequently arise in large complex litigation involving multiple parties and multiple claims.

(change in existing course—eff. fall 17)

276. Juvenile Justice Process (2)
Lecture/discussion—2 hours. Legal and philosophical bases of a separate juvenile justice process for crimes committed by minors. The role of counsel at each phase of the process is examined.

(change in existing course—eff. spring 17)

277. Federal Indian Law (3)
Discussion—3 hours. Focuses on legal relations between Native American tribes and the federal and state governments.

(change in existing course—eff. fall 16)

277A. Tribal Justice (2)
Lecture. Examines the administration of justice within tribal governments and courts and the efforts of advocates to achieve justice for tribes through litigation, policy advocacy, public education, organizing, and inter-governmental collaboration.

(new course—eff. fall 17)

279. Legal Analysis (2)
Seminar—2 hours. Prerequisite: consent of instructor. Limited enrollment; for 2Ls only. Focuses on skills critical to law school success, and ultimately, bar exam success. (S/U grading only.)

(change in existing course—eff. spring 18)

280B. Problem Solving and Analysis (2)
Lecture. 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.)

(new course—eff. fall 17)

280BT. Problem Solving and Analysis (2)
(cancelled course—eff. fall 17)

281. State and Local Government Law (3)
Discussion—3 hours. Topics include: federalism, relations between states and localities, governmental liability, zoning, educational equity, and public finance. Readings will be drawn not only from case law and statues, but from history, theory and public policy.

(change in existing course—eff. fall 17)

282A. Renewable Energy Seminar (2)
Seminar. Provides a broad overview of renewable energy law and policy with a particular focus on the California policy context. Topics include renewable electricity, California's renewable portfolio standard, and project development.

(new course—eff. fall 17)

282AT. Renewable Energy Seminar (2)
(cancelled course—eff. fall 17)

283. Remedies (3)
Lecture/discussion—3 hours. Survey of modern American civil remedies law in both private and public law contexts. Topics include equitable remedies, equitable defenses, contempt power, injunctive relief, restitution, and money damages in torts and contracts.

(change in existing course—eff. fall 17)

285C. Food and Agricultural Law (2)
Discussion—2 hours. Introduction to agricultural law, focusing on legal principles and issues at the forefront of contemporary debates about agriculture in society.

(change in existing course—eff. fall 16)

285D. Farmworkers and the Law (2)
(cancelled course—eff. fall 17)

285E. Utility of Law School and Careers in the Law (1)
Discussion—1 hour. Despite improvements in the economy, some observers continue to question whether law school is a viable option for college graduates. Considers the controversy and expose students to the variety of careers in the legal profession. (S/U grading only.)

(new course—eff. fall 17)

285ET. Utility of Law School and Careers in the Law (1)
(cancelled course—eff. fall 17)

285F. Practice Ready Seminar (2)
Seminar. Includes a discussion and review of the role of the junior attorney within a law firm/legal department, professional goal-setting, strategies for effective communication and work within teams, delegation and resource management, organization and time management, an introduction to common junior-level assignments and how to complete them efficiently and effectively, building a professional network, and an introduction to business development, among other topics.

(new course—eff. fall 17)

285G. Environmental Law Seminar: Emerging Technologies and the Environment (2)
Seminar. 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.
(new course—eff. fall 17)

285T. Wine and the Law (2)
(cancelled course—eff. spring 18)

287. Public Land Law (2)
Discussion—2 hours. Legal aspects of federal land management, including the history of public land law, the scope of federal and state authority over the federal lands, and the allocation of public land resources among competing uses.
(change in existing course—eff. fall 17)

288B. Supreme Court Simulation Seminar (3)
Seminar—3 hours. Take on the role of Justices of, and advocates before, the Supreme Court of the United States.
(change in existing course—eff. fall 17)

290C. Information Privacy Law (2)
Seminar—2 hours. Prerequisite: Criminal Procedure strongly recommended. Examine several topics that arise in field of information privacy law, with a special emphasis on law enforcement access to this information.
(new course—eff. spring 18)

290CT. Information Privacy Law (2)
(cancelled course—eff. spring 18)

290T. International Trade Law (2)
Discussion—2 hours. Review existing landscape of trade regulation from the World Trade Organizations, to regional organizations such as NAFTA, ASEAN, and the European Union.
(change in existing course—eff. fall 17)

291T. International Arbitration and Investment Law (2)
Lecture. Covers international arbitration involving States, individuals, and corporations; including: the parties; the agreement to arbitrate; the arbitrators; the arbitral proceeding; and, the arbitral award.
(change in existing course—eff. fall 17)

292A. Advanced Topics in Immigration and Citizenship Law Seminar (2)
Lecture. Prerequisite: course 292; may be waived by the professor. Conducts a closer examination of various topics and subject matters that relate to immigration and citizenship law.
(new course—eff. fall 17)

292T. Advanced Topics in Immigration and Citizenship Law Seminar (2)
(cancelled course—eff. fall 17)

296D. Art Law (2)
Discussion—2 hours. Selected issues in Art Law, including meaning of art, how to represent artists, copyright, publicity, first amendment rights, censorship, street art, government regulation, art markets, international protection of art and cultural property; and more.
(change in existing course—eff. spring 17)

Professional

400E. Study Abroad—Comillas Pontifical University Madrid, Spain (12)
Independent study. Semester-away study abroad at the Comillas Pontifical University in Madrid, Spain. Enhance knowledge of international legal regimes and obtain a global legal educational experience. (S/U grading only)
(new course—eff. fall 17)

411A. Journal of International Law and Policy (1-2)
The UC Davis Journal of International Law and Policy publishes semi-annually and strives to contribute pertinent and interesting scholarly works to the field of international law. May be repeated for credit up to five times. Students are allowed to participate in the journal for more than one term. (S/U grading only.)
(change in existing course—eff. spring 17)

411B. Journal of Juvenile Law and Policy (1-2)
Independent study—1-2 hours. The Journal of Juvenile Law & Policy is a biannual publication of the UC Davis School of Law that addresses the unique concerns of youth in the American legal system. May be repeated for credit up to five times; students are allowed to participate in the journal for more than one term. (S/U grading only.)
(change in existing course—eff. spring 17)

411C. UC Davis Business Law Journal (1-2)
Independent study—1-2 hours. The UC Davis Business Law Journal is run by dedicated law students who are committed to providing current and valuable legal and business analysis. May be repeated for credit up to five times. Students are allowed to participate in the journal for more than one term. (S/U grading only.)
(change in existing course—eff. spring 17)

411D. Immigration and Nationality Law Review (1-2)
Independent study. Prerequisite: consent of instructor. The Immigration and Nationality Law Review (INLR) is in part a reprint journal and serves as an anthology of seminal articles in immigration, nationality, and citizenship law. INLR has republished a number of articles authored by King Hall faculty. INLR also creates space for student Notes. The INLR also hosts a symposium or other immigration-related project each year and publishes materials from that enterprise in the year's volume. May be repeated for credit up to five times; students are allowed to participate in the journal for more than one term.
(new course—eff. fall 17)

416. Law Review Writer (1-2)
Writing of a law review article under the editorial supervision of editors of the UC Davis Law Review. Office hours (including but not limited to Bluebooking and cite-checking) are required. 1 or 2 units. In the spring semester, credit is obtained only upon achieving status as a member of the UC Davis Law Review, which requires that the student has made substantial progress towards completing an editorship article. Credit is awarded only after certification by the editor in chief and approval of the faculty advisers. One unit of credit is earned the first semester. Two units are earned the second semester upon nomination and acceptance of nomination to the Editorial Board. One unit is earned second semester if only a membership draft and office hours are completed. May be repeated for credit. (S/U grading only.)
(change in existing course—eff. spring 17)

418. Environmental Law and Policy Journal (1-2)
Independent study. Environs is a biannual environmental law and policy journal that provides an open forum for the discussion of current environmental issues, particularly those pertaining to the state of California. May be repeated for credit up to five times. Students are allowed to participate in the journal for more than one term. (S/U grading only.)
(change in existing course—eff. spring 17)

445A. Aoki Water Justice Clinic (5)
Clinical activity. Prerequisite: consent of instructor. Aoki Water Justice Clinic trains students to use community lawyering and transactional legal tools to ensure that low-income, California communities receive safe, clean, and affordable drinking water.
(new course—eff. fall 17)

446A. UC Davis Capital Law Scholars Seminar (1)
Seminar —2 hours. May be required for students enrolled in Capital Law Scholars Externship. Covers issues related to lawyering in California's state capital, and help students maximize educational and professional experience in their externship placements.
(new course—eff. fall 16)

450. Environmental Law Externship (2-12)
Fieldwork—4-24 hours. Program is designed to provide students with hands-on lawyering experience in a legislative office, with a legislative committee, or with a government/nonprofit office engaged in legislative and policy work. (S/U grading only.)
(new course—eff. fall 16)

455B. Advanced Aoki Water Justice Clinic (3-5)
The Advanced Aoki Water Justice Clinic allows students to leverage their legal research and practical lawyering skills to advance policies that ensure that low-income, California communities receive safe, clean, and affordable drinking water.
(new course—eff. fall 17)

495. Instruction in Legal Research and Writing Skills (1-2)
Discussion—–2 hours. Prerequisite: consent of instructor. Participants assist in instructing the Legal Research and Writing programs for first-year students under the direction of the Legal Research and Writing instructors. (S/U grading only.)
(change in existing course—eff. spring 17)

Letters & Science, College of

New and changed courses in College of Letters & Science (LTS)

Lower Division

98. Directed Group Study (1-4)
Prerequisite: consent of instructor. Directed group study. May be repeated for credit. (P/NP grading only.) Offered irregularly.
(new course—eff. winter 17)

Upper Division

198. Directed Group Study (1-4)
Prerequisite: consent of instructor. Directed group study. May be repeated for credit. (P/NP grading only.) Offered irregularly.
(new course—eff. winter 17)

Linguistics

New and changed courses in Linguistics (LIN)

Lower Division

3. Language and the Body (4)
Lecture—2 hours; discussion—2 hours. Perspectives on the role of language in issues about bodies. Language-related disabilities. Social implications of language use in discussing body-related conditions. GE credit: OL, SS.—*S. (S.)* Barreda, Ramanathan, Zellou
(new course—eff. winter 18)

20. Oral English for Undergraduate ESL Students (3)
(cancelled course—eff. fall 18)

27. Second Language Learning and Teaching (4)
(cancelled course—eff. spring 18)

28. Reading in Scientific and Technical Subjects for ESL Students (4)
(cancelled course—eff. winter 18)

Upper Division

103A. Linguistic Analysis I: Phonetics, Phonology, Morphology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 recommended. 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.—*F. (F.)* Barreda, Zellou

(change in existing course—eff. winter 17)

103B. Linguistic Analysis II: Morphology, Syntax, Semantics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 recommended. 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.—*W. (W.)* Aranovich, Farrell

(change in existing course—eff. winter 17)

106. English Grammar (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or course 1Y 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 18)

112. Phonetics (4)
Lecture—3 hours; term paper. Prerequisite: course 1 recommended. Detailed examination of articulatory and acoustic phonetics. GE credit: SciEng|SE.—*F. (F.)* Barreda, Zellou

(change in existing course—eff. winter 17)

121. Morphology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 103A, 103B recommended. Introduction to the analysis of word structure and the relation of word structure to the lexicon and other grammatical components. GE credit: ArtHum|AH.—*S. (S.)* Aranovich

(change in existing course—eff. winter 17)

127. Text Processing and Corpus Linguistics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 1, course 5, course 6, or Anthropology 4 recommended. 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.—*S. (S.)* Aranovich

(change in existing course—eff. winter 17)

131. Introduction to Syntactic Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 103B recommended. 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.—*F. (F.)* Aranovich, Farrell

(change in existing course—eff. winter 17)

141. Semantics (4)
Lecture—3 hours; term paper. Prerequisite: course 103B recommended. 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.—*F. (F.)* Ojeda

(change in existing course—eff. winter 17)

150. Languages of the World (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or Anthropology 4 recommended. Survey of the world's languages, their geographical distribution and classification, both genetic and typological. Illustrative descriptions of several major languages from different geographical areas; pidgins and creoles, lingua francas and other languages of widespread use. Not open for credit to students who have completed course 50. GE credit: ArtHum or SocSci, Wrt|AH or SS, WC.—*S. (S.)* Hawkins

(change in existing course—eff. winter 17)

151. Historical Linguistics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 103A recommended. 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, Farrell

(change in existing course—eff. winter 17)

152. Language Universals and Typology (4)
Lecture—3 hours; term paper. Prerequisite: course 103B recommended. 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. Offered in alternate years. GE credit: ArtHum, Wrt|AH.—*S. (S.)* Farrell, Hawkins

(change in existing course—eff. winter 17)

160. American Voices (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or course 1Y or Anthropology 4; or upper division standing recommended. Explores the forms of American English; traditional notions of regional dialects and increasingly important social dialects, reflecting age, class, gender, race, ethnicity, and sexual orientation. The influence of language attitudes on perception of dialect speakers; dialect in media, education, and literature. GE credit: SocSci, Div, Wrt|SS, WE.—*F, W. (F, W.)*

(change in existing course—eff. winter 18)

163. Language, Gender, and Society (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or Anthropology 4 recommended. Investigation of real and putative (stereotyped) gender-linked differences in language structure and usage, with a consideration of some social and psychological consequences of such differences. Focus is on English, but other languages are also discussed. GE credit: SocSci, Div, Wrt|ACGH, DD, SS, WE.—*W. (W.)* Timm, Menard-Warwick

(change in existing course—eff. winter 17)

166. The Spanish Language in the United States (4)
Lecture—3 hours; term paper. Prerequisite: course 1 or course 1Y or Spanish 111N; Spanish 23 or equivalent to Spanish 23 recommended. 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.—*S. (S.)*

(change in existing course—eff. spring 18)

171. Introduction to Psycholinguistics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or course 1Y; course 103A, course 103B recommended. Introduction to psychological issues relating to the implementation of language and linguistic structure during speech production and comprehension and to the implications of research in psychology and related fields for linguistic theory. GE credit: SocSci | SS.—*W. (W.)* Corina

(change in existing course—eff. spring 18)

173. Language Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or course 1Y; or consent of instructor; course 103A, course 103B recommended. 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.) Offered in alternate years. GE credit: SocSci|SS.—*S. (S.)* Uchikoshi

(change in existing course—eff. spring 18)

175. Biological Basis of Language (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 recommended; consent of instructor. Overview of issues in the field of neurolinguistics and techniques used to explore representation of language in the human brain. GE credit: SciEng|SE.—*F. (F.)* Corina

(change in existing course—eff. winter 17)

177. Computational Linguistics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: consent of instructor; course 1 recommended. 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.—*W. (W.)* Ojeda

(change in existing course—eff. winter 17)

180. Second Language Learning and Teaching (4)
Lecture/discussion—4 hours. Prerequisite: course 1 or course 1Y; or equivalent recommended. 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.—*F. (F.)* Menard-Warwick

(change in existing course—eff. spring 18)

192. Internship in Linguistics (1-12)
Internship—3-36 hours; two written reports. Prerequisite: course 1 or course 1Y; or equivalent course; consent of instructor. Internship applying linguistic-related skills to a fieldwork project in areas such as media, law, or industry, in approved organizations or institutions. Maximum of four units applicable toward major. (P/NP grading only.)

(change in existing course—eff. winter 18)

Graduate

253. Speech Perception (4)
Discussion—3 hours; extensive writing—2 hours. Investigation into how listeners map a continuous and variable acoustic signal to a linguistic interpretation. Phonetic context, variation, linguistic knowledge, and sociolinguistics as factors in perceiving speech. Offered in alternate years.—*(W.)* Zellou

(new course—eff. winter 17)

Management

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

Lower Division

11A. Elementary Accounting (4)
(cancelled course—eff. fall 17)

11B. Elementary Accounting (4)
(cancelled course—eff. fall 17)

12Y. Navigating Life's Financial Decisions (3)
Lecture—2 hours; web virtual lecture—1 hour. Survey of major life financial decisions (e.g., career choice, consumption v. saving, investments, mortgages, insurance) and how decision-making biases (e.g., overconfidence, present bias, limited attention) can lead to suboptimal choice. The course draws on research from economics, psychology, and sociology. GE credit: SS, QL.—*S. (S.)*

(change in existing course—eff. winter 16)

Upper Division

100. Introduction to Financial Accounting (3)
(cancelled course—eff. fall 17)

101. Sources and Uses of Accounting Information (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 11A; course 11B. Develops an understanding of the supply and demand of accounting information. Topics include the generation and processing of accounting information, the examination of accounting information by auditors, and the use of accounting information by capital markets and tax authorities.—*F. (F.)*

(new course—eff. fall 17)

103. Intermediate Financial Accounting I (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 11A; course 11B. Course begins to develop expertise in the accounting for assets and introduces students to the analysis of financial statements.—*F. (F.)*

(new course—eff. fall 17)

105. Intermediate Financial Accounting II (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 103. Course continues to develop expertise in the preparation of financial statements by studying the accounting for liabilities and stockholders' equity. Course also examines the accounting for contracts that can have significant effects on firms' financial statements.—*W. (W.)*

(new course—eff. fall 17)

107. Intermediate Financial Accounting III (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 105. Course finishes the Intermediate Financial Accounting series by examining in depth the accounting for contracts related to pensions and leases. Course teaches the preparation of the statement of cash flows and footnote disclosures.—*S. (S.)*

(new course—eff. spring 17)

120. Managing and Using Information Technology (4)
(cancelled course—eff. fall 17)

140. Marketing for the Technology-Based Enterprise (4)
(cancelled course—eff. fall 17)

150. Technology Management (4)
(cancelled course—eff. fall 17)

160. Financing New Business Ventures (4)
(cancelled course—eff. fall 17)

170. Managing Costs and Quality (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 11B; course 11A; or consent of instructor. Designing cost systems in high technology organizations and managing operations to maximize quality and minimize costs. Topics include activity based costing and management, managing quality and time to create value, ethical issues in cost assignment, and differential costing for decision. GE credit: SS.

(new course—eff. summer 18)

180. Supply Chain Planning and Management (4)
(cancelled course—eff. fall 17)

190. Special Topics in Accounting (4)
Seminar—11 hours. Prerequisite: course 11A; course 11B; course 101. Seminar in the theory and practice of advanced or emerging areas related to the practice of professional accountancy. Specific topics will vary according to the interests of the instructor or students—*S. (S.)*

(new course—eff. winter 17)

Graduate

200B. Managerial Accounting (3)
Lecture—3 hours. Prerequisite: Management 200A or Management Working Professional Bay Area 200A or Management Working Professional 200A. Information managers should know to be effective, including: product costing, motivating people, and differential analysis for decision making. Includes team projects and written and oral presentations.—*W, Su. (W, Su.)*

(change in existing course—eff. fall 17)

202B. Business, Government, and the International Economy (3)
Lecture—3 hours. Prerequisite: Management 202A or Management Working Professional Bay Area 202A or Management Working Professional 202A. Examines the influence of government and international factors on business. Topics include distribution of income, business cycles, inflation and interest rates, the federal debt, monetary policy and international trade and finance.—*W. (W.)* Taylor

(change in existing course—eff. fall 17)

203B. Forecasting and Managerial Research Methods (3)
Lecture—3 hours. Prerequisite: Management 203A or Management Working Professional Bay Area 203A or Management Working Professional 203A. Practical statistical methods for managerial decision making covers regression analysis, time series analysis and forecasting, design and analysis of experiments in managerial research and contingency table analysis. Application of these methods to marketing, finance, accounting, production, operations, and public policy.—*W. (W.)* Tsai

(change in existing course—eff. fall 17)

223. Power and Influence in Management (3)
Seminar—3 hours. Prerequisite: Management 201A or Management Working Professional Bay Area 201A or Management Working Professional 201A; consent of instructor. Investigation of the bases of power in organizations and the tactics used to translate power into influence. Topics include the control of resources (including information), social psychological processes (including commitment), the construction of meaning, and ethics.—*F. (F.)* Palmer

(change in existing course—eff. fall 17)

224. Managing People in High-Performance Organizations (3)
Lecture—3 hours. Prerequisite: Management 201A or Management Working Professional Bay Area 201A or Management Working Professional 201A. Restricted to students in the MBA program. Strategic approach to the management of people within organization. Analyze employment systems' fit with firms' environments and strategies. Explore consequences of choices firms make in managing people--decisions as to selection, performance evaluation, compensation, and other management policies and practices. Not open to students who have taken Management 224 or Management Working Professional 224.—*W, Su. (W, Su.)* Greta

(change in existing course—eff. fall 17)

234. Pricing (3)
Lecture/discussion—3 hours. Prerequisite: Management 202A or Management Working Professional Bay Area 202A or Management Working Professional 202A; Management 203B or Management Working Professional Bay Area 203B or Management Working Professional 203B; Management 204 or Management Working Professional Bay Area 204 or Management Working Professional 204. Restricted to students in the MBA Program. Combines lectures, cases and homework to teach students tools and skills necessary to analyze pricing situations, make pricing decisions, and implement them, in a systematic manner.—*S. (S.)*

(change in existing course—eff. fall 17)

239. Digital Marketing (3)
Lecture/discussion—3 hours. Prerequisite: Management 204 or Management Working Professional Bay Area 204 or Management Working Professional 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.—*S. (S.)* Peters

(change in existing course—eff. fall 17)

241. New Product Development (3)
Lecture/discussion—3 hours. Prerequisite: Management 204 or Management Working Professional Bay Area 204 or Management Working Professional 204. Open to graduate students in the Graduate School of Management. State-of-the-art concepts and methods to enhance the effectiveness of new product development activities. Focuses on the understanding of managerial issues and acquiring the ability to solve problems.—*W, Su. (W, Su.)* Aravindakshan

(change in existing course—eff. fall 17)

243. Customer Relationship Management (3)
Lecture/discussion—3 hours. Prerequisite: Management 204 or Management Working Professional Bay Area 204 or Management Working Professional 204. Restricted to MBA students only. Customer Relationship Management (CRM) is a management approach under which marketing activities are organized and measured around customers (rather than around brands.) This approach is appealing because customers, not brands, are those who make buying decisions.—*F. (F.)* Aravindakshan

(change in existing course—eff. fall 17)

244. New and Small Business Ventures (3)
Lecture—3 hours. Prerequisite: Management 204 or Management Working Professional Bay Area 204 or Management Working Professional 204. Student teams develop complete business plans for their own start-up ventures. Process includes: elevator pitch, business strategy, comprehensive bottoms-up financial projections, capital requirements, product differentiation, competitive, alliance, and go-to-market strategy development, investor presentation, and comprehensive written business plan.—*F, W. (F, W.)* Lowe

(change in existing course—eff. fall 17)

248. Marketing Strategies (3)
Lecture—3 hours. Prerequisite: Management 202A or Management Working Professional Bay Area 202A or Management Working Professional 202A; Management 204 or Management Working Professional Bay Area 204 or Management Working Professional 204. Examines process by which organizations develop strategic marketing plans. Includes definition of activities and products, marketing audits, appraising market opportunities, design of new activities and products, and organiz-

ing marketing planning function. Applications to problems in private and public sector marketing.—*F. (F.)* Rubel

(change in existing course—eff. fall 17)

249. Marketing Research (3)
Lecture—3 hours. Prerequisite: Management 202A or Management Working Professional Bay Area 202A or Management Working Professional 202A; Management 203A or Management Working Professional Bay Area 203A or Management Working Professional 203A; Management 204 or Management Working Professional Bay Area 204 or Management Working Professional 204. Course addresses the managerial issues and problems of systematically gathering and analyzing information for making private and public marketing decisions. Covers the cost and value of information, research design, information collection, measuring instruments, data analysis, and marketing research applications.—*W. (W.)* Bunch

(change in existing course—eff. fall 17)

250. Technology, Competition and Strategy (3)
Lecture—3 hours. Prerequisite: Management 202A or Management Working Professional Bay Area 202A or Management Working Professional 202A; Management 203A or Management Working Professional Bay Area 203A or Management Working Professional 203A. Restricted to students in the MBA program. Why is software typically so defective? Why do many firms in the IT industry give away their best products free? This course helps you analyze questions like these by modeling competition and strategy in the network, technology and information industries.—*W. (W.)* Bhargava

(change in existing course—eff. fall 17)

251. Management of Innovation (3)
Lecture—3 hours. Prerequisite: Management 201A or Management Working Professional Bay Area 201A or Management Working Professional 201A. Managing innovative enterprise in changing and uncertain environments. Covers technology forecasting and assessment, program selection and control, financial management, regulation, and ethics.—*F. (F.)* Hargadon

(change in existing course—eff. fall 17)

252. Managing for Operational Excellence (3)
Lecture—3 hours. Prerequisite: course 203A. 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.

(change in existing course—eff. spring 18)

260. Corporate Finance (3)
Lecture—3 hours. Prerequisite: Management 200A or Management Working Professional Bay Area 200A or Management Working Professional 200A; Management 202A or Management Working Professional Bay Area 202A or Management Working Professional 202A; Management 205 or Management Working Professional Bay Area 205 or Management Working Professional 205. Focuses on planning, acquiring, and managing a company's financial resources. Includes discussion of financial aspects of mergers and other forms of reorganization; analysis of investment, financial, and dividend policy; and theories of optimal capital structure.—*S. (S.)* Scherbina

(change in existing course—eff. fall 17)

261. Investment Analysis (3)
Lecture—3 hours. Prerequisite: Management 203A or Management Working Professional Bay Area 203A or Management Working Professional 203A; Management 205 or Management Working Professional Bay Area 205 or Management Working Professional 205. Examines asset pricing theories and relevant evidence, including the investment performance of stocks and bonds. Topics include the efficiency of markets, domestic and international portfolio diversification, factors influencing the value of stocks and other investments, and portfolio management and performance.—*F. (F.)* J. Chen

(change in existing course—eff. fall 17)

263. Derivative Securities (3)
Lecture/discussion—3 hours. Prerequisite: course 205 or Management Working Professional 205 or Management Working Professional Bay Area 205; course 203A or Management Working Professional 203A or Management Working Professional Bay Area 203A. Open to students enrolled in the MBA program. Behavior of options, futures, and other derivative securities markets and how public agencies, business and others use those markets. Trading strategies involving options, swaps, and financial futures contracts. Pricing of derivative securities, primarily by arbitrage methods.—*F. (F.)* Edelen

(change in existing course—eff. fall 17)

265. Venture Capital and the Finance of Innovation (3)
Lecture/discussion—3 hours. Prerequisite: Management Working Professional Bay Area 205 or Management Working Professional 205 or course 205. Restricted to students in the MBA program. Examines venture capital finance and the related practice of R&D finance. Goal is to apply finance tools and framework to the world of venture capital and financing of projects in high-growth industries.—*W. (W.)* Yasuda

(change in existing course—eff. fall 17)

266. International Finance (3)
Lecture—3 hours. Prerequisite: Management 205 or Management Working Professional Bay Area 205 or Management Working Professional 205; or the equivalent. Studies fixed and floating exchange-rate systems. Topics include determinants of a nation's balance of international payments; macroeconomic interdependence of nations under various exchange-rate regimes and its implications for domestic stabilization policies; and the international coordination of monetary and stabilization policies.—*Su. (Su.)*

(change in existing course—eff. fall 17)

270. Corporate Financial Reporting (3)
Lecture—3 hours. Prerequisite: Management 200A or Management Working Professional Bay Area 200A or Management Working Professional 200A. Analyzes and evaluates contemporary issues in financial reporting and develops implications of those issues for business decision makers, investment managers, and accounting policymakers.—*F. Su. (F. Su.)* Wong

(change in existing course—eff. fall 17)

271. Strategic Cost Management (3)
Laboratory/discussion—3 hours. Prerequisite: Management 202A or Management Working Professional Bay Area 202A or Management Working Professional 202A. Restricted to students in the MBA program. Theoretical frameworks and associated techniques for using organizational design and cost management to achieve a sustainable, profitable cost structure. Topics include: target costing, process design for low cost, total cost of ownership, cost of customers, implementing structural change, and incentives.—*W. (W.)* Anderson

(change in existing course—eff. fall 17)

272. Evaluation of Financial Information (3)
Lecture—3 hours. Prerequisite: Management 200A or Management Working Professional Bay Area 200A or Management Working Professional 200A. Studies how investors, creditors, others use accounting and other information in making rational investment, lending decisions. Emphasis is placed on the analysis of financial information in a variety of contexts. Where applicable, recent research in finance and economics is discussed.—*W. (W.)* Skaife

(change in existing course—eff. fall 17)

276. Real Estate, Finance and Development (3)
Lecture—3 hours. Prerequisite: Management 205 or Management Working Professional Bay Area 205 or Management Working Professional 205; Management 201A or Management Working Professional Bay Area 201A or Management Working Professional 201A. Focus on single family, attached, detached, multi-family, and light commercial development. Students will study factors which make up successful real estate developments. Course will consider financial aspects involved in land acquisition, land development, construction, and project lending.—*Su. (Su.)*

282. Supply Chain Management (3)
Lecture/discussion—3 hours. Prerequisite: Management 203A or Management Working Professional Bay Area 203A or Management Working Professional 203A. Restricted to students in the MBA program. Matching supply with demand is a primary challenge for a firm: excess supply is too costly, inadequate supply irritates customers. Matching supply to demand is easiest when a firm has a flexible supply process, but flexibility is generally expensive.—*S. (S.)* R. Chen

(change in existing course—eff. fall 17)

Professional

401. Crisis Management (1)
Discussion/laboratory —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.—W. (W.)

(change in existing course—eff. winter 17)

404. Organizational Change Management (1)
Laboratory/discussion—1 hour. Challenges in getting significant changes made in organizations. Learn Organization Change Management (OCM) techniques and discuss case situations where OCM techniques play a role.—*F. (F.)* Mathur

(change in existing course—eff. fall 16)

405. Business Literature (1)
Lecture/discussion—1 hour. Will examine Business history – historical trends that might influence contemporary business. Some argue that the recent collapse of our financial system might have been averted if business leaders had a better sense of history.—W. (W.)

(change in existing course—eff. winter 17)

406. Ethical Issues in Management (1)
Lecture/discussion—1 hour. Explores the philosophical foundation of ethical theory and its recent applications to business situations. Professional codes of ethics, such as those promulgated by educational, managerial, engineering, scientific, medical and legal professional societies, are presented.—*W. (W.)*

(change in existing course—eff. winter 17)

407. Storytelling for Leadership (1)
Lecture/discussion—1 hour. Internalize the fundamental principles behind stories that educate, influence, motivate, inspire, persuade and connect.—*Su. (Su.)* Charnsupharindr

(change in existing course—eff. fall 16)

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.—*W. (W.)*

(change in existing course—eff. winter 17)

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. (S.)*

(change in existing course—eff. winter 17)

412. International Marketing (1)
Lecture/discussion—1 hour. 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 your marketing mix.—*W. (W.)* Peters

(change in existing course—eff. fall 16)

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.—*W. (W.)* Rubel

(change in existing course—eff. winter 17)

416. Topics in Private Equity (1)
Lecture—1 hour. Prerequisite: Management 205 or Management Working Professional Bay Area 205 or Management Working Professional 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.—*F. (F.)* Yasuda

(change in existing course—eff. fall 17)

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. (S.)*

(change in existing course—eff. winter 17)

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.—*F, W, S, Su. (F, W, S, Su.)* Schmitz

(change in existing course—eff. winter 17)

419. Business Strategy Consulting Skills (1)
Lecture—5 hours. Restricted to students enrolled in the MBA program. Students will learn practical business consulting skills which will help apply strategy theories in the workplace. Students will learn and practice tools to frame and analyze problems, conduct research, communicate findings and navigate client relationships.—*F. (F.)* Bethlahmy

(change in existing course—eff. winter 17)

420. Advanced Optimization in a Python-based Modeling Language (1)
Web virtual lecture—1 hour. Prerequisite: Management Working Professional 252 or Management Working Professional Bay Area 252 or Management 252; Management Working Professional 206 or Management Working Professional Bay Area 206 or Management 206. Restricted to students enrolled in the MBA program. Covers advanced optimization modeling techniques and practical application of modern, scalable modeling language. Techniques will be developed using examples from production planning in a supply chain, but students may explore other areas of application of optimization for their final project.—*W. (W.)* Woodruff

(change in existing course—eff. winter 17)

421. Monte Carlo Simulation for Managerial Analysis (1)
Lecture—1 hour. Students create Excel-based simulation models across business domains, from finance to hypothesis testing and inventory management. By course-end, students are experts at recognizing this decision-making fallacy and fixing it. Offered irregularly.—*S. (S.)* Saigal

(change in existing course—eff. spring 17)

422. Behavioral Finance and Valuation (1)
Lecture—1 hour. Prerequisite: Management 260 or Management Working Professional 260 or Management Working Professional Bay Area 260; Management 261 or Management Working Professional 261 or Management Working Professional Bay Area 261. Restricted to students enrolled in the MBA program. Investor psychology and market frictions can cause asset prices to deviate from fundamental values, creating profit opportunities for sophisticated investors. The course will cover techniques of financial analysis with the goal of learning how to value assets and identify mispricing.—*S. (S.)* Scherbina

(change in existing course—eff. winter 17)

423. Leader as Coach: An Introduction to Coaching Skills for Leaders (1)
Lecture—1 hour. Restricted to students enrolled in the MBA program. Course introduces the fundamental coaching skills and coaching models that leaders can apply in everyday interactions with their team and colleagues in order to build trust, overcome challenges and help others discover their own full potential.—*S. (S.)* Charnsupharindr

(change in existing course—eff. winter 17)

425. Digital Marketing Techniques (1)
Lecture—1 hour. Course provides students with an introduction to digital marketing. The course introduces MBA students to the fundamental aspects and tools of online marketing communication, i.e., how organizations use digital channels to effectively communicate their value propositions to the target customers.—*S. (S.)* Blanchard

(change in existing course—eff. winter 17)

426. The Business of Healthcare (1)
Lecture—1 hour. Restricted to students enrolled in the MBA program (Business Administration—Working Professional, Business Administration—Bay Area, Business Administration—Full-Time). Course is intended to provide students with an overall understanding of the unique business aspects of the healthcare industry.—*S. (S.)*

(change in existing course—eff. winter 17)

427. Implementing International Strategy (1)
Lecture—1 hour. Restricted to students enrolled in the MBA program (Business Administration—Working Professional, Business Administration—Bay Area, Business Administration—Full-Time). Course looks at the pitfalls of implementing international strategies, and suggest several accessible, yet powerful frameworks to help international managers implement strategies successfully and completely.—*S. (S.)* Katzenstein

(change in existing course—eff. winter 17)

431. Project Management (1)
Lecture—10 hours. Open to students enrolled in the MBA program. Students learn project management; including project scope, project planning, milestones and project closing. Important themes include leadership, team dynamics, storytelling/creating a narrative, communication, and conflict management. Offered in alternate years.—*F.* Goldberg

(new course—eff. fall 16)

432. Project Management with Applications in Healthcare (1)
Lecture—1 hour. Course will focus on the heart of healthcare administration and how project management can be applied as a key lever to increase efficiency, decrease costs and improve the patient experience. Offered irregularly.—*S. (S.)* Beckler

(new course—eff. spring 17)

440. Integrated Management Project (5)
Project—15 hours. Prerequisite: first-year core courses of MBA 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.—*W. (W.)* Dinunzio, Lowe

(change in existing course—eff. fall 16)

440C. Integrated Management Project Lead (1)
Project—3 hours. Integrated Management Project Team leader.—*W. (W.)* Dinunzio, Lowe

(new course—eff. fall 16)

Maternal and Child Nutrition

New and changed courses in Maternal and Child Nutrition (MCN)

Graduate

260. Nutrition During Pregnancy (6)
Lecture—5 hours; term paper. Prerequisite: acceptance into the Master of Advanced Studies in Maternal and Child Nutrition; other students by consent of instructor. Open to Graduate standing. Overview of the anatomical, physiological and biochemical changes that occur during pregnancy and early development. Discussion and evaluation of nutritional/lifestyle factors associated with pregnancy outcomes and nutrition programs/interventions for pregnant women. Offered in alternate years.—*F. (F.)* Keen

(new course—eff. fall 16)

261. Lactation and Infant Nutrition (6)
Lecture—5 hours; term paper. Prerequisite: course 260; graduate standing. Restricted to students enrolled in the MAS program; other graduate students by consent of instructor. Overview of the physiological and biochemical processes underlying human lactation and nutritional needs of both mother and infant. Development of skills in assessment, nutrition counseling, education and support of new mothers and their families. Offered in alternate years.—*W. (W.)* Dewey

(new course—eff. fall 16)

262. Child and Adolescent Nutrition (6)
Lecture—5 hours; term paper. Prerequisite: course 261; graduate standing. Restricted to students enrolled in the MAS program; other graduate students by consent of instructor. Relationships among nutrition, growth, and development during childhood and adolescence. Nutritional assessment for normal and high risk groups; psychological, social, and economic factors contributing to nutritional status. Nutritional needs and interventions for special groups, including obese children/adolescents, athletes, and eating disordered. Offered in alternate years.—*S. (S.)* Heinig

(new course—eff. fall 16)

263. Applied Research Methods in Maternal and Child Nutrition (4)
Lecture/discussion—4 hours. Prerequisite: graduate standing. Restricted to students enrolled in the MAS program; other graduate students by consent of instructor. Application of epidemiological principles to the study of maternal and child nutrition. Topics

include quantitative and qualitative study procedures, including study design, data collection, and related analytical techniques. Offered in alternate years.—*F.* Stewart

(new course—eff. winter 18)

264A. Current Topics in Maternal and Child Nutrition: Principles of Adult Education (2)
Seminar—2 hours. Prerequisite: graduate standing. Restricted to students enrolled in the MAS program; other graduate students by consent of instructor. Current scientific literature related to Maternal and Child Nutrition in adult education settings. Topics include methods and theories of adult education and critical thinking skills related to research evaluation. Offered in alternate years.—*(W.)* Heinig

(new course—eff. spring 17)

264B. Current Topics in Maternal and Child Nutrition: Epidemiology and Evidence-Based Practice (2)
Seminar—2 hours. Prerequisite: graduate standing. Restricted to students enrolled in the MAS program; other graduate students by consent of instructor. Current scientific literature related to Maternal and Child Nutrition. Topics include epidemiology, evidence-based practice, breastfeeding promotion, and nutritional assessment of populations. Offered in alternate years.—*(W.).* Heinig

(new course—eff. spring 17)

264C. Current Topics in Maternal and Child Nutrition: Public Policy Development and Implementation (2)
Seminar—2 hours. Prerequisite: graduate standing. Restricted to students enrolled in the MAS program; other graduate students by consent of instructor. Current scientific literature related to Maternal and Child Nutrition. Topics include nutrition surveillance and monitoring, as well as public policy development and implementation. Offered in alternate years.—*(S.)* Heinig

(new course—eff. fall 17)

Mathematics

New and changed courses in Mathematics (MAT)

Lower Division

16B. Short Calculus (3)
Lecture—3 hours. Prerequisite: course 16A C- or better or course 17A C- or better or course 21A C- or better or course 21AH C- or better. Integration; calculus for trigonometric, exponential, and logarithmic functions; applications. Not open for credit to students who have completed courses 17C, 21B, or 21C. Only 2 units of credit to students who have completed course 17B. GE credit: SciEng|QL, SE, SL.—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 17)

16C. Short Calculus (3)
Lecture—3 hours. Prerequisite: course 06B C- or better or course 17B C- or better or course 21B C- or better or course 21BH C- or better. Differential equations; partial derivatives; double integrals; applications; series. Not open for credit to students who have completed course 21C. Only 2 units of credit to students who have completed course 17C. GE credit: SciEng|QL, SE, SL.—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 17)

17B. Calculus for Biology and Medicine (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 16A C- or better or course 17A C- or better or course 21A C- or better or course 21AH C- or better. Introduction to integral calculus and elementary differential equations via applications to biology and medicine. Fundamental theorem of calculus, techniques of integration including integral tables and numerical methods, improper integrals, elementary first order differential equations, applications in biology and medicine. Not open for credit to students who have completed course 16C, 21B, or 21C; only 2 units of credit for students who have completed course 16B. GE credit: SciEng|QL, SE, SL.—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 17)

21B. Calculus (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 21A or 21AH with C- or above; or 17A with B or above. Definition of definite integral, fundamental theorem of calculus, techniques of integration. Application to area, volume, arc length, average of a function, improper integral, surface of revolution. Only 2 units of credit to students who have completed course 16B, 16C, 17B, or 17C. GE credit: SciEng|QL, SE, SL.—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 17)

21C. Calculus (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 16C, 17C, 21B, or 21BH with C- or above; or 17B with grade of B or above. Sequences, series, tests for convergence, Taylor expansions. Vector algebra, vector calculus, scalar and vector fields. Partial derivatives, total differentials. Applications to maximum and minimum problems in two or more variables. Applications to physical systems. GE credit: SciEng|QL, SE.—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 17)

21D. Vector Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 21C or 21CH with C- or above; or 17C with B or above. 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.—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 17)

22A. Linear Algebra (3)
Lecture—3 hours. Prerequisite: course 16C C- or better or course 17C C- or better or course 21C C- or better or course 21CH C- or better; Engineering 6 or Mechanical Engineering 5 or Chemical and Materials Science Engineering 60 or course 22AL (can be concurrent). Matrices and linear transformations, determinants, eigenvalues, eigenvectors, diagonalization, factorization. GE credit: QL, SE.

(change in existing course—eff. summer 18)

22AL. Linear Algebra Computer Laboratory (1)
Laboratory—3 hours. Prerequisite: course 16C or course 17C or course 21C or course 21CH. Introduction to Matlab and its use in linear algebra. (P/NP grading only.) GE credit: QL, SE.—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 17)

25. Advanced Calculus (4)
Lecture/discussion—4 hours. Prerequisite: course 21C C- or better or course 21CH C- or better. 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.—*F, W, S. (F, W, S.)*

(change in existing course—eff. spring 17)

67. Modern Linear Algebra (4)
Lecture/discussion—4 hours. Prerequisite: course 21C C- or better or course 21CH C- or better. Rigorous treatment of linear algebra; topics include vector spaces, bases and dimensions, orthogonal projections, eigenvalues and eigenvectors, similarity transformations, singular value decomposition and positive definiteness. Only one unit of credit to students who have completed course 22A. Only one unit of credit to students who have completed course 22A. GE credit: SciEng|SE.—*F, W. (F, W.)*

(change in existing course—eff. winter 17)

Upper Division

111. History of Mathematics (4)
Lecture—3 hours; term paper or discussion. Prerequisite: course 25 or course 127A or course 67 or course 108 or course 114 or course 115A or course 141 or course 145; eight units of upper division Mathematics. History of mathematics from ancient times through the development of calculus. Mathematics from Arab, Hindu, Chinese and other cultures. Selected topics from the history of modern mathematics. GE credit: SE.

(change in existing course—eff. fall 18)

116. Differential Geometry (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 21D; course 22B; course 22A or course 67. Vector analysis, curves, and surfaces in three dimensions. Offered in alternate years. GE credit: SciEng|SE.—*(S.)*

(change in existing course—eff. winter 17)

125B. Real Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 125A; course 67 or (course 22A, course 108). 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.—*W, S. (W, S.)*

(change in existing course—eff. winter 17)

127A. Real Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 21C or course 21CH; course 67 or course 22A and course 108. Real numbers, sequences, series, and continuous functions.—*F, W. (F, W.)*

(new course—eff. fall 17)

127B. Real Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 127A. Derivatives, integrals, sequences of functions, and power series.—*W, S. (W, S.)*

(new course—eff. fall 17)

127C. Real Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 127B. Metric spaces and multi-variable calculus.—*F, S. (F, S.)*

(new course—eff. fall 17)

135A. Probability (4)
Lecture/discussion—4 hours. Prerequisite: course 21C; course 108 or course 25. 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 | SE.—*F, W, S. (F, W, S.)*

(change in existing course—eff. spring 18)

141. Euclidean Geometry (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 21B; course 22A or course 67. 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.—*W, S. (W, S.)*

(change in existing course—eff. winter 18)

146. Algebraic Combinatorics (4)
Lecture/discussion—4 hours. Prerequisite: course 22A and course 108, or course 67; course 145. Enumeration, Polya theory, generating functions, current topics in algebraic combinatorics. Not open for credit to students who have completed former course 149A. GE credit: SE.

(change in existing course—eff. fall 18)

160. Mathematics for Data Analytics and Decision Making (4)
Lecture—3 hours; project. Prerequisite: course 167. 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. GE credit: SciEng | SE.—*S. (S.)*

(change in existing course—eff. spring 18)

Medical Sciences

New and changed courses in Medical Sciences (MDS)

Professional

400. Summer Pre-Matriculation Program (2)
PE activity—7 hours; independent study—15 hours; lecture—14 hours. Prerequisite: consent of instructor. Two week program provides students from diverse backgrounds an early introduction to learning skills that will facilitate success in medical school. (P/F grading only.)—*Su. (Su.)*

(change in existing course—eff. summer 16)

411. Doctoring 1 (9)
Discussion—1 hour; clinical activity—1 hour; lecture—1 hour. Prerequisite: consent of instructor. Small group training in patient communication, interviewing techniques, physical exam and clinical identification. Outpatient clinical experiences and didactic presentations also included. (P/F grading only; deferred grading only, pending completion of sequence.)—*F, W, S, Su. (F, W, S, Su.)* Danielson

(new course—eff. summer 17)

411A. Doctoring 1 (4)
(cancelled course—eff. winter 18)

411B. Doctoring 1 (5)
Discussion—1.5 hours; clinical activity—1.5 hours; lecture/discussion—1.8 hours. Medical students only. Small, case-based learning groups with training in patient communication and interviewing techniques, clinical identification and problem solving, applications of social, psychological, cultural, bioethical, and basic science concepts to patient case scenarios, outpatient clinical experiences and didactic presentations. (Deferred grading only, pending completion of sequence.)—*F, S. (F, S.)* Eidson-Ton, Henderson, Onate

(new course—eff. winter 18)

415. Population Health and Evidence-Based Medicine (2)
Lecture—36 hours; discussion—12 hours. Prerequisite: consent of instructor. Focuses on the bedrock themes of public health: populations and prevention. (P/F grading only; deferred grading only, pending completion of sequence.)—*F, Su. (F, Su.)* Romano

(change in existing course—eff. summer 17)

445. Race and Health in the United States (3-6)
Discussion—4 hours. Interprofessional course facilitates the professional and personal developmental of medical students and other health professions students who think they would like to be leaders in securing equity in population health and work environments. (P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)* Murray-García

(change in existing course—eff. fall 17)

490A. Community Health Scholars Seminar A (1.5)
Lecture—1 hour. Longitudinal year-long course starting on July 1 and concluding at the end of Block 2. Focuses on immersing students in their respective communities to understand the strengths and challenges they face in relation to health. May be repeated for credit. (P/F grading only; deferred grading only, pending completion of sequence.)—*Su. (Su.)* Fancher

(change in existing course—eff. winter 18)

490B. Community Health Scholars Seminar B (0.5)
Lecture—1 hour. Longitudinal year-long course starting on July 1 and concluding at the end of Block 2. Focuses on immersing students in their respective communities to understand the strengths and challenges they face in relation to health. May be repeated for credit. (P/F grading only; deferred grading only, pending completion of sequence.)—*F. (F.)* Fancher

(change in existing course—eff. winter 18)

490C. Community Health Scholars Seminar C (0.5)
Lecture—1 hour. Longitudinal year-long course starting on July 1 and concluding at the end of Block 2. Focuses on immersing students in their respective communities to understand the strengths and challenges they face in relation to health. May be repeated for credit. (P/F grading only; deferred grading only, pending completion of sequence.)—*W. (W.)* Fancher

(change in existing course—eff. winter 18)

490D. Community Health Scholars Seminar D (1)
Lecture—1 hour. Longitudinal year-long course starting on July 1 and concluding at the end of Block 2. Focuses on immersing students in their respective communities to understand the strengths and challenges they face in relation to health. May be repeated for credit. (P/F grading only; deferred grading only, pending completion of sequence.)—*S. (S.)* Fancher

(change in existing course—eff. winter 18)

Medicine: Anesthesiology and Pain Medicine

New and changed courses in Anesthesiology and Pain Medicine (ANE)

Professional

435. Primary Care Multidisciplinary Pain Management (3)
Clinical activity—80 hours. Rotation will give 3rd year primary-care bound students an overview of the scope of Pain Medicine. May be repeated for credit. (H/P/F grading only.)—*F, W, S. (F, W, S.)* Sheth

(new course—eff. fall 16)

455. Externship in Anesthesiology (3-6)
Clinical Activity. Prerequisite: consent of instructor. Away clinical rotation in Anesthesiology or Pain Medicine. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(new course—eff. summer 17)

462. Perioperative Management of the Obstetric Patient (3-6)
Variable—2 hours. Prerequisite: consent of instructor. Perioperative Management of Obstetric Patient advanced clinical clerkship will offer the medical student the chance to understand and be able to apply the principles of basic science into major improvements in obstetric anesthesia patient care. May be repeated for credit. (H/P/F grading only.)

(change in existing course—eff. spring 18)

464. Multidisciplinary Approach to the Neurosurgical Patient (3-9)
Clinical Activity—40 hours. Prerequisite: consent of instructor. Participate in the perioperative care of patients undergoing neurosurgical procedures while under the supervision of anesthesia, neurology and neurosurgical ICU residents and attending physicians. May be repeated for credit. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)* Schloemerkemper, Tirado

(new course—eff. winter 17)

499. Anesthesiology Research (1-18)
Laboratory—12-54 hours. Prerequisite: third- or fourth-year medical students, advanced standing undergraduate and veterinary medicine students; or consent of instructor. Problems in clinical and/or laboratory research. May be repeated for credit. (H/P/F grading only for medical students.)

(change in existing course—eff. spring 18)

Medicine: Biological Chemistry

New and changed courses in Biological Chemistry (BCM)

Graduate

230. Practical NMR Spectroscopy and Imaging (1)
Lecture—1 hour. Prerequisite: Chemistry 107A; Chemistry 107B; Physics 9A-9C or Physics 5A-C; or consent of instructor. Basic theory, experimental methods, and instrumentation of NMR. Enables students to understand NMR spectroscopy and imaging experiments. (S/U grading only.)—*F. (F.)*

(change in existing course—eff. winter 17)

Professional

499. Research (1-12)
Prerequisite: medical students with consent of instructor. Research with Department of Biological Chemistry. May be repeated for credit. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(change in existing course—eff. winter 18)

Medicine: Emergency Medicine

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

Lower Division

92C. Joan Viteri Memorial Clinic Preceptorship (1.5)
Clinical activity—3 hours; seminar—1 hour. Prerequisite: consent of instructor. Directed towards the undergraduate students at UC Davis that volunteer at the Joan Viteri Memorial Clinic (JVMC). May be repeated for credit. (P/NP grading only.)—Rose

(new course—eff. spring 17)

Graduate

299. Research (1-12)
Laboratory—3-36 hours. Prerequisite: consent of instructor. Directed research in the Department of Emergency Medicine. May be repeated for credit. (S/U grading only.)

(new course—eff. spring 17)

Professional

450. Ambulatory Elective in Emergency Medicine (3-18)
Restricted to MS4 students in good standing; externships/away rotations only. Credit will be given for approved non-AI Emergency Medicine courses at other institutions to which there is not an equal learning experience at UC Davis. May be repeated for credit up to two times. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)* Jones

(change in existing course—eff. fall 16)

455A. Focus on POCUS A (6)
Clinical activity—30 hours. Prerequisite: consent of instructor. Directed towards gaining a greater proficiency of point-of-care ultrasound. Particularly useful for those pursuing careers that use this modality heavily in clinical practice such as primary care, pediatrics, emergency medicine, critical care, physical medicine and rehabilitation, etc. (H/P/F grading only.)—*F, Su. (F, Su.)* Schick, Medeiros

(new course—eff. summer 17)

455B. Focus on POCUS B (6)
Clinical activity—30 hours. Prerequisite: consent of instructor. Directed towards gaining a greater proficiency of point-of-care ultrasound. Particularly useful for those pursuing careers that use this modality heavily in clinical practice such as primary care, pediatrics, emergency medicine, critical care, physical medicine and rehabilitation, etc. (H/P/F grading only.)—*W, S. (W, S.)* Schick, Medeiros

(new course—eff. summer 17)

465. Externship in Emergency Medicine (3-9)
Clinical activity—36 hours; lecture/discussion—4 hours. Prerequisite: satisfactory completion of Medicine, Surgery and Pediatrics. Students complete clinical shifts in the Emergency Department, functioning as Acting Intern. Treat a wide variety of patients and problems under the supervision of the EM Attending. Students are expected to take focused histories and present in clear, concise fashion. May be repeated for credit. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)* Jones

(change in existing course—eff. fall 17)

470. Pediatric Emergency Medicine Clerkship (3-6)
Clinical activity—36 hours; lecture/discussion—4 hours. Prerequisite: satisfactory completion of Medicine, Surgery, and Pediatrics. Restricted to fourth-year medical student in good standing only. See patients in the Pediatric area of the Emergency Department under the supervision of an Emergency Medicine Attending. Emphasis on recognition and management of the acutely ill pediatric patient and treatment of common pediatric complaints. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)* Vance

(change in existing course—eff. summer 17)

Medicine: Family and Community Medicine

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

Professional

405. The Healer's Art (1)
Lecture—0.6 hours; workshop—3 hours. Prerequisite: consent of instructor. Limited to first-year medical students. Learning to strengthen your humanity and remain open-hearted can make the difference between burnout and a fulfilling life. Learn tools for selfcare, healing, finding meaning, strengthening commitment and becoming a true physician. May be repeated for credit. (P/F grading only.)—*W. (W.)* Eidson-Ton

(change in existing course—eff. fall 16)

430FA. SJVP Longitudinal Family Medicine Clerkship 1 (1.5-6))
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: consent of instructor; approval by School of Medicine Committee on Student Progress. Longitudinal Family Medicine Clerkship runs concurrently with Internal Medicine, Pediatrics and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*S. (S.)* Eidson-Ton, Srinivasan

(change in existing course—eff. spring 17)

430FB. SJVP Longitudinal Family Medicine Clerkship (1.5-6)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: consent of instructor; approval by School of Medicine Committee on Student Progress. Longitudinal Family Medicine Clerkship runs concurrently with Internal Medicine, Pediatrics and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*F. (F.)* Eidson-Ton, Srinivasan

(change in existing course—eff. spring 17)

430FC. SJVP Longitudinal Family Medicine Clerkship (1.5-6)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: consent of instructor; approval by School of Medicine Committee on Student Progress. Longitudinal Family Medicine Clerkship runs concurrently with Internal Medicine, Pediatrics and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*W. (W.)* Eidson-Ton, Srinivasan

(change in existing course—eff. spring 17)

430FD. SJVP Longitudinal Medicine Clerkship (1.5-6)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: consent of instructor; approval by School of Medicine Committee on Student Progress. Longitudinal Family Medicine Clerkship runs concurrently with Internal Medicine, Pediatrics and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*S. (S.)* Eidson-Ton, Srinivasan

(change in existing course—eff. spring 17)

430FE. SJVP Longitudinal Primary Care Clerkship at UCSF Track 2 (4)
(cancelled course—eff. summer 17)

430FF. SJVP Longitudinal Primary Care Clerkship at UCSF Track 2 (4)
(cancelled course—eff. summer 17)

430K. ACE-PC Family Medicine Clerkship (6)
(cancelled course—eff. summer 17)

430KA. ACE-PC Family Medicine Clerkship A (1.5)
(cancelled course—eff. fall 17)

430KB. ACE-PC Family Medicine Clerkship B (1.5)
(cancelled course—eff. winter 18)

430KC. ACE-PC Family Medicine Clerkship C (1.5)
(cancelled course—eff. summer 17)

430KD. ACE-PC Family Medicine Clerkship D (1.5)
(cancelled course—eff. summer 17)

430R. Rural PRIME Family Medicine Longitudinal Clerkship (2)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Family Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only.)—*S. (S.)* Eidson-Ton, Srinivasan

(change in existing course—eff. spring 17)

430RA. Rural PRIME Family Medicine Longitudinal Clerkship (3)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: consent of instructor. Family Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*Su. (Su.)* Eidson-Ton

(new course—eff. spring 17)

430RB. Rural PRIME Family Medicine Longitudinal Clerkship (3)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: consent of instructor. Family Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*F. (F.)* Eidson-Ton

(new course—eff. spring 17)

430RC. Rural PRIME Family Medicine Longitudinal Clerkship (3)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: consent of instructor. Family Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*W. (W.)* Eidson-Ton

(new course—eff. spring 17)

430RD. Rural PRIME Family Medicine Longitudinal Clerkship (1)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: consent of instructor. Family Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*S. (S.)* Eidson-Ton

(new course—eff. spring 17)

431. Introduction to Primary Care Continuity Clinic (1)
Clinical activity—4 sessions; project—1 session. Prerequisite: completion of the Pre-Clinical Curriculum; consent of instructor. Longitudinal component of the third-year primary care curriculum. Student attends their clinic roughly 18 half-days over the course of the year, working one-on-one with a primary care preceptor. (H/P/F grading only.)—*S. (S.)* Eidson-Ton, Schwartz, Srinivasan

(change in existing course—eff. fall 16)

431KA. ACE-PC Continuity Clinic (6)
Clinical Activity—40 hours. Prerequisite: consent of instructor. Longitudinal clinic component of the 2nd year of the ACE-PC Program. Students start off with a 4 week immersion experience and then 12 additional half-days over the course of the year, working one-on-one with a primary care preceptor. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*S. (S.)* Eidson-Ton, Srinivasan

(new course—eff. spring 17)

431KB. ACE-PC Continuity Clinic (0.5)
Clinical Activity—2 hours. Prerequisite: consent of instructor. Longitudinal clinic component of the 2nd year of the ACE-PC Program. Students start off with a 4 week immersion experience and then 12 additional half-days over the course of the year, working one-on-one with a primary care preceptor. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*Su. (Su.)* Eidson-Ton, Srinivasan

(new course—eff. spring 17)

431KC. ACE-PC Continuity Clinic (0.5)
Clinical Activity—2 hours. Prerequisite: consent of instructor. Longitudinal clinic component of the 2nd year of the ACE-PC Program. Students start off with a 4 week immersion experience and then 12 additional half-days over the course of the year, working

one-on-one with a primary care preceptor. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*F. (F.)* Eidson-Ton, Srinivasan

(new course—eff. spring 17)

431KD. ACE-PC Continuity Clinic (0.5)
Clinical Activity—2 hours. Prerequisite: consent of instructor. Longitudinal clinic component of the 2nd year of the ACE-PC Program. Students start off with a 4 week immersion experience and then 12 additional half-days over the course of the year, working one-on-one with a primary care preceptor. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*W. (W.)* Eidson-Ton, Srinivasan

(new course—eff. spring 17)

Medicine: Human Physiology

New and changed courses in Human Physiology (HPH)

Upper Division

115. Cannabis and Cannabinoids in Physiology and Medicine (3)
Lecture—3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 100 or Neurobiology, Physiology, and Behavior 101 or Neurobiology, Physiology, and Behavior 110B; or consent of instructor. In-depth scientific analysis of cannabis and cannabinoids, topics include biochemical, physiological, behavioral, pharmacological, social and therapeutic aspects of cannabinoids, with emphasis on the physiological impacts on major organ systems in humans and animals, and the potential medicinal uses. GE credit: SciEng|SE, SL.—*S. (S.)* Lin

(change in existing course—eff. spring 17)

157. Advanced Physiology of Animal/Human Disease (3)
Lecture—1 hour; lecture/discussion—2 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101 B+ or better or Neurobiology, Physiology, and Behavior 110C B+ or better; consent of instructor. Limited to 35 students initially. Centers on fundamental mechanisms and pathophysiological basis for animal and human diseases. Course is case-based and uses animal and human diseases to help exemplify the physiological consequences of organ dysfunction. (Same course as Neurobiology, Physiology, and Behavior 157.)—*S. (S.)* Horwitz, Payne

(new course—eff. spring 17)

Graduate

440. Cannabis and Cannabinoids in Physiology and Medicine (3)
Lecture. Prerequisite: consent of instructor. Provides an in-depth scientific analysis of current knowledge on cannabis and cannabinoids pertaining to human physiology and potential medicinal uses. May be repeated for credit. (H/P/F grading only.)—*F, W, S. (F, W, S.)* Lin

(new course—eff. winter 18)

Medicine: Internal Medicine

New and changed courses in Internal Medicine (IMD)

Lower Division

90. Seminar in Medical Ethics (1)
Lecture—1 hour. Seminar Series covering the current topics in Medical Ethics. (P/NP grading only.)—*F. (F.)* Yarborough

(new course—eff. winter 17)

Graduate

290C. Controversies in Clinical Research (1)
(cancelled course—eff. summer 17)

Professional

430FA. SJVP Longitudinal Medicine Clerkship (1.5-6)
Clinical activity—45 hours. Prerequisite: consent of instructor; approval by School of Medicine Committee on Student Progress. Longitudinal Clerkship runs concurrently with Family Medicine, Pediatrics and Psychiatry for 32 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.)—*Su. (Su.)* Aronowitz, Johl

(change in existing course—eff. spring 17)

430FB. SJVP Longitudinal Medicine Clerkship (1.5-6)
Clinical activity—45 hours. Prerequisite: consent of instructor; approval by School of Medicine Committee on Student Progress. Longitudinal Clerkship runs concurrently with Family Medicine, Pediatrics and Psychiatry for 32 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.)—*F. (F.)* Aronowitz, Johl

(change in existing course—eff. spring 17)

430FC. SJVP Longitudinal Medicine Clerkship (1.5-6)
Clinical activity—45 hours. Prerequisite: consent of instructor; approval by School of Medicine Committee on Student Progress. Longitudinal Clerkship runs concurrently with Family Medicine, Pediatrics and Psychiatry for 32 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.)—*W. (W.)* Aronowitz, Johl

(change in existing course—eff. spring 17)

430FE. SJVP Longitudinal Medicine Clerkship at UCSF Track 2 (4)
(cancelled course—eff. summer 17)

430FF. SJVP Longitudinal Medicine Clerkship at UCSF Track 2 (4)
(cancelled course—eff. summer 17)

430R. Rural PRIME Internal Medicine Longitudinal Clerkship (2)
Clinical activity—45 hours. Prerequisite: consent of instructor. Internal Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only.)—*S. (S.)* Aronowitz

(change in existing course—eff. spring 17)

430RA. Rural PRIME Internal Medicine Longitudinal Clerkship (3)
Clinical activity—45 hours. Prerequisite: consent of instructor. Internal Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*Su. (Su.)* Aronowitz

(new course—eff. spring 17)

430RB. Rural PRIME Internal Medicine Longitudinal Clerkship (3)
Clinical activity—45 hours. Prerequisite: consent of instructor. Internal Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*F. (F.)* Aronowitz

(new course—eff. spring 17)

430RC. Rural PRIME Internal Medicine Longitudinal Clerkship (3)
Clinical activity—45 hours. Prerequisite: consent of instructor. Internal Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*W. (W.)* Aronowitz

(new course—eff. spring 17)

430RD. Rural PRIME Internal Medicine Longitudinal Clerkship (1)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: consent of instructor. Internal Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*S. (S.)* Aronowitz

(new course—eff. spring 17)

493. Introduction Interprofessionalism, Pain Management, and Palliative Care (6)
Clinical activity—24 hours; discussion—4 hours; independent study—2 hours. Prerequisite: consent of instructor. Learners will spend one week with the inpatient palliative care service, one week with the inpatient pain pharmacy service and two weeks with Snowline Hospice. (P/F grading only.)

(change in existing course—eff. winter 18)

Medicine: Internal Medicine—Infectious Diseases

New and changed courses in Internal Medicine—Infectious Diseases (IDI)

Professional

493. Correctional Medicine SSM—Evaluation of HIV and Hepatitis C Patients (6)
Clinical activity—30 hours; discussion—5 hours. Primary agenda focuses on the evaluation of treatment of HIV and Hepatitis C patients in the correctional environment. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(change in existing course—eff. fall 16)

Medicine: Internal Medicine—Nephrology

New and changed courses in Internal Medicine—Nephrology (NEP)

Professional

499. Research in Nephrology (3-18)
Prerequisite: consent of instructor; individual arrangement. Independent laboratory research on a specific problem related to biochemical or immunologic causes of renal disease and/or uremic disorders in humans or animals. May be repeated for credit. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(change in existing course—eff. fall 17)

Medicine: Internal Medicine—Pulmonary Medicine

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

Professional

499. Research (1-12)
Prerequisite: consent of instructor. Research opportunity in Pulmonary Medicine. May be repeated for credit. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(change in existing course—eff. fall 17)

Medicine: Neurology

New and changed courses in Neurology (NEU)

Professional

460. Externship in Neurology (3-6)
Clinical activity. Prerequisite: consent of instructor. Externship course for Neurology rotations not meeting the qualifications to be an Acting Internship. May be repeated for credit. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(new course—eff. summer 17)

462. Externship in Advanced Neurology (3-6)
Clinical activity. Prerequisite: consent of instructor. Away rotation in Neurology where coursework meets the standards to be counted as an Acting Internship. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(new course—eff. summer 17)

499. Research (1-12)
Laboratory—2-24 hours. Prerequisite: consent of instructor. Approved for graduate degree credit. Laboratory investigation on selected topics. May be repeated for credit. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(change in existing course—eff. fall 17)

Medicine: Neurosurgery

New and changed courses in Medicine: Neurosurgery (NSU)

Professional

464. Externship (3-9)
Clinical activity. Prerequisite: fourth-year medical student having completed a neurosurgical clerkship or consent of instructor. Clerkship in neurosurgery to be arranged at another institution with accredited residency program in neurosurgery under proper supervision. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(change in existing course—eff. summer 16)

Medicine: Obstetrics and Gynecology

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

Professional

430F. SJVP OBGYN Clerkship at UCSF (6-12)
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.)—*F, W, S, Su. (F, W, S, Su.)* Hou

(change in existing course—eff. spring 17)

430R. Rural PRIME OBGYN Longitudinal Clerkship (2)
Clinical activity—45 hours. Prerequisite: consent of instructor. Obstetrics and Gynecology Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only.)—*S. (S.)* Hou

(change in existing course—eff. spring 17)

430RA. Rural PRIME OBGYN Longitudinal Clerkship (3)
Clinical activity—45 hours. Prerequisite: consent of instructor. Obstetrics and Gynecology Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*Su. (Su.)* Hou

(new course—eff. spring 17)

430RB. Rural PRIME OBGYN Longitudinal Clerkship (3)
Clinical activity—45 hours. Prerequisite: consent of instructor. Obstetrics and Gynecology Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*F. (F.)* Hou

(new course—eff. spring 17)

430RC. Rural PRIME OBGYN Longitudinal Clerkship (3)
Clinical activity—45 hours. Prerequisite: consent of instructor. Obstetrics and Gynecology Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*W. (W.)* Hou

(new course—eff. spring 17)

430RD. Rural PRIME OBGYN Longitudinal Clerkship (1)
Clinical activity—45 hours. Prerequisite: consent of instructor. Obstetrics and Gynecology Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*S. (S.)* Hou

(new course—eff. spring 17)

Medicine: Ophthalmology

New and changed courses in Medicine: Ophthalmology (OPT)

Professional

499. Research in Ophthalmology (1-12)
Variable—3-36 hours. Prerequisite: medical students with consent of instructor. Individual research on selected topics in optics and visual physiology, cornea and external disease. May be repeated for credit. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(change in existing course—eff. fall 17)

Medicine: Otolaryngology

New and changed courses in Otolaryngology (OTO)

Professional

465. Away Acting Internship in Otolaryngology (3-6)
Clinical activity. Externship rotation for Acting Internships in Otolaryngology. May be repeated for credit. (H/P/F grading only.)

(new course—eff. spring 18)

499. Research (1-12)
Prerequisite: medical students with consent of instructor; open to graduate students. Approved for graduate degree credit. Participation in ongoing projects. May be repeated for credit. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(change in existing course—eff. fall 17)

Medicine: Pathology

New and changed courses in Medicine: Pathology (PMD)

Graduate

290C. Research Group Conferences (1)
Seminar—3 hours. Prerequisite: graduate level standing. Focused around the mechanisms of function of the central nervous system under normal and pathogenic conditions. Seminars lead by various speakers from UC Davis and other Institutions, both domestic and international. May be repeated for credit. (S/U grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(change in existing course—eff. fall 17)

296. Neurodevelopment Group Study (1-6)
Explore mechanisms that impact perinatal development of the cerebral cortex, and other cortical structures, under normal and pathological conditions.—*F, W, S, Su. (F, W, S, Su.)* Cerdeño, Noctor

(new course—eff. summer 17)

298. Advanced Group Study (1-5)
Prerequisite: consent of instructor. Group Study provides the opportunity for a faculty member to work with students in a focused manner.
(change in existing course—eff. summer 17)

Professional

499. Research (1-18)
Prerequisite: medical student with consent of instructor. Limited enrollment. Research in experimental, molecular, comparative, and applied pathology. May be repeated for credit. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)*
(change in existing course—eff. fall 17)

Medicine: Pediatrics

New and changed courses in Medicine: Pediatrics (PED)

Professional

430FA. SJVP Longitudinal Pediatrics Clerkship (1.5-6)
Clinical activity—40-60 hours. Prerequisite: consent of instructor. Longitudinal Pediatrics Clerkship runs concurrently with Internal Medicine, Family Medicine and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*Su. (Su.)* Plant
(new course—eff. spring 17)

430FB. SJVP Longitudinal Pediatrics Clerkship (1.5-6)
Clinical activity—40-60 hours. Prerequisite: consent of instructor. Longitudinal Pediatrics Clerkship runs concurrently with Internal Medicine, Family Medicine and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*F. (F.)* Plant
(new course—eff. spring 17)

430FC. SJVP Longitudinal Pediatrics Clerkship (1.5-6)
Clinical activity—40-60 hours. Prerequisite: consent of instructor. Longitudinal Pediatrics Clerkship runs concurrently with Internal Medicine, Family Medicine and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*W. (W.)* Plant
(new course—eff. spring 17)

430FD. SJVP Longitudinal Pediatrics Clerkship (1.5-6)
Clinical activity—40-60 hours. Prerequisite: consent of instructor. Longitudinal Pediatrics Clerkship runs concurrently with Internal Medicine, Family Medicine and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*S. (S.)* Plant
(new course—eff. spring 17)

430R. Rural PRIME Pediatrics Longitudinal Clerkship (2)
Clinical activity—45 hours. Prerequisite: consent of instructor. Pediatrics Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only.)—*S. (S.)* Plant
(new course—eff. spring 17)

430RA. Rural PRIME Pediatrics Longitudinal Clerkship (3)
Clinical activity—45 hours. Prerequisite: consent of instructor. Pediatrics Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*Su. (Su.)* Plant
(new course—eff. spring 17)

430RB. Rural PRIME Pediatrics Longitudinal Clerkship (3)
Clinical activity—45 hours. Prerequisite: consent of instructor. Pediatrics Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*F. (F.)* Plant
(new course—eff. spring 17)

430RC. Rural PRIME Pediatrics Longitudinal Clerkship (3)
Clinical activity—45 hours. Prerequisite: consent of instructor. Pediatrics Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*W. (W.)* Plant
(new course—eff. spring 17)

430RD. Rural PRIME Pediatrics Longitudinal Clerkship (1)
Clinical activity—45 hours. Prerequisite: consent of instructor. Pediatrics Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*S. (S.)* Plant
(new course—eff. spring 17)

430TA. TeachMS Longitudinal Pediatrics Clerkship (A) (4)
Clinical activity—45 hours. Prerequisite: 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. *(H/P/F grading only; deferred grading only, pending completion of sequence.)—F. (F.)* Butani, Plant
(new course—eff. fall 16)

430TB. TeachMS Longitudinal Pediatrics Clerkship (B) (6)
Clinical activity—45 hours. Prerequisite: 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. *(H/P/F grading only; deferred grading only, pending completion of sequence.)—W. (W.)* Butani, Plant
(new course—eff. winter 17)

430TC. TeachMS Longitudinal Pediatrics Clerkship (C) (6)
Clinical activity—45 hours. Prerequisite: 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. *(H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.)* Butani, Plant
(new course—eff. spring 17)

460A. Acting Internship: General Inpatient Pediatric Clerkship (3-18)
Clinical activity. Prerequisite: course 430 B or better; consent of instructor; letter of recommendation from Pediatrics faculty member. Limited enrollment. The Ward Acting Intern functions in a manner similar to that of a pediatric intern. The Acting Intern takes admissions in the regular sequence and is expected to take night call. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)* Kim
(change in existing course—eff. fall 16)

476. Acting Internship in Pediatric Intensive Care (6-18)
Clinical activity. Prerequisite: course 430 with grade of A or consent of instructor; letter of recommendation from Pediatrics faculty member. Limited enrollment. Evaluation and support of critically ill infants and children. In general, student expected to take night call every third night during rotation. May be repeated for credit. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)* Plant
(change in existing course—eff. fall 16)

499. Research Topics in Pediatrics (1-18)
Prerequisite: student in Medical School with consent of instructor. Individual research project in pediatric subspecialty areas (cardiology, endocrinology, hematology, metabolism, newborn physiology and others) may be arranged with faculty member. Independent research by student will be emphasized and long-term projects are possible. May be repeated for credit. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)*
(change in existing course—eff. fall 17)

Medicine: Pharmacology and Toxicology

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

Graduate

225. Gene and Cellular Therapies (3)
Lecture/discussion—3 hours. Gene therapy from basic concepts to clinical applications. Topics include the human genome and genetic variation, genetic diseases, methods to manipulate gene expression, viral and non-viral delivery vectors, history and progress of gene therapy, case studies, and ethical issues. (Same course as Genetics 225.)—*S. (S.)* Anderson
(change in existing course—eff. winter 17)

499. Directed Research for Medical Students (1-12)
Laboratory—3-36 hours. Prerequisite: consent of instructor. Directed research in pharmacology for medical students. May be repeated for credit. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)*
(change in existing course—eff. fall 17)

Medicine: Physical Medicine and Rehabilitation

New and changed courses in Medicine: Physical Medicine and Rehabilitation (PMR)

Professional

470. Away Acting Internship in Physical Medicine & Rehabilitation (3-6)
Clinical activity. Prerequisite: consent of instructor. AI Externship option for PM&R rotations at other institutions. May be repeated for credit. (H/P/F grading only.)
(new course—eff. spring 18)

499. Research for Medical Students (1-12)
Prerequisite: consent of instructor. Research on any of a variety of topics in physical medicine and rehabilitation. May be repeated for credit. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)*
(change in existing course—eff. fall 17)

Medicine: Psychiatry

New and changed courses in Medicine: Psychiatry (PSY)

Professional

419. Combined Family Medicine-Psychiatry Clerkship (3-6)
Clinical activity—32 hours; discussion—8 hours. Students rotate through the county Primary Care Clinic under the supervision of dual-boarded Psychiatry and Family Practice Faculty to provide medical care of indigent and uninsured patients as well as primary care for psychiatry patients. May be repeated for credit. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)* Scher

(new course—eff. winter 18)

420. Acting Internship in Psychiatry (3-6)
Clinical activity—40 hours. Prerequisite: course 430 and/or consent of course coordinator. Acting intern position with close faculty supervision with emphasis on biological psychiatry, psychopharmacology and psychodynamic aspects appropriate to diagnostic and long-term patient management. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)* Liu

(change in existing course—eff. summer 16)

421. Combined Internal Medicine-Psychiatry Clerkship (3-6)
Clinical activity—32 hours; discussion—8 hours. Prerequisite: Psychiatry Clerkship or consent of instructor; medical students only. Students rotate through the county Primary Care Clinic under the supervision of dual-boarded Psychiatry and Internal Medicine Faculty to provide medical care of indigent and uninsured patients as well as primary care for psychiatry patients. May be repeated for credit. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)* Scher

(change in existing course—eff. winter 18)

430FA. SJVP Longitudinal Psychiatry Clerkship (1.5-6)
Clinical activity—45 hours. Prerequisite: consent of instructor; approval by School of Medicine Committee on Student Progress. Longitudinal Clerkship runs concurrently with Family Medicine, Pediatrics and Internal Medicine for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*Su. (Su.)* Scher

(change in existing course—eff. spring 17)

430FB. SJVP Longitudinal Psychiatry Clerkship (1.5-6)
Clinical activity—45 hours. Prerequisite: consent of instructor; approval by School of Medicine Committee on Student Progress. Longitudinal Clerkship runs concurrently with Family Medicine, Pediatrics and Internal Medicine for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*F. (F.)* Scher

(change in existing course—eff. spring 17)

430FC. SJVP Longitudinal Psychiatry Clerkship (1.5-6)
Clinical activity—45 hours. Prerequisite: consent of instructor; approval by School of Medicine Committee on Student Progress. Longitudinal Clerkship runs concurrently with Family Medicine, Pediatrics and Internal Medicine for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*W. (W.)* Scher

(change in existing course—eff. spring 17)

430FD. SJVP Longitudinal Psychiatry Clerkship (1.5-6)
Clinical activity—45 hours. Prerequisite: consent of instructor; approval by School of Medicine Committee on Student Progress. Longitudinal Clerkship runs concurrently with Family Medicine, Pediatrics and Internal Medicine for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*S. (S.)* Scher

(change in existing course—eff. spring 17)

430FE. SJVP Longitudinal Psychiatry Clerkship at UCSF Track 2 (4)
(cancelled course—eff. summer 17)

430FF. SJVP Longitudinal Psychiatry Clerkship at UCSF Track 2 (4)
(cancelled course—eff. summer 17)

430R. Rural PRIME Psychiatry Longitudinal Clerkship (2)
Clinical activity—45 hours. Prerequisite: consent of instructor. Psychiatry Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only.)—*S. (S.)* Scher

(new course—eff. spring 17)

430RA. Rural PRIME Psychiatry Longitudinal Clerkship (3)
Clinical activity—45 hours. Prerequisite: consent of instructor. Psychiatry Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*Su. (Su.)* Scher

(new course—eff. spring 17)

430RB. Rural PRIME Psychiatry Longitudinal Clerkship (3)
Clinical activity—45 hours. Prerequisite: consent of instructor. Psychiatry Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*F. (F.)* Scher

(new course—eff. spring 17)

430RC. Rural PRIME Psychiatry Longitudinal Clerkship (3)
Clinical activity—45 hours. Prerequisite: consent of instructor. Psychiatry Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*W. (W.)* Scher

(new course—eff. spring 17)

430RD. Rural PRIME Psychiatry Longitudinal Clerkship (1)
Clinical activity—45 hours. Prerequisite: consent of instructor. Psychiatry Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*S. (S.)* Scher

(new course—eff. spring 17)

499. Research (1-12)
Prerequisite: consent of instructor. Approved for graduate degree credit. Individual research on selected topics or research projects. May be repeated for credit. (H/P/F grading.)—*F, W, S, Su. (F, W, S, Su.)*

(change in existing course—eff. fall 17)

Medicine: Public Health Sciences

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

Upper Division

102. Introduction to Human Epidemiology (4)
Lecture—2 hours; discussion—2 hours. Practice of epidemiology as it relates to human populations. Content is fundamental to the Public Health minor and a required core course. GE credit: SE.—*S. (S.)* Garcia

(change in existing course—eff. spring 17)

105. Health Disparities in the U.S. (3)
(cancelled course—eff. spring 17)

113. Health Disparities in the U.S. (2)
Lecture—2 hours. Introduction to the principles and practice of health disparities research. GE credit: DD, SS.—*W. (W.)* Garcia

(new course—eff. winter 18)

175W. Health Policy and Health Politics (4)
(cancelled course—eff. fall 16)

190. Topics in Public Health (1)
Seminar—1 hour. Prerequisite: consent of instructor. Seminar on key issues and current topics in public health. May be repeated for credit. (P/NP grading only.)—*F, W, S. (F, W, S.)*

(new course—eff. fall 16)

Graduate

202. Public Health Issues in California's Central Valley (3)
Lecture—3 hours. Prerequisite: consent of instructor. Public health issues in California's Central Valley, including the influences of migration, racial and ethnic diversity, the agricultural industry, environmental exposures, and rurality.

(change in existing course—eff. spring 18)

205. Health Disparities in the U.S. (2)
(cancelled course—eff. spring 17)

205AY. Epidemiology for Health Professionals (4)
Lecture—2 hours; web virtual lecture—2 hours. Prerequisite: consent of instructor. Basic epidemiologic concepts and approaches to epidemiologic research, with examples from human medicine, including outbreak investigation, infectious disease epidemiology, properties of tests.

(change in existing course—eff. fall 17)

208. Principles & Applications of Cancer Prevention & Control (2)
Lecture/discussion—2 hours. Prerequisite: consent of instructor. Principles and applications of cancer prevention and control from a public health perspective. (S/U grading only.)—Chen, Pollock

(new course—eff. spring 18)

211. Infectious Disease Epidemiology (3)
(cancelled course—eff. fall 16)

213. Health Disparities in the U.S. (2)
Lecture—2 hours. Restricted to upper division or graduate standing. Introduction to the principles and practice of health disparities research.—*W. (W.)* Garcia

(new course—eff. winter 18)

233. Persuasive Technologies for Health (4)
Lecture/discussion—3 hours; term paper. Theorizing, designing and evaluating ethical technology-based health communication interventions. Uses of social media, mobile communication apps, wearable devices, computer-generated tailored messages, educational games, and computational approaches in health promotion and healthcare delivery. (Same course as Communication 233.) Offered in alternate years.—*S.* Zhang

(change in existing course—eff. fall 17)

235. Health Communication Campaigns (4)
Lecture/discussion—3 hours; term paper. Prerequisite: consent of instructor. Restricted to graduate students. Principles of health communication campaign planning, implementation and evaluation. Strategies for changing health behaviors, shaping policy, and improving healthcare organizations' relations with stakeholders. (Same course as Communication 235.) Offered in alternate years.—*W.* Hether

(new course—eff. fall 17)

244. Introduction to Medical Statistics (4)
Lecture 4 hours. Introduction to statistical methods and software in clinical, laboratory and population medicine. Graphical and tabular presentation of data, probability, binomial, Poisson, normal, t-, F-, and Chi-square distributions, elementary nonparametric methods, simple linear regression and correlation, life tables. Only one unit of credit for students who have completed Statistics 100 or Preventive Veterinary Medicine 402. (Same course as Clinical Research 244.)—*Su. (Su.)* Yang

(change in existing course—eff. winter 17)

277. Net Benefit Regression (3)
Lecture/discussion—2 hours. Prerequisite: Statistics 100 or course 244 or Preventive Veterinary Medicine 202; or consent of instructor; graduate student standing. Open to graduate students only. Uses regression methods for cost-effectiveness analysis. Focus on methods that create and explain economic information in person-level data.— Hoch

(new course—eff. fall 17)

280. Introduction to SAS Programming (3)
Lecture—2 hours; discussion/laboratory—1 hour. Prerequisite: introductory statistics course (e.g., Preventive Veterinary Medicine 402, Statistics 102). Introduction to SAS, an integrated software system for data retrieval and management, data manipulation and programming. (Same course as Epidemiology (Graduate Group) 280.)—Qi

(new course—eff. fall 16)

290. Topics in Public Health (1)
Seminar—1 hour. Prerequisite: consent of instructor. Open to students in Master of Public Health program. Key issues and current topics in public health. Course begins in August SSII. Students must enroll in August, then Fall and Winter. The course is a series but grades and units are given at end of each quarter. May be repeated for credit up to ten times. (S/U grading only.)—*F, W, S, Su. (F, W, S, Su.)* Kass, McCurdy

(change in existing course—eff. winter 17)

291. Public Health Sciences Doctoral Seminar (1)
Seminar—3 hours. Prerequisite: consent of instructor. Seminar to explore research on translational science and rural health; includes presentations of student research in progress. May be repeated for credit up to six times when topic differs; with consent of instructor, etc.—*F, W, S. (F, W, S.)*

(new course—eff. fall 17)

292A. Public Health Translational Science Rotation (1-7)
Prerequisite: Ph.D. student in Public Health Sciences or consent of instructor. Public Health Translational Science Rotation for Ph.D. students in Public Health Sciences. May be repeated for credit up to eight units with consent of instructor. (S/U grading only.)—*F, W, S. (F, W, S.)*

(new course—eff. fall 17)

292B. Public Health Translational Science Rotation (1-7)
Prerequisite: Ph.D. student in Public Health Sciences or consent of instructor. Open to Ph.D. students in Public Health Sciences. Public Health Translational Science Rotation for Ph.D. students in Public Health Sciences. May be repeated for credit up to eight units with consent of instructor. (S/U grading only.)—*F, W, S. (F, W, S.)*

(new course—eff. winter 18)

Professional

499. Research in Public Health Sciences (1-9)
Prerequisite: medical students with consent of instructor. Work with faculty member in areas of research interest, including but not limited to public health, injury control, international health, health policy, occupational and environmental health, health promotion and wellness, women's health, and health demographics. May be repeated for credit. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(change in existing course—eff. fall 17)

Medicine: Radiology—Diagnostic

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

Professional

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. May be repeated for credit. (H/P/F grading only)—*F, W, S, Su. (F, W, S, Su.)* McGahan

(change in existing course—eff. summer 16)

499. Research in Diagnostic Radiology (1-12)
Prerequisite: consent of instructor. Approved for graduate degree credit. May be repeated for credit. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)* Coleman, Fragoso, Li, Mayadev, Monjazeb, Vaughan

(change in existing course—eff. fall 17)

Medicine: Radiology—Nuclear Medicine

New and changed courses in Medicine: Radiology—Nuclear Medicine (RNU)

Professional

430. Introduction to Clinical Radiology (3-6)
Prerequisite: consent of instructor. Introduces students to common radiology tests, including limitations and risks by using ACR Appropriateness Criteria and incorporate patient specific clinical data into ordering and interpreting appropriate imaging tests. (H/P/F grading only)—*F, W, S, Su. (F, W, S, Su.)* Aminololama-Shakeri

(change in existing course—eff. fall 17)

499. Research in Nuclear Medicine (1-12)
Prerequisite: consent of instructor. Research in Nuclear Medicine. May be repeated for credit. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(change in existing course—eff. fall 17)

Medicine: Surgery

New and changed courses in Medicine: Surgery (SUR)

Professional

430F. SJVP Surgery Clerkship at UCSF (6-12)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. General surgery clerkship includes GI, Burn, Oncology, Plastics, Vascular Cardiothoracic, consult, transplant and trauma. Clerkship assignments are at UCSF Fresno. Student involvement includes work-up and care of surgical patients. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)* Carr, Phan

(change in existing course—eff. winter 17)

430R. Rural PRIME Surgery Longitudinal Clerkship (2)
Clinical activity—45 hours. Prerequisite: consent of instructor. Surgery Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only.)—*S. (S.)* Phan

(new course—eff. spring 17)

430RA. Rural PRIME Surgery Longitudinal Clerkship (3)
Clinical activity—45 hours. Prerequisite: consent of instructor. Surgery Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*Su. (Su.)* Phan

(new course—eff. spring 17)

430RB. Rural PRIME Surgery Longitudinal Clerkship (3)
Clinical activity—45 hours. Prerequisite: consent of instructor. Surgery Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*F. (F.)* Phan

(new course—eff. spring 17)

430RC. Rural PRIME Surgery Longitudinal Clerkship (3)
Clinical activity—45 hours. Prerequisite: consent of instructor. Surgery Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*W. (W.)* Phan

(new course—eff. spring 17)

430RD. Rural PRIME Surgery Longitudinal Clerkship (1)
Clinical activity—45 hours. Prerequisite: consent of instructor. Surgery Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—*S. (S.)* Phan

(new course—eff. spring 17)

474. Colorectal Surgery (3-6)
Clinical activity—30-50 hours. Prerequisite: Consent of Instructor; fourth-year medical student. Students actively participate in clinic and the operating room on colon and rectal patients. This includes medical and surgical management. Assignments involve work up and care of the surgical patients. May be repeated for credit. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)* Farkas

(new course—eff. spring 18)

493. Clinically-Oriented Anatomy Special Study Module (6)
(cancelled course—eff. fall 16)

499. Laboratory Research (1-12)
Laboratory—3-36 hours. Prerequisite: consent of instructor; completion of second year of medical school. Laboratory research on surgically related problems. Participation in projects to include the fol-

lowing: burn, nutrition, oncology, transplant and others. May be repeated for credit. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(change in existing course—eff. fall 17)

Medicine: Urology

New and changed courses in Medicine: Urology (URO)

Professional

499. Research in Urology (1-12)
Prerequisite: medical or veterinary medical students with consent of instructor. Research in oncology, male infertility, urodynamics, neurogenic bladder. Unique opportunity to apply recent technologies (nuclear medicine resonance, flow cytometry, recombinant DNA) in investigation, diagnosis and treatment of GU cancer, infectious disease, male infertility and development of genitourinary bioprosthetics. May be repeated for credit. (H/P/F grading only.)—*F, W, S, Su. (F, W, S, Su.)* Ghosh, Kurzrock

(change in existing course—eff. winter 17)

Medieval Studies

New and changed courses in Medieval Studies (MST)

Lower Division

20A. Early Medieval Culture (5)
Lecture—3 hours; discussion—1 hour. Readings (in translation) in medieval culture, such as Codes of Justinian, Confessions of Saint Augustine, Beowulf, the Nibelungenlied, The Song of Roland, the Summa Theologica of Thomas Aquinas, the Chronicles of Froissart, Chaucer's Canterbury Tales, and Dante's Divine Comedy. Offered irregularly. GE credit: ArtHum, Wrt | AH, WC, WE.—*F. (F.)* Alving

(change in existing course—eff. fall 18)

20B. The Culture of the High Middle Ages (4)
Lecture—3 hours; discussion—1 hour. Great transformations that created the modern world: Constitutional Government, the Hundred Years War, the Black Death, and the Peasants Revolts, the Renaissance, Reformation and Counter-Reformation, and the Baroque. Offered irregularly. GE credit: ArtHum, Wrt | AH, WC, WE.

(change in existing course—eff. spring 18)

98F. Student Facilitated Course (1-4)
Prerequisite: consent of instructor. Student facilitated course intended primarily for lower division students. Offered irregularly. (P/NP grading only.)

(new course—eff. winter 17)

Upper Division

198F. Student Facilitated Course (1-4)
Prerequisite: consent of instructor. Student facilitated course intended primarily for upper division students. Offered irregularly. (P/NP grading only.)

(new course—eff. winter 17)

199FA. Student Facilitated Course Development (1-4)
Prerequisite: consent of instructor. Under the supervision of a faculty member, an undergraduate student plans and develops the course they will offer under 98F/198F. Offered irregularly. (P/NP grading only.)

(new course—eff. winter 17)

199FB. Student Facilitated Teaching (1-4)
Prerequisite: consent of instructor. Student facilitated. Under the supervision of a faculty member, an undergraduate student teaches a course under 98F/198F. Offered irregularly. (P/NP grading only.)

(new course—eff. winter 17)

Microbiology

New and changed courses in Microbiology (MIC)

Upper Division

172. Host-Parasite Interactions (3)
Lecture—3 hours. Prerequisite: course 102 or course 101 or course 104; Biological Sciences 101; Biological Sciences 102 or 105 strongly recommended. Exploration of host-parasite interactions at multiple levels, with an emphasis on global health and medically important human parasites. Offered in alternate years. GE credit: SE, SL.—*W. (W.)* Ralston

(new course—eff. fall 17)

Middle East/South Asia Studies

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

Upper Division

131B. Modern South Asia Cinema (4)
Lecture/discussion —3 hours; film viewing—3 hours. Prerequisite: upper-division standing or consent of instructor. South Asian cinema of last 100 years in the context of cultural, social, and political changes. South Asian history, Independence, Partition, urban life, class, migration, postcolonial identity, diaspora, gender, sexuality, religion, sport, performance, etc. (Same course as Anthropology 147 and Cinema & Technocultural Studies 146B) Offered in alternate years. GE credit: SocSci|AH, SS, VL, WC, WE.

(new course—eff. winter 17)

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Supervised internship on and off campus in the area of Middle East and South Asia Studies. May be repeated for up to 12 units of credit. (P/NP grading only.)

(cancelled course—eff. spring 18)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. May be repeated for credit. (P/NP grading only.)

(cancelled course—eff. spring 18)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. May be repeated for credit. (P/NP grading only.)

(cancelled course—eff. spring 18)

Molecular and Cellular Biology

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

Lower Division

23. Biography of Cancer: Past, Present and Future (3)
Lecture/discussion—3 hours. Historical account of the progression of cancer treatment, prevention, and human understanding of the biological basis of cancer. Past, present and future social implications of cancer treatment and prevention. GE credit: ACGH, SE or SS, SL, WE.

(new course—eff. spring 18)

Upper Division

120. Molecular Biology and Biochemistry Laboratory Associated Lecture (3)
Lecture—10 hours; laboratory/discussion—1 hour. Prerequisite: Biological Sciences 102; or consent of instructor. Pass One restricted to upper division Biochemistry & Molecular Biology majors; concurrent enrollment in MCB 120L required; on-time attendance for first lecture is mandatory. Introduction to laboratory methods and procedures employed in studying molecular biology and biochemical processes. Lecture component for course 120L. GE credit: SciEng|SE, SL.—*F, W, S, Su. (F, W, S, Su.)* Hilt, Lagarias, Morand

(new course—eff. winter 18)

120L. Molecular Biology and Biochemistry Laboratory (6)
Laboratory—10 hours. Prerequisite: Biological Sciences 102; or consent of instructor; must be taken concurrently with course 120. Pass One restricted to upper division Biochemistry & Molecular Biology majors; concurrent enrollment in MCB 120 required; on-time attendance for first lab is mandatory. Introduction to laboratory methods and procedures employed in studying molecular biology and biochemical processes. Designed for students who need experience in use of molecular biology and biochemical techniques as research and analytical tools. GE credit: SciEng|QL, SE, VL, WE.—*F, W, S, Su. (F, W, S, Su.)* Cheng, Hilt, Lagarias, Liu, Morand, Theg, Wilson

(change in existing course—eff. winter 18)

140. Cell Biology Laboratory Associated Lecture (3)
Lecture—2 hours; discussion/laboratory—1 hour. Prerequisite: Biological Sciences 104; or consent of instructor. Pass One restricted to upper division Cell Biology majors; concurrent enrollment in course 140L required; on-time attendance for first lecture is mandatory. Lectures illustrating the principles of cell biology with emphasis on light microscopy. Accompanies course 140L. GE credit: SciEng | OL, SE, SL, WE.—*W. (W.)* Carrasco Garcia, Kaplan, Morand

(new course—eff. winter 18)

160. Genetics Laboratory Associated Lecture (3)
Lecture—2 hours; discussion/laboratory—1 hour. Prerequisite: Biological Sciences 101; or consent of instructor. Pass One restricted to upper division Genetics and Genomics majors; concurrent enrollment in course 160L required; on-time attendance for first lecture is mandatory. Lecture instruction in the theoretical basis of laboratory techniques in transmission and molecular genetics, discussion of lab results and experiment interpretation. GE credit: SciEng | QL, SE, WE.—*F, W, S. (F, W, S.)* Ellefson-Crowder, Engebrecht, Harmer, Ori-McKenney, Rose, Sundaresan

(new course—eff. winter 18)

163. Developmental Genetics (3)
Lecture—3 hours. Prerequisite: course 121 (can be concurrent). Current aspects of developmental genetics. Historical background and current genetic approaches to the study of development of higher animals. GE credit: SciEng|SE.—*W. (W.)* Natzle, Rose

(change in existing course—eff. fall 17)

182. Principles of Genomics (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101. Fundamentals of genomics, including structural genomics, functional genomics, proteomics, and bioinformatics, focusing on the impact of these disciplines on research in the biological sciences. Social impacts of genomic research. GE credit: SciEng|SE.—*W. (W.)* Korf, Quon

(new course—eff. winter 17)

Graduate

256. Cell and Molecular Biology of Cancer (2)
(cancelled course—eff. spring 17)

263. Biotechnology Fundamentals and Application (2)
(cancelled course—eff. fall 17)

294. Current Progress in Biotechnology (1)
(cancelled course—eff. spring 18)

Music

New and changed courses in Music (MUS)

Lower Division

10. Introduction to Musical Literature (4)
Lecture—3 hours; discussion—1 hour. Introduction to composers and major styles of Western music. Lectures, listening sections, and selected readings. For non-majors. GE credit: ArtHum | AH, VL, WC.—*F, W, S. (F, W, S.)* Hess, Holoman, Levy, Pelo

(change in existing course—eff. spring 18)

17B. Intermediate Musicianship, Part 2 (2)
Lecture/laboratory—2 hours. Prerequisite: course 17A; course 7B (can be concurrent); course 7B required concurrently; completion of course 17A 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—*W. (W.)* Craig

(change in existing course—eff. winter 17)

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.—*F. (F.)* Bauer, Pelo, Rohde, San Martin

(change in existing course—eff. winter 17)

102. Tonal Counterpoint (4)
Lecture—3 hours; practice—1 hour. Prerequisite: course 6C; or consent of instructor. 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.—*F. (F.)* Bauer

(change in existing course—eff. winter 17)

105. History and Analysis of Jazz (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3A or course 10 or course 28; or consent of instructor. Jazz and the evolution of jazz styles in historical and cultural context. For non-majors. GE credit: ArtHum, Div, Wrt|ACGH, AH, DD, WE.—*F. (F.)* Bauer

(change in existing course—eff. winter 17)

106. History of Rock Music (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3A or course 10 or course 28; or consent of instructor. Rock and the evolution of rock styles in historical and cultural context. For non-majors. GE credit: ArtHum, Wrt|ACGH, AH, VL, WE.—*W. (W.)* Froh, Reynolds

(change in existing course—eff. winter 17)

107B. Handmade Electronic Music (4)
Lecture—5 hours; laboratory—1 hour. Prerequisite: course 107A; consent of instructor. Hacking, bending, and creating electronic circuits to make sound. Learning to read circuit diagrams, to build prototypes, and to solder components together. Repertoire study. Offered in alternate years. GE credit: ArtHum|AH.—*(W.*) Nichols

(change in existing course—eff. winter 18)

112A. Jazz Fundamentals (2)
Lecture/laboratory—6 hours. Prerequisite: course 3A C- or better; or consent of instructor. Concurrent enrollment with course 140 or course 146 required. Fundamentals of Jazz music theory, ear training, harmony and composition techniques. Designed to complement participation in Jazz Combo or Jazz Band. First course of a three course sequence. GE credit: ArtHum|AH.—*F. (F.*) Griffith, Manricks

(new course—eff. winter 17)

112B. Jazz Theory (2)
Lecture/laboratory—6 hours. Prerequisite: course 112A C- or better; or consent of instructor. Concurrent enrollment with course 140 or course 146 required. Intermediate level Jazz music theory, ear training, harmony, and composition techniques including improvisation. Designed to complement participation in Jazz Combo or Jazz Band. Second course of a sequence. GE credit: ArtHum|AH.—*W. (W.*) Griffith, Manricks

(new course—eff. winter 17)

112C. Jazz Composition (2)
Lecture—6 hours. Prerequisite: course 112B C- or better; consent of instructor. Concurrent enrollment in course 140 required. Jazz compositions and arranging in different styles using techniques of Jazz theory, harmony and improvisation. Third course of a sequence. GE credit: ArtHum|AH.—*S. (S.*) Griffith, Manricks

(new course—eff. winter 17)

123. Music as Culture (3)
Lecture/discussion—3 hours. Prerequisite: course 24C; or consent of instructor. Introduction to the study of music in cross-cultural perspective. Basic theories and frameworks of ethnomusicology; in-depth case studies of three musical traditions from around the world. Intended for music majors. Offered in alternate years. GE credit: ArtHum|AH, WC, WE.—*F. (F.)* Lee, Spiller

(change in existing course—eff. winter 17)

117. The Broadway Musical (4)
Lecture—3 hours; discussion—1 hour. Exploration of a variety of Broadway and film musicals from different time periods, and how musicals reflect and help create social reality, and the different aspects of the creative process as manifested through music, dance, scenery, and acting. Offered in alternate years. GE credit: AH, DD, VL.—*W.* Hess

(new course—eff. winter 18)

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 English or Spanish depending on instructor. Not open to students who taken Spanish 171S or Music 127S. May be repeated for credit up to one time when the topic differs. (Same course as Spanish 171.) Offered in alternate years. GE credit: ArtHum, Wrt|AH, VL, WC, WE.—*F. (F.)* Hess, Irwin, Ortiz

(change in existing course—eff. winter 18)

127S. 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 or English depending on instructor. Not open to students who have taken Spanish 171 or Music 127. May be repeated for credit up to one time when content differs. (Same course as Spanish 171S.) Offered in alternate years. GE credit: ArtHum, Wrt|AH, VL, WC, WE.—*F. (F.)* Irwin, Ortiz

(new course—eff. winter 18)

140. University Jazz Band (2)
Rehearsal—2 hours; practice—4 hours. Prerequisite: consent of instructor; admission by audition. Open to students in any major. rehearsal, study, and performance of jazz band music and full variety of jazz band style, including swing, be-bob, and contemporary jazz styles. May be repeated for credit. (P/NP grading only.)—*F, W, S. (F, W, S.)* Griffith

(change in existing course—eff. spring 17)

Native American Studies

New and changed courses in Native American Studies (NAS)

Lower Division

46. Orientation to Research in Native American Studies (4)
Lecture/discussion—3 hours; term paper. Prerequisite: Native American Studies major or minor, or consent of instructor. Limited enrollment. Introduces students to basic research resources pertinent to Native American subjects available in the region, including libraries, archives, museums, etc. Emphasis is upon learning to use documentary resources or other collections of data. Students will carry out individual projects. GE credit: SocSci, Div, Wrt.

(change in existing course—eff. fall 18)

Upper Division

109. Native American Language Spotlight (4)
Lecture—3 hours; discussion—1 hour. In-depth examination of the history, structure, and sociolinguistics of a particular Native American language or language family. Different language studied each time the course is offered. Oral proficiency component included in some years. May be repeated for credit. Offered in alternate years. GE credit: ArtHum, SocSci, Div, Wrt | ACGH, AH, SS, WC, WE.—Spence

(new course—eff. winter 18)

125. Performance and Culture Among Native Americans (4)
Lecture—3 hours; film viewing—3 hours. Prerequisite: 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. GE credit: ArtHum, SocSci | AH or SS, WC, WE.

(change in existing course—eff. spring 18)

133. Ethnohistory of Native People of Mexico and Central America (4)
Lecture/discussion—4 hours. Ethnohistorical development of pre-colonial, colonial, post-colonial Mexican and Central American indigenous people; the impact of economic and political factors on the process of cultural adaptation. Attention is given to the questions of nation-building, forced assimilation, indigenous resistance, organized political responses. GE credit: SocSci, Div|SS.

(change in existing course—eff. winter 17)

133A. Ethnoshistory of Native Peoples of Mexico and Central America to 1500 (4)
Lecture/discussion—4 hours; term paper. 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. Offered in alternate years. GE credit: ArtHum or SocSci, Div|AH or SS, VL, WC, WE.

(change in existing course—eff. winter 17)

133B. Ethnohistory of Native Peoples of Mexico and Central America 1500 to 2000 (4)
Lecture/discussion—4 hours; term paper. 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.

(change in existing course—eff. winter 17)

134. Race, Culture, and Nation (4)
Lecture/discussion—3 hours; term paper. Prerequisite: upper division standing or consent of instructor; courses 1 or courses 10 encouraged, but not required. Exploration of complexities of Native American racial, cultural and national identities and alliances. Study of tribal and federal citizenship, mixed descent and diasporic people(s), claims to resources, ethnic fraud and contemporary movements of cultural resurgence and political sovereignty and self-determination. GE credit: ACGH, DD, SS, WE.

(change in existing course—eff. fall 18)

Nematology

New and changed courses in Nematology (NEM)

Lower Division

150. Revising Scientific Prose (4)
Lecture—3 hours; term paper. Prerequisite: one course in English composition; understanding of English grammar and parts of speech; upper division standing in a science major; or consent of the instructor. Class size limited to 15 students. Principles of detailed revision; close analysis of writing styles in research papers, popular scientific articles, and other scientific reports; use of verb-based and noun-based writing styles. GE credit: Wrt.—*W.* (*W.*) Jaffee

(change in existing course—eff. spring 18)

Neurobiology, Physiology, and Behavior

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

Lower Division

18. Biological Science for Social Justice (3)
Lecture—3 hours. Broad survey of the many ways one can use the biological sciences to better the lives of others and break down barriers that have restricted social mobility. GE credit: SE, SS, DD, SL.—*S. (S.)* Calisi

(new course—eff. spring 18)

Upper Division

100. Neurobiology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 2A; course 9A, course 9B or course 7A, course 7B recommended. Brains and nervous systems, neurons and neural circuits. Coordination of movement. Development of nervous systems. Vision, hearing, and feature extraction by the central nervous system. The cell biology of learning and memory. Perception, cognition, and disorders of the brain. Not open for credit to students who have completed course 110B, 112, 160, 161 or 162, or Neuroscience 221 or 222. GE credit: SE, QL.—*F, W, S. (F, W, S.)* Carstens, Cheng, Miller, Sutter, Zito

(change in existing course—eff. spring 18)

100L. Neurobiology Laboratory (3)
Lecture—1 hour; laboratory—3 hours; extensive writing or discussion. Prerequisite: course 100 (can be taken concurrently) or course 110B (can be concurrent). 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.—*S. (S.)* Goldman

(change in existing course—eff. winter 17)

101. Systemic Physiology (5)
Lecture—5 hours. Prerequisite: Biological Sciences 1A or Biological Sciences 2A; Chemistry 2B; Physics 1B or Physics 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. Not open for credit to students who have completed course 110C. GE credit: SciEng|SE.—*F, W, S. (F, W, S.)* Bautista, Debello, Fuller, Furlow, Gomes, Ishida, Liets, Usrey, Weidner

(change in existing course—eff. winter 17)

101D. Systemic Physiology Discussion (1.5)
Discussion—1.5 hour. Prerequisite: course 101 (can be concurrent); consent of instructor. Discussion and problem solving related to fundamental principles of systemic physiology as presented in course 101. (P/NP grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(change in existing course—eff. spring 17)

101L. Systemic Physiology Laboratory (3)
Laboratory—3 hours; discussion—2 hours; term paper. Prerequisite: course 101 or course 110C.Selected experiments to illustrate functional characteristics of organ systems discussed in course 101.—*F, W, S. (F, W, S.)* Bautista, Liets

(change in existing course—eff. winter 17)

104L. Cellular Physiology/Neurobiology Laboratory (4)
Lecture—1 hour; laboratory—3 hours; discussion—1 hour; term paper or discussion. Prerequisite: course 101L; Biological Sciences 103 or Biological Sciences 105. Experiments in the physical and chemical processes of cells and tissues. Offered irregularly. GE credit: Wrt.—Liets

(change in existing course—eff. spring 18)

106. Experiments in Neurobiology, Physiology, and Behavior: Design and Execution (3)
Laboratory—7.5 hours; discussion—0.5 hours. Prerequisite: course 110A or course 100 or course 101 or course 102); course 199; and consent of instructor. Design and execution of experiments in neurobiology, physiology, and/or behavior. Students choose and design a project in consultation with the sponsoring faculty member. May be repeated one time for credit to complete the project, with consent of instructor. An additional repeat is permitted for a different project under the guidance of another faculty member. (P/NP grading only.) GE credit: OL, QL, VL, WE.—*F, W, S. (F, W, S.)* Rosenquist

(change in existing course—eff. winter 18)

108Y. Animal Behavior Laboratory (3)
Lecture—3 hours; web electronic discussion—12 hours. Hybrid course, consisting of limited in-person lectures and the rest laboratory exercises. The laboratory exercises will be online, and will require students to view and score videos of animal behavior in order to test behavioral hypotheses. GE credit: SL.—*Su. (Su.)* Hedrick

(new course—eff. summer 16)

109. Kinesiology - Analysis and Control of Human Movement (4)
Lecture—4 hours. Prerequisite: Physics 7A; Physics 7B; course 101 or course 110C recommended; Cell Biology and Human Anatomy 101 and Cell Biology and Human Anatomy 101L (same as Exercise Biology 106 and Exercise Biology 106L) or equivalent recommended. Functional anatomy, motor control, and biomechanics of human movement understood in the context of body structures, basic principles of physics, and functional characteristics of muscle. GE credit: SE.—*S. (S.)* Hawkins

(new course—eff. spring 18)

110. Computing, Data, & Law in the United States (4)
Lecture/discussion—3 hours; term paper. Introduction to the problems in American law and policy borne out of the creation and use of information technologies. Topics include intellectual property, corporate law, privacy, and emerging problems surrounding big data. GE: ACGH, SS, WE.—Con Díaz

(new course—eff. winter 18)

110A. Foundations 1: From Molecules to Individuals (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: Biological Sciences 2A, Biological Sciences 2B; Chemistry 2B or Chemistry 3A); course 7A and course 7B recommended; Biological Sciences 2C recommended. Pass One restricted to majors in Neurobiology, Physiology and Behavior. Major concepts in cell biology with special emphasis on connections between cell biology and behavior. Includes: cellular metabolism, cellular sensing and signaling, membrane structure-function, molecular switches, electrical and chemical signaling, endocrine signaling, cell cycle and differentiation, cytoskeleton, and integrative examples. Credit limited to 3 units for students who have taken Biological Sciences 104. GE credit: SciEng|SE.—*F, S. (F, S.)* Gomes, Hahn

(change in existing course—eff. winter 18)

110B. Foundations 2: Neurobiology (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 110A C- or better; Physics 7A and Physics 7B recommended. Open to declared NPB majors only. Core concepts of neurobiology including single-neuron biophysics, synapses and transmitters, neuronal development, motor systems, central pattern generation, neuronal circuits, intracellular signal transduction, sensory processing, multisensory integration, autonomic nervous system, neuromodulation, learning and memory, and higher cognition and

disease. Credit limited to 2 units for students who have taken course 100. GE credit: SciEng|SE.—*F, W. (F, W.)* Britten, Sutter

(change in existing course—eff. winter 17)

110C. Foundations 3: Physiology (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 110A C- or better; Physics 7A; Physics 7B and Physics 7C recommended. Open to declared NPB majors only. Focuses on the structure, function, and interactions of animal organ systems in homeostasis and reproduction, and the response to perturbations of homeostasis; neural and endocrine signaling; skeletal muscle and movement; cardiovascular and respiratory systems; renal, digestive, immune, and reproductive physiology. Credit limited to two units for students who have taken course 101. GE credit: SciEng|SE.—*W, S. (W, S.)* Furlow, Usrey

(change in existing course—eff. winter 18)

111C. Advanced Systemic Physiology Laboratory (3)
(cancelled course—eff. winter 17)

111L. Advanced Systemic Physiology Laboratory (4)
Lecture—1 hour; discussion—2 hours; laboratory—6 hours; term paper. Prerequisite: course 101L. Selected comprehensive experiments in the autonomic nervous system and the cardiovascular, respiratory, and neuromuscular systems. Emphasis on conceptual and methodological approaches in demonstrating the physiology of organ systems. Offered irregularly. GE credit: Wrt.—Liets

(change in existing course—eff. winter 18)

112. Neuroscience (3)
(cancelled course—eff. winter 17)

113. Cardiovascular, Respiratory, and Renal Physiology (4)
Lecture—4 hours. Prerequisite: course 110C or course 101; Chemistry 8B, course 007B and course 007C recommended. An intense and advanced presentation of concepts in cardiovascular, respiratory, and renal physiology including discussion of acid-base balance.

(change in existing course—eff. winter 18)

114. Gastrointestinal Physiology (3)
Lecture—3 hours. Prerequisite: course 110C or course 101; Biological Sciences 105 or Biological Sciences 103 recommended, Biological Sciences 105 preferred. Gastrointestinal anatomy and physiology. Digestion, secretion, absorption, motility, comparative physiology and pathology. Strong emphasis on neural and hormonal regulation and on cellular mechanisms of secretion and absorption.—*F. (F.)* Bautista, Horwitz

(change in existing course—eff. winter 18)

117. Avian Physiology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 2A, Biological Sciences 2B; Chemistry 002B; course 101 or course 110C strongly recommended. Physiology of the various systems of birds with emphasis on digestion, respiration, excretion, and endocrine systems.—*S. (S.)* Hahn, Klasing

(change in existing course—eff. winter 18)

121. Physiology of Reproduction (4)
Lecture—4 hours. Prerequisite: course 101 or course 110C. Physiological mechanisms related to reproduction, breeding efficiency and fertility, with special reference to domestic animals. GE credit: QL, SL.—*W. (W.)* Berger

(change in existing course—eff. winter 18)

121L. Physiology of Reproduction Laboratory (1)
Laboratory—3 hours. Prerequisite: course 121 (can be concurrent). Experiments on the reproductive systems of domestic animals including male and female gametes. (P/NP grading only.)—*W. (W.)* Berger

(change in existing course—eff. spring 17)

123. Comparative Vertebrate Organology (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Biological Science 1A and 1B or 2A and 2B. Functional anatomy of major organ systems in vertebrates. Each system examined from cellular to gross level in fish, birds, and mammals. Emphasis on how differentiated cell types are integrated into tissues and organs to perform diverse physiological functions. (Same course as Anatomy, Physiology and Cell Biology 100.) Offered in alternate years.—*F.* Genetos

(change in existing course—eff. winter 18)

124. Comparative Neuroanatomy (3)
Lecture—3 hours. Prerequisite: course 101 or course 100 or course 110B or Psychology 121. Overview of the neuroanatomy in mammalian vertebrates, focusing on the cerebral cortex and experimental techniques. Examine changes or modifications to neural structures as a result of morphological or behavioral specializations. (Same course as Psychology 124.)

(change in existing course—eff. fall 18)

124L. Comparative Neuroanatomy Laboratory (2)
Laboratory—6 hours. Prerequisite: course 124 (can be concurrent). Pass One restricted to PSC and NPB majors; must be concurrently enrolled in course 124. Comparative neuroanatomy laboratory illustrating modern neuroanatomical techniques in determining neural connections within the mammalian brain. Includes experimentation and presentation of results. (Same course as Psychology 124L.)

(new course—eff. fall 18)

125. Comparative Physiology: Neurointegrative Mechanisms (3)
(cancelled course—eff. winter 17)

127. Comparative Physiology: Circulation (3)
(cancelled course—eff. fall 16)

130. Physiology of the Endocrine Glands (4)
Lecture—4 hours. Prerequisite: course 110C or course 101. Advanced presentation of concepts in endocrinology with emphasis on the role of hormones in reproduction, metabolism, and disease. GE credit: VL.—*F. (F.)*

(change in existing course—eff. winter 18)

134. General Immunology for Physiologists (3)
Lecture—2 hours; lecture/discussion—1hour. Prerequisite: course 101 C- or better or course 110C C- or better; or consent of instructor. Immunology for undergrads interested in physiology aimed at understanding the physiological role of immune responses. Illustrated with examples of human diseases including diabetes, allergies and asthma, and emerging diseases such as Ebola and Zika. Offered in alternate years. GE credit: SE.—Huising

(new course—eff. fall 17)

140. Principles of Environmental Physiology (3)
Lecture—3 hours. Prerequisite: course 101 or course 110C; Biological Sciences 102 recommended. Physiological aspects of interactions of organisms and environmental, cellular, system, and organismal levels. Emphasis on regulatory responses/mechanisms to thermal, pressure, gravity and light environmental variables. Not open for credit to students who have completed course 148. (Former course 148.) GE credit: WE.—*W.* Fuller

(change in existing course—eff. fall 18)

150. Advanced Animal Behavior (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 102 or Psychology 101; or consent of instructor. Advanced integrative survey of biological principles of behavioral organization, emphasizing historical roots, current research directions, conceptual issues and controversies. Laboratory exercises on the description and analysis of the behavior of captive and free-living animals. (Same course as Psychology 122.) Offered irregularly.—Hahn

(change in existing course—eff. winter 18)

152. Hormones and Behavior (3)
Lecture—3 hours. Prerequisite: course 101 or course 110C; course 102 or Psychology 101. Endocrine physiology with an emphasis on the principles of behavior. Fundamental relationships between hormones and various behaviors engaged in by the organism during its lifetime. Role of hormones in behavioral homeostasis, social behavior, reproductive behavior, parental behavior, adaptation to stress. (Same course as Psychology 123.)—*S. (S.)* Bales, Furlow, Hahn, Trainor, Wingfield

(change in existing course—eff. winter 18)

157. Advanced Physiology of Animal/Human Disease (3)
Lecture—1 hour; lecture/discussion—2 hours. Prerequisite: course 101 B+ or better or course 110C B+ or better; consent of instructor. Limited to 35 students initially. Centers on fundamental mechanisms and pathophysiological basis for animal and human diseases. Course is case-based and uses animal and human diseases to help exemplify the physiological consequences of organ dysfunction. (Same course as Human Physiology 157.)—*S. (S.)* Horwitz, Payne

(new course—eff. spring 17)

160. Molecular and Cellular Neurobiology (3)
(cancelled course—eff. fall 17)

160L. Advanced Cellular Neurobiology Laboratory (4)
(cancelled course—eff. winter 17)

161. Developmental Neurobiology (3)
Lecture—3 hours. Prerequisite: course 100 or course 101 or course 110B. 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.—*W. (W.)* McAllister, Zito

(change in existing course—eff. winter 18)

162. Neural Mechanisms of Behavior (3)
Lecture—3 hours. Prerequisite: course 100 or course 101 or course 110B. Relationship between brain and behavior. Identification and analysis of the relevant neural circuits involved. Examples of systems to be considered are birdsong, locomotion, echolocation.—*S. (S.)* Britten

(change in existing course—eff. winter 18)

163. Systems Neuroscience (3)
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: course 100 or course 110B; 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, storage of information, neural codes, neural mechanisms underlying cognitive functions. GE credit: SE.—*S. (S.)* Ditterich

(change in existing course—eff. spring 17)

164. Mammalian Vision (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or course 110B or Psychology 101. Structure and function of the mammalian visual system, from the formation of images on the retina through visually guided behavior and perception. Emphasis on biological mechanisms underlying vision.—*W. (W.)* Britten, Werner

(change in existing course—eff. spring 17)

165. Neurobiology of Speech Perception (3)
Lecture—3 hours. Prerequisite: course 110B or course 100 or course 101; or consent of instructor. Interdisciplinary approach to speech perception with emphasis on functional neuroanatomy and behavior. Topics include auditory processing in time and space, intelligibility in noisy environments,

visual speech, evolution of vocal communication, models of speech perception, development, and hearing impairment. GE credit: SL.—*S. (S.)* Miller

(change in existing course—eff. winter 18)

166. Math Tools for Neuroscience (4)
Lecture—4 hours. Prerequisite: course 100 or course 110B; Mathematics 16A, Mathematics 16B, Mathematics 16C) or Mathematics 17A, Mathematics 17B, Mathematics 17C or Mathematics 21A, Mathematics 21B, Mathematics 21C; or consent of instructor. Introduction to mathematics techniques used in neuroscience. Applications to neuroscience of differential equations, linear algebra, Fourier transforms, correlation and convolution, and probability theory. Offered irregularly. GE credit: QL.—Goldman

(change in existing course—eff. winter 18)

167. Computational Neuroscience (5)
Lecture—4 hours; lecture/laboratory—3 hours. Prerequisite: course 100 or course 110B; Mathematics 16A, Mathematics 16B, Mathematics 16C or Mathematics 17A, Mathematics 17B, Mathematics 17C) or Mathematics 21A, Mathematics 21B, Mathematics 21C); or consent of instructor; Physics 7A, Physics 7B or equivalent recommended. Mathematical models and data analysis techniques used to describe computations performed by nervous systems. Lecture topics include single neuron biophysics, neural coding, network dynamics, memory, plasticity, and learning. Lab topics include programming mathematical models and data analysis techniques in MATLAB. Offered irregularly. GE credit: SciEng|SE, QL.—Goldman

(change in existing course—eff. winter 18)

168. Neurobiology of Addictive Drugs (4)
Lecture/discussion—4 hours. Prerequisite: course 100 or course 110B or course 110C or course 101; or equivalents. Neurobiological basis for the effects and mechanisms of action of drugs with addictive potential, including opiates (morphine, heroin, methadone), amphetamines, cocaine, nicotine, marijuana (cannabinoids), alcohol, caffeine, and mind-altering drugs such as LSD and antidepressants. GE credit: SL, VL.—*S. (S.)* Liets

(change in existing course—eff. winter 18)

171. Physiology of Neuroimmune Interactions (4)
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: Biological Sciences 2A; course 12 (can be concurrent) or course 100 (can be concurrent) or course 110B (can be concurrent); or consent of instructor; completion of Pathology, Microbiology, and Immunology 126 or Medical Microbiology 188 recommended prior to this course. Explores the complex interactions of the nervous and immune systems, and examine how the systems function together to serve homeostasis, behavior, and disease (such as Alzheimer's, autism, and multiple sclerosis). GE credit: SL.—*S. (S.)* Fomina

(new course—eff. fall 17)

172. Map Formation in the Brain (3)
Lecture—3 hours. Prerequisite: course 100 C- or better or course 110B C- or better; or equivalent basic neuroscience training with consent of instructor. Topographic map connection is a fundamental principle for establishing neural network in the brain. This course will provide comprehensive understanding of the current concepts of map formation in various sensory and motor nervous systems. GE credit: SE.—*S. (S.)* Cheng

(new course—eff. spring 17)

173. Neurobiology of Brain Disorders (3)
Lecture—3 hours. Prerequisite: course 110B or course 100; or consent of instructor. Examination of brain disorders from a basic science perspective to gain insights into the mechanisms of their action. Genetic, molecular, cellular, circuit, and environmental basis of a variety of brain disorders. How insights about underlying mechanisms may lead to the development of improved therapies.—Hanks

(new course—eff. spring 18)

Graduate

211. Advanced Topics in Neuroimaging (3)
Seminar—2 hours; laboratory—1 hour. Prerequisite: Psychology 210; or consent of instructor. Restricted to 16 students. Critical presentation and discussion of the most influential advanced issues in neuroimaging, emphasizing fMRI design/analysis and the integration of fMRI with EEG/MEG. May be repeated for credit. (Same course as Neuroscience 211 and Psychology 211.) (S/U grading only.) Offered in alternate years.—*(S.)* Miller

(change in existing course—eff. spring 17)

212. Light and Fluorescence Microscopy (3)
Lecture—2 hours; laboratory—1hour. Prerequisite: consent of instructor. Restricted to maximum 16 students. Theory and practical application of light and fluorescence microscopy in the biological sciences. Laboratory component will focus on an optics bench, where we build simple compound and confocal microscopes on an optical rail. (S/U grading only.) Offered in alternate years.—*S. (S.)* Zito

(change in existing course—eff. spring 17)

267. Computational Neuroscience (5)
Lecture—4 hours; lecture/laboratory—3 hours. Prerequisite: one course in general Neuroscience at the level of course 100 or course 110B; one year college-level Calculus at the level of Mathematics 16A, Mathematics16B, Mathematics16C or higher; one year Physics at the level of Physics 7A, Physics 7B, Physics 7C recommended; or 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. (Same course as Neuroscience 267.)—*(F.)* Goldman

(change in existing course—eff. winter 18)

287A. Topics in Theoretical Neuroscience (2)
Lecture/discussion —2 hours. Prerequisite: consent of instructor. In-depth exploration of topics in theoretical neuroscience. Topic varies each year. Fall quarter (287A): foundational material from books and review articles. Spring quarter (287B): continuation of year's topic through readings of seminal articles from the primary literature. May be repeated for credit. (Same course as Neuroscience 287A.) (S/U grading only.) Offered in alternate years.—*F.* Goldman

(change in existing course—eff. spring 17)

Neuroscience

New and changed courses in Neuroscience (NSC)

Upper Division

160. Molecular and Cellular Neurobiology (3)
(cancelled course—eff. fall 17)

Graduate

211. Advanced Topics in Neuroimaging (3)
Seminar—2 hours; laboratory—1 hour. Prerequisite: Psychology 210; or consent of instructor. Restricted to 16 students. Critical presentation and discussion of the most influential advanced issues in neuroimaging, emphasizing fMRI design/analysis and the integration of fMRI with EEG/MEG. May be repeated for credit. (Same course as Neurobiology, Physiology, and Behavior 211 and Psychology 211.) (S/U grading only.) Offered in alternate years.—*(S.)* Miller

(change in existing course—eff. spring 17)

267. Computational Neuroscience (5)
Lecture—4 hours; lecture/laboratory—3 hours. Prerequisite: consent of instructor; one course in general Neuroscience at the level of course 100; or Neurobiology, Physiology & Behavior 110B; one year college-level Calculus at level of Mathematics 16A, Mathematics 16B, Mathematics 16C or higher; one year Physics at the level of Physics 7A, Physics 7B, Physics 7C, recommended; or 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. (Same course as Neurobiology, Physiology & Behavior 267.)—*F. (F.)* Goldman

(change in existing course—eff. winter 18)

287A. Topics in Theoretical Neuroscience (2)
Lecture/discussion —2 hours. Prerequisite: consent of instructor. In-depth exploration of topics in theoretical neuroscience. Topic varies each year. Fall quarter (287A): foundational material from books and review articles. Spring quarter (287B): continuation of year's topic through readings of seminal articles from the primary literature. May be repeated for credit. (Same course as Neurobiology, Physiology & Behavior 287A.) (S/U grading only.) Offered in alternate years.—*F.* Goldman

(change in existing course—eff. spring 17)

Nursing, School of

New and changed courses in Nursing (NRS)

Graduate

212. Technology & Innovations in Health Care (2)
Lecture/discussion—2 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Group or by consent of the instructor. Multidisciplinary approach to stimulate new thinking in the practice, process, and delivery of health care. Focus on improving overall health outcomes.—*W. (W.)*

(new course—eff. winter 17)

222A. Research Quality Improvement and Evidence Based Practice (2)
Lecture/discussion—2 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Group or by consent of the instructor. Introduction to providing safe, competent and compassionate care in a highly technical and digital environment. Emphasis on safety, quality and research to clinical practice. Accessing and analyzing reliable sources of evidence for integration in care-plan.—*Su. (Su.)*

(new course—eff. summer 16)

222B. Research Quality Improvement and Evidence Based Practice (2)
Lecture/discussion—2 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Group or by consent of the instructor. Introduction to providing safe, competent and compassionate care in a highly technical and digital environment. Emphasis on safety, quality and research to clinical practice. Accessing and analyzing reliable sources of evidence for integration in care-plan.—*F. (F.)*

(new course—eff. fall 16)

223. Quality and Safety Education in Health Care (2)
Lecture/discussion—2 hours. Prerequisite: course 221; course 272; course 420; course 421; course 273; course 422; course 423; course 425; consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Group or by consent of the instructor. Implementing best practices alongside technological tools and focusing on continuous quality improvement.

Emphasis on providing safe, competent care in a highly technical and digital environment. Building capacity to apply concepts related to safety, quality and research to clinical practice.—*S. (S.)*

(new course—eff. spring 17)

224. Developing Future Nurse Leaders (2)
Lecture/discussion—2 hours. Prerequisite: NRS 221; course 272; course 420; course 421; course 273; course 422; course 423; course 425; course 223; course 426; consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Group or by consent of the instructor. Develop skills around effective decision making, fiscal and environmental stewardship, initiating and maintaining effective working relationships, using mutually respectful communication and collaboration, care coordination, delegation and supervision. Emphasis on conflict resolution, leadership and interprofessional teamwork.—*Su. (Su.)*

(new course—eff. summer 17)

225. Professional Nursing Role Formation (3)
Lecture/discussion—3 hours. Prerequisite: NRS 221; course 220; course 221; course 222A; course 272; course 420; course 421; course 429A; course 222B; course 273; course 422; course 423; course 429B; course 203; course 212; course 425; course 429C; course 202; course 223; course 426; course 429D; course 224; course 424; course 427; course 429E; consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Group or by consent of the instructor. Transition from nursing student to professional nurse. Focus on ethical comportment, professional values of social justice, autonomy, advocacy, altruism, human dignity, and integrity. Students must pass a mastery exit examination and complete a capstone project.—*F. (F.)*

(new course—eff. fall 17)

Professional

493A. Improving Quality in Health Care (4)
Lecture/discussion—4 hours. Open to Nursing Science and Health-Care Leadership Students. 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.—*F. (F.)*

(change in existing course—eff. fall 17)

493B. Improving Quality in Health Care (4)
Lecture/discussion—4 hours. Prerequisite: course 493A; consent of instructor. Open to Nursing Science and Health-Care Leadership Students and/or consent of instructor. Working in interdisciplinary teams, will explore advanced theory and practical methods being employed to make improvement in health care systems while providing an opportunity for interprofessional educational experience.—*W. (W.)*

(change in existing course—eff. winter 18)

493C. Enhancing Patient Safety in Health Care (3)
Seminar—1 hour; clinical activity—1 hour; discussion—1 hour. Prerequisite: consent of instructor; Nursing Science and Health-Care Leadership graduate students. 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.—*S. (S.)*

(change in existing course—eff. spring 17)

Nutrition

New and changed courses in Nutrition (NUT)

Lower Division

10. Discoveries and Concepts in Nutrition (3)
Lecture—3 hours; project—1 hour. Nutrition as a science; historical development of nutrition concepts; properties of nutrients and foods. Not open for credit to students who have taken an upper division course in nutrition. No credit will be granted to students who have completed course 10Y or course 10V or an upper-division nutrition course. GE credit: SciEng|SE, SL.—*F, W, S, Su. (F, W, S, Su.)* Applegate

(change in existing course—eff. winter 18)

10V. Discoveries and Concepts in Nutrition (3)
Web virtual lecture—3 hours; project—1 hour. Nutrition as a science; historical development of nutrition concepts; properties of nutrients and foods. Not open for credit to students who have taken an upper division course in nutrition. No credit will be granted to students who have completed course 10 or course 10Y or an upper-division nutrition course. GE credit: SciEng|SE, SL.—*F, W, S, Su. (F, W, S, Su.)* Applegate

(new course—eff. winter 18)

10Y. Discoveries and Concepts in Nutrition (3)
Web virtual lecture—3 hours; project—1 hour. Nutrition as a science; historical development of nutrition concepts; properties of nutrients and foods. Not open for credit to students who have taken an upper division course in nutrition. No credit will be granted to students who have completed course 10 or course 10V or an upper-division nutrition course. GE credit: SciEng|SE, SL.—*F, W, S, Su. (F, W, S, Su.)* Applegate

(change in existing course—eff. winter 18)

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.—*F. (F.)* Haj, Oteiza

(new course—eff. fall 16)

112. Nutritional Assessment (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Animal Biology 102, Animal Biology 103 or Biological Sciences 102, Biological Sciences 103; course 111AY; Statistics 13 or Statistics 13Y or Plant Sciences 120. Restricted to upper division or graduate level Nutrition students only. Methods of human nutritional assessment, including dietary, anthropometric, biochemical methods. Principles of precision, accuracy, and interpretation of results for individuals and populations. GE credit: SciEng|QL, SE.—*S. (S.)* Satre, Stewart

(change in existing course—eff. spring 18)

113. Principles of Epidemiology in Nutrition (4)
Lecture/discussion—4 hours. Prerequisite: Statistics 13 or Statistics 13Y or Plant Sciences 120 or Statistics 100. Introduction to epidemiology as it relates to the field of nutrition, including study design, principles of epidemiologic inference, criteria for causality, and interpreting measures of disease risk. GE credit: QL, SE.

(change in existing course—eff. fall 18)

Graduate

201. Vitamin and Cofactor Metabolism (3)
(cancelled course—eff. winter 18)

203. Advanced Protein and Amino Acid Nutrition (3)
(cancelled course—eff. winter 18)

204. Mineral Metabolism (2)
(cancelled course—eff. winter 18)

219A. International Nutrition (3)
Lecture—3 hours. Prerequisite: course 111AV; course 111AY; graduate standing; undergraduates only admitted with consent of instructor. Epidemiology, etiology, and consequences of undernutrition, with particular focus on the nutritional problems of children and women in low income populations. Offered in alternate years.—*(W.)* Dewey

(change in existing course—eff. spring 18)

252. Nutrition and Development (3)
Lecture—3 hours. Prerequisite: Nutritional Biology 210A, Nutritional Biology 210B, and Nutritional Biology 210C recommended. Relationship of nutrition to prenatal and early postnatal development.—*W. (W.)* Keen, Oteiza

(change in existing course—eff. spring 18)

257. Selected Topics in Nutritional and Hormonal Control of Nitrogen Metabolism (2)
(cancelled course—eff. winter 18)

260. Nutrition During Pregnancy (6)
(cancelled course—eff. fall 16)

261. Lactation and Infant Nutrition (6)
(cancelled course—eff. fall 16)

262. Child and Adolescent Nutrition (6)
(cancelled course—eff. fall 16)

263. Applied Research Methods in Maternal and Child Nutrition (4)
(cancelled course—eff. winter 18)

264A. Current Topics in Maternal and Child Nutrition: Principles of Adult Education (2)
(cancelled course—eff. spring 17)

264B. Current Topics in Maternal and Child Nutrition: Epidemiology and Evidence-Based Practice (2)
(cancelled course—eff. spring 17)

264C. Current Topics in Maternal and Child Nutrition: Public Policy Development and Implementation (2)
(cancelled course—eff. fall 17)

Persian

New and changed courses in Persian (PER)

Lower Division

2. Elementary Persian (5)
Lecture/discussion—5 hours. Prerequisite: course 1; or consent of instructor. Continuation of course 1. Introduction to listening, speaking, reading and writing skills in Persian and to Persian culture. GE credit: ArtHum, Div|WC.—*W. (W.)* Sharlet

(new course—eff. winter 17)

3. Elementary Persian (5)
Lecture/discussion—5 hours. Prerequisite: course 1; or consent of instructor. Continuation of course 2. Introduction to listening, speaking, reading and writing skills in Persian and to Persian culture. GE credit: ArtHum, Div|WC.—*S. (S.)* Sharlet

(new course—eff. spring 17)

21. Intermediate Persian (5)
Lecture/discussion—5 hours. Prerequisite: course 3; or the equivalent. Integrated presentation of listening, speaking, reading and writing skills as well as cultural topics in intermediate Persian. GE credit: ArtHum, Div, Wrt| AH, WC.—*F. (F.)* Sharlet

(new course—eff. fall 16)

22. Intermediate Persian (5)
Lecture/discussion—5 hours. Prerequisite: course 21; or the equivalent. Integrated presentation of listening, speaking, reading and writing as well as cultural topics in Intermediate Persian. GE credit: ArtHum, Div, Wrt|AH, WC.—*W. (W.)* Sharlet

(new course—eff. winter 17)

23. Intermediate Persian (5)
Lecture/discussion—5 hours. Prerequisite: course 22; or the equivalent. Integrated presentation of listening, speaking, reading and writing skills as well as cultural topics in Intermediate Persian. GE credit: ArtHum, Div, Wrt| AH, WC.—*S. (S.)* Sharlet

(new course—eff. spring 17)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Directed group study. May be repeated for credit. (P/NP grading only.)

(new course—eff. winter 17)

Upper Division

101. Advanced Persian: Topics in Modern Persian Culture 1900-Present (5)
Lecture/discussion—3 hours; term paper. Prerequisite: course 23; or consent of instructor. Integrated work on reading, listening, discussion and writing about modern Persian cultural production using fiction and poetry as well as cinema and theory. May be repeated for credit up to one time if content is different from the first time. GE credit: ArtHum, Div, Wrt| AH, WC, WE.—*F. (F.)* Sharlet

(new course—eff. fall 17)

103. Advanced Persian: Topics in Medieval Persian Culture 900-1500 (5)
Lecture/discussion—3 hours; term paper. Prerequisite: course 23; or consent of instructor. Integrated work on reading, listening, discussion, writing about medieval Persian culture with a focus on lyric and narrative poetry and representative selections of literary prose, rhetoric, biography, history, religious and philosophical discourse. May be repeated for credit up to one time if content differs. GE credit: ArtHum, Div, Wrt | AH, OL, WC, WE.

(new course—eff. winter 18)

198. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. Special study. May be repeated for credit. (P/NP grading only.)

(new course—eff. winter 17)

Professional

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: consent of instructor. Restricted to graduate students. Teaching practicum. May be repeated for credit up to eighteen times. (S/U grading only.)—*F, W, S. (F, W, S.)*

(new course—eff. winter 17)

Philosophy

New and changed courses in Philosophy (PHI)

Lower Division

10. Introduction to Cognitive Science (4)
Lecture/discussion—4 hours. Pass One open to Cognitive Science majors only. Introduction to the interdisciplinary cognitive scientific approach to the study of mind, drawing concepts and methods from psychology, philosophy, linguistics, artificial intelligence, and other disciplines. (Same course as Cognitive Science 1.) GE credit: SciEng|SE, SL.—*F. (F.)* Drayson, Molyneux

(change in existing course—eff. fall 17)

21. Philosophical Classics of the Ancient Era (4)
Lecture—3 hours; discussion—1 hour. Survey of Survey of ancient Western philosophy with special attention to the Pre-Socratics, Plato, Aristotle, and the Sceptics. GE credit: ArtHum, Wrt| AH, WE.—*W. (W.)* Szaif

(change in existing course—eff. spring 17)

22. Philosophical Classics of the Modern Era (4)
Lecture—3 hours; discussion—1 hour. Survey of modern Western philosophy, including Descartes, Locke, Hume, and Kant. GE credit: ArtHum, Wrt| AH, WC.—*W. (W.)* Mattey, Szaif

(change in existing course—eff. spring 17)

Upper Division

112. Intermediate Symbolic Logic (4)
Lecture—1 hour; discussion—3 hours. Prerequisite: course 12 C- or better; or consent of instructor. Predicate logic syntax and semantics. Transcription between predicate logic and English. Models, truth-trees, and derivations. Identity, functions, and definite descriptions. Introduction to concepts of metatheory. GE credit: ArtHum| AH.—*W. (W.)* Landry

(change in existing course—eff. winter 18)

118. Political Philosophy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one course in philosophy recommended. Intensive examination of some central concepts of political thought such as the state, sovereignty, rights, obligation, freedom, law, authority, and responsibility. GE credit: SocSci, Div, Wrt| AH, WE.—*W. (W.)* Oshana

(change in existing course—eff. winter 17)

119. Philosophy of Law (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: consent of instructor; one course in philosophy recommended. Philosophical theories of the nature of law, legal obligation, the relation of law and morals. Problems for law involving liberty and justice: freedom of expression, privacy, rights, discrimination and fairness, responsibility, and punishment. GE credit: SocSci, Div, Wrt| AH, SS, WE.—Oshana

(change in existing course—eff. winter 17)

133. Logic, Probability, and Artificial Intelligence (4)
Lecture/discussion—4 hours. Prerequisite: course 112; course 112. Introduction to theoretical artificial intelligence with a focus on nonmonotonic logic, Bayesian networks, and learning theory. Offered in alternate years.—*F. (F.)* Kao

(change in existing course—eff. fall 16)

145. Christian, Islamic, and Jewish Philosophers of the Middle Ages (4)
Lecture/discussion—4 hours. Prerequisite: course 21 recommended. Major Christian, Islamic, and Jewish philosophers of the Middle Ages. Offered irregularly. GE credit: ArtHum|AH, WC.—*S. (S.)* Szaif

(change in existing course—eff. spring 17)

Physical Education

New and changed courses in Physical Education (PHE)

Lower Division

1A. Physical Activity-Archery (0.5)
Laboratory—2 hours. Physical Education Activity classes in Archery. The academic classes are instructional rather than recreational and are intended to improve activity specific skills and knowledge. Credit limited to 6 units in combination with course 6. May be repeated for credit up to six units along with course 6, for a combination total of 6 units. (P/NP grading only.)

(new course—eff. fall 18)

1AQ. Physical Activity-Fitness Family (0.5)
Laboratory—2 hours. Physical Education Activity classes in Aquatics. The academic classes are instructional rather than recreational and are intended to improve activity specific skills and knowledge. Credit limited to 6 units in combination with course 6. May be repeated for credit up to six units along with course 6, for a combination total of 6 units. (P/NP grading only.)

(new course—eff. fall 18)

1F. Physical Activity-Aquatic Family (0.5)
Laboratory—2 hours. Physical Education Activity classes in personal fitness. The academic classes are instructional rather than recreational and are intended to improve activity specific skills and knowledge. Credit limited to 6 units in combination with course 6. May be repeated for credit up to six units along with course 6, for a combination total of 6 units. (P/NP grading only.)

(new course—eff. fall 18)

1G. Physical Activity-Golf (0.5)
Laboratory—2 hours. Physical Education Activity classes in Golf. These academic classes are instructional rather than recreational and are intended to improve activity specific skills and knowledge. Credit limited to 6 units in combination with course 6. May be repeated for credit up to six units along with course 6, for a combination total of 6 units. (P/NP grading only.)

(new course—eff. fall 18)

1I. Physical Activity-Individual Sport Family (0.5)
Laboratory—2 hours. Physical Education Activity classes in Individual Sports. The academic classes are instructional rather than recreational and are intended to improve activity specific skills and knowledge. Credit limited to 6 units in combination with course 6. May be repeated for credit up to six units along with course 6, for a combination total of 6 units. (P/NP grading only.)

(new course—eff. fall 18)

1M. Physical Activity-Martial Arts Family (0.5)
Laboratory—2 hours. Physical Education Activity classes in Martial Arts. The academic classes are instructional rather than recreational and are intended to improve activity specific skills and knowledge. Credit limited to 6 units in combination with course 6. May be repeated for credit up to six units along with course 6, for a combination total of 6 units. (P/NP grading only.)

(new course—eff. fall 18)

1R. Physical Activity-Racquet Family (0.5)
Laboratory—2 hours. Physical Education Activity classes in Racquet sports. The academic classes are instructional rather than recreational and are intended to improve activity specific skills and knowledge. Credit limited to 6 units in combination with course 6. May be repeated for credit up to six units along with course 6, for a combination total of 6 units. (P/NP grading only.)

(new course—eff. fall 18)

1RC. Physical Activity-Rock Climbing (0.5)
Laboratory—2 hours. Physical Education Activity classes in Rock Climbing. The academic classes are instructional rather than recreational and are intended to improve activity specific skills and knowledge. Credit limited to 6 units in combination with course 6. May be repeated for credit up to six units along with course 6, for a combination total of 6 units. (P/NP grading only.)

(new course—eff. fall 18)

1S. Physical Activity-Self Defense for Women (0.5)
Laboratory—2 hours. Physical Education Activity classes in Self Defense for Women. The academic classes are instructional rather than recreational and are intended to improve activity specific skills and knowledge. Credit limited to 6 units in combination with course 6. May be repeated for credit up to six units along with course 6, for a combination total of 6 units. (P/NP grading only.)
(new course—eff. fall 18)

1T. Physical Activity-Team Sports Family (0.5)
Laboratory—2 hours. Physical Education Activity classes in Team Sports. The academic classes are instructional rather than recreational and are intended to improve activity specific skills and knowledge. Credit limited to 6 units in combination with course 6. May be repeated for credit up to six units along with course 6, for a combination total of 6 units. (P/NP grading only.)
(new course—eff. fall 18)

Physics

New and changed courses in Physics (PHY)

Lower Division

9A. Classical Physics (5)
Lecture—3 hours; laboratory—2.5 hours; discussion—1 hour. Prerequisite: Mathematics 21B or Mathematics 21M; or consent of instructor. Introduction to general principles and analytical methods used in physics for physical science and engineering majors. Classical mechanics. Only 2 units of credit for students who have completed 1A or 7B. Not open for credit to students who have completed course 9HA. GE credit: SE.
(change in existing course—eff. summer 18)

10CY. Physics of California (3)
Web virtual lecture—1 hour; web electronic discussion—0.5 hours; discussion—1.5 hours. Conceptual understanding of the physics underlying regional sports in CA. Focus on skiing, surfing, and scuba diving. Atmospheric phenomena common in CA, local weather patterns and microclimes, applications to CA energy, and water are also discussed. Not open for credit to students who have completed Physics 10C, any quarter of Physics 9A, 9B, 9C, 9D, 9HA, 9HB, 9HC, 9HD, or 9HE, or any upper division physics course. GE credit: SciEng|SE, SL, VL.—*F. (F.)* Bradac
(new course—eff. winter 17)

12. Visualization in Science (3)
Lecture—3 hours. Production, interpretation, and use of images in physics, astronomy, biology, and chemistry as scientific evidence and for communication of research results. Offered irregularly. GE credit: SciEng|SE, SL, VL.—*S. (S.)* Terning
(change in existing course—eff. winter 17)

80. Experimental Techniques (4)
Lecture—2 hours; laboratory—5 hours. Prerequisite: course 9D or course 9HD. Open to Physics and Applied Physics majors only. Experimental techniques. Design of circuits. Data analysis, sources of noise, statistical and systematic uncertainties. Light sources, detection, and measurement in basic optical systems.—*W.* Cebra, Chertok, Chiang, Mulhearn. Pantic, Taufour, Vishik
(new course—eff. fall 17)

Upper Division

110A. Electricity and Magnetism (4)
Lecture—3 hours. Prerequisite: course 9B C- or better; course 9C C- or better; course 9D C- or better; Mathematics 21D C- or better; Mathematics 22A C- or better; Mathematics 22B C- or better; course 104A; course 105A; or consent of department. Theory of electrostatics, electromagnetism, Maxwell's equations, electromagnetic waves. GE credit: SciEng|SE.—*W. (W.)* Yu
(change in existing course—eff. winter 18)

122A. Advanced Laboratory in Condensed Matter Physics (4)
Laboratory—8 hours. Prerequisite: course 104A; course 105A; course 110B; course 115A; course 112 (can be concurrent); or consent of the department. Registration by Permission to Add (PTA) number only; priority given to graduating PHY and APP majors. 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.—*W. (W.)* Tyson, Zhu
(change in existing course—eff. winter 18)

122B. Advanced Laboratory in Particle Physics (4)
Laboratory—8 hours. Prerequisite: course 104A; course 105A; course 110B; course 115A; course 112 (can be concurrent); or consent of the department. Registration by Permission to Add (PTA) number only; priority given to graduating PHY and APP majors. Experimental techniques and measurements in nuclear and particle physics. Students perform three to six experiments depending on difficulty. Individual work is stressed. Thorough write-ups of the experiments are required. GE credit: SciEng|SE, WE.—*W. (W.)* Pantic, Tyson, Zhu
(change in existing course—eff. winter 18)

157. Astronomy Instrumentation and Data Analysis Laboratory (4)
laboratory—8 hours. Prerequisite: course 104A; course 105A; course 110A; course 115A (can be concurrent); course 110B (can be concurrent); and consent of instructor. Registration by Permission to Add (PTA) number only; priority given to graduating PHY astrophysics emphasis seniors. 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.—*(S.)* Boeshaar, Tyson
(change in existing course—eff. winter 18)

Graduate

256. Natural Computation and Self-Organization: The Physics of Information Processing in Complex Systems (3)
(cancelled course—eff. spring 17)

256A. Physics of Information (4)
Lecture—3 hours; extensive problem solving. Prerequisite: consent of instructor; advanced undergraduate or introductory graduate differential equations, applied linear algebra, and probability theory; e.g., Mathematics 119A/B or 207A, 167 or 226A, and 135A/B or 235A, respectively; or in courses 104A/C or 204A/B. Class size limited to 30 students. Nonlinear dynamics, deterministic chaos, bifurcations, pattern formation, symbolic dynamics, measurement theory, stochastic processes, elementary information theory, information in complex systems, computational laboratory.—*W. (W.)* Crutchfield
(change in existing course—eff. spring 17)

256B. Physics of Information (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 256A; consent of instructor; advanced undergraduate or introductory graduate differential equations, applied linear algebra, and probability theory; e.g., in Mathematics 119A/B or 207A, 167 or 226A, and 135A/B or 235A, respectively; or in courses 104A/C or 204A/B. Class size limited to 30 students. Structural complexity, computational mechanics, information measures, causal inference, applications to complex materials, quantum dynamics, and nonequilibrium thermodynamics, computational laboratory.—*S. (S.)* Crutchfield
(change in existing course—eff. spring 17)

280. Seminar in Ethics for Scientists (2)
(cancelled course—eff. fall 17)

Plant Biology

New and changed courses in Plant Biology (PLB)

Lower Division

102. California Floristics (5)
Lecture—2 hours; laboratory—7 hours; fieldwork—2 hours. Prerequisite: Plant Sciences 2 or Biological Sciences 2C; or equivalent course in Plant Science. Survey of the California flora, emphasizing recognition of important plant families and genera and use of taxonomic keys to identify species. Phylogenetic relationships among families. Principles of systematics and taxonomy. Two Saturday field trips. (Same course as Plant Sciences 102.) GE credit: SciEng|SE, VL.—*S. (S.)* Potter
(change in existing course—eff. fall 17)

Plant Pathology

New and changed courses in Plant Pathology (PLP)

Lower Division

90. Introduction to Global Disease Biology (1)
(cancelled course—eff. fall 14)

Plant Sciences

New and changed courses in Plant Sciences (PLS)

Lower Division

7. Just Coffee: The Biology, Ecology and Socioeconomic Impacts of the World's Favorite Drink (4)
Lecture—3 hours; discussion—1 hour. Coffee used as a case study to examine biological, ecological and social factors influencing sustainability of farming systems and how food production systems impact human well-being. GE credit: SE, SS, WE.—*W. (W.)* Brown
(new course—eff. fall 17)

Upper Division

100A. Metabolic Processes of Cultivated Plants (3)
Lecture—3 hours. Prerequisite: course 2 or Biological Sciences 2C; 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.—*F. (F.)* Gilbert
(change in existing course—eff. spring 17)

100B. Growth and Yield of Cultivated Plants (3)
Lecture—3 hours. Prerequisite: course 100A; or the equivalent of course 100A. 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.—*W. (W.)* Bradford, Melotto

(change in existing course—eff. spring 17)

100C. Environmental Interactions of Cultivated Plants (3)
Lecture—3 hours. Prerequisite: course 100A; or the equivalent of course 100A. 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.—*S. (S.)* Brown

(change in existing course—eff. spring 17)

102. California Floristics (5)
Lecture—2 hours; laboratory—7 hours; fieldwork—2 hours. Prerequisite: course 2 or Biological Sciences 2C; or equivalent course in Plant Science. Survey of the California flora, emphasizing recognition of important plant families and genera and use of taxonomic keys to identify species. Phylogenetic relationships among families. Principles of systematics and taxonomy. Two Saturday field trips. (Same course as Plant Biology 102.) GE credit: SciEng|SE, VL.—*S. (S.)* Potter

(change in existing course—eff. fall 17)

105. Concepts in Pest Management (3)
Lecture—2 hours; laboratory/discussion—3 hours. Prerequisite: Chemistry 8B; Plant Sciences 2 or Biological Sciences 2B or Biological Sciences 2C. 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.—*F. (F.)* Al-Khatib

(change in existing course—eff. winter 17)

110. Crop Management Systems for Vegetable Production (4)
Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: course 2 or Biological Sciences 2A, Biological Sciences 2B, Biological Sciences 2C. Horticultural principles applied to production and management systems for vegetable crops. Laboratory and discussion illustrate efficient field management and resource use practices. Not open for credit to students who have completed Plant Sciences 110C. (Former course Plant Sciences 110C.) Offered in alternate years.—*F.* Mitchell

(new course—eff. winter 17)

110A. Principles of Agronomic Crop Production in Temperate and Tropical Systems (3)
(cancelled course—eff. spring 17)

110C. Crop Management Systems for Vegetable Production (4)
(cancelled course—eff. winter 17)

110L. Principles of Agronomy Laboratory (1)
(cancelled course—eff. spring 17)

111. Principles of Agronomic Crop Production Systems (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 2 or Biological Sciences 2A-C. Principles, practices and technologies of agronomic cropping systems, including crop systematics, physiology, agroecology, equipment, and management. Cropping systems analysis and integration of economic and ecological decision-making considerations involved in crop production. One weekend field trip required. Not open for credit to students who have completed Plant Sciences 110A. (Former course Plant Sciences 110A.). Offered in alternate years. GE credit: SciEng|SE.—*(F.)* Mitchell

(new course—eff. spring 17).

130. Rangelands: Ecology, Conservation and Restoration (3)
Lecture—3 hours. Prerequisite: Plant Sciences 2 or Biological Sciences 2B or Biological Sciences 2C; or consent of instructor; upper division standing. Introduction to the ecological principles and processes important for an understanding of the dynamics of range ecosystems. Emphasis on ecological and evolutionary concepts underlying management strategies for conserving biological diversity and environmental quality in rangelands. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 130. (Former course Agricultural Management and Rangeland Resources 130.) Offered in alternate years. GE credit: SE.—*(W.)* Tate

(change in existing course—eff. winter 17)

131. Identification and Ecology of Grasses (2)
Lecture—7.5 hours; laboratory—20 hours; discussion—5 hours. Prerequisite: course 130 or course 102 or course 147 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.—*S.* DiTomaso

(change in existing course—eff. spring 17)

162. Urban Ecology (3)
Lecture/discussion—3 hours. Prerequisite: Course in general or plant ecology such as Plant Biology 117, Environmental Science and Policy 100, Evolution and Ecology 101, Evolution and Ecology 120 or course 163. 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. Discussion of primary literature. GE credit: SciEng|SE, SL.—*W. (W.)* Cadenasso

(change in existing course—eff. winter 17)

170A. Fruit and Nut Cropping Systems (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 2 or Biological Sciences 2C; 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.—*(F.)* Gradziel

(change in existing course—eff. spring 17)

170B. Fruit and Nut Cropping Systems (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 2 or Biological Sciences 2C; 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.—*(S.)* Gradziel

(change in existing course—eff. spring 17)

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.—*S. (S.)* Zakharov

(change in existing course—eff. spring 17)

Graduate

206. Applied Multivariate Modeling in Agricultural and Environmental Sciences (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 120; Statistics 106 or Statistics 108 or course 205. Multivariate linear and nonlinear models. Model selection and parameter estimation. Analysis of manipulative and observational agroecological experiments. Discriminant, principal component, and path analyses. Logistic and biased regression. Bootstrapping. Exercises based on actual research by UC Davis students. Not open for credit to students who have complete Agronomy 206. (Former course Agronomy 206.)—*F. (F.)* Laca

(change in existing course—eff. winter 17)

Political Science

New and changed courses in Political Science (POL)

Lower Division

11A. America Decides: Who Will Win This Year's Election? (4)
Lecture—3 hours; term paper or discussion—1 hour. Survey of factors influencing presidential and congressional elections. Analysis of candidate nominations, campaign strategy, campaign finance, media coverage, and voter decision-making. Offered irregularly. GE credit: ACGH, SS, WE.—*F, W, S. (F, W, S.)* Boydstun

(new course—eff. fall 16)

11B. Citizen Lawmaking: Direct Democracy, Public Policy & Political Representation in America (4)
Lecture—3 hours; term paper or discussion—1 hour. Analysis of direct participation by citizens in the lawmaking process. Offered irregularly. GE credit: ACGH, SS, WE.—*F, W, S. (F, W, S.)* MacKenzie

(new course—eff. fall 16)

11C. Politics and Film (4)
Lecture—3 hours; term paper or discussion—1 hour. Survey of portrayals of politics and policy issues in moving pictures. Analysis of political processes, policy development, social mores, and historical periods as highlighted in Hollywood movies, television, and/or documentary films. Offered irregularly. GE credit: ACGH, VL, WE.—*F, W, S. (F, W, S.)* Boydstun

(new course—eff. fall 16)

11D. Political Persuasion (4)
Lecture—3 hours; term paper or discussion—1 hour. Examination of political influence and persuasion. Offered irregularly. GE credit: SS, WE.—*F, W, S. (F, W, S.)* Boudreau

(new course—eff. fall 16)

12A. Politics and Sports (4)
Lecture—3 hours; term paper or discussion—1 hour. Core issues in American and world politics through the lens of sports and the athletes who play them. The introduction of American civil rights movement, the Cold War, Middle East Tensions, and democratization. Offered irregularly. GE credit: SS, WE.—*F, W, S. (F, W, S.)* Scheiner

(new course—eff. fall 16)

12B. Climate Change and Politics (4)
Lecture—3 hours; term paper or discussion—1 hour. Analysis of political institutions' response and adaptation to climate change. Offered irregularly. GE credit: SS, WE.—*F, W, S. (F, W, S.)* Shugart

(new course—eff. fall 16)

219A. Political Theory Sequence (4)
Seminar—3 hours; term paper. Survey of the great works in ancient and medieval political theory including such writers as Plato, Aristotle, Cicero, St. Augustine, Aquinas, Alfarabi and Marsilius. Discussions of various interpretations of these authors. May be repeated for credit if topic differs.
(change in existing course—eff. fall 18)

219B. Political Theory Sequence (4)
Seminar—3 hours; term paper. Survey of the great works in early modern to contemporary political theory including such writers as Machiavelli, Hobbes, Locke, Rousseau, Marx, Mill, Nietzsche, and Rawls. Discussion of various interpretations of these authors. May be repeated for credit if topic differs.
(change in existing course—eff. fall 18)

Portuguese

New and changed courses in Portuguese (POR)

Lower Division

1. Elementary Portuguese (5)
Lecture/discussion—5 hours. Introduction to Portuguese grammar and development of all language skills in a cultural context with special emphasis on communication. Students who have successfully completed POR 002 or POR 003 in the 10th or higher grade of high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student's P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed. GE credit: AH, WC.
(change in existing course—eff. fall 18)

2. Elementary Portuguese (5)
Lecture/discussion—5 hours. Prerequisite: course 1. Continuation of course 001 in the areas of grammar and development of all basic language skills in cultural context with special emphasis on communication. GE credit: AH, WC.
(change in existing course—eff. fall 18)

3. Elementary Portuguese (5)
Lecture/discussion—5 hours. Prerequisite: course 2. Continuation of course 002 in the areas of grammar and development of all basic language skills in cultural context with special emphasis on communication. GE credit: AH, WC.
(change in existing course—eff. fall 18)

21. Intermediate Portuguese (5)
Lecture/discussion—5 hours. Prerequisite: course 3. Review and develop the grammar, vocabulary, and composition acquired in first year Portuguese through exercises and reading of modern texts. GE credit: AH, WC.
(change in existing course—eff. fall 18)

22. Intermediate Portuguese (5)
Lecture/discussion—5 hours. Prerequisite: course 21. Continuation of course 21. Focus on more difficult grammar concepts and further composition practice. Development of all language skills through exercises and reading of modern texts. GE credit: AH, WC.
(change in existing course—eff. fall 18)

23. Portuguese Composition I (4)
Lecture—3 hours; extensive writing. Prerequisite: course 22. Development of writing skills by way of reading, discussion, and analysis of authentic materials, literary texts, and videos. Selective review of grammar. Class activities include composition, journals, letters, individual and group projects. GE credit: AH, WC, WE.
(change in existing course—eff. fall 18)

Professional Accountancy

New and changed courses in Professional Accountancy (ACC)

Professional

455. Audit Data Analytics (4)
Lecture—4 hours. Prerequisite: course 253. Analytical techniques and methods as related to the practice of financial statement auditing. Combines theory and the application of auditing professional standards including diagnosing problems and issues, analyzing relevant information, and reporting decision results and recommendations.—*S. (S.)*
(new course—eff. fall 17)

490. Topics in Accounting (1-4)
Contemporary and emerging issues in financial management accounting. Application of modern techniques of evaluation and analysis of financial information. Use of appropriate electronic database and research techniques. May be repeated for credit.—*S. (S.)*
(new course—eff. spring 18)

Psychology

New and changed courses in Psychology (PSC)

Lower Division

1. General Psychology (4)
Lecture—4 hours. Principles and basic concepts of psychology. The empirical study of individual behavior including perception, cognition, development, personality, social interactions and the biological underpinnings of behavior. Not open for credit to students who have taken course 1Y. GE credit: SocSci|SS.—*F, W, S. (F, W, S.)* Simonton, Thompson, Traxler
(change in existing course—eff. winter 17)

1Y. General Psychology (4)
Lecture—1 hour; discussion—1 hour; web virtual lecture—2 hours. Principles and basic concepts of psychology. Introduction to empirical approaches. Focus on perception, cognition, personality and social psychology, and biological aspects of behavior. Not open for credit to students who have taken course 1. GE credit: SS.—*F, W, S. (F, W, S.)* Ferreira, Henderson, Luck, Simonton, Thompson, Traxler
(change in existing course—eff. winter 17)

41. Research Methods in Psychology (4)
Lecture—3 hours; extensive writing. Prerequisite: course 1 or course 1Y; course 12Y, Statistics 13, or Statistics100 strongly recommended. Introduction to experimental design, interviews, questionnaires, field and observational methods, reliability, and statistical inference. GE credit: QL.—*F, W, S. (F, W, S.)* Cross, Vazire
(change in existing course—eff. fall 17)

41S. Research Methods in Psychology (4)
(cancelled course—eff. winter 17)

51. Relationship Science: Lust, Love, and Evolution (4)
Lecture—4 hours. Prerequisite: course 1 or course 1Y; or introductory social science course or introductory life science course. Evolutionary perspectives on attraction and close relationships. Integrating social psychological and evolutionary theories with empirical evidence pertaining to human mating. GE credit: SE, SS.—*W. (W.)* Eastwick
(change in existing course—eff. spring 18)

Upper Division

100. Introduction to Cognitive Psychology (4)
Lecture—4 hours. Prerequisite: course 1 or course 1Y; course 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.—*F, W, S. (F, W, S.)* Ekstrom, Ferreira, Henderson, Long, Luck
(change in existing course—eff. winter 18)

101. Introduction to Biological Psychology (4)
Lecture—4 hours. Prerequisite: course 1 or course 1Y; course 41. Pass One open to majors. Survey and integration of the relationships between behavior and biological processes, including physiology, genes, development, ecology, and evolution. Two units of credit for those students who have completed Neurobiology, Physiology and Behavior 100.—*F, S. (F, S.)* Luck
(change in existing course—eff. winter 18)

100Y. Introduction to Cognitive Psychology (4)
Web virtual lecture—4 hours; discussion—1 hour; lecture—1 hour. Prerequisite: course 1 or course 1Y; course 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.—*F, S. (F, S.)* Luck
(change in existing course—eff. spring 18)

103A. Statistical Analysis of Psychological Data (5)
Lecture—4 hours; laboratory—2 hours; term paper. Prerequisite: course 1 or course 1Y; course 41; Statistics 13 or Statistics 13Y or Statistics 102. Pass One open to Psychology majors. Design and statistical analysis of psychological investigations and the interpretation of quantitative data in psychology. Not open for credit to students who have completed course 103. GE credit: QL.
(change in existing course—eff. winter 18)

103B. Statistical Analysis of Psychological Data (5)
Lecture—4 hours; laboratory—2 hours. Prerequisite: course 103A; Statistics 13 or Statistics 13Y or Statistics 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.
(change in existing course—eff. winter 18)

104. Applied Psychometrics: An Introduction to Measurement Theory (4)
Lecture—4 hours. Prerequisite: course 41; course 103A; Statistics13 or Statistics 13Y; upper division standing in Psychology. 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. Offered irregularly. GE credit: QL.
(change in existing course—eff. spring 18)

107. Questionnaire and Survey Research Methods (4)
Lecture/discussion—2 hours; laboratory/discussion—2 hours. Prerequisite: course 1 or course 1Y; and consent of instructor; course 41 or an equivalent course on social or behavioral research methods or consent of instructor. Limited enrollment. Introduction to survey and questionnaire research methods with emphasis on how to ask questions. Social and psychological factors that influence survey

response. Practical aspects of fielding survey and questionnaire research. Offered irregularly. GE credit: QL.—Herek

(change in existing course—eff. spring 18)

120. Agent-Based Modeling (4)
Lecture/laboratory—4 hours. Prerequisite: course 100 and/or course 101 recommended. Class size limited to 24 students. Introduction to agent-based computer simulation and analysis with emphasis on learning how to model animals, including humans, to achieve insight into social and group behavior. GE credit: QL.—*S. (S.)* Schank

(change in existing course—eff. spring 18)

124. Comparative Neuroanatomy (3)
Lecture—3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101 or Neurobiology, Physiology, and Behavior 100 or Neurobiology, Physiology, and Behavior 110B or course 121. Overview of the neuroanatomy in mammalian vertebrates, focusing on the cerebral cortex and experimental techniques. Examine changes or modifications to neural structures as a result of morphological or behavioral specializations. (Same course as Neurobiology, Physiology, and Behavior 124.)

(change in existing course—eff. fall 18)

124L. Comparative Neuroanatomy Laboratory (2)
Laboratory—6 hours. Prerequisite: course 124 (can be concurrent). Pass One restricted to PSC and NPB majors; must be concurrently enrolled in course 124. Comparative neuroanatomy laboratory illustrating modern neuroanatomical techniques in determining neural connections within the mammalian brain. Includes experimentation and presentation of results. (Same course as Neurobiology, Physiology, and Behavior 124L.)

(new course—eff. fall 18)

126. Health Psychology (4)
Lecture—4 hours. Prerequisite: course 1 or course 1Y; course 41; course 101 recommended. Pass One open to Psychology majors only. Psychological factors influencing health and illness. Topics include stress and coping, personality and health, symptom perception and reporting, heart disease, cancer, compliance, and health maintenance and promotion. Not open for credit to students who have completed former course 160.—*W, S. (W, S.)* Emmons

(change in existing course—eff. winter 18)

130. Human Learning and Memory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or course 1Y; course 41; course 12Y or Statistics 13 or Statistics 100; or consent of instructor. Consideration of major theories of human learning and memory with critical examination of relevant experimental data.—*F, W, S. (F, W, S.)* Ranganath, Yonelinas

(change in existing course—eff. winter 18)

131. Perception (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 1 or course 1Y; course 41; course 100 or course 135. Cognitive organizations related to measurable physical energy changes mediated through sensory channels. Perception of objects, space, motion, events.—*F, W, S. (F, W, S.)* Geng, Henderson

(change in existing course—eff. winter 18)

132. Language and Cognition (4)
Lecture—3 hours; term paper. Prerequisite: course 1 or course 1Y; course 41; course 100 or course 135); or consent of instructor. Introduction to the cognitive processes involved in language comprehension and production. Topics include the biological foundations of language, speech perception, word recognition, syntax, reading ability, and pragmatics. GE credit: WE.—*F, W, S. (F, W, S.)* Ferreira, Long, Swaab, Traxler

(change in existing course—eff. winter 18)

133. Neuroeconomics/Reinforcement Learning and Decision Making (4)
Lecture—3 hours; term paper. Prerequisite: course 100 or course 100Y or course 135 or Agricultural and Resource Economics 100A or Economics 100A or Neurobiology, Physiology, and Behavior 162 or Neurobiology, Physiology, and Behavior 163; Statistics 13 or Statistics 13Y or Statistics 100 or course 103A; or consent of instructor. Theoretical and empirical approaches to neuroeconomics (neuroscience of decision making) from psychology, neuroscience, economics, and computer science. Neuroscience of judgment and decision making, behavioral economics, and reinforcement learning. GE credit: SocSci | SS, SL.—Boorman

(new course—eff. spring 18)

135. Cognitive Neuroscience: The Biological Foundations of the Mind (4)
Lecture—4 hours;. Prerequisite: course 1 or course 1Y; course 41; or consent of instructor; course 101, course 121, or course 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.—*F, W, S. (F, W, S.)* Ekstrom, Geng, Janata, Mangun, Ranganath

(change in existing course—eff. winter 18)

136. Psychology of Music (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or course 1Y; course 41; course 100 or course 135 or Music6C); or consent of instructor. Introduction to the mental and neural representations of musical structures and processes involved in perceiving, remembering, and performing music. Music and emotion. GE credit: WE.—*F. (F.)* Janata

(change in existing course—eff. spring 18)

137. Neurobiology of Learning & Memory (4)
Lecture—4 hours. Prerequisite: course 1 or course 1Y; course 41; course 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.—*F, S. (F, S.)* Wiltgen

(change in existing course—eff. spring 18)

138. Consciousness and Cognition (4)
Lecture—4 hours. Prerequisite: course 1 or course 1Y; course 41; course 100 or course 135. Current theoretical and empirical evidence in the study of cognition and consciousness. Theories of consciousness, psychological and neural basis of conscious and unconscious processes such as attention, intentionality, and dreams. (Same course as Cognitive Science 138.)—*W. (W.)* Isham

(change in existing course—eff. spring 18)

139. Advanced Cognitive Neuroscience (4)
Lecture—3 hours; term paper. Prerequisite: course 1 or course 1Y; course 41; course 135; or consent of instructor. Advanced integrative survey of cognitive neuroscience, including perception, attention, memory, and navigation. Emphasis on reviewing literature in psychology, neuroscience, and statistics; understanding methods in cognition; and presentation skills. GE credit: SL.—*S. (S.)* Ekstrom, Geng

(change in existing course—eff. spring 18)

140. Developmental Psychology (4)
Lecture—4 hours. Prerequisite: course 1 or course 1Y; course 41. Pass One open to Psychology majors. Ontogenetic account of human behavior through adolescence with emphasis on motor skills, mental abilities, motivation, and social interaction. Two units of credit allowed to students who have completed Human Development 100A or 100B. Not open for credit to students who have completed course 112. (Former course 112.)—*F, W, S. (F, W, S.)* Cross, Ghetti, Goodman, Graf Estes, Lagattuta, Oakes

(change in existing course—eff. winter 18)

143. Infant Development (4)
Lecture—3 hours; extensive writing. Prerequisite: course 1 or course 1Y; course 41; 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.—*F. (F.)* Oakes

(change in existing course—eff. winter 18)

145. Developmental Cognitive Neuroscience (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 135 or course 140 or Human Development 100A or Human Development 100B; course 101 or course 121 or Neurobiology, Physiology, and Behavior 161 or Human Development 163; course 141 recommended. Neuroscientific theories and methods (EEG, ERP, fNIRS, fMRI) that inform an understanding of behavioral and cognitive development over infancy and childhood. Neurodevelopmental correlates of perception, action, language, and social cognition; value of the neuroscientific perspective; limitations and challenges of neuroscientific research in the developmental context. GE credit: SL.

(new course—eff. fall 18)

146. The Development of Memory (4)
Lecture—3 hours; term paper. Prerequisite: course 1 or course 1Y; course 41; and any Psychology upper division course from Core Group A or D. Pass One open to Psychology majors. Theory and research on memory development with focus on infancy and childhood. Not open for credit to students who have completed course 133. GE credit: WE.—*S. (S.)* Ghetti, Rivera

(change in existing course—eff. spring 18)

148. Developmental Disorders (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or course 1Y; course 41; course 140 or course 141 or Human Development 100A or Human Development 100B. Current scientific knowledge of the influences of biological, cognitive, and environmental factors on the emergence of disorders with onset in childhood. Examples include autism spectrum, ADD/ADHD, dyslexia and dyscalculia. Emphasis placed on understanding these disorders, their causes and their treatments.—*F, S. (F, S.)* Rivera

(change in existing course—eff. spring 18)

151. Social Psychology (4)
Lecture—4 hours. Prerequisite: course 1 or course 1Y, course 41 recommended. Pass One open to Psychology majors. Behavior of the individual in the group. Examination of basic psychological processes in social situations, surveying various problems of social interaction: group tensions, norm-development, attitudes, values, public opinion, status. Not open for credit to students who have completed former course 145. GE credit: DD.

(change in existing course—eff. summer 18)

152. Social Cognition (4)
Lecture—4 hours. Prerequisite: course 1 or course 1Y; course 41. Examines how social factors influence how we attend to, encode, and process information and how these mental processes affect subsequent judgments and behavior.—*S. (S.)* Pickett, Sherman

(change in existing course—eff. spring 18)

153. Psychology and Law (4)
Lecture—4 hours. Prerequisite: course 1 or course 1Y; course 41. Pass One open to Psychology majors. Current theoretical and empirical issues in the study of psychology and law. Topics include eyewitness testimony, child abuse, jury decision making, juvenile delinquency and criminology, prediction of violence, insanity defense, and memory for traumatic

events. Not open for credit to students who have completed course 115. Offered in alternate years.—*S.* Goodman

(change in existing course—eff. spring 18)

154. Psychology of Emotion (4)
Lecture—4 hours. Prerequisite: course 1 or course 1Y; course 41. Pass One open to Psychology majors. Introduction to current theories and research on emotion and bodily feelings with special reference to self-knowledge. Not open for credit to students who have completed course 143. Offered in alternate years.—*S.* Goodman

(change in existing course—eff. winter 18)

157. Stereotyping, Prejudice, and Stigma (4)
Lecture/discussion—4 hours. Prerequisite: course 1 or course 1Y; course 41. 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: DD.—*W. (W.)* Sherman

(change in existing course—eff. winter 18)

158. Sexual Orientation and Prejudice (4)
Lecture/discussion—4 hours. Prerequisite: course 1 or course 1Y; course 41. Pass One open to Psychology majors. Current scientific knowledge about sexual orientation and prejudice based on sexual orientation. Emphasis on learning the skills necessary for a critical understanding of science and public policy issues relevant to sexuality. GE credit: ACGH, DD, SS, WE.—*W. (W.)* Herek

(change in existing course—eff. spring 18)

159. Gender and Human Reproduction (4)
Lecture—4 hours. Prerequisite: course 1 or course 1Y; course 41. Pass One open to Psychology majors. Psychology of reproduction. Reproductive events over the course of an individual's life, including sexual development, mate choice, relationships, and reproduction. Biological and social psychological explanations at the levels of mechanism and evolutionary function. Not open for credit to students who have completed former course 149. (Formally course 149.) GE credit: ArtHum.—*S. (S.)* Scheib

(change in existing course—eff. spring 18)

161. Psychology of the Self (4)
Lecture—4 hours. Prerequisite: course 1 or course 1Y; course 41. Psychological theory and research on the self. Topics include: self-knowledge, self-esteem, self-regulation, self-presentation, cognitive and emotional aspects of the self, and the role of the self in shaping social interaction.—*F. (F.)* Pickett

(change in existing course—eff. spring 18)

162. Introduction to Personality Psychology (4)
Lecture—3 hours; term paper. Prerequisite: course 1 or course 1Y; course 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.—*F, S. (F, S.)* Robins

(change in existing course—eff. winter 18)

165. Introduction to Clinical Psychology (4)
Lecture—4 hours. Prerequisite: course 1 or course 1Y; course 41; course 168; course 140 or course 151. Major theoretical formulations in the history of clinical psychology, from classical psychoanalysis to contemporary existentialism and behavior modification. A survey, based on lectures, films, and tapes, of what clinical psychologists do, including methods of appraisal, professional roles, and approaches to treatment.—*S. (S.)* Zane

(change in existing course—eff. spring 18)

168. Abnormal Psychology (4)
Lecture—4 hours. Prerequisite: course 1 or course 1Y; course 41. Descriptive and functional account of behavioral disorders, with primary consideration given to neurotic and psychotic behavior. GE credit: SocSci|SS.—*F, W, S. (F, W, S.)* Schepeler, Zane

(change in existing course—eff. winter 18)

170. Psychology of Religion (4)
Lecture—4 hours. Prerequisite: course 1 or course 1Y; course 41. Major theories, issues, data, and research methodologies of the psychology of religion. Religious experience and expression; religious development in childhood, adolescence, and adulthood; conversion; religious influences on physical and mental health; cross-cultural perspectives. GE credit: Div, Wrt|WE.—*S. (S.)* Emmons

(change in existing course—eff. winter 18)

175. Genius, Creativity, and Leadership (4)
Lecture—3 hours; term paper. Prerequisite: course 1 or course 1Y; course 41; or consent of instructor; or equivalents. The phenomenon of genius examined from a diversity of theoretical, methodological, and disciplinary perspectives, with an emphasis on outstanding creativity and leadership in art, music, literature, philosophy, science, war, and politics. GE credit: SS, WE.—*F, S. (F, S.)* Simonton

(change in existing course—eff. spring 18)

180D. Research in Developmental Psychology (4)
Lecture—2 hours; laboratory—4 hours. Prerequisite: course 41; consent of instructor; four upper division Psychology courses. Empirical research on selected topics in developmental psychology (research design and analysis, development, cognitive development, social and personality development etc.). May be repeated for credit up to one time when content differs.—*(S.)* Gradziel

(new course—eff. winter 17)

185. History of Psychology (4)
Lecture—3 hours; term paper. Prerequisite: course 1 or course 1Y; course 41; upper division standing or consent of instructor. Pass One open to Psychology majors. Development of psychological thought and research in context of history of philosophy and science. Not open for credit to students who have completed course 120. (Former course 120.) GE credit: SS, WE.

(change in existing course—eff. winter 18)

192. Fieldwork in Psychology (1-6)
Fieldwork—1-6 hours. Prerequisite: consent of instructor; upper division standing in psychology. Limited enrollment. Supervised internship off and on campus, in community and institutional settings. Maximum of six units may be used towards satisfaction of upper division major requirement. May be repeated for credit up to one time per internship site. (P/NP grading only.)

(change in existing course—eff. winter 17)

Graduate

205A. Applied Multivariate Analysis of Psychological Data (4)
Lecture—4 hours. Prerequisite: course 204A; course 204B; course 204D; or consent of instructor. Review of the major methods of multivariate data analysis for psychological data. Students will program statistical routines using a linear algebra-based computing language. Topics will include multivariate analysis of variance. discriminant analysis, canonical analysis factor analysis, and component analysis. Not open for credit to students who have completed course 207B. (Former course 207B.) Offered in alternate years.—*W. (W.)* Ferrer

(change in existing course—eff. spring 17)

211. Advanced Topics in Neuroimaging (3)
Seminar—2 hours; laboratory—1 hour. Prerequisite: course 210; or consent of instructor. Restricted to 16 students. Critical presentation and discussion of the most influential advanced issues in neuroimaging, emphasizing fMRI design/analysis and the integration of fMRI with EEG/MEG. May be repeated for credit. (Same course as Neuroscience 211 and Neurobiology, Physiology, and Behavior 211.) (S/U grading only.) Offered in alternate years.—*(S.)* Miller

(change in existing course—eff. spring 17)

242. Attraction and Close Relationships (4)
Seminar—10 hours; term paper—1 hour. Prerequisite: graduate standing in Psychology, Sociology, Human Development, a related social science, or consent of instructor. Social psychological theory and research on attraction and close relationships, with a particular emphasis on romantic relationships. Covers attachment theory, interdependence theory, and evolutionary psychological perspectives. Offered irregularly.

(new course—eff. winter 18)

Professional

390. The Teaching of Psychology (4)
Seminar—4 hours. Prerequisite: consent of instructor; advanced graduate standing in Psychology or a closely related discipline. Methods and techniques of teaching undergraduate psychology. Integration of learning outcomes with effective evaluation. Practical experience in the application of pedagogical principles. (S/U grading only.)—*W. (W.)* Cross

(new course—eff. winter 17)

391. Teaching of Psychology Practicum (4)
Seminar—1 hour; fieldwork—10 hours. Prerequisite: course 390; or consent of instructor. Supervised teaching in undergraduate classrooms. Techniques for delivering content through lectures, discussions, or labs; course administration; communications; assessment of student learning; solving ethical problems; instructional technology. (S/U grading only.)—*S. (S.)* Cross, Ferreira, Henderson

(new course—eff. fall 17)

Religious Studies

New and changed courses in Religious Studies (RST)

Lower Division

1E. Fundamentalism (4)
Lecture—3 hours; discussion—1 hour. Introduction to comparative religion, focusing on the idea of fundamentalism in different religious traditions. No credit given to students that have taken course 3E. GE credit: ArtHum or SocSci, Div, Wrt|AH or SS, DD, OL, WE.—Miller, Watenpaugh

(change in existing course—eff. fall 17)

5. Comparative Religion (2)
Lecture—2 hours. Comparative Religion based on rotating topics such as Dreams and Revelations, Evil, Prophecy, Salvation, and Crime and Punishment. May be repeated for credit. GE credit: ArtHum, Div, Wrt|AH, WE.—*S. (S.)*

(new course—eff. winter 18)

6. Introduction to Health Sciences and the Humanities (4)
Lecture/discussion—3 hours; extensive writing—3 hours. Humanities in the health sciences focusing on illness, the practice of medicine, and the role of culture in biomedical research. GE credit: ACGH, AH, DD, SS, WE.—*F. (F.)*

(new course—eff. spring 18)

21. The Bible and Its Interpreters (4)
Lecture—3 hours; term paper or discussion. Introduction to the Hebrew Bible (Old Testament): key narratives and themes (creation, flood, prophecy, justice, sexuality, etc.); origins in Ancient Israel; diverse ways it has been interpreted in Jewish and Christian communities. GE credit: AH, WC, WE.

(change in existing course—eff. fall 18)

Upper Division

123. Sex and Gender in the Bible (4)
Lecture—3 hours; term paper—3 hours. Gender and sexuality in the Bible and its interpretation in Judaism and Christianity. Femininity and masculinity; gender roles; homosexuality; sexual violence. Historical origins in the ancient world; influence on contemporary views. GE credit: ArtHum, Div, Wrt|AH, WC, WE.—*F, W, S. (F, W, S.)* Mroczek

(new course—eff. fall 17)

Russian

New and changed courses in Russian (RUS)

Upper Division

120. Topics in Russian Literature and Culture (4)
Laboratory/discussion—4 hours. Prerequisite: upper division standing or consent of instructor. Knowledge of Russian not required. Investigation of significant themes and issues of Russian literature and culture within their European context. May be repeated for credit up to one time. GE credit: AH, OL, WC, WE.

(new course—eff. spring 17)

142. Women in Russian Culture (4)
Lecture/discussion—3 hours; term paper. Study of the representation of 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. GE credit: ArtHum|AH, OL, VL, WC, WE.—Kaminer

(change in existing course—eff. winter 17)

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. 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). Students my not take both course 7V and course 7 for credit. GE credit: SocSci, Wrt|SS, WC, WE.—Carey

(change in existing course—eff. spring 17)

14. Forests and Society (3)
Lecture—2 hours; discussion—1 hour; term paper. Class size limited to 120 students. Sociology, natural history and current issues of the world's forests. Application of scientific principles in outdoor laboratories and on-campus field trips. GE credit: ACGH, SE or SS, OL, SL, WE.—*S. (S.)* Horwath

(new course—eff. fall 16)

15. AIDS and Society (4)
(cancelled course—eff. fall 17)

35. The Good, the Bad, and the Ugly (3)
Lecture—2 hours; discussion—1 hour. Class size restricted to 60 students. Impact of microorganisms on Earth, Humans and Society. Historical, scientific, and contemporary issues dealing with microbes on natural and built environments. GE credit: SciEng, SocSci|SE, SS, WE.—*S. (S.)* Rodrigues

(new course—eff. spring 17)

70A. Genetic Engineering in Medicine, Agriculture, and Law (5)
Lecture—5 hours. Not open to students who have completed Biological Sciences 2A and Biological Sciences 2B and Biological Sciences 2C. Historical and scientific study of the impact of genetic engineering in medicine, agriculture, and law, including examination of social, ethical, and legal issues raised. Offered in a distance-learning format. GE credit: SE or SS, SL.

(change in existing course—eff. winter 18)

90C. Herbal Medicine: Relevance for the 21st Century (2)
(cancelled course—eff. fall 17)

90D. Saving Endangered Plant Species: Problems and Prospects (2)
(cancelled course—eff. fall 17)

91A. Explorations in Science and Society: Cultures and Identities (2)
(cancelled course—eff. fall 17)

91B. Explorations in Science and Society: Leadership and Collaboration (2)
(cancelled course—eff. fall 17)

91C. Explorations in Science and Society: Engagement (2)
(cancelled course—eff. fall 17)

Upper Division

109. Environmental Change, Disease and Public Health (4)
Lecture/discussion—3 hours; project. Analysis of environmental changes from pre-history to the present and their influence on disease distribution, virulence and public health. Focus on critical study of many human-driven environmental changes and the accelerated transformation/spread of pathogens under globalization. Not open for credit to students who have taken course History 109B. GE credit: SciEng, SocSci, Div|SE, SS, SL, WC.—*F. (F.)* Davis

(new course—eff. fall 16)

135S. Biodiversity and Society in South Africa (4)
(cancelled course—eff. winter 17)

140. Genetics and Social Issues (4)
(cancelled course—eff. fall 17)

Science and Technology Studies

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

Lower Division

2. Introduction to the History of Science and Technology (4)
Lecture—3 hours; discussion—1 hour. Introduction to topics and methods of the history of science and technology. Emphasis on understanding the role of science and technology in the modern world through a long-term historical perspective. (Same course as History 2.) GE credit: AH, SL, SS, WC, WE.

(new course—eff. fall 17)

11. Science on Trial: Law, Science, and Technology in the United States (4)
Lecture/discussion—3 hours; term paper. Relationships among law, technology, and science. Scientific evidence and testimony, biology education, patenting, and sterilization. GE credit: ACGH, SS.

(new course—eff. spring 18)

Upper Division

101. Introduction to Data Studies (4)
Lecture/discussion—4 hours. Introduction to basic data science concepts, defining problems, clarifying questions, identifying stakeholders, caring for and cleaning data, interviewing techniques, structuring presentations, use of Excel for data problems. GE credit: SS.—Dumit

(new course—eff. fall 17)

112. Visualizing Society with Data (4)
Lecture/lab—3 hours; term paper—3 hours. Analysis and visualization of historical and contemporary data about populations and societies using R. Critical exploration of visual communication of information about people over time and critical assessment of role of data collection and analysis in societies. GE credit: DD, QL, SS.—Merchant

(new course—eff. winter 18)

113. Business and Technology in the United States: From Electricity to E-Commerce (4)
Lecture/discussion—3 hours; term paper. Historical introduction to the joint development of business and technology in the United States from the late nineteenth century to the present day. GE credit: ACGH, SS, WE.

(new course—eff. spring 18)

122. Health and Medical Technologies (4)
Lecture/discussion—3 hours; term paper—3 hours. Critical/historical examination of medical technologies: imaging, pharmaceuticals, genetics, implants/devices. Exploration of mutually constitutive relationship between health, medical technologies, social difference (race/gender/class/sexuality). GE credit: DD, SS.—Merchant

(new course—eff. spring 18)

152. Sounding Data: Critical Approaches to Sonification (4)
Lecture/discussion—3 hours; term paper/discussion—3 hours. Critical and creative approaches to auditory data and display in art, science, and technology. Practical introduction to sonification techniques through sound studies and sensory ethnography. Heuristic listening and collaborative sound design. GE credit: SS, WE.—*S. (S.)* Marshall

(new course—eff. spring 17)

Graduate

210. Digital Technologies: History and Theory (4)
Discussion—3 hours; term paper. Introduction to the history and theory of digital technologies. Human-machine interaction, cybernetics, software studies, and global networking.

(new course—eff. spring 18)

Sociology

New and changed courses in Sociology (SOC)

Lower Division

6. Health and Illness (4)
Lecture—3 hours; discussion—1 hour. Introduction to the sociology of health and illness, including social determinants of health, social inequalities in health/health disparities, social construction of health, the organization of health care, and the politics of health care reform. GE credit: SS, DD.—*S. (S.)* Halfmann, Hamilton

(new course—eff. fall 16)

Upper Division

162. Society, Culture, and Health (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1, 2, 3, or 6 recommended. Analysis of how socio-cultural factors shape illness experience. Eval-

uation of how certain conditions come to be understood as health conditions; illness identities and biographies; doctor-patient interactions; biomedical cultures; and how race, ethnicity, and gender shape health practices. GE credit: SS, DD.—*F, S. (F, S.)* Lo

(new course—eff. fall 16)

163. Population Health: Social Determinants and Disparities in Health (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1, 2, 3, or 6 recommended. Survey of the social determinants and disparities in health: measurement of population health; health transitions and global disparities; domestic disparities in health by class, race/ethnicity, nativity, gender, and sexual orientation; social determinants including social support, social stress, neighborhoods, and policy. GE credit: SS, DD.—*F. (F.)* Hamilton

(new course—eff. fall 16)

164. Health Policy and Politics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1, 2, 3, or 6 recommended. Introduction to health policy and politics, including health care access and delivery, and policies related to health inequalities, the social determinants of illness and health behaviors. GE credit: SS, DD.—*F, S. (F, S.)* Halfmann

(new course—eff. fall 16)

178. Punishment and Corrections (4)
Lecture—3 hours; term paper. Prerequisite: course 1, 2, or 3 recommended. Origins, characteristics, and consequences of various sanctions and punishment regimes including fines, banishment, incarceration, deportation, and execution. GE credit: SS.—*S. (S.)* McCarthy

(new course—eff. spring 17)

192. Internship and Research Practicum (2-6)
Internship—6-18 hours. Prerequisite: consent of Instructor; must have 84 units complete; faculty approval of proposed internship. Supervised internship and study in an agency, organization, or institution; application of sociological concepts to the work experience. Maximum of four units may be counted toward the major. May be repeated for credit with consent of instructor. (P/NP grading only.)—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 18)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of Instructor; must have 84 units complete and faculty approval. Special study. (P/NP grading only.)

(change in existing course—eff. winter 18)

Graduate

224. Sociology of Education (4)
Seminar—9 hours; term paper—3 hours. Prerequisite: course 206 or equivalent recommended. Restricted to graduate students or consent of instructor. Overview of sociological theories accounting for the form, role, and evolution of educational systems. Emphasis on empirical research on education and social stratification and application to educational policy. Offered irregularly.

(change in existing course—eff. winter 18)

254. Sociology of Health and Illness (4)
Seminar—9 hours; term paper—3 hours. Open to graduate or professional students. Sociological perspectives and methods on the study of health and illness. Students select topics for supervised research. Research paper required. Offered irregularly.

(change in existing course—eff. winter 18)

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: College-level courses in each of chemistry, physics, biology, and geology 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.—*F. (F.)* Scow, Southard

(change in existing course—eff. winter 18)

102. Environmental Soil Chemistry (3)
Lecture—3 hours. Prerequisite: General chemistry; course 100 or equivalent recommended. 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.—*W. (W.)* Parikh

(change in existing course—eff. winter 18)

111. Soil Microbiology (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Biological Sciences 2C recommended. 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.—*W. (W.)* Scow

(change in existing course—eff. winter 18)

112. Soil Ecology (3)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or equivalent recommended. Overview of living constituents of soils, their interactions, importance to, and impact on biogeochemical cycles, decomposition, and soil properties. Practical applications of soil biological diversity are emphasized. GE credit: SE.—*F. (F.)* Rodrigues

(change in existing course—eff. winter 18)

118. Soils in Land Use and the Environment (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: consent of instructor; course 100 or equivalent recommended. 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.—*S. (S.)* O'Geen

(change in existing course—eff. winter 18)

Graduate

202. Topics in Advanced Soil Chemistry (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: consent of instructor; general chemistry; course 100 or equivalent recommended. Restricted to 18 students. Reviews of current research in soil chemistry. Topics include double layer theory; clay mineral and oxide surface chemistry; adsorption on soil surfaces; speciation and modeling of solution ions; solubility and mineral stability diagrams. May be repeated for credit up to one time if topic differs.—*W. (W.)* Parikh

(change in existing course—eff. winter 18)

Spanish

New and changed courses in Spanish (SPA)

Lower Division

8. Elementary Spanish Conversation (2)
Discussion—3 hours. Prerequisite: course 3 or course 3V or course 3Y; course 21 (concurrently) recommended. Not open to native speakers or upper division students. Designed to develop oral communication skills. Emphasis on increasing vocabulary, improving listening comprehension, pronunciation, accuracy and grammar control. Practice of everyday situations. GE credit: OL, WC.

(change in existing course—eff. spring 18)

21. Intermediate Spanish (5)
Lecture/discussion—5 hours; laboratory—1 hour. Prerequisite: course 3 or 3S. Review and develop the grammar, vocabulary and composition acquired in the first year through exercises and reading of modern texts. Students transferring from other institutions are recommended to start the second year program at this point. Not open for credit to students who have completed course 21S. GE credit: AH, WC.—*F, W, S. (F, W, S.)*

(change in existing course—eff. spring 16)

22. Intermediate Spanish (5)
Lecture/discussion—5 hours; laboratory—1 hour. Prerequisite: course 21 or 21S or 21V or 21Y. Continuation of course 21 and 21S. Focus on more difficult grammar concepts and further practice on composition. Development of all language skills through exercises and reading of modern texts. Not open for credit to students who have completed course 22S. GE credit: AH, WC.—*F, W, S. (F, W, S.)*

(change in existing course—eff. spring 16)

28. Intermediate Spanish Conversation (2)
Discussion—3 hours. Prerequisite: course 8 or course 22 or course 22V or course 22Y. Continuation of course 8. Designed to develop oral communication skills at a more advanced level. Practice in more complex situations. (Former course 9.) GE credit: OL, WC.

(change in existing course—eff. spring 18)

31. Intermediate Spanish for Native Speakers I (5)
Lecture/discussion—3 hours; tutorial—1 hour; extensive writing. Prerequisite: course 3 or course 3V or course 3Y; or equivalent course or consent of instructor. First course of a three-quarter series designed to provide bilingual students whose native language is Spanish with the linguistic and learning skills required for successfully completing upper division courses in Spanish. Intensive review of grammar and composition. GE credit: AH, OL, WC, WE.—*F. (F.)*

(change in existing course—eff. winter 18)

98F. Student Facilitated Course (1-4)
Prerequisite: consent of instructor. Student facilitated course intended primarily for lower division students. Offered irregularly. (P/NP grading only.)—*F, W, S. (F, W, S.)*

(new course—eff. winter 17)

Upper Division

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 English or Spanish depending on instructor. Not open to students who taken Spanish 171S or Music 127S. May be repeated for credit up to one time

when the topic differs. (Same course as Music 127.) Offered in alternate years. GE credit: ArtHum, Wrt|AH, VL, WC, WE.—*F. (F.)* Hess, Irwin, Ortiz

(change in existing course—eff. winter 18)

127S. 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 or English depending on instructor. Not open to students who have taken Spanish 171 or Music 127. May be repeated for credit up to one time when content differs. (Same course as Music 127S.) Offered in alternate years. GE credit: ArtHum, Wrt|AH, VL, WC, WE.—*F. (F.)* Irwin, Ortiz

(new course—eff. winter 18)

151N. Survey of Spanish-American Literature 1900 to Present (4)
(cancelled course—eff. fall 16)

198F. Student Facilitated Course (1-4)
Prerequisite: consent of instructor. Student facilitated course intended primarily for upper division students. (P/NP grading only.)—*F, W, S. (F, W, S.)*

(new course—eff. winter 17)

199FA. Student Facilitated Course Development (1-2)
Prerequisite: consent of instructor. Open to upper division Spanish majors only. Under the supervision of a faculty member, an undergraduate student plans and develops the course they will offer under 98F/198F. (P/NP grading only.)—*F, W, S. (F, W, S.)*

(new course—eff. spring 17)

199FB. Student Facilitated Teaching (1-4)
Prerequisite: course 199FA; consent of instructor. Must have completed course 199FA, and be teaching a course 98F or 198F; open to upper division Spanish majors only. Student-facilitated course under the supervision of a faculty member, an undergraduate student teaches a course under 98F/198F. (P/NP grading only.)—*F, W, S. (F, W, S.)*

(new course—eff. spring 17)

Graduate

230. Topics in Latin American Cultural Studies (4)
Seminar—3 hours; term paper. Discussion of select contemporary theoretical debates in Latin American Cultural Studies. Application of critical questions to the analysis of cultural texts. May be repeated for credit up to two times when content differs.—Irwin

(change in existing course—eff. fall 07)

Statistics

New and changed courses in Statistics (STA)

Lower Division

32. Gateway to Statistical Data Science (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 16B or Mathematics 21B or Mathematics 17B. Probability concepts; programming in R; exploratory data analysis; sampling distribution; estimation and inference; linear regression; simulations; resampling methods. Alternative to Statistics 13 for students with a background in calculus and programming. Only two units of credit allowed to students who have taken course 13; not open for credit to students who have taken course 100. GE credit: SciEng|QL, SE.—*W, S. (W, S.)*

(change in existing course—eff. winter 18)

Upper Division

100. Applied Statistics for Biological Sciences (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: Mathematics 16B or Mathematics 17B or Mathematics 21B. Descriptive statistics, probability, sampling distributions, estimation, hypothesis testing, contingency tables, ANOVA, regression; implementation of statistical methods using computer package. Only two units credit allowed to students who have taken course courses 13, 32 or 103; not open for credit to students who have taken course 102. GE credit: SciEng|QL, SE.—*F, W, S, Su. (F, W, S, Su.)*

(change in existing course—eff. spring 17)

103. Applied Statistics for Business and Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 13 or course 13Y or course 32 or course 100; Mathematics 16B or Mathematics 17B or Mathematics 21B. Descriptive statistics; probability; random variables; expectation; binomial, normal, Poisson, other univariate distributions; joint distributions; sampling distributions, central limit theorem; properties of estimators; linear combinations of random variables; testing and estimation; Minitab computing package. Two units credit given to students who have completed course 100. GE credit: SciEng|QL, SE.—*F, W, S, Su. (F, W, S, Su.)*

(change in existing course—eff. winter 18)

104. Applied Statistical Methods: Nonparametric Statistics (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: course 13 or course 13Y or course 32 or course 100. Sign and Wilcoxon tests, Walsh averages. Two-sample procedures. Inferences concerning scale. Kruskal-Wallis test. Measures of association. Chi square and Kolmogorov-Smirnov tests. Offered in alternate years. GE credit: SciEng|QL, SE.—*S. (S.)*

(change in existing course—eff. winter 18)

106. Applied Statistical Methods: Analysis of Variance (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 13 or course 13Y or course 32 or course 100. Basics of experimental design. One-way and two-way fixed effects analysis of variance models. Randomized complete and incomplete block design. Multiple comparisons procedures. One-way random effects model. GE credit: SciEng|SE.—*F, W, S, Su. (F, W, S, Su.)*

(change in existing course—eff. winter 18)

108. Applied Statistical Methods: Regression Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 13 or course 13Y or course 32 or course 100. Simple linear regression, variable selection techniques, stepwise regression, analysis of covariance, influence measures, computing packages. GE credit: SciEng|QL, SE, SL.—*F, W, S, Su. (F, W, S, Su.)*

(change in existing course—eff. winter 18)

130A. Mathematical Statistics: Brief Course (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 16C or Mathematics 17C or Mathematics 21C. 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.—*F. (F.)*

(change in existing course—eff. winter 18)

131A. Introduction to Probability Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 21B; Mathematics 21C; Mathematics 22A or Mathematics 67. 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.—*F, S. (F, S.)*

(change in existing course—eff. winter 18)

131B. Introduction to Mathematical Statistics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 131A or Mathematics 135A; or consent of 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.—*W. (W.)*

(change in existing course—eff. winter 17)

141. Statistical Computing (4)
(cancelled course—eff. fall 16)

141A. Fundamentals of Statistical Data Science (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 108 or course 106; course 32 or course 100 or course 13 or course 13Y. Introduction to computing for data analysis and visualization, and simulation, using a high-level language (e.g., R). Computational reasoning, computationally intensive statistical methods, reading tabular and non-standard data. Not open for credit to students who have taken course 141 or course 242.—*F. (F.)*

(change in existing course—eff. spring 18)

141B. Data & Web Technologies for Data Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 141A. Essentials of using relational databases and SQL. Processing data in blocks. Scraping Web pages and using Web services/APIs. Basics of text mining. Interactive data visualization with Web technologies. Computational data workflow and best practices. Statistical methods.—*W. (W.)*

(change in existing course—eff. winter 18)

190X. Seminar (1-2)
Seminar—1-2 hours. Prerequisite: course 13 or course 13Y or course 32 or course 100 or course 103. In-depth examination of a special topic in a small group setting.

(change in existing course—eff. spring 18)

141C. Big Data & High Performance Statistical Computing (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 141B or course 141A and Engineering: Computer Science 10. High-performance computing in high-level data analysis languages; different computational approaches and paradigms for efficient analysis of big data; interfaces to compiled languages; R and Python programming languages; high-level parallel computing; MapReduce; parallel algorithms and reasoning.—*S. (S.)*

(change in existing course—eff. winter 18)

194HA. Special Studies for Honors Students (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. fall 16)

194HA. Special Studies for Honors Students (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. fall 16)

Graduate

200A. Introduction to Probability Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 21A; Mathematics 21B; Mathematics 21C; Mathematics 22A; consent of instructor. Funda-

mental 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.—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 18)

200B. Introduction to Mathematical Statistics I (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A; or consent of instructor. Sampling, methods of estimation, bias-variance decomposition, sampling distributions, Fisher information, confidence intervals, and some elements of hypothesis testing. —*W, S. (W, S.)*

(change in existing course—eff. winter 18)

200C. Introduction to Mathematical Statistics II (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200B; or consent of the instructor. Testing theory, tools and applications from probability theory, Linear model theory, ANOVA, goodness-of-fit. No credit to students who have taken course 131C.—*S. (S.)*

(change in existing course—eff. winter 18)

209. Optimization for Big Data Analytics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A; course 208. Optimization algorithms for solving problems in statistics, machine learning, data analytics. Review computational tools for implementing optimization algorithms (gradient descent, stochastic gradient descent, coordinate descent, Newton's method.).

(change in existing course—eff. spring 18)

Sustainable Agriculture and Food Systems

New and changed courses in Sustainable Agriculture and Food Systems (SAF)

Lower Division

43. Energy, Materials, and Design Over Time (4)
Lecture—3 hours; discussion—1 hour. 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. (Same course as Design 40A). GE credit: ArtHum | AH, WC.—*W. (W.)* Cogdell

(new course—eff. spring 18)

90X. SA & FS Seminar (1-2)
Seminar—3-6 hours. Introductory or survey topics within Sustainable Agriculture and Food Systems. May be repeated for credit. (P/NP grading only.)—*F, W, S, Su. (F, W, S, Su.)*

(new course—eff. spring 18)

Upper Division

121. Politics of Public Art (4)
Lecture/discussion—4 hours. Politics of public art. Role of contemporary artists, public monuments, urban spaces, the movie industry, photography, propaganda art, and comics in construction of political ideologies and collective identities. GE credit: ArtHum | AH, VL, WE.—*S. (S.)* Grigor, Talinn

(new course—eff. winter 18)

Technocultural Studies

New and changed courses in Technocultural Studies (TCS)

Lower Division

100. Experimental Digital Cinema I (4)
Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: Cinema & Technocultural Studies 20 or Dramatic Art 12 or course 7B; course 170B; or equivalent with consent of instructor. Class size limited to 20 students. Experimental approaches to the making of film and video in the age of digital technologies. Builds upon foundation provided by course 20. Instruction in technical, conceptual, creative, and critical skills for taking a project from idea to fruition. GE credit: AH, OL, VL.—Wyman

(change in existing course—eff. spring 17)

121. Introduction to Electronic Sound (4)
Lecture/discussion—3 hours; laboratory—3 hours. Introduction to the use of electronic sound within the arts. Techniques and aesthetics of experimental contemporary practices. Creation of original sound works.—Ostertag

(change in existing course—eff. winter 18)

Textiles and Clothing

New and changed courses in Textiles and Clothing (TXC)

Upper Division

173. Principles of Fashion Marketing (3)
Lecture—3 hours. Prerequisite: course 8; Economics 1A or Economics 1AV; Agricultural and Resource Economics 113 or Agricultural and Resource Economics 136. Study of basic elements of fashion marketing including philosophy and objectives, organization, merchandising, pricing, promotion and personnel. GE credit: SocSci | SS, VL.

(change in existing course—eff. spring 18)

180A. Introduction to Research in Textiles (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.—*F, W, S. (F, W, S.)*

(change in existing course—eff. fall 16)

180B. Introduction to Research in Textiles (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.—*F, W, S. (F, W, S.)*

(change in existing course—eff. fall 16)

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 or Statistics 13Y; 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.)—*W. (W.)*

(change in existing course—eff. spring 18)

UC Davis Washington Center

New and changed courses in UC Davis Washington Center (WAS)

Upper Division

175. Health Policy and Health Politics (4)
(cancelled course—eff. fall 16)

University Writing Program

New and changed courses in University Writing Program (UWP)

Lower Division

10. Introduction to Professional Writing Studies (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or course 1V or course 1Y; 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: AH, WE.—*F. (F.)*

(change in existing course—eff. spring 18)

13. Video Game Rhetorics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better. Examination of video games as rhetorical texts whose meaning is produced through complex interplay of procedures, narratives, rules, and context. Writing about video games using critical perspectives and analytic methods. GE credit: AH, VL, WE.—*S. (S.)* Ching

(new course—eff. spring 18)

18. Style in the Essay (4)
Lecture/discussion—4 hours. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative

Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 003 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better. 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.—*F, W, S. (F, W, S.)*

(change in existing course—eff. spring 18)

19. Writing Research Papers (4)
Lecture/discussion—4 hours. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better. 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.—*F, W. (F, W.)*

(change in existing course—eff. spring 18)

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

(new course—eff. fall 18)

23. Advanced Academic Reading and Writing for Multilingual Students (4)
Lecture/discussion—4 hours. Prerequisite: course 22. Pass One passed course 22 with a C- or better OR a score of 80-89 on the English Language Placement Examination (ELPE) offered by the UWP. Reading and writing source/research-based texts for academic purposes. Suitable for students whose primary home language was not English.—*F, W, S. (F, W, S.)*

(cancelled course—eff. fall 16)

25. Academic Writing for ESL Students (4)
Lecture/discussion—4 hours. Prerequisite: consent of instructor. Writing skills necessary for upper division courses, including skills crucial to writing lab and project reports, summaries, critiques, abstracts, and responses to exam questions. Includes practice with the syntax, grammar, and vocabulary characteristics of academic writing. Not open for credit to students who have taken Linguistics 27. Offered irregularly.—*F. (F.)*

(new course—eff. spring 18)

26. Reading in Scientific and Technical Subjects for ESL Students (4)
Lecture/discussion—4 hours. Prerequisite: consent of instructor. Instruction and practice in reading scientific and technical texts. Techniques for comprehending and analyzing grammatical and organizational patterns. Notetaking skills, summarizing, vocabulary enrichment. Not open for credit to students who have taken Linguistics 28. (P/NP grading only.)—*W, S. (W, S.)*

(new course—eff. fall 18)

28. Persuasive Writing for Multilingual Students (4)
Lecture/discussion—4 hours. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better. Instruction in analyzing style of persuasive texts, using appropriate vocabulary, and applying English grammatical structures in argumentation. Suitable for multilingual students desiring additional instruction in persuasive English writing. GE credit: AH, WE.—*F, W, S. (F, W, S.)*

(new course—eff. fall 17)

29. Research Writing for Multilingual Students (4)
Lecture/discussion—4 hours. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better. Reading and writing effectively in various research genres across the disciplines. Suitable for multilingual students desiring additional instruction in the linguistic and rhetorical features of research writing in English for academic purposes. GE credit: AH, WE.—*F, W, S. (F, W, S.)*

(new course—eff. fall 17)

48. Style in the Essay (4)
Lecture/discussion—4 hours. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; or equivalent. Restricted to completion of course 1, or equivalent, with C- (P) or better. Principles of style, language, and structure in the essay. Analysis and development of voice and genre, including sentence revision for force and clarity, and development of effective paragraphs and essays. Not open for credit to students who have taken course 18. GE credit: AH, WE.—*F, W, S. (F, W, S.)*

(new course—eff. spring 18)

49. Writing Research Papers (4)
Lecture/discussion—4 hours. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; or equivalent. Restricted to completion of course 1, or equivalent, with C- (P) or better. Principles of research writing. Analysis and development of research topics and effective arguments, including critical reading, analysis, integration, and documentation of source material. Not open for credit to students who have taken course 19. GE credit: AH, WE.—*F, W, S. (F, W, S.)*

(new course—eff. fall 18)

92. Internship in Writing (1-12)
Internship—3-36 hours. Prerequisite: course 1 or course 1V or course 1Y or English 3. Internships in fields where students can practice their skills. May be repeated for credit for a total of 12 units. (P/NP grading only.)

(change in existing course—eff. winter 18)

98. Directed Group Study (1-5)
Prerequisite: course 1 or course 1V or course 1Y or English 3; or equivalent course; consent of instructor. May be repeated two times for credit. (P/NP grading only.) GE credit: AH, WE.

(change in existing course—eff. winter 18)

99. Special Study for Undergraduates (1-5)
Prerequisite: course 1 or course 1V or course 1Y or English 3; or equivalent course; consent of instructor. (P/NP grading only.) GE credit: AH, WE.

(change in existing course—eff. winter 18)

Upper Division

100. Genre Theory and Professional Writing (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 1 or course 1V or course 1Y; course 10; or the equivalent of course 1. 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.—*W. (W.)*

(change in existing course—eff. spring 18)

101. Advanced Composition (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; 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.—*F, W, S, Su. (F, W, S, Su.)*

(change in existing course—eff. winter 18)

102A. Writing in the Disciplines: Special Topics (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; 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.—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 18)

102B. Writing in the Disciplines: Biology (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; 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.—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 18)

102C. Writing in the Disciplines: History (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; 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.—*W. (W.)*

(change in existing course—eff. winter 18)

102D. Writing in the Disciplines: International Relations (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; 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.—*W. (W.)*

(change in existing course—eff. winter 18)

102E. Writing in the Disciplines: Engineering (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; 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.—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 18)

102F. Writing in the Disciplines: Food Science and Technology (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; 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.—*S. (S.)*

(change in existing course—eff. winter 18)

102G. Writing in the Disciplines: Environmental Writing (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; 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.—*S. (S.)*

(change in existing course—eff. winter 18)

102H. Writing in the Disciplines: Human Development and Psychology (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; 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.—*F. (F.)*

(change in existing course—eff. winter 18)

102I. Writing in the Disciplines: Ethnic Studies (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; 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.—*F. (F.)*

(change in existing course—eff. winter 18)

102J. Writing in the Disciplines: Fine Arts (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; 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.—*F, S. (F, S.)*

(change in existing course—eff. winter 18)

102K. Writing in the Disciplines: Sociology (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; 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.—*S. (S.)*

(change in existing course—eff. winter 18)

102L. Writing in the Disciplines: Film Studies (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; 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.—*W. (W.)*

(change in existing course—eff. winter 18)

102M. Writing in the Disciplines: Community and Regional Development (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; and upper division standing. 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.—*S. (S.)*

(change in existing course—eff. winter 18)

102N. Writing in the Disciplines: Anthropology (4)
Lecture—3 hours; term paper. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; 4 or 5 on AP English Lit and Comp exam; or 6 or better on IB HL English Exam. Restricted to upper division standing; Anthropology Major or Minor. Advanced instruction in writing and practice in effective styles of communication in Anthropology and related academic and professional fields. GE credit: AH, WE.

(change in existing course—eff. summer 18)

104A. Writing in the Professions: Business Writing (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; 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.—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 18)

104B. Writing in the Professions: Law (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; 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.—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 18)

104C. Writing in the Professions: Journalism (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; 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.—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 18)

104D. Writing in the Professions: Elementary and Secondary Education (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; and upper division standing. Advanced expository writing in the contemporary American

classroom. Strongly recommended for teaching credential candidates. GE credit: ArtHum, Wrt|AH, WE.—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 18)

104E. Writing in the Professions: Science (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; 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.—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 18)

104F. Writing in the Professions: Health (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; and upper division standing. Not open to students who have taken course 104FY. 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. Not open for credit to students who have taken course 104FY. GE credit: ArtHum, Wrt|AH, WE.—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 18)

104FY. Writing in the Professions: Health (4)
Lecture/discussion—1.5 hours; web electronic discussion—1.5 hours; extensive writing. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; and upper division standing. Not open to students who have taken course 104F. 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. Not open for credit to students who have taken course 104F. GE credit: ArtHum|AH, WE.—*F, W, S, Su. (F, W, S, Su.)*

(change in existing course—eff. winter 18)

104I. Writing in the Professions: Internships (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; 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. Offered irregularly. GE credit: ArtHum, Wrt|AH, WE.—*S. (S.)*

(change in existing course—eff. winter 18)

104J. Writing in the Professions: Writing for Social Justice (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; and upper division standing. Advanced instruction in writing for Social Justice, using an interdisciplinary approach combining feminist, critical race, ethnic, cultural, and transnational studies; practice in techniques of research and styles of communication for diverse audiences. Suitable for activists in community organizing, non-profits, politics. GE credit: ArtHum|AH, WE.—*W. (W.)*

(change in existing course—eff. winter 18)

104T. Writing in the Professions: Technical Writing (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 C- or better or course 1V C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better; and upper division standing. 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.—*F, W, S. (F, W, S.)*

(change in existing course—eff. winter 18)

106. English Grammar (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or course 1V or course 1Y or English 3 or Linguistics 1 or Linguistics 1Y; 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.

(change in existing course—eff. winter 18)

Upper Division

192. Internship in Writing (1-12)
Internship—3-36 hours. Prerequisite: course 1 or course 1V or course 1Y or English 3; or equivalent course; consent of instructor. 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 18)

198. Directed Group Study (1-5)
Prerequisite: course 1 or course 1V or course 1Y or English 3; or equivalent course; 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 18)

Graduate

395. Teaching Multilingual Writers (4)
Seminar—3 hours. Prerequisite: graduate standing or advanced undergraduate standing; recommended: course 390, Linguistics 1, English/Linguistics/course 106. Preparing teachers of university-level second language writers, whether in composition courses or courses in other disciplines with a substantial writing component. Suitable for graduate students and advanced undergraduates.—*F, W, S. (F, W, S.)* Ferris

(new course—eff. fall 17)

Veterinary Medicine: Medicine and Epidemiology

New and changed courses in Veterinary Medicine: Medicine and Epidemiology (VME)

Lower Division

57V. Global Population, Health, and Environment (4)
Web virtual lecture—2 hours; web electronic discussion—2 hours. Students critically examine multi-scale processes involving human, animal, and ecosystem health. Online team and independent work engage local and global topics around population pressures on environments and environmental pressures on populations.—*W. (W.)* Smith

(new course—eff. spring 17)

Upper Division

158. Infectious Disease in Ecology and Conservation (3)
Lecture—3 hours. Prerequisite: Biological Sciences 2A; Biological Sciences 2B; Biological Sciences 2C; or equivalent; Evolution and Ecology 100 is recommended. Introduction to the dynamics and control of infectious disease in wildlife, including zoonotic diseases and those threatening endangered species. Basic epidemiological models and application to field data. Scientists' role in developing disease control policies.—*W. (W.)* Foley

(change in existing course—eff. winter 17)

Graduate

201. Emerging Issues at the Interface of Ecosystem, Animal and Human Health (3)
(cancelled course—eff. winter 17)

225. Viral Pathogenesis Seminar/Journal Club (1)
Discussion—1 hour. Prerequisite: consent of instructor; graduate student status in the Comparative Pathology, Microbiology or Immunology graduate groups. Participatory seminar addressing the mechanisms of retroviral pathogenesis in a journal club format. Focus on the review of current scientific journal papers concerning viral pathogenesis, immunology and virology with a special focus on retroviruses. May be repeated for credit up to 12 times. (S/U grading only.)—*F, W, S. (F, W, S.)* Murphy, Sparger

(change in existing course—eff. winter 17)

Veterinary Medicine: Molecular Biosciences

New and changed courses in Veterinary Medicine: Molecular Biosciences (VMB)

Upper Division

101V. Principles of Pharmacology and Toxicology (3)
Web virtual lecture—0.3 hours; web electronic discussion—1.5 hours; project—1.5 hours; auto tutorial—2 hours. Prerequisite: upper division standing in a science major; chemistry through organic chemistry, general biology, or consent of instructor; good standing with the university; computing capability (use MS Word®, Excel®, PowerPoint, menu driven software programs, Course LMS); own a computer or have ready access to a computer with broadband internet access; Neurobiology, Physiology, and

Behavior 101 and Biological Sciences 104 recommended. Online course will provide training in core concepts of pharmacological and toxicological sciences and prepare students to develop higher-order problem solving and critical thinking skills. GE credit: SE, OL, SL.—*F. (F.)* Puschner

(new course—eff. fall 16)

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.—*S. (S.)* Puschner

(change in existing course—eff. winter 17)

Veterinary Medicine: Pathology, Microbiology, and Immunology

New and changed courses in Veterinary Medicine: Pathology, Microbiology, and Immunology (PMI)

Upper Division

127. Medical Bacteria and Fungi (3)
Lecture—3 hours. Prerequisite: course 127L (can be concurrent); any Microbiology course with lab; Immunology strongly recommended; PMI 127L to be taken concurrently. Pass One restricted to Microbiology majors. Introduction to the bacterial and mycotic pathogens of man and animals, with emphasis on pathogenic mechanisms and ecologic aspects of infectious disease.

(change in existing course—eff. fall 18)

127L. Medical Bacteria and Fungi Lab (2)
Laboratory—6 hours. Prerequisite: course 127 (can be concurrent); any Microbiology course with lab; Immunology strongly recommended. Pass One restricted to Microbiology majors. Introduction to the bacterial and mycotic pathogens of man and animals, with emphasis on pathogenic mechanisms and ecologic aspects of infectious disease.

(new course—eff. fall 18)

Graduate

200. Research Foundations (1)
Seminar—1 hour. Introduction to key components of graduate school success including mentor/mentee relationship issues, avoiding plagiarism, hypothesis development and experimental design, demystifying the grant writing process, understanding the NIH administrative structure, preparing for a non-academic career, and strategies to maintain a work-life balance. (S/U grading only.)

(new course—eff. fall 18)

206. Mentored Scientific Writing (1)
Discussion—1.5 hours. Prerequisite: consent of instructor. Enrollment limited to 12 students. Drafting a scientific manuscript for publication based on research results. Students engage in collaborative peer review and learn effective writing, including how to convey a persuasive message and write clearly and succinctly. May be repeated for credit up to one time. (S/U grading only.)—*S. (S.)* Christopher

(change in existing course—eff. winter 17)

Veterinary Medicine: Population Health and Reproduction

New and changed courses in Veterinary Medicine: Population Health and Reproduction (PHR)

Graduate

242. Ecological Genetics: Applied Genetics for Ecology, Health, and Conservation of Natural Populations (3)
(cancelled course—eff. spring 17)

Veterinary Medicine: Preventive Veterinary Medicine

New and changed courses in Veterinary Medicine: Preventive Veterinary Medicine (MPM)

Graduate

208. Research Planning and Reporting I (2)
Lecture/discussion—2 hours. Prerequisite: MPVM standing or consent of instructor. Identify and implement research questions through hypothesis construction, articulation of aims, acquiring permits, working as a team, and all other techniques needed to develop a successful research program. Not open for credit to students who have previously taken course 408B.—*F. (F.)*

(new course—eff. winter 17)

209. Research Planning and Reporting II (1)
Lecture/discussion. Prerequisite: course 208. Concepts and skills in effective scientific writing for publication in a peer-reviewed journal in animal health or biomedicine. Includes developing an argument, organizing and writing a manuscript, improving readability, and responding to peer review.—*W. (W.)* Christopher

(change in existing course—eff. fall 16)

210. Advanced Health Leadership (1.5)
Lecture; discussion. Class size limited to 35 students. Develop skills for effective scientific leadership, including: project management and collaboration, conflict resolution, communication with the public, dynamic distribution of health information, and evidence-based policy influence.—*F. (F.)* Mazet

(change in existing course—eff. winter 17)

212. Concepts and Methods in Infectious Disease Surveillance and Control (3)
Lecture—2 hours; discussion/laboratory—1 hour. Prerequisite: consent of instructor. Basic and advanced level of conceptual and methodological foundations in infectious disease epidemiology necessary for veterinarians to develop and evaluate programs for detection, prevention, and control of infectious diseases in animal populations.—*W. (W.)* Lopez

(new course—eff. fall 16)

Professional

403. Medical Statistics II (3)
(cancelled course—eff. spring 18)

410. Animal Health Policy and Risk Communication (1)
(cancelled course—eff. winter 17)

Viticulture and Enology

New and changed courses in Viticulture and Enology (VEN)

Upper Division

123. Analysis of Musts and Wines (2)
Lecture—2 hours. Prerequisite: Chemistry 2C; Chemistry 8B; Plant Sciences 21. Fundamental principles of analytical chemistry as they relate to specific methods used in winemaking. GE credit: SciEng|SE.—*F. (F.)* Waterhouse

(change in existing course—eff. winter 18)

123L. Analysis of Musts & Wines Laboratory (2)
Lab—3 hours; independent study—3 hours. Prerequisite: course 123 (can be concurrent); Chemistry 2C; Chemistry 8B; Plant Sciences 21; Or equivalent of Chemistry 8B. Restricted to upper division and graduate students in Viticulture & Enology; others by approval of instructor. 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. GE credit: SciEng, Wrt|QL, SE, VL, WE.—*F. (F.)* Waterhouse

(change in existing course—eff. winter 18)

125. Wine Types and Sensory Evaluation (2)
Lecture—2 hours. Prerequisite: Plant Sciences 120 or Statistics. 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.—*S. (S.)* Heymann

(change in existing course—eff. spring 18)

127L. Post-Fermentation Wine Processing Lab (3)
Laboratory—9 hours. Prerequisite: course 123; course 123L; course 126; course 126L; course 135 (can be concurrent); consent of instructor. Restricted to upper division or graduate standing. Sensory and chemical impact of processing on wines; bench-scale analytical results to make and implement processing decisions; principles and theories of equipment operation and scale-up.—*S. (S.)* Runnebaum

(new course—eff. spring 18)

128. Wine Microbiology (2)
Lecture—2 hours. Prerequisite: course 123, course 124; Microbiology 102, Food Science and Technology 104, Food Science and Technology 104L; Microbiology 103L; course 125, course 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.—*W. (W.)* Bisson

(change in existing course—eff. winter 18)

128L. Wine Microbiology Laboratory (2)
Laboratory—6 hours. Prerequisite: course 123; course 124; course 128 (can be concurrent); Food Science and Technology 104; Food Science and Technology 104L; Microbiology 103L. Restricted to upper division major students in fermentation science or viticulture & enology; graduate students in the food science program. 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.—*W. (W.)* Bisson

(change in existing course—eff. winter 18)

135. Wine Technology and Winery Systems (4)
Lecture—3 hours; discussion/laboratory—2 hours. Prerequisite: course 21; Mathematics 16A; Mathematics 16B; Physics 1A, Physics 1B or Physics 7A. 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.—*S. (S.)* Block

(change in existing course—eff. spring 18)

Graduate

210. Grape Development and Composition (3)
Discussion—1 hour; lecture—2 hours. Prerequisite: Biological Sciences 102, Biological Sciences 103; or Biological Sciences 105. Anatomy, physiology and biochemistry of grape berry development, with emphasis on the development of grape composition relevant to winemaking. Offered in alternate years.—*S.* Cantu, Dario

(change in existing course—eff. winter 18)

216. Sustainable Vineyard Development (5)
Lecture/discussion—3 hours; fieldwork—3 hours; term paper. Prerequisite: course 101A, course 101B, course 101C; course 115 or course 118; or consent of instructor. 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.—*F. (F.)* Smart

(change in existing course—eff. winter 17)

Wildlife, Fish, and Conservation Biology

New and changed courses in Wildlife, Fish, and Conservation Biology (WFC)

Lower Division

51. Introduction to Conservation Biology (3)
Lecture—3 hours. Introduction to conservation biology including both biological and social issues related to the loss of species and habitats. Intended for students with no background in biological sciences. GE credit: SciEng, Wrt|SE, SL.—*S. (S.)* Caro

(change in existing course—eff. spring 17)

Upper Division

122. Population Dynamics and Estimation (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 16A, Mathematics 16B; Statistics 13 or Statistics 13Y; Biological Sciences 2A, Biological Sciences 2B, Biological Sciences 2C; or the equivalent of Statistics 13; an upper division course in ecology. Description of bird, mammal and fish population dynamics, modeling philosophy, techniques for estimation of animal abundance (e.g., mark-recapture, change-in-ratio, etc.), mathematical models of populations (e.g., Leslie matrix, logistic, dynamic pool, stock-recruitment); case histories.—*S. (S.)* Botsford

(change in existing course—eff. spring 18)

130. Physiological Ecology of Wildlife (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 2A-2C; Evolution and Ecology 101 or Environmental Science and Policy 100 or equivalent course, can be taken concurrently. 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.—*W. (W.)* Fangue

(change in existing course—eff. winter 17)

134. Herpetology (3)
Lecture—2 hours; term paper. Prerequisite: Biological Sciences 2A, 2B, 2C; upper division ecology 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.—*W.* Todd

(change in existing course—eff. winter 17)

134L. Herpetology Laboratory (3)
Laboratory—6 hours. Prerequisite: course 134 (can be concurrent) and 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.—*W.* Todd

(change in existing course—eff. winter 17)

136. Ecology of Waterfowl and Game Birds (4)
Lecture—3 hours; laboratory—3 hours; fieldwork—1 hour. Prerequisite: course 111, course 111L (strongly recommended) or consent of instructor. Detailed examination of distribution, behavior, population dynamics, and management of waterfowl and upland game birds. Offered in alternate years.—*(W.)* Eadie

(change in existing course—eff. winter 17)

141. Behavioral Ecology (4)
Lecture—3 hours; film viewing—1 hour. Prerequisite: Biological Sciences 2A-2C; Evolution and Ecology 101 or Environmental Science and Policy 100 or equivalent course (can be taken concurrently). 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.—*(W.)* Caro

(change in existing course—eff. winter 17)

152. Ecology of Human—Wildlife Conflicts (3)
Lecture—3 hours. Prerequisite: Biological Sciences 2B or equivalent. Ecological approaches to managing wild vertebrates that come into conflict with agriculture, public health, or the conservation of biodiversity. Offered in alternate years.—*W.* Van Vuren

(change in existing course—eff. winter 17)

154. Conservation Biology (4)
Lecture—3 hours; term paper. Prerequisite: Biological Sciences 2A-2C; Evolution and Ecology 101 or Environmental Science and Policy 100 or equivalent course (can be taken concurrently). Introduction to conservation biology and background to the biological issues and controversies surrounding loss of species and habitats. Review of species' recovery plan. GE credit: SciEng|SE, WE.—*F. (F.)* Todd

(change in existing course—eff. winter 17)

160. Animal Coloration (3)
Lecture/discussion—3 hours. Prerequisite: Biological Sciences 2A, 2B, 2C. Evolutionary and ecological significance of coloration in mammals, birds, reptiles, amphibians, fish, cephalopods, crustaceans, spiders, insects, humans as well as color in fashion, plants and the military. Topics include history, protective coloration, warning coloration, mimicry, sexual dichromatism and color change. Offered in alternate years.—*(W.)* Caro

(change in existing course—eff. winter 17)

Women's Studies

New and changed courses in Women's Studies (WMS)

Upper Division

102. Gender and Post Colonialism (4)
Lecture/discussion—4 hours; term paper. 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. GE credit: ArtHum or SocSci, Div, Wrt|AH or SS, DD, WC, WE.

(change in existing course—eff. winter 18)

104. Feminist Research (4)
Lecture/discussion—4 hours. Prerequisite: required for Women's Studies major. Introduction to feminist applications and transformations of traditional disciplinary research practices; initial training in methodologies for feminist interdisciplinary work. GE credit: ArtHum or SocSci, Wrt|AH or SS, DD, OL, WE.

(change in existing course—eff. winter 18)

130. Feminism and the Politics of Family Change (4)
Lecture/discussion—4 hours. Political/cultural changes, conflicts, and economic disparities that have led to greater mobility and dispersal of families. Transnationalism on gender relations, sexualities, and the meaning of family. Offered in alternate years. GE credit: ArtHum or SocSci, Div|AH or SS, OL, WC, WE.—*W. (W.)* Joseph

(change in existing course—eff. spring 18)

136. Critical Food Studies (4)
Lecture/discussion—4 hours. Production and consumption of food at the intersections of gender, race, ethnicity, nation, and body. Individual and familial experiences as part of larger economic and political structures in the U.S. and globally. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt|ACGH, AH or SS, DD, OL, WE.—Nettles-Barcelón

(change in existing course—eff. spring 18)

137. Contemporary Debates in Western Feminist Theory (4)
Lecture/discussion—4 hours. Prerequisite: course 60; or consent of instructor. Interpretations of poststructuralist, postmodern, and postcolonial thought from a critical feminist perspective; includes methods of applying theory to concrete social/cultural problems of gender, race, sexuality, class. Offered irregularly. GE credit: ArtHum or SocSci, Div, Wrt|ACGH, AH or SS, DD, WE.

(change in existing course—eff. spring 18)

146. Gender, War and Peace (4)
Lecture/discussion—4 hours. Prerequisite: 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.

(change in existing course—eff. winter 18)

158. Masculinities (4)
Lecture/discussion—3 hours; term paper. Cultural, economic, and political forces which shape historical and contemporary masculinities. Impact of race, class, ability, nation and sexuality on experiences and cultural representations of masculinity. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt|ACGH, AH or SS, DD, WE.

(change in existing course—eff. spring 18)

165. Feminist Media Production (6)
Lecture/discussion—3 hours; laboratory—3 hours; fieldwork—6 hours. Prerequisite: Cinema & Technocultural Studies 20 or Cinema & Digital Media 20; or two Women and Gender Studies courses. Media production as a mode of cultural criticism, furthering feminist and social justice goals. Fundamentals of camera, editing and distribution via a social engagement model. Study and hands-on response to key historic and contemporary feminist and social justice media discourses. (Same course as Cinema & Digital Media 165.) GE credit: AH, SS, ACGH, DD, VL.
(change in existing course—eff. fall 18)

174. Body Politics (4)
Lecture/discussion—4 hours. The body as a site where status inequalities are formed and resisted. Self-making through bodywork, history of gendered and racial meanings of the body, and analysis of normalizing discourses and practices. Offered in alternate years. GE credit: ArtHum or SocSci, Wrt|AH or SS, DD, WC, WE.—*F, W, S. (F, W, S.)* Craig
(new course—eff. winter 18)

187. Gender and Social Policy (4)
Lecture/discussion—3 hours; term paper—3 hours. Role of gender in the creation of social policies, especially with respect to issues brought into the policy arena by contemporary feminism. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt|ACGH, DD, SS, WE.
(change in existing course—eff. winter 18)

Policies & Requirements Addendum

Advanced Placement (AP) Examinations

Changes to Advanced Placement (AP) Examinations table
(change—eff. fall 17)

Changes to:

- Computer Science A—* 4 transferable unit maximum for Computer Science A and Computer Science AB exams.
- Computer Science AB (2 rows)—* 4 transferable unit maximum for Computer Science A and Computer Science AB exams.
- Computer Science Principles —New exam information.

See "College Board Advanced Placement (AP) Examination Credit" on page 90.

American History and Institutions

Changes to Completion of the Advanced Placement (AP) Examination in United States Government and Politics
(change—eff. fall 17)

The American History and Institutions requirement ensures that every graduating student will have at least a minimum knowledge of the background of this country's development and an understanding of the political, economic and social interrelationships of its way of life.

You may meet this requirement in any of these ways:

- Complete one high school unit in American history, or 1/2 high school unit in American history and 1/2 high school unit in civics or American government, with a grade of *C* or better in each course
- Complete any one of the following courses:
  - African American and African Studies 10, 100
  - Asian American Studies 1, 2
  - Chicana/Chicano Studies 10
  - Economics 111A, 111B
  - History 17A, 17B, 72A, 72B, 170A, 170B, 170C, 171A, 171B, 174A, 174B, 174C, 176A, 176B, 177A, 177B, 179, 180A, 180B, 183A, 183B (upper division courses may be taken only with the consent of the instructor)
  - Native American Studies 1, 10, 116, 130A, 130B, 130C
  - Political Science 1, 5, 100, 102, 104, 105, 106, 108, 109, 113, 130, 131, 160, 163

  Students electing to complete one of the above courses in order to meet this requirement are subject to the rules for prerequisites and majors
- Present evidence that the requirement has been accepted as satisfied at another campus of the university
- Present evidence that the requirement has been satisfied through courses in the area of American History and Institutions at another collegiate institution whose credits are acceptable for transfer to UC Davis
- Successful completion of the Advanced Placement (AP) Examination in United States (American) History with a score of 3 or higher.
- Successful completion of the Advanced Placement (AP) Examination in United States Government and Politics taken May 2014 and prior with a score of 3 or higher. *As of May 2015 AP examination, AP United States Government and Politics no longer satisfies the American History and Institutions requirement*.
- Successful completion of the International Baccalaureate (IB) Examination in History of the Americas Higher Level (HL) with a score of 5, 6, or 7
- Successful completion of the SAT Subject Examination in U.S. History with a score of 550 or higher

International students, regardless of the type of visa they hold, must meet the university's American History and Institutions requirement for graduation.

General Education Requirement

Changes to General Education; Domestic Diversity under Civic and Cultural Literacy
(change—eff. fall 17)

2. Civic and Cultural Literacy at least 9 units

The objective of this core literacy is to prepare students for thoughtful, active participation in civic society. Students will learn to think analytically about American institutions and social relations, understand the diversity of American cultures, and see the relationships between national and local cultures and the world.

a. American Cultures, Governance, and History at least 3 units

Courses in American Cultures, Governance, and History provide students with an understanding and appreciation of the social and cultural diversity of the United States and of the relationships between these diverse cultures and larger patterns of national history and institutions.

b. Domestic Diversity at least 3 units

Courses in Domestic Diversity provide students with an understanding of issues such as race, ethnicity, social class, gender, sexuality, and religion within the United States, and develop the student's ability to think critically about diverse sociocultural perspectives.

c. World Cultures at least 3 units

Courses in World Cultures provide students with a global perspective in a world where communication technologies, economic relationships, and the flow of people across national borders increasingly challenge national identities and create transnational cultures. Students can satisfy this requirement through coursework or through certified study abroad.

College Board Advanced Placement (AP) Examination Credit

Examination [1]	Score	Credit Toward Degree; Quarter Units	UC Transfer Admission Eligibility Area [2]	IGETC Area [3]	UC Davis Course Equivalencies	Duplicate Credit Allowance [4]	Continuing UC Davis Course	COLLEGE [5] Agricultural and Environmental Sciences	Biological Sciences	Engineering	Letters and Science	Comments
Art History	5	8	UC-H	3A or 3B	Art History 1A, 1B, 1C	No	–	–	–	–	a	
Art History	4, 3	8	UC-H	3A or 3B	–	–	–	–	–	–	–	
Biology	5, 4, 3	8	UC-S	5B and 5C	Biological Sciences 10	No	–	–	–	–	b	Biological Sciences 2A is the first course taken by most students majoring in the life sciences.
Chemistry	5	8	UC-S	5A and 5C	Chemistry 2A	Yes*	Consult with adviser	–	–	–	b	* Although Chemistry 2A may be taken for full credit, students are strongly encouraged to enroll in the 2AH, 2BH, 2CH sequence.
Chemistry	4, 3	8	UC-S	5A and 5C	Chemistry 10	No	–	–	–	–	b	
Chinese Language and Culture	5, 4, 3	8	UC-H	3B and 6A	–	–	Consult with adviser	–	f	–	f	
Comparative Government and Politics	5, 4, 3	4	UC-B	4	*	–	–	–	–	–	–	* AP exams completed prior to May 2015 with scores of 3, 4 and 5 should receive course credit for Political Science 2. Effective with May 2015 AP exam, course credit for Political Science 2 will no longer be awarded for AP exam scores of 3, 4 and 5.
Computer Science A	5, 4, 3	2 *	–	–	–	–	–	–	–	–	b	* 4 transferable unit maximum for Computer Science A and Computer Science AB exams.
Computer Science AB	5, 4	4 *	–	–	Engineering Computer Science 30	No	Engineering Computer Science 40*	–	–	–	b	Credit for Computer Science and Engineering 30 may fulfill prerequisite for Computer Science and Engineering 40 with instructor consent. * 4 transferable unit maximum for Computer Science A and Computer Science AB exams.
Computer Science AB	3	4 *	–	–	–	–	–	–	–	e	b	* 4 transferable unit maximum for Computer Science A and Computer Science AB exams.
Computer Science Principles	5, 4, 3	8	–	–	Engineering Computer Science 15	Yes	–	–	–	e	–	
English Language and Composition	5, 4	8 *	UC-E	1A	English 3, University Writing Program 1	No	–	d	c	–	d	Satisfies university Entry Level Writing Requirement * 8 transferable unit maximum for all English exams.
English Language and Composition	3	8 *	UC-E	1A	–	–	–	–	–	–	–	Satisfies university Entry Level Writing Requirement * 8 transferable unit maximum for all English exams.
English Literature and Composition	5, 4	8 *	UC-E / H	1A or 3B	English 3, University Writing Program 1	No	–	d	c	–	d	Satisfies university Entry Level Writing Requirement * 8 transferable unit maximum for all English exams.
English Literature and Composition	3	8 *	UC-E / H	1A or 3B	–	–	–	–	–	–	–	Satisfies university Entry Level Writing Requirement * 8 transferable unit maximum for all English exams.
Environmental Science	5, 4, 3	4	UC-S	5A and 5C	Environmental Science and Policy 10	No	–	–	–	–	b	
European History	5, 4, 3	8	UC-B/H	3B or 4	History 4B, 4C	4A, 4B: Yes; 4C: No	–	–	–	–	–	
French Language	5	8 *	UC-H	3B and 6A	French 22	No	French 23 or consult with adviser	–	f	–	f	* 8 transferable unit maximum for French Language and French Language and Culture exams. Maximum credit awarded to the exam with the highest score.
French Language	4	8 *	UC-H	3B and 6A	French 21	No	French 22	–	f	–	f	* 8 transferable unit maximum for French Language and French Language and Culture exams. Maximum credit awarded to the exam with the highest score.
French Language	3	8 *	UC-H	3B and 6A	French 3	No	French 21	–	f	–	f	* 8 transferable unit maximum for French Language and French Language and Culture exams. Maximum credit awarded to the exam with the highest score.
French Language and Culture	5	8 *	UC-H	3B and 6A	French 22	No	French 23 or consult with adviser	–	f	–	f	* 8 transferable unit maximum for French Language and French Language and Culture exams. Maximum credit awarded to the exam with the highest score.
French Language and Culture	4	8 *	UC-H	3B and 6A	French 21	No	French 22	–	f	–	f	* 8 transferable unit maximum for French Language and French Language and Culture exams. Maximum credit awarded to the exam with the highest score.

College Board Advanced Placement (AP) Examination Credit

Examination [1]	Score	Credit Toward Degree; Quarter Units	UC Transfer Admission Eligibility Area [2]	IGETC Area [3]	UC Davis Course Equivalencies	Duplicate Credit Allowance [4]	Continuing UC Davis Course	COLLEGE [5] Agricultural and Environmental Sciences	Biological Sciences	Engineering	Letters and Science	Comments
French Language and Culture	3	8 *	UC-H	3B and 6A	French 3	No	French 21	–	f	–	f	* 8 transferable unit maximum for all French Language and French Language and Culture exams. Maximum credit awarded to the exam with the highest score.
French Literature	5, 4, 3	8	UC-H	3B and 6A	Upper Division	No	French 100 or consult with adviser	–	f	–	f	
German Language	5	8 *	UC-H	3B and 6A	German 21	No	German 22 or consult with adviser	–	f	–	f	* 8 transferable unit maximum for German Language and German Language and Culture exams. Maximum credit awarded to the exam with the highest score.
German Language	4	8 *	UC-H	3B and 6A	German 20	No	German 21 or consult with adviser	–	f	–	f	* 8 transferable unit maximum for German Language and German Language and Culture exams. Maximum credit awarded to the exam with the highest score.
German Language	3	8 *	UC-H	3B and 6A	German 3	No	German 20 or consult with adviser	–	f	–	f	* 8 transferable unit maximum for German Language and German Language and Culture exams. Maximum credit awarded to the exam with the highest score.
German Language and Culture	5	8 *	UC-H	3B and 6A	German 21	No	German 22 or consult with adviser	–	f	–	f	* 8 transferable unit maximum for German Language and German Language and Culture exams. Maximum credit awarded to the exam with the highest score.
German Language and Culture	4	8 *	UC-H	3B and 6A	German 20	No	German 21 or consult with adviser	–	f	–	f	* 8 transferable unit maximum for German Language and German Language and Culture exams. Maximum credit awarded to the exam with the highest score.
German Language and Culture	3	8 *	UC-H	3B and 6A	German 3	No	German 20 or consult with adviser	–	f	–	f	* 8 transferable unit maximum for German Language and German Language and Culture exams. Maximum credit awarded to the exam with the highest score.
Human Geography	5, 4, 3	4	UC-B	4	–	–	–	–	–	–	–	
Italian Language and Culture	5	8	UC-H	3B and 6A	Italian 5	No	Italian 9 or consult with adviser	–	f	–	f	* 8 transferable unit maximum for Italian Language (last offered May 2011) and Italian Language and Culture exams. Maximum credit awarded to the exam with the highest score.
Italian Language and Culture	4	8	UC-H	3B and 6A	Italian 4	No	Italian 5 or consult with adviser	–	f	–	f	* 8 transferable unit maximum for Italian Language (last offered May 2011) and Italian Language and Culture exams. Maximum credit awarded to the exam with the highest score.
Italian Language and Culture	3	8	UC-H	3B and 6A	Italian 3	No	Italian 4 or consult with adviser	–	f	–	f	* 8 transferable unit maximum for Italian Language (last offered May 2011) and Italian Language and Culture exams. Maximum credit awarded to the exam with the highest score.
Japanese Language and Culture	5, 4, 3	8	UC-H	3B and 6A	–	–	Consult with adviser	–	f	–	f	
Latin	5, 4, 3	8	UC-H	3B and 6A	Latin 2	No	Consult with Classics adviser	–	–	–	–	* 8 transferable unit maximum for Latin (offered May 2013 and beyond) and Latin (Vergil) exams. Maximum credit awarded to the exam with the highest score.
Latin (Vergil)	5, 4, 3	4	UC-H	3B and 6A	Latin 2	No	Consult with Classics adviser	–	f	–	f	
Latin Literature	5, 4, 3	4	UC-H	3B and 6A	–	–	Consult with Classics adviser	–	f	–	f	
Macroeconomics	5, 4, 3	4	UC-B	4	Economics 1B	No	Economics 101	–	–	–	–	
Mathematics—Calculus AB	5, 4	4 *	UC-M	2A	Mathematics 12, 16A, 17A or 21A	12: No; 16A, 17A, 21A: Yes	Mathematics 16B, 17B or 21B	–	–	–	b	Credit for Mathematics 16A, 17A or 21A equivalents may fulfill prerequisite for Mathematics 16B, 17B or 21B. Students electing to register in Mathematics 12, 16A, 17A or 21A must take the math placement exam and receive a qualifying score, regardless of AP score. Details at math.ucdavis.edu/undergrad/math_placement. * 8 transferable unit maximum for all mathematics-calculus exams.
Mathematics—Calculus AB	3	4 *	UC-M	2A	–	–	Mathematics 16A, 17A or 21A	–	–	–	b	Students electing to register in Mathematics 12, 16A, 17A or 21A must take the math placement exam and receive a qualifying score, regardless of AP score. Details at math.ucdavis.edu/undergrad/math_placement. * 8 transferable unit maximum for all mathematics-calculus exams.

College Board Advanced Placement (AP) Examination Credit

Examination [1]	Score	Credit Toward Degree; Quarter Units	UC Transfer Admission Eligibility Area [2]	IGETC Area [3]	UC Davis Course Equivalencies	Duplicate Credit Allowance [4]	Continuing UC Davis Course	COLLEGE [5] Agricultural and Environmental Sciences	Biological Sciences	Engineering	Letters and Science	Comments
Mathematics—Calculus BC^	5	8 *	UC-M	2A	Mathematics 12, 16A-16B, 17A-17B or 21A-21B	12: No; 16A, 16B, 17A, 17B, 21A, 21B: Yes	Mathematics 16C, 17C or 21C	–	–	–	b	Mathematics 16A, 16B, 17A, 17B, 21A or 21B equivalents may fulfill prerequisites for Mathematics 16B, 16C, 17B, 17C, 21B or 21C. Students electing to register in Mathematics 12, 16A, 17A or 21A must take the math placement exam and receive a qualifying score, regardless of AP score. Details at math.ucdavis.edu/undergrad/math_placement. * 8 transferable unit maximum for all mathematics-calculus exams.
Mathematics—Calculus BC^	4, 3	8 *	UC-M	2A	Mathematics 12, 16A, 17A or 21A	12: No; 16A, 17A, 21A: Yes	Mathematics 16B, 17B or 21B	–	–	–	b	Credit for Mathematics 16A, 17A or 21A equivalents may fulfill prerequisite for Mathematics 16B, 17B or 21B. Students electing to register in Mathematics 12, 16A, 17A or 21A must take the math placement exam and receive a qualifying score, regardless of AP score. Details at math.ucdavis.edu/undergrad/math_placement. * 8 transferable unit maximum for all mathematics-calculus exams.
Microeconomics	5, 4, 3	4	UC-B	4	Economics 1A	No	Economics 100	–	–	–	–	
Music Theory	5, 4, 3	8	UC-H	–	Music 3A	No	–	–	–	–	a	Prior to the May 2016 AP exam, completion of AP Music Theory with a score of 3, 4 or 5 is awarded credit for Music 10.
Physics 1	5,4	8 *	UC-S	5A and 5C	Physics 1A, 1B	No	–	–	–	–	b	*8 transferable unit maximum for all physics exams.
Physics 1	3	8 *	UC-S	5A and 5C	–	–	–	–	–	–	b	*8 transferable unit maximum for all physics exams.
Physics 2	5,4	8 *	UC-S	5A and 5C	Physics 1A	No	–	–	–	–	b	*8 transferable unit maximum for all physics exams.
Physics 2	3	8 *	UC-S	5A and 5C	–	–	–	–	–	–	b	*8 transferable unit maximum for all physics exams.
Physics B	5,4	8 *	UC-S	5A and 5C	Physics 1A, 1B	No	–	–	–	–	b	* 8 transferable unit maximum for all physics exams. Physics B replaced by Physics 1 and 2 in 2014-15.
Physics B	3	8 *	UC-S	5A and 5C	–	–	–	–	–	–	b	* 8 transferable unit maximum for all physics exams. Physics B replaced by Physics 1 and 2 in 2014-15.
Physics C1 —Mechanics	5,4	4 *	UC-S	5A and 5C	Physics 1A	No	–	–	–	–	b	* 8 transferable unit maximum for all physics exams.
Physics C1 —Mechanics	3	4 *	UC-S	5A and 5C	–	–	–	–	–	–	b	* 8 transferable unit maximum for all physics exams.
Physics CII — Electricity/Magnetism	5, 4	4 *	UC-S	5A and 5C	–	–	–	–	–	–	b	* 8 transferable unit maximum for all physics exams.
Physics CII — Electricity/Magnetism	3	4 *	UC-S	5A and 5C	–	–	–	–	–	–	b	* 8 transferable unit maximum for all physics exams.
Psychology	5	4	UC-B	4	Psychology 1	No	–	–	–	–	–	
Psychology	4, 3	4	UC-B	4	–	–	–	–	–	–	–	
Spanish Language	5	8 *	UC-H	3B and 6A	Spanish 23	No	Spanish 24 or consult with adviser	–	f	–	f	* 8 transferable unit maximum for Spanish Language and Spanish Language and Culture exams. Maximum credit awarded to the exam with the highest score.
Spanish Language	4	8 *	UC-H	3B and 6A	Spanish 22	No	Spanish 23 or consult with adviser	–	f	–	f	* 8 transferable unit maximum for Spanish Language and Spanish Language and Culture exams. Maximum credit awarded to the exam with the highest score.
Spanish Language	3	8 *	UC-H	3B and 6A	Spanish 21	No	Spanish 22 or consult with adviser	–	f	–	f	* 8 transferable unit maximum for Spanish Language and Spanish Language and Culture exams. Maximum credit awarded to the exam with the highest score.
Spanish Language and Culture	5	8 *	UC-H	3B and 6A	Spanish 23	No	Spanish 24 or consult with adviser	–	f	–	f	* 8 transferable unit maximum for Spanish Language and Spanish Language and Culture exams. Maximum credit awarded to the exam with the highest score.
Spanish Language and Culture	4	8 *	UC-H	3B and 6A	Spanish 22	No	Spanish 23 or consult with adviser	–	f	–	f	* 8 transferable unit maximum for Spanish Language and Spanish Language and Culture exams. Maximum credit awarded to the exam with the highest score.

College Board Advanced Placement (AP) Examination Credit

Examination [1]	Score	Credit Toward Degree; Quarter Units	UC Transfer Admission Eligibility Area [2]	IGETC Area [3]	UC Davis Course Equivalencies	Duplicate Credit Allowance [4]	Continuing UC Davis Course	COLLEGE [5] Agricultural and Environmental Sciences	Biological Sciences	Engineering	Letters and Science	Comments
Spanish Language and Culture	3	8 *	UC-H	3B and 6A	Spanish 21	No	Spanish 22 or consult with adviser	–	f	–	f	* 8 transferable unit maximum for Spanish Language and Spanish Language and Culture exams. Maximum credit awarded to the exam with the highest score.
Spanish Literature	5, 4	8 *	UC-H	3B and 6A	Spanish 24	No	Spanish 100 or consult with adviser	–	f	–	f	* 8 transferable unit maximum for Spanish Literature and Spanish Literature and Culture exams. Maximum credit awarded to the exam with the highest score.
Spanish Literature	3	8 *	UC-H	3B and 6A	Spanish 23	No	Spanish 24 or consult with adviser	–	f	–	f	* 8 transferable unit maximum for Spanish Literature and Spanish Literature and Culture exams. Maximum credit awarded to the exam with the highest score.
Spanish Literature and Culture	5, 4	8 *	UC-H	3B and 6A	Spanish 24	No	Spanish 100 or consult with adviser	–	f	–	f	* 8 transferable unit maximum for Spanish Literature and Spanish Literature and Culture exams. Maximum credit awarded to the exam with the highest score.
Spanish Literature and Culture	3	8 *	UC-H	3B and 6A	Spanish 23	No	Spanish 24 or consult with adviser	–	f	–	f	* 8 transferable unit maximum for Spanish Literature and Spanish Literature and Culture exams. Maximum credit awarded to the exam with the highest score.
Statistics	5, 4	4	UC-M	2A	Statistics 13	Yes	–	–	–	–	b	
Statistics	3	4	UC-M	2A	–	–	–	–	–	–	b	
Studio Art [Drawing Portfolio]	5, 4	8 *	–	–	Art Studio 2	No	–	–	–	–	a	* 8 transferable unit maximum for all three Studio Art exams. Campus articulation revised, effective with May 2012 AP exam.
Studio Art [Drawing Portfolio]	3	8 *	–	–	–	–	–	–	–	–	a	* 8 transferable unit maximum for all three Studio Art exams. Campus articulation revised, effective with May 2012 AP exam.
Studio Art [2-D Design Portfolio; 3-D Design Portfolio]	5,4, 3	8 *	–	–	–	–	–	–	–	–	–	* 8 transferable unit maximum for all three Studio Art exams. Campus articulation revised, effective with May 2012 AP exam.
United States Government and Politics	5, 4, 3	4	UC-B	4	*	–	–	–	–	–	–	AP Exams completed prior to May 2015 with scores of 3,4 and 5 should receive course credit for Political Science 1 and be awarded the American History and Institutions requirement. Effective with the May 2015 AP exam, course credit for Political Science 1 will no longer be awarded and the university American History and Institutions requirement will no longer be satisfied.
United States History	5, 4, 3	8	UC-B/H	3B or 4	History 17A, 17B	Yes	–	–	–	–	–	Satisfies university American History and Institutions requirement.
World History	5, 4, 3	8	UC-B/H	3B or 4	–	–	–	–	–	–	–	

Note: This is not a comprehensive list. If your exam is not listed, credit will be determined in consultation with an adviser.

^ Students who take the Calculus BC exam and earn a sub-score of 3 or higher on the Calculus AB portion will receive credit for the Calculus AB exam, even if they do not receive a score of 3 or higher on the BC exam. The Calculus BC/AB sub-score satisfies IGETC Area 2A.

[1] Examination

Last test administration for discontinued exams:

May 2009—Computer Science AB, French Literature, Italian, Latin Literature

May 2011—French Language, German Language, Italian Language, Italian Literature

May 2012—Spanish Literature, Latin (Vergil)

May 2013—Spanish Language

May 2014—Physics B

[2] UC Transfer Admission Eligibility Area

- UC-B=Behavioral and Social Sciences, UC-E=English, UC-H=Humanities, UC-M=Math, UC-S=Biological and Physical Sciences
- UC-E: If English AP test score of 3, 4, 5 was achieved prior to completing any transferable English composition course(s), 8 quarter units of transfer credit are awarded for the AP exam, and one of two English Composition requirements (UC-E) satisfied. UC Davis articulates (AP) English Language and Composition, and English Literature and Composition, with scores of 4 or 5 as UWP 1 and English 3; therefore we will not allow transfer credit for any duplicated English courses.
- For details regarding IGETC certification, see your California community college adviser and Help Topics: IGETC at www.assist.org. Students with partial IGETC certification should contact their dean's office.

[3] IGETC Area

- Each AP exam may be applied to one IGETC area as satisfying one course requirement, with the exception of Language other than English (LOTE).
- There is no equivalent AP exam for the Area 1B—Critical Thinking/Composition requirement.
- For details regarding IGETC certification, see your California community college adviser and *Help Topics: IGETC* at www.assist.org. Students with partial IGETC certification should contact their dean's office.

[4] Duplicate Credit Allowance for Coursework/Exams

The university does not generally award full credit for college courses that duplicate college credit already earned through AP exams, whether taken before or during enrollment at the university. Exceptions to this policy are indicated in this column. We encourage students who have AP credit to speak with an academic adviser in their major department, undergraduate advising in your college dean's office or Biology Academic Success Center to determine which courses will provide the greatest benefit.

[5] UC Davis College Area Requirements

a. Partially satisfies area (breadth) requirements for the A.B. degree.

b. Allows 4 units of credit toward Natural Sciences credit or preparatory coursework for science majors in each Natural Sciences exam passed, and 8 units of credit allowed for Mathematics BC and Physics B exams.

c. Satisfies 4 lower-division units of the English Composition requirement.

d. Satisfies first course toward English Composition requirement.

e. Exam awards units toward the Unrestricted Electives requirement.

f. Language exams, except any Latin exam, satisfy the foreign language requirement.

UC Davis Pattern of General Education

Courses for which AP credit has been granted may not be used as a substitute for courses required as part of the UC Davis GE requirement; see Advanced Placement (AP) examinations on page 40 and page 50.

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

Courses & Programs are subject to change without notice.

Graduation Honors

Update Grade Point Average by College table

(change—eff. fall 17)

Grade point averages from the winter quarter prior to graduation are used to determine the averages that will earn an honors designation. Following are the averages for winter quarter 2017. These averages will be used through winter quarter 2018.

Grade Point Average by College

Percent Determining Cut-Off Point	Agricultural & Environmental Sciences	Biological Sciences	Engineering	Letters and Sciences
2%	3.918	3.970	3.951	3.930
3%	3.878	3.950	3.930	3.900
4%	3.843	3.922	3.890	3.870
6%	3.790	3.877	3.819	3.821
8%	3.738	3.840	3.772	3.779
12%	3.635	3.763	3.687	3.696
16%	3.551	3.689	3.600	3.624

Programs Offered By UC Davis

Changes to Major Programs listing

(change—eff. fall 17)

Biological Systems Engineering
B.S., Integrated B.S./M.S, D.Engr., M.Engr., Ph.D. . . . . Engineering

Computer Engineering
B.S. . . . . Engineering

Electrical Engineering
B.S. . . . . Engineering

Energy Systems
M.S, Ph.D. . . . . GSM

Master of Business Analytics
M.B.A . . . . . Graduate School of Management

Mechanical Engineering
B.S. . . . . Engineering

Technocultural Studies
A.B.. . . . . L&S

Addition to Minor Programs listing

(change—eff. fall 17)

Accounting . . . . . GSM

The Minor

Changes to Minor section in the Academic Information chapter

(change—eff. fall 16)

College of Letters and Science

With the exception of interdisciplinary minors approved by the College Executive Committee, students in the College of Letters and Science may not complete a minor offered by the department or program in charge of the student's major. You can elect only one minor in a subject area.

No more than one course applied to the satisfaction of requirements in the major program shall be accepted in satisfaction of the requirements of a minor. No course used to satisfy the requirements of one minor shall be applied toward any other minor.

Students wishing to pursue a minor offered by the College of Letters and Science, must have completed at least one upper division course toward the minor with a GPA of 2.000 or higher to be eligible to declare that minor.

School of Management

The Graduate School of Management offers the Technology Management Minor and Minor in Accounting. To complete the Technology minor, students must complete a minimum of 20 units of coursework in the minor with a GPA of 2.000 or better. Coursework in the Tech minor will complement the student's undergraduate major studies with training in accounting, finance, marketing, organizational behavior and operations. The minor also provides students with business and management skills that will enable them to apply training from their major program in a business setting. The UC Davis Graduate School of Management's Undergraduate Accounting Minor gives you the opportunity to enhance your coursework with a carefully crafted series of five upper-division courses. These courses are designed to prepare you for accounting-related careers or advanced study in accounting. All five courses, 20 units total, must be completed to receive the minor certification.

Undergraduate Education

Changes to College of Letters and Science Natural Sciences and Mathematics & College Board Advanced Placement Examination sections in the Undergraduate Education chapter

(change—eff. fall 17)

Natural Sciences and Mathematics

- Engineering: Computer Science 10, 12, 20, 30, 40, 50, 60, 120, 122A, 122B, 124, 127, 129, 130, 132, 140A, 140B, 142, 145, 150, 152A, 152B, 152C, 153, 154A, 154B, 158, 160, 161, 162, 163, 165A, 165B, 170, 171, 173, 174, 175, 177, 178, 193A, 193B
- Psychology 41, 100, 100Y, 101, 103A, 103B, 104, 113, 121, 122, 123, 124, 125 126, 127, 129, 130, 131, 132, 135, 137, 146, 180B

College Board Advanced Placement Examination. A score on an AP exam taken in high school must be equivalent to UC Davis course 3 or higher in a foreign language to satisfy the College Foreign Language requirement. Consult the AP chart for course equivalency information.

African American and African Studies

Changes to A.B. Major Requirements

(change—eff. fall 17)

Related Upper Division Courses

The following courses are offered by faculty members in other disciplines and focus on African American studies, African diaspora studies, or African studies.

American Studies 156; Anthropology 104N, 139AN, 140A, 140B; Art History 150; Community and Regional Development 151, 151L, 152, 153, 172; Comparative Literature 154, 165; English 167, 178, 179, 181A, 181B; History 102O, 115A, 115B, 115C, 115D, 116, 177A, 177B, 178A, 178B; Political Science 134, 149, 176; Sociology 128, 129, 130, 134, 137, 143A, 145A, 145B, 130; Dramatic Art 155A; Women's Studies 160, 178C, 180, 182

Anthropology

Changes to Anthropology A.B. & B.S. Major, & Anthropology Minor Requirements

(change—eff. fall 17)

A.B. Major Requirements:

UNITS

Evolutionary Emphasis:

Preparatory Subject Matter 19-21

Anthropology 1, 2, 3 12
Choose one: 4-5
Anthropology 15, 23, 24, 50, 54
Choose one: 3-4
Anthropology 13, Sociology 46B, Statistics 13, 32, 100, 102

Depth Subject Matter 42-47

Choose two: 7-9
Anthropology 101, 103, 105, 122A, 128A, 141B, 141C, 154A, 154B, 154C, 154CL, 158, 178
Choose one: 3-5
Anthropology 153, 157, 159
Choose one: 4-5
Anthropology 151, 152
Choose one: 4
Anthropology 170, 171, 172, 173, 174, 175, 176, 177, 179, 180, 182, 183, 184 or 185
Choose one: 4
Anthropology 100, 104N, 109, 110, 117, 120, 121, 122B, 123AN, 124, 125A, 125B, 126A, 126B, 127, 128B, 129, 130A, 131, 132, 133, 134, 135, 136, 137, 138, 139AN, 139BN, 140A, 140B, 141B, 141C, 142, 143A, 144, 145, 146N, 148A, 149A, 149B, 186A
Select 20 additional units from any upper division evolutionary track Anthropology courses (see list below) chosen in consultation with an evolutionary track undergraduate adviser. Up to 4 units of Anthropology 191, 192, 194H, 198, or 199 can be used towards this requirement. 20

Total Units for the Major 62-69

Note: Evolutionary track courses at the upper division level are courses 101, 103, 105, 122A, 128A, 141B, 141C, and 151 to 186A

Sociocultural Emphasis:

Preparatory Subject Matter 20-22

Anthropology 2 4
Choose two: 8
Anthropology 1, 3, 4
Choose one of the following two options: 8-10
(1) Two additional quarters of the foreign language used to meet the L&S language requirement
(2) Two additional lower division sociocultural track courses

Depth Subject Matter 42-46

Anthropology 100 4
Choose two upper division area-focus sociocultural track courses:
Anthropology 140A, 140B, 141C, 142, 143A, 144, 145, 146N, 148A, 149A, 149B 8
Choose one of the following two options in consultation with sociocultural track undergraduate advisor (see list below identifying upper division sociocultural courses; see list above identifying evolutionary track courses): 30-34
(1) Eight additional upper division anthropology courses (two courses may be in the evolutionary track; and up to six units can be Anthropology 192, 194H, 198, or 199 units)
(2) Eight additional upper division courses that may combine six sociocultural track courses and either 8 units of Study Abroad *credit or two related courses in a single* academic discipline (including but not limited to: African American and African Studies, American Studies, Art Studio, Art History, Asian American Studies, Chicana/o Studies, Communication, Community and Regional Development, Design, Economics, East Asian Studies, History, Linguistics, Middle East/South Asia Studies, Music, Native American Studies, Nature and Culture, Philosophy, Political Science, Psychology, Religious Studies, Science and Technology Studies, Sociology, Textiles and Clothing, Theatre and Dance, Women and Gender Studies)

Total Units for the Major 62-68

Note: Sociocultural track courses at the upper division level are those with numbers from 100 to 149B, with the exception of 101, 103, 105, 128A, and 141B. Area-focus sociocultural track courses are those that refer in their titles to one or more peoples or regions of the world.

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 54-60

Anthropology 1, 2, 3 12
Biological Sciences 2A, 2B, 2C. 14
Chemistry 2A, 2B, and 8A, 8B, or 118A, 118B 16-18
Mathematics 16A-16B-16C or 17A-17B-17C or 21A-21B-21C 9-12
Choose one: 3-4
Anthropology 13, Sociology 46B, Statistics 13, 32, 100, or 102

Depth Subject Matter 45

Choose one:
Anthropology 151, 152 4-5
Choose one:
Anthropology 153, 157, 159 3-5
Choose one:
Anthropology 154A, 154B 5
Three additional courses in anthropology chosen in consultation with evolutionary track undergraduate advisor 8-12
Biological Sciences 101 4
Evolution and Ecology 100 4
Additional units from the list below to achieve a minimum of 45 upper division units: 10-14
Anthropology 101, 103, 105, 122A, 128A, 151, 152, 153, 154A 154B, 154C, 154CL, 156A, 156B, 157, 157L, 158, 159, 180, 182, 185; Anatomy, Physiology and Cell Biology 100; Biological Sciences 102, 103; Cell Biology and Human Anatomy 101, 101L; Environmental Science and Policy 100; Evolution and Ecology 101, 102, 103, 104, 105, 138, 141, 147, 149, 175; Exercise Science 103, 115; Geology, 107, 107L, 108, 144, 146; History and Philosophy of Science 131; Molecular and Cellular Biology 120L, 121, 150, 150L, 160L, 161, 162, 163, 164; Neurobiology, Physiology, and Behavior 101, 101L, 102, 123, 124, 150, 152; Psychology 101, 113, 121, 122, 123, 124; Statistics 104, 106, 108, 130A, 130B; Wildlife, Fish, and Conservation Biology 141, 154

Total Units for the Major 99-105

Recommended

Anthropology 5, 15, 50; Geology 1; Psychology 1

Major Advisors. Consult Department office.

Minor Program Requirements:

UNITS

Anthropology 18-30

General emphasis 19-21

Choose one: 3-5
Anthropology 101, 103, 105, 122A, 128A, 151, 152, 153, 154A, 155, 156A, 156B, 157, 158, 159
Choose one: 4
Anthropology 170, 172, 173, 174, 176, 177, 179, 180, 182, 183, 184, 185
Choose one from: 4
Anthropology 140A-149B, 178 or any other sociocultural track course that refers in its title to one or more peoples or regions of the world
Choose two: 8
Anthropology 100 through 139BN, excluding 101, 103, 105, 128A

Archaeology emphasis 20-25

Anthropology 170 4
Choose two: 8
Anthropology 172, 173, 174 175, 176, 177, 178, or 179
Choose two: 8-13
Anthropology 156A, 156B, 180, 181, 182, 183, 184, or 185

Evolutionary emphasis 18-30

Any five upper division Evolutionary Anthropology courses chosen in consultation with an evolutionary track advisor.

Sociocultural emphasis 19-21

Anthropology 100 4
One upper division area-focus sociocultural track course; area-focus sociocultural track courses are those that refer in their titles to one or more peoples or regions of the world 4
Choose two: 8
Anthropology 109-139BN; excluding 128A
One additional upper division Anthropology course chosen in consultation with sociocultural track undergraduate advisor 3-5

Minor Advisor. Consult Department office in 1282 Social Sciences & Humanities.

Biological Sciences

Changes to B.S. Major Requirements

(change—eff. fall 15)

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 56-66

Biological Sciences 2A-2B-2C 15
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

Depth Subject Matter 42-51

Biological Sciences 101 4
Biological Sciences 105 (or 102 + 103) 3-6
Biological Sciences 104 3
Statistics 100 4
Evolution and Ecology 100 4
** Select one course from each topic:*

* *Evolution*:
Evolution and Ecology 101 or Environmental Science Policy 100.....4
* *Microbiology:*
Microbiology 102, 104, 162, 170; Food Science & Technology 104.....3-5
* *Animal Physiology, Behavior or Development:*
Neurobiology, Physiology and Behavior 100, 101, 102, 141; Molecular and Cellular Biology 150 3-5
* *Plant Physiology or Development:*
Plant Biology 105**, 111, 112, 113, 116** .3-5

Cinema and Digital Media

Change from Program to Department

(change—eff. fall 17)

Michael Neff, Ph.D., Department Chair

Department Office. 101 Art Building
530-752-0890; *http://catcs.ucdavis.edu*

Classics

New Arabic Minor

(change—eff. fall 17)

The Department offers minors in Arabic, Classical Civilization, Greek and Latin for those wishing to follow a shorter but formally recognized program of study in Classics.

UNITS

Arabic.....20
Arabic 121, 122, 123.....12
Choose one upper division course in Arabic language or literature.....4
Choose one upper division course in Arabic language or literature, or one humanities or social science course: 4
Middle East/South Asia 111A, 121A/ARB 140, 122A, 150/Women's Studies 185, 181C, 182C; Anthropology 142; Arabic 1/1A, 2, 3, 21, 22, 23, 121, 122, 123, 198; Art History 155; Comparative Literature 53C, 155, 166; History 6, 102R, 112C, 115F, 190A, 190B, 190C, 193A, 193B; Political Science 135, 136; Religious Studies 60, 65C, 160, 161, 162, 163, 167; Women's Studies 178A, 184

Communication

Changes to A.B. Major Requirements

(change—eff. fall 16)

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 29-30
Anthropology 4 or Linguistics 1.....4
Communication 10Y.....4
Choose one:.....4
Communication 1, 3, or 5/Linguistics 5
Computer Science 15 or Philosophy 12 4
Psychology 1 4
Sociology 1 5
Statistics 13 or Sociology 46B 4-5

Depth Subject Matter.....40
Communication 101; 102; 120;140; 170/170V or 172.....20
Choose five: 20
Communication 110, 111, 112, 114, 121, 122, 123, 130, 131, 136, 139, 141, 142, 143, 144, 145, 146, 148, 161, 165, 170/170V, 172, 174, 176, 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 other College of Letters & Science 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 69-70

Grading recommendation. Although not required, it is recommended that all courses offered in satisfaction of the major, except variable-unit courses, be taken for a letter grade.

Major Advisor. Faculty; contact department.

Advising Office. 466 Kerr Hall

Minor Program Requirements:

UNITS

Communication.....24
Choose one:.....4
Communication 1, 3
At least five upper division courses in communication.....20

Graduate Study. The Department of Communication offers programs of study and research leading to M.A. and Ph.D. degrees in Communication. Detailed information may be obtained from the Graduate Advisor, Department of Communication.

Graduate Advisor. B. Feng

Community and Regional Development

Changes to B.S. Major Requirements

(change—eff. fall 16)

B.S. Major Requirements:

UNITS

Preparatory Subject Matter.....22-26
Community and Regional Development 1, 2..... 8
Plant Sciences 21 or Computer Science Engineering 15.....3-4
Economics 1A or 1B 4
Anthropology 2 or Sociology 1.....4-5
Statistics 13 or 32 or Sociology 46B 3-5

Depth Subject Matter.....40-43
Core Issues in Community Development: Three courses from: Community and Regional Development 142, 152, 153A or 153B or 153C, 164, 172, 176, or 180 12-13
Economics of Community Change: Two courses from: Community and Regional Development 118, 140, 141, 162, or International Agricultural Development 103 8
Political Processes and Community Change: Two courses from: Community and Regional Development 147, 149, 154, 157, 158, or 171 . 8
Methods for Community Research: Two courses, including at least one *'d course from: Community and Regional Development 151, *156, *Communication 102, *Education 114, *Landscape and Architecture 150, *Sociology 103, *Sociology 106, *Statistics 102 8-10
**Note on substitutions: supplementary list of pre-approved substitutions available in Advising Office.
Internship: Community and Regional Development 192..... 4

Areas of Specialization

Take 20 units from each of two options, including at least one Community and Regional Development course from each option, or 40 units from one option, including at least two Community and Regional Development courses. These courses cannot overlap with the depth subject. Up to 4 units of variable-unit course work may be counted toward this requirement; e.g., Community and Regional Development 192.

Global Communities Option..... 40

Students must consult with a faculty advisor to identify an emphasis within the option and to select suitable courses.

Development Policy: Anthropology 122B, 126A, 142, Agricultural and Resource Economics 115A, 115B, Community and Regional Development 140, 152, 153A, 153B, 153C, 164, 180, Economics 115A, 115B, 160A, 160B, 162, International Agricultural Development 170, Sociology 138, 139, 141, 145A, 159
Gender and Development: Sociology 132, 145A, 145B, Anthropology 126B, Women and Gender Studies 102, 182
Globalization and Politics: Political Science 124, 130, 131, 175
Experiential Learning, Area Studies, and Language: Total number of units of credit in Experiential learning, Area Studies, and Language courses cannot exceed 32.
Up to 12 credits transferred from any accredited foreign program or foreign internship, including UCD EAP and Summer Abroad programs.
Up to 12 credits in regional area studies classes; e.g., Middle East, China, Latin America.
Up to 12 credits for foreign Language.

Organization and Management Option..... 40

Students must consult with a faculty advisor to identify an emphasis within the option and to select suitable courses.

Administration: Community and Regional Development 157, 158, 194HA and 194HB, Agricultural and Resource Economics 100A, 171A, Economics 115A, Political Science 100, 105, 142A, 142B, 142C, 155, 183
Communication: Communication 134, 136, 140, 152, Community and Regional Development 147, 176, Education 120
Human Resources: Community and Regional Development 151, 172, 176, Communication 102, Economics 151B, Sociology 120, 128, 129
Management: Community and Regional Development 118, 140, 141, 154, 162, 164, Agricultural and Resource Economics 112, 113, History 174A, 174AD, Sociology 138, 139, 158, 159, 180A, 180B

Policy, Planning, and Social Services Option..... 40

Students must consult with a faculty advisor to identify an emphasis within the option and to select suitable courses.

General: Community and Regional Development 118, 142, 151, 153A, 153B, 153C, 154, 156, 162, 176, 180, 194HA and 194HB, Environmental Science and Policy 165N, Political Science 100, 105, 108, 109, 142A, 142B,142C, 154, 155, 183, Sociology 120, 140, 154, 155, 185
Community Health and Counseling: Communication120, 122, 165, Community and Regional Development 164, Education 160A,

160B, Public Health Sciences 101, Human Development 120, 130, Psychology 123, 126, 151, 154, 162, 168, Sociology 154
Education and Community: Agricultural Education 100, 160, Communication 101,146, Education 100, 110, 120, 151, 152, 153, Psychology 100, 132, Sociology 124
Environmental Policy and Regional Planning: Community and Regional Development 140, 141, 149, 152, 158, 171, Economics 115A, Environmental Science and Management 121, Environmental Science and Policy 110, 160, 161, 164, 166N,168A, 168B, 171, 172, 173, 179, Political Science 102, 107, 175, Sociology 102, 118, 138, 141, 143A, 143B, 170
Family and Community: American Studies 152, Community and Regional Development 147, Human Development 100A, 100B, 100C, 101, 102, 103, 110, 130, 140, 140L, 141, 143, 160, 161, 163, Psychology 140, Sociology 122, 131, 134, 135, 152

Three courses in English Composition from the following list:

English 3, University Writing Program 1, 18, 19, 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 102H, 102J, 102K, 102L, 104A, 104B, 104C, 104D, 104E, 104F, 104I, Communication 1, Comparative Literature 1, 2, 3, 4, or Native American Studies 5.

At least one course must be selected from:

University Writing Program 101, 102 and 104 series.

The Upper Division Composition Exam does not satisfy the requirement.

Advanced Placement English score of 4 or 5 which satisfies English 3 and/or University Writing Program 1 will satisfy one of the three required courses.

Total Units for Major 106-113

Major Advisor. M. Kenney, *mfkenney@ucdavis.edu*

Computer Science

Changes to Major Preparatory Requirements & Minor Program Requirements

(change—eff. fall 17)

The Major Program

The Department of Computer Science administers two majors: Computer Science and Engineering (CSE), in the College of Engineering, and Computer Science (CS), in the College of Letters and Science. It also administers two minors: Computer Science, in the College of Letters and Science, and Computational Biology, in the College of Engineering. For information on the Computer Science and Engineering curriculum and the minor in Computational Biology, see Engineering: Computer Science, on page 276.

The primary differences between the CSE and CS majors are the extent of hardware coverage and curricular flexibility. The CSE major develops a solid understanding of the entire machine, including hands-on experience with its hardware components. The CS major teaches some hardware, at the digital-design level, on simulators. The CSE major has fewer free electives. The CS major's more generous electives make it easier to complete a minor or double major.

Students in the CS major receive a solid grounding in the fundamentals of computer languages, operating systems, computer architecture, and the mathematical abstractions underpinning computer science. Students are prepared for both industry and postgraduate study.

Preparatory Requirements. Before declaring a major in Computer Science, students must complete the following five courses with an overall UC Davis grade point average of at least 3.000. All five courses must be completed with a grade of C- or better:

	UNITS
Mathematics 21A, 21B	8
Engineering: Computer Science 20, 30, 40	12

B.S. Major Requirements:

	UNITS
Preparatory Subject Matter	**50-55**
Mathematics 21A-21B-21C; 22A or 67	15-16
Computer Science Engineering 20, 30, 40, 60	16
Computer Science Engineering 50 or Electrical and Computer Engineering 70	4
Choose one series:	15-19
(a) Chemistry 2A-2B-2C	
(b) Chemistry 2A-2B and Biological Sciences 2A	
(c) Chemistry 2AH-2BH-2CH	
(d) Physics 9A-9B-9C and Mathematics 21D	
Depth Subject Matter	**50-55**
Computer Science Engineering 122A, 120 or 122B, 140A, 150, 154A	20
Computer Science Engineering 132 or Mathematics 135A or Statistics 131A	4
Computer Science electives	26-31
Choose a minimum of seven courses, including at least one mathematics or statistics course, from: Computer Science Engineering 120-189 inclusive; Computer Science and Engineering 193AB (counts as one); one approved 3–5 units course from Computer Science and Engineering 192 or 199; Economics 122; Electrical and Computer Engineering 100, 171, 172, 180A, 180B; Linguistics 127, 177; Mathematics courses numbered between 100 and 189, excluding Mathematics 111; Statistics 131A, 131B; Psychology 120. **No course can count as both a required course and a Computer Science elective.**	
Total Units for the Major	**100-110**

Major Advisors. M. Farrens, V. Filkov, D. Ghosal, P. Koehl, N. Matloff, M. Neff, P. Koehl, P. Rogaway

Minor Program Requirements:

	UNITS
Computer Science	**23-26**
Computer Science Engineering 60	4
Choose any three upper-division Computer Science Engineering courses; a single approved course of three or four units from Computer Science and Engineering 192 or 199 is allowed	11-12
Choose any two Upper Division courses including any Upper Division Computer Science and Engineering courses or any upper division course in Math (excluding Math 111), Electrical and Computer Engineering 100, 171, 192, 180A, 180B; Economics 122; Statistics 131A, 131B; Psychology 120, or Linguistics 77, 127	8-10

Note. Computer Science and Engineering 60 has a prerequisite chain of 30, 40, and Mathematics 16A, 17A, or 21A.

Graduate Study. See Graduate Studies, on page 121.

Design

Changes to Design A.B. Major Program

(change—eff. fall 17)

A.B. Major Requirements:

	UNITS
Preparatory Subject Matter	**32**
Design 1	4
Design 14 or 21	4
Design 15	4
Design 16	4
Choose one:	4
University Writing Program 11, 12 (preferred), 18 or 19	
Choose one:	4
Design 40A, 40B, 40C	4
Choose two:	8
Design 40A*, 40B*, 40C*, 50, 51, 70, 77, Art 12	
* 40A, 40B, 40C can only be used for this requirement if not counted above.	
Depth Subject Matter	**40**
Choose three; at least two must be Design courses from list A:	12
List A: Art History 168, 184, 187, 188A, 188B, 189; Design 127A, 138, 142A, 142B, 143, 144, 145, 149; Dramatic Art 114, 150, 155; Technocultural Studies 150, 152, 153, 155, 159	
Choose five from lists B and C; one may be a non-Design course:	20
List B: Design 107, 113, 115, 116, 117, 127B, 131, 132A, 132B, 134A, 134B, 135A, 135B, 136A, 136B, 137A, 137B, 150B, 151, 155A, 156, 160, 161, 170, 171, 177, 178, 180A, 185, 186, 191	
One from the following approved list may count: Art History 110A, 113, 114A, Chicano Studies 172, Dramatic Art 124A, 124B, 124C,124D, 124E, 128, 130, 170, Technocultural Studies 100, 104, 130, 131; Textiles and Clothing 163, 163L, Landscape Architecture 141.	
List C: Capstone Course Option; these courses are the most advanced in the major and prerequisites are strictly enforced: Design 154, 157, 159, 179, 180B, 187	
Choose two from list A, B, or C that have not been previously counted	8
Note: Substitutions for the listed courses may be allowed under certain circumstances with prior departmental approval.	
Total Units for the Major	**72**

Earth and Planetary Sciences

Changes to Natural Sciences Major Program

(change—eff. fall 17)

Natural Sciences Major Program

Admission consideration to the Natural Sciences major is closed to freshman and transfer applicants as the major has been discontinued effective fall 2018.

The Natural Sciences major is also closed to on-campus transfers beginning 2017-2018.

Students interested in exploring a career in math or science education are encouraged to consider

coursework in the CalTeach/MAST program which include an exploration of effective teaching practices and methods and include an active internship in local K-12 and UC Davis classrooms. For additional information, see *http://mast.ucdavis.edu*.

Ecological Management and Restoration

Changes to B.S. Major Requirements

(change—eff. fall 17)

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 49-58

- Biological Sciences 2A, 2B, 2C 15
- Chemistry 2A, 2B 10
- Physics 1A, 1B or Physics 7A, 7B, 7C 6-12
- Mathematics 16A, 16B or Mathematics 17A, 17B or Mathematics 21A, 21B 6-8
- Plant Sciences 120 4
- Soil Science 100 5
- Plant Sciences 101 or Environmental Science and Policy 1 3-4

Depth Subject Matter 54-69

- Environmental Horticulture 160, 160L 4
- Plant Sciences 176 4
- Plant Sciences 152 or Environmental Horticulture 150 3-4
- Choose one:
  - Soil Science 102, 105, 111, 118, 120 3-5
- Choose two ecology courses: 5-8
  - Environmental Science and Policy 155, Plant Biology 117, Plant Sciences 131, 144, 147 Wildlife, Fish, and Conservation Biology 156, 157
- Choose one: 4-5
  - Evolution and Ecology 100, Plant Biology 108, Plant Sciences 102, 116
- Choose four restoration/conservation courses: 11-16
  - Plant Sciences 130, 135, 150, Environmental Science and Management 141, Environmental Science and Policy 127, 155L, Wildlife, Fish, and Conservation Biology 154, 155, 155L
- Choose one: 3-4
  - Environmental Science and Management 100, Hydrology 143, 147, 151
- Choose one: 3-4
  - Plant Sciences 171, Environmental Horticulture 120
- Choose one: 3
  - Plant Sciences 100C, Landscape Architecture 180F, Plant Sciences 163
- Choose one: 3-4
  - Plant Biology 111, Plant Sciences 100A
- Choose one: 4-5
  - Environmental Science and Policy 160, 161, 171, 172, 179
- Internship: 2
  - Plant Sciences 192 or 164; must be selected in consultation with master advisor
- In addition to the required coursework listed above, students might consider taking some of the following courses:
  - Entomology 107, Hydrology 124, Landscape Architecture 150, Plant Sciences, 158, 135, 141 and 162, Science and Society 18, and Soil Science 109

Total Units for the Major 103-127

Economics

Changes to Major Requirements & Minor Program Requirements

(change—eff. fall 17)

Updated 7/12/2018

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 17-20

- Economics 1A-1B 8
- Choose one: 3-4
  - Statistics 13, 32, 102
- Mathematics 16A-16B or 21A-21B 6-8

Depth Subject Matter 44

- Economics 100A, 100B, 101 12
- Economics 102 4

Choose one specialization below:

Specialization: General

- Choose one: 4
  - Economics 110A, 110B, 111A, 111B
- Choose three courses: 12
  - Economics 103, 106, 116, 121A, 121B, 122, 125, 130, 131, 132, 134 (or Agricultural and Resource Economics 171A), 135, 136, 137, 140 (or Agricultural and Resource Economics 106), 145, 151A, 151B, 152, 160A, 160B, 194HA, 194HB, Agricultural and Resource Economics 139, 156, 175, 176
- Additional upper division Economics courses 12

Specialization: Behavior and Strategy

- Economics 121A or 122 4
- Choose one: 4
  - Economics 110A, 110B, 111A, 111B
- Choose two: 8
  - Economics 103, 106, 121A, 121B, 122
- Additional upper division Economics courses 12

Specialization: Data Analytics and Economics Analysis

- Choose one: 4
  - Economics 110A, 110B, 111A, 111B
- Economics 140 4
- Choose two: 8
  - Economics 103, 106, 122, and either 132 or 145
- Additional upper division Economics courses 12

Specialization: International Macro-Finance

- Choose one: 4
  - Economics 110A, 110B, 111A, 111B
- Choose three: 12
  - Economics 110B, 134, 135, 136, 160B, 171
- Choose two: 8
  - Economics 103, 106, 116, 121A, 121B, 122, 125, 130, 131, 132, 134 (or Agricultural and Resource Economics 171A), 135, 136, 137, 140 (or Agricultural and Resource Economics 106), 145, 151A, 151B, 152, 160A, 160B, 194HA, 194HB, Agricultural and Resource Economics 139, 156, 175, 176
- Additional upper division Economics courses 8

Specialization: Policy

- Choose one:
  - Economics 110A, 110B, 111A, 111B 4
- Choose three:
  - Economics 125, 130, 131, 145, 151A, 151B, 160A 12
- Additional upper division Economics courses 12

Specialization: Poverty and Inequality

- Choose one: 4
  - Economics 110A, 110B, 111A, 111B
- Choose three: 12
  - Economics 115A, 115B, 130, 151B
- Choose two: 8
  - Economics 103, 106, 116, 121A, 121B, 122, 125, 130, 131, 132, 134 (or Agricultural and Resource Economics 171A), 135, 136, 137, 140 (or Agricultural and Resource Economics 106), 145, 151A, 151B, 152, 160A, 160B, 194HA, 194HB, Agricultural and Resource Economics 139, 156, 175, 176
- Additional upper division Economics courses 4

Specialization: Economic History

- Choose four: 16
  - Economics 110A, 110B, 111A, 111B, one of which may be from History 108, 109B, 110, 110A, 111A-C, 112A, 112B, 112C, 113, 115A-F, 116, 120, 121A-C, 122, 125, 130A-C, 131A-C, 132, 133, 134A, 135A-B, 138A-C, 139A-B, 140, 141, 142A-B, 143, 144A-B, 145, 146A-B, 147A-C, 148A-C, 149,151A-D, 159, 160, 162, 163A-B, 164, 165, 166A-B, 167, 168, 169A-B, 170A-C, 171A-B, 171D, 172, 173, 174A, 174B, 174C, 174D, 175, 176A-B, 177A-B, 178A-B, 179, 180AN, 181, 182, 183A-B, 184, 185A-B, 188, 189, 190A-D, 191A-J, 193A-D, 194A-E, 195B, 196A-B
- Choose three: 12
  - Economics 103, 106, 116, 121A, 121B, 122, 125, 130, 131, 132, 134 (or Agricultural and Resource Economics 171A), 135, 136, 137, 140 (or Agricultural and Resource Economics 106), 145, 151A, 151B, 152, 160A, 160B, 194HA, 194HB, Agricultural and Resource Economics 139, 156, 175, 176

Total Units for the Major 61–64

Recommended. Students considering graduate study in economics are strongly urged to take Mathematics 21A-21B-21C and 22A.

The Economics Department suggests that Economics 100A, 100B, 101, and 102 be taken as soon as possible after the introductory courses.

Major Advisor. Contact Department office at *ecnugadvisor@ucdavis.edu* or 530-752-9142.

Minor Program Requirements:

UNITS

Economics 20

- Economics 100, 101 8
- Choose eight units: 8
  - Economics 103, 106, 116, 121A, 121B, 122, 125, 130, 131, 132, 134 (or Agricultural and Resource Economics 171A), 135, 136, 137, 140 (or Agricultural and Resource Economics 106), 145, 151A, 151B, 152, 160A, 160B; Agricultural and Resource Economics 139, 156, 175, 176
- Choose four units: 4
  - Upper division Economics courses

Energy (A Graduate Group)

Alissa Kendall, Ph.D., Chairperson of the Group

Annemarie Schaaf, Graduate Program Coordinator

Group Office. West Village, 1605 Tilia, Suite 100, Davis, CA 95616; 530-752-0247; *https://eec.ucdavis.edu/energy-graduate-group/*

Faculty. *https://eec.ucdavis.edu/energy-graduate-group/egg-faculty/*

Graduate Study. The Energy Graduate Group offers the M.S. (Plan 1—Thesis, and Plan II—Exam) and Ph.D. degrees in two tracks of study: Energy Science & Technology, and Energy Policy & Management. The program is designed to meet the world's growing needs for highly qualified, thoughtful and dedicated leaders in sustainable energy systems. Both tracks are aimed at a wide range of students, though Energy Science and technology students are expected to come from disciplinary backgrounds in engineering or the physical sciences,

while Energy Management and Policy students are expected to come from a wider range of disciplines interested in economic, policy, business and social aspects of energy systems.

Graduate Advisors. Adam Moule (*Energy Science & Technology*), Katrina Jessoe (*Energy Policy & Management*), Julia Fan (*Admissions*)

English

Changes to A.B. Major Requirements

(change—eff. fall 16)

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 20
- English 3 or University Writing Program 1.... 4
- English 10A, 10B, 10C 12
- Choose one: 4
  - English 40, 43, 44, 45

Depth Subject Matter..... 44
- English 110A or 110B 4
- Historical Distribution Requirements 20
  - Three courses focusing on literature written in English before 1800, at least one of which must be on literature written primarily before 1500:
    - *Before 1500*
      - English 111, 113A, 113B
    - *1500-1800*
      - English 115, 117, 122, 123, 142, 150A, 155A, 185A
  - One course focusing on literature written in English between 1800 and 1900:
    - English 130, 133, 143, 144, 155B, 158A, 181A, 185B
  - One course focusing on literature written in English between 1900 and present:
    - English 137N, 138, 146N, 147, 150B, 155C, 156, 158B, 166, 167, 168, 181B, 185C
- Non-Historical Distribution Requirements ... 8
  - One course on literature and ethnicity, literature and gender, or literature and sexuality:
    - English 125, 139, 140, 141, 166, 167, 178, 179, 181A, 181B, 185A, 185B, 185C, 186
  - One course in film and media studies, language studies, cultural studies and contexts, literature and science/technology, or literature and the environment:
    - English 105, 106, 107, 120, 160, 161A, 161B, 162, 164/Science and Technology Studies 164, 171A, 171B, 172, 173, 175, 180, 182, 183, 184; Linguistics 106; Science and Technology Studies 173
  - Please note that while some courses are identified as fulfilling more than one distribution requirement, a given course can only fulfill one such requirement.

Area of Emphasis (choose at least one).. 12
- *Literature, Criticism, and Theory*
- One upper division English elective.
- Two advanced courses, one of which can be a seminar:
- Please note that English 110A or 110B is a prerequisite for advanced study in the major.
- English 149, 153, 159, 163, 165, 177, 187A, 188A, 189, 194H, 195H
- *Creative Writing*
- Three sections of English 100F, 100P, 100NF, 100FA, 100PA

Total Units for the Major 64

Engineering

Changes to Engineering Majors

(change—eff. fall 17)

The Major Programs

Twelve 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
- Environmental Engineering
- Materials Science and Engineering
- Mechanical Engineering

Engineering: Chemical Engineering

Changes to Chemical Engineering Undergraduate Program

(change—eff. fall 17)

UNITS

Lower Division Required Courses 76-77
- 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 5, 51, 60, 80 12
- Engineering 17 or 35 or 45 or 45Y 4
- Biotechnology 1 or 1Y or Biological Sciences 2A..... 4 or 5
- Choose one; a grade of C- or better is required: 4
  - English 3 or University Writing Program 1, 1V 1Y, or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5 (grade of C- or better is required)

Upper Division Required Courses 80-84
- Chemical Engineering 140, 141, 142, 143, 145A, 145B, 148A, 148B, 152A, 152B, 155, 157, 158A, 158B, 158C 56
- Chemistry 110A, 110B, 128A, 128B, 129A 16
- Chemical Engineering and Materials Science Electives 8
  - 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 four units for any combination of engineering courses numbered 190C, 192, 198, and 199. Courses may also be selected from the following: Biological Sciences 102; Food Science and Technology 100A, 102A, 102B; Fiber and Polymer Science 150.
- Upper Division Composition Requirement ..... 0 or 4
  - Choose one; a grade of C- or better is required:
    - University Writing Program 102E, 102F, 104A, 104E, 104T or passing the Upper Division Composition Exam.

Changes to Biochemical Engineering Undergraduate Program

(change—eff. fall 17)

UNITS

Lower Division Required Courses 73
- 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 5, 51, 60, 80 12
- Choose one; a grade of C- or better is required: 4
  - English 3 or University Writing Program 1, 1V or 1Y, or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5 (grade of C- or better is required)

Upper Division Required Courses 92-96
- Chemical Engineering 140, 141, 142, 143, 145A, 145B, 148A, 152A, 152B, 157, 158A, 158C, 161A, 161B, 161C, 161L 60
- Biological Sciences 102 3
- Microbiology 102, 103L 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 you submit 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, 117, 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, 107; Plant Biology 112; Plant Sciences 100A, 152; Statistics 120, 130A, 131A.; Viticulture and Enology 123, 124
- Upper Division Composition Requirement ..... 0 or 4
  - Choose one; a grade of C- or better is required:
    - University Writing Program 102E, 102F, 104A, 104E, 104T or passing the Upper Division Composition Exam.

Engineering: Civil and Environmental

Change in the Civil Engineering Undergraduate Program and New B.S. in Environmental Engineering Undergraduate Program

(new degree—eff. fall 17)

Areas of Specialization

Environmental Engineering. This area focuses on understanding and management of physical, chemical, and biological processes in natural and engineered systems. Areas of emphasis include improvement of air, land, and water quality in the face of increasing population, expanding industrialization, and global climate change. Examples of environmental engineering include innovative analysis and design of air, water, wastewater, and solid waste treatment systems; mathematical modeling of natural and engineered systems; life cycle analysis; sampling, analysis, transport and transformation of natural and anthropogenic pollutants; and modeling of air pollutant emissions.

Suggested Advisors. H.N. Bischel, C.E. Bronner, C. D. Cappa, J.L. Darby, A. Kendall, M.N. Kinyua, M.J. Kleeman, F. J. Loge, J.R. Lund, M.P. Modera, D.A. Niemeier, S.G. Schladow, T.M. Young

Geotechnical Engineering. This area deals with civil infrastructure and environmental problems that require quantifying the behavior of geologic materials (such as soils and rocks). Examples of geotechnical engineering problems include foundations for buildings and bridges, earthwork (such as dams, tunnels, highways), earthquake hazards (such as ground motions, liquefaction, soil-structure interaction), and geo-environmental problems (ground water flow, subsurface contaminant transport and remediation).

Suggested Advisors. R.W. Boulanger, Y.F. Dafalias, J.T. DeJong, J.T. Harvey, B. Jeremic, B.L. Kutter, P.C. Lucia, A. Martinez, K. Ziotopoulou

Structural Engineering and Structural Mechanics. Structural Engineering addresses the conception, sustainable design, analysis, construction, and life-cycle modeling of all types of civil infrastructure, including buildings, bridges, dams, ports, highways, and industrial facilities subject to sources of loadings ranging from gravity, to earthquakes, to extreme environmental events. Structural Mechanics encompasses the theory of solid structures, and the associated methods of analysis and computation used in the practice of Structural Engineering. For both disciplines, materials of particular interest include steel, reinforced concrete, timber, advanced composites and particulate media.

Suggested Advisors. J.E. Bolander, Y.K. Chai, L. Cheng, Y.F. Dafalias, J.T. Harvey, A.M. Kanvinde, S.K. Kunnath, B.H. Maroney, S.A. Miller, M.M. Rashid, N. Sukumar

Transportation Planning and Engineering. This area deals with the movement of people and goods in a manner consistent with society's environmental and socio-economic goals. Transportation engineering applies engineering, physical and mathematical sciences, economics, and behavioral social science principles to plan, analyze, design, and operate resilient and sustainable transportation systems, such as highways, transit, airfields and ports. Transportation planning involves the formulation and analysis of transportation policy, program, and project alternatives in consideration of societal goals, budgetary constraints, socio-economic (such as safety, equity and mobility) and environmental objectives (such as air and water quality, climate change, and clean energy), and technological feasibilities (such as vehicle, infrastructure, and information technologies).

Suggested Advisors. Y. Fan, J.T. Harvey, M.A. Jaller, A. Kendall, M.P. Modera, D.A. Niemeier, D. Sperling, H.M. Zhang

Water Resources Engineering. This area includes hydrology, hydraulics, fluid mechanics, and water resources systems planning and design. Hydrology deals with quantifying and understanding all aspects of the hydrologic cycle, including the relationships between precipitation, runoff, groundwater, and surface water. Water quality and contaminant transport issues are linked to hydrologic conditions. Hydraulics and fluid mechanics deal with flows in pipes, open-channel water-distribution systems, and natural systems, such as lakes and estuaries. Water resources systems planning and design deals with the comprehensive development of water resources to meet the multiple needs of industry, agriculture, municipalities, recreation, and other activities.

Suggested Advisors. F.A. Bombardelli, J.L. Darby, A.L. Forrest, J.D. Herman M.L. Kavvas, J.R. Lund, V.L. Morales, H.J. Oldroyd, S.G. Schladow, B.A. Younis

Additional information on areas of specialization and potential faculty advisor can be obtained from the departmental website.

Civil Engineering Undergraduate Program

The Civil Engineering program is accredited by the Engineering Accreditation Commission of ABET; see *http://www.abet.org*.

Students are encouraged to adhere carefully to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed. Exclusive of General Education units, the minimum number of units required for the Civil Engineering major is 152 (77 units in lower division and 75 units in upper division).

	UNITS
Lower Division Required Courses	**77**
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-22B	6
Physics 9A-9B-9C	15
Choose one:	4
Physics 9D, Chemistry 2C, Biological Science 2A, Geology 50-50L	
Chemistry 2A-2B or 2AH-2BH	10
Civil and Environmental Engineering 3, 16 . 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 upper-division Civil and Environmental Engineering coursework.	6
Choose one:	4
Civil and Environmental Engineering 19, Engineering 6, or Computer Science Engineering 30	
Engineering 35	4
Engineering 45 or 45Y	4
Choose one; a grade of C- or better is required:	4
English 3 or University Writing Program 1, 1V, or 1Y, or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5 (grade of C- or better)	
Choose one:	4
Communication 1, 3, Engineering 3	
Upper Division Required Courses	**75**
Engineering 103, 104, 104L, 106	12
Engineering 102 or 105	4
Civil and Environmental Engineering 114, 190	6
Choose one: Civil and Environmental Engineering 115, 153; Mathematics 118A; or Statistics 108	4
Civil & Environmental Engineering Breadth	
Choose one course from four of the following group options:	14-17
Environment: Civil and Environmental Engineering 140 or 148A or 149	
Geotechnical: Both Civil and Environmental Engineering 171 and 171 Lab	
Structures: Civil and Environmental Engineering 130	
Transportation: Civil and Environmental Engineering 161 or 163 or 165	
Water Resources: Both Civil and Environmental Engineering 141 and 141 Lab	
Civil & Environmental Engineering Depth	
Choose two additional courses from two of the four group options selected for Civil and Environmental Engineering Breadth:	15-16
Environment: Civil and Environmental Engineering 140, 148A, 148B, 149, 150	
Geotechnical: Civil and Environmental Engineering 173, 175, 179	
Structures: Civil and Environmental Engineering 131, 132, 135, 136	
Transportation: Civil and Environmental Engineering 153, 161, 162, 179	
Water Resources: Civil and Environmental Engineering 142, 144, 145, 146, 155	
Civil & Environmental Engineering electives	12
Civil & Environmental Engineering electives may include any upper division, letter-graded Civil & Environmental Engineering course not already used towards another degree requirement, Engineering 102 or 105, and may include, but not exceed, a combination of six units from Civil & Environmental Engineering 198 and 199.**	
Civil & Environmental Engineering 193A & 193B	8
Upper Division Composition Requirement	0-4
Choose one: a grade of C- or better is required: University Writing Program 101, 102E, 102G, 104A, 104E, 104T or passing the Upper Division Composition Exam.	

* No unit of coursework may be used to satisfy two different degree requirements, i.e. although a course may be listed in more than one category, that course may only satisfy one requirement.

** 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 advisor.

Environmental Engineering Undergraduate Program

	UNITS
Lower Division Required Courses	**72-73**
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-22B	6
Chemistry 2A-2B-2C	15
Physics 9A-9B	10
Geology 50 or Atmospheric Science 60	3-4
Engineering 6	4
Engineering 35	4
Civil and Environmental Engineering 3, 16, 40	10
Choose one; a grade of C- or better is required:	4
English 3 or University Writing Program 1, 1V, or 1Y, or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5	
Upper Division Required Courses	**66-70**
Engineering 103, 105, 106	11
Civil and Environmental Engineering 114, 123, 140, 140L, 141, 141L, 143, 145, 147A-B, 148A-B, 149, 150, 171, 171L, 190	55
Upper Division Composition Requirement	0-4

Choose one; a grade of C- or better is required:
University Writing Program 101, 102E, 102G, 104A, 104E, 104T or passing the Upper Division Composition Exam.

Suggested Electives

Atmospheric Science 116
Engineering: Biological Systems 75, 130, 147
Civil and Environmental Engineering 125, 140B, 142, 144, 146, 153, 155, 162, 163, 198, 199
Geology 50L, 139, 140, 156
Hydrologic Sciences 134, 142, 150, 182

Total Units for the Major 138-143

Construction Engineering and Management Minor

All courses must be taken for a letter grade. A grade of C- or better is required for all courses used to satisfy minor requirements with an overall GPA in minor requirement courses of 2.000 or better. Minor prerequisite: C- or better in Engineering 104.

UNITS

Construction Engineering and Management 24

Civil and Environmental Engineering 137, 143, 153 12
Choose twelve units: 12
Civil and Environmental Engineering 179, Agricultural and Resource Economics 112, 155, 157, 171A, 171B, Economics 134, 162; Environmental Science and Policy 161; may include one from Agricultural and Resource Economics 18, Management 11A

Minor advisors. J.L. Darby, J.T. Harvey, J.R. Lund

Sustainability in the Built Environment Minor

All courses must be taken for a letter grade. A grade of C- or better is required for all courses used to satisfy minor requirements with an overall GPA in minor requirement courses of 2.000 or better.

UNITS

Sustainability in the Built Environment 20

Civil and Environmental Engineering 123, 143 8
Choose 12 units: 12
Civil and Environmental Engineering 125, 126, 127, 128, 148A, 149, 155, 162, 165, Engineering 188, Anthropology 101 (same as Environmental Science & Policy 101), 104N, Agricultural and Resource Economics 175, 176, Atmospheric Science 116, Community and Regional Development 142, 154, 172, Environmental Science and Policy 161, 162, 171, Environmental Toxicology 101, 102A, Geology 130, 134, Landscape Architecture 3, 180*, Plant Sciences 101, 141, 150, 162
* Due to variability in series course offering, consent of minor advisor is required.

Minor advisors. C.E. Bronner, F.J. Loge, A. Kendall, S.A. Miller

The Graduate Program in Civil and Environmental Engineering

M.S. and Ph.D.; Designated Ph.D. emphasis available in Biotechnology
http://cee.engr.ucdavis.edu
530-752-1441

With over forty faculty members, over $20 million in annual research expenditures and over 200 graduate students, the Department of Civil and Environmental Engineering integrates research, education and professional service in areas related to civil infrastructure and the environment. Graduate students benefit from close working relationships with professors who are the leading international experts in their field. They are supported in their study and research by robust funding, and they have access to state-of-the-art research centers. For example, the Center for Geotechnical Modeling, *http://cgm.engr.ucdavis.edu*, has the largest centrifuge of its kind in the nation and gives researchers access to their peers at other unique centers via high-speed networks. Since 1960, researchers at the J. Amorocho Hydraulics Laboratory (JAHL) have served the state of California by solving ecological, biological, environmental and hydraulic engineering problems. Students may also have the opportunity to work in one of the many modern environmental engineering labs or the structural testing facilities in the department. Our graduates go on to serve the profession and academia by advancing the leading edge of fundamental knowledge, as well as engineering practice.

Generous financial support is available in the form of research assistantships, teaching assistantships, fellowships and financial aid. About 75% of the graduate students in our program are either fully or partially supported.

Research Highlights:

- Alternative fuel transportation infrastructure
- Earthquake engineering
- Environmental engineering
- Environmental planning and management
- Geotechnical engineering
- Hydraulics and fluid mechanics
- Hydrology
- Structural engineering
- Structural health monitoring
- Structural mechanics
- Systems planning and design
- Transportation engineering
- Transportation planning and design
- Water resources engineering

Research Facilities and Partnerships:

- Advanced Transportation Infrastructure Research Center
- Center for Geotechnical Modeling
- Center for Watershed Sciences
- Center for Water-Energy Efficiency
- Institute of Transportation Studies
- J. Amorocho Hydraulics Laboratory (JAHL)
- John Muir Institute of the Environment
- Nano-Engineering and Smart Structures Technologies
- Tahoe Environmental Research Center
- Western Cooling Efficiency Center

Complete Information on our website.

Engineering: Computer Science

Changes to Computer Science and Engineering Undergraduate Program

(change—eff. fall 17)

The Computer Science and Engineering program is accredited by the Engineering Accreditation Commission of ABET; see *http://www.abet.org*.

Exclusive of General Education units, the minimum number of units for the Computer Science and Engineering major is 144.

Students are encouraged to adhere carefully to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

UNITS

Lower Division Required Courses 78-79

Mathematics 21A-21B-21C-21D 16
Mathematics 22A or 67 3-4
Mathematics 22B 3
Physics 9A-9B-9C-9D 19
Chemistry 2A 5
Computer Science Engineering 20, 30, 40, 60 16
Computer Science Engineering 50 or Electrical and Computer Engineering 70 4
Engineering 17 4
Choose one; a grade of C- or better is required 4
English 3 or University Writing Program 1, 1V, 1Y or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5
Communication 1 4

Upper Division Required Courses 62-66

Computer Science Engineering 132, 140A, 150, 152A, 154A, 154B, 160, 188, 193A, 193B 34
Computer Science Engineering 120 or 122A 4
Electrical and Computer Engineering 100, 172 9
Computer Science electives 15
A minimum of four courses and a minimum of 15 units chosen from Computer Science Engineering courses numbered 120 to 189 inclusive; one approved course of 3 to 5 units from Computer Science and Engineering 192 or 199; Electrical and Computer Engineering 171, 180A, 180B; one course may be taken from the following restricted elective list: Economics 122; Linguistics 127, 177; Mathematics 135A, 135B; Psychology 120; Statistics 131A, 131B. No course can count as both a required course and a computer science and engineering elective.
Upper Division Composition Requirement 0-4
Choose one:
University Writing Program 101 (a grade of C- or better is required) or passing the Upper-Division Composition Exam.

Engineering: Materials Science and Engineering

Changes to Materials Science and Engineering Undergraduate Program & Materials Science Minor

(change—eff. fall 17)

UNITS

Lower Division Required Courses 78

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, 45 or 45Y 8
Materials Science and Engineering 2 2
Chemical Engineering 60 4
Choose one; a grade of C- or better is required: 4
English 3 or University Writing Program 1 or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5
Communication 1 or 3 4

Upper Division Required Courses 75-83

Engineering 190 3
Materials Science and Engineering 160, 162, 162L, 164, 172, 172L, 174, 174L, 180, 181, 188A, 188B 42

Choose one:.....4
Engineering 180, Mathematics 135A, Statistics 120, 131A, Civil and Environmental Engineering 114, Chemical Engineering 140, Mechanical Engineering 115, Physics 104A
Choose one:.....3-4
Chemistry 110A, 124A, 128A, or Physics 108 and 108L, 110A, 122A, 151, 160
Choose one:.....3-4
Chemical Engineering 158A, Materials Science and Engineering 170, Engineering 106, 160, 188, Civil Engineering 123, 125, 143
A minimum of 14 units from one of the following focus areas:.....14
Biomedical Engineering:
Biology 2A, Biomedical Engineering 20, 106*, 109
Biological Systems Engineering:
Biology 2A, Engineering 100, Biological Systems Engineering 75, 165
Chemical Engineering:
Chemical Engineering 51, 140, 141, 142
Civil Engineering:
Engineering 35, 104, Civil Engineering 130, 132
Electrical Engineering:
Engineering 100, Electrical Engineering 140A, 140B, 146A
Mechanical Engineering:
Engineering 35, 102, 103, 104
Depending on area of focus, 6-9 units of upper division electives.....6-9
Students may receive up to a maximum of 4 units of credit for engineering 199 courses, when these courses are approved by the departmental undergraduate studies committee. To receive credit, students must submit a summary of their research to the committee. A letter of support from the faculty mentor is also required to verify that you have conducted substantial research activity.
*Students would need to take Neurobiology, Physiology, and Behavior 101 as an elective to enroll in Biomedical Engineering 106
Upper Division Composition Requirement.....0 or 4
Choose one; grade of C- or better is required:
University Writing Program 102E, 102F, 104A, 104E, 104T or passing the Upper Division Composition Exam.

Minor Requirements

	UNITS
Materials Science	**20**
Materials Science and Engineering 160, 162, 164	12
Science and Engineering 172 or 174	4
Choose an additional four units from the following, if not used above: Materials Science and Engineering 147, 162L, 172, 172L, 174, 174L, 180, 181, 182	4

Engineering: Mechanical and Aerospace Engineering

Changes to Mechanical and Aerospace Engineering & Aerospace Science and Engineering Undergraduate Programs

(change—eff. fall 17)

The Mechanical and Aerospace Engineering Undergraduate Programs

The Department of Mechanical and Aerospace Engineering administers two undergraduate programs in the College of Engineering: *(1)* Mechanical Engineering, *(2)* Aerospace Science and Engineering.

For more information about our programs, please see *http://mae.ucdavis.edu/ug.php*.

Mission. The Department of Mechanical and Aerospace Engineering is committed to educating future engineers so 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.

Mechanical Engineering Undergraduate Program

The Mechanical Engineering program is accredited by the Engineering Accreditation Commission of ABET; *http://www.abet.org*.

The mechanical engineer uses basic science in the design and manufacture of complex engineering systems, requiring the application of physical and mechanical principles to the development of machines, energy conversion systems, materials, and equipment for guidance and control.

Work in this broad field of engineering requires a thorough knowledge of mathematics, physics, chemistry, material science, applied mechanics, thermodynamics, heat transfer, mass transfer, electricity, manufacturing processes, and economics.

The Mechanical Engineering program is designed to provide knowledge in mechanical engineering and associated applied sciences so that graduates may practice in a broad range of industries, pursue graduate studies, participate in research and development, and/or pursue entrepreneurial endeavors.

Areas of Interest

Students spend their third year in further study of fundamental courses, and in the fourth year they may tailor their studies to their interests by selecting courses in controls and systems analysis, fluid mechanics, heat transfer, mechanical design or thermodynamics. Students can either prepare for graduate study in mechanical engineering or obtain a broad background for entering engineering practice.

Students may select elective courses from among the areas of interest listed below.

Mechanical Design. The creation and improvement of products, processes, or systems that are mechanical in nature are the primary activities of a professional mechanical engineer. The development of a product from concept generation to detailed design, manufacturing process selection and planning, quality control and assurance, and life cycle considerations are areas of study and specialization in the area of mechanical design.

Solutions to such major social problems as environmental pollution, the lack of mass transportation, the lack of raw materials, and energy shortages, will depend heavily on the engineer's ability to create new types of machinery and mechanical systems.

The engineer-designer must have a solid and relatively broad background in the basic physical and engineering sciences and have the ability to synthesize the information from such a background in creative problem solving. In addition to having technical competence, the designer must be able to consider the socioeconomic consequences of a design and its possible impact on the environment. Product safety, reliability, and economics are other considerations.

Suggested technical electives:

Aerospace Science and Engineering 133, 139
Biological Systems Engineering 114, 120, 165
Biomedical Engineering 118/Electrical and Computer Engineering 147
Engineering 122, 160 (only one unit of credit towards Technical Electives requirement)
Materials Science and Engineering 180, 181, 182
Mechanical Engineering 121, 134, 150B, 151, 152, 154, 161, 163

Suggested Advisors. H.H. Cheng, R.T. Farouki, M.R. Hill, B.S. Linke, B. Ravani, M. Soshi, S. Velinsky

Biomedical and Engineering Fluid Mechanics. This field of study is based on the fundamentals of fluid mechanics and their broad range of applications in the biomedical and engineering areas. Areas of current research include blood circulation and its potential role in the regulation of normal physiological function and in the development of disease; groundwater and atmospheric flows and their implications for pollutant transport and environmental concerns; aerodynamic flow around transportation vehicles and its impact on vehicle performance; and flow in combustion engines and other energy systems with considerations of efficiency and environmental impact. These areas are investigated both experimentally and computationally.

Suggested technical electives:

Aerospace Science and Engineering 138
Engineering 160 (only one unit of credit towards technical requirements)
Chemical Engineering 161A, 161B
Civil and Environmental Engineering 144, 149
Mechanical Engineering 161, 163

Suggested Advisor. R.C. Aldredge, M. Hafez, S.K. Robinson, B.D. Shaw, C.P. van Dam, A.S. Wexler

Combustion and the Environment. Combustion is widely used for energy generation, propulsion, heating, and waste disposal, as well as for many other applications. Mechanical engineers are often heavily involved with the design of combustion systems (internal combustion engines, gas turbines, furnaces, etc.) and deal with aspects of combustion ranging from increasing efficiencies to reducing pollutant emissions. This specialization is for those who would like to work in fields that use combustion, or that deal with pollution related to combustion. With the current increased emphasis on reducing pollutants while maintaining or increasing efficiency, the efforts of mechanical engineers in designing and improving combustion systems are becoming more important.

Suggested technical electives:

Mechanical Engineering 161, 163
Civil and Environmental Engineering 149, 150

Suggested Advisors. R.C. Aldredge, R. Davis, P. A. Erickson, B.D. Shaw

Heat Transfer, Thermodynamics, and Energy Systems. This specialization emphasizes the fundamentals of heat transfer and thermodynamics, and their application to the design of advanced engineering systems. The objective of the program is to introduce students to the fundamental processes of heat transfer and thermodynamics in complex engineering systems so that they are able to design more efficient, cost effective, and reliable systems with less environmental pollution and impact. An understanding of heat transfer and thermodynamics is required for the design of efficient, cost-effective systems for power generation, propulsion, heat exchangers, industrial processes, refining, and chemical processing. This area of specialization is important to many industries—aerospace, defense, automotive—as well as to the thermal design of electronic and computer packages.

Suggested technical electives:

Aerospace Science and Engineering 138
Mechanical Engineering 161, 163

Suggested Advisors. R.C. Aldredge, R. Davis, P.A. Erickson, J.W. Park, B.D. Shaw

Manufacturing. Manufacturing is concerned with the conversion of raw materials into finished products by a variety of processes, such as machining, forming, casting, and molding. Modern manufacturing technology is increasingly dependent upon integration with computer-aided design systems and precision computer controls. State-of-the-art laboratories offer the opportunity for hands-on experience with a wide spectrum of manufacturing equipment. Manufacturing engineers must have expertise in design, materials, controls, statistical methods, computer software, and microprocessor applications.

Suggested technical electives:

Biomedical Engineering 118/Electrical and Computer Engineering 147
Electrical and Computer Engineering 160
Materials Science and Engineering 180, 181
Mechanical Engineering 150B, 151, 154

Suggested Advisors. H.H. Cheng, R.T. Farouki, B.S. Linke, D.A. Horsley, V. La Saponara, M. Soshi, B. Ravani

System Dynamics and Control. Engineers are increasingly concerned with the performance of integrated dynamics systems in which it is not possible to optimize component parts without considering the overall system.

System dynamics and control specialists are concerned with the modeling, analysis, and simulation of all types of dynamic systems and with the use of automatic control techniques to change the dynamic characteristics of systems in useful ways. The emphasis in this program is on the physical systems that are closely related to mechanical engineering, but the techniques for studying these systems apply to social, economic, and other dynamic systems.

Ongoing research includes projects on continuously variable transmissions, active and semi-active suspension systems, modeling and control of vehicle dynamics, electromechanical actuator design, electronically controlled steering, the analysis of fuel management systems, and the design of flight-control systems with humans in the loop.

Suggested technical electives:

Aerospace Science and Engineering 129, 139, 141
Electrical and Computer Engineering 160
Engineering 122
Mechanical Engineering 121, 134, 154

Suggested Advisors. S. Joshi

Ground Vehicle Systems. An important aspect of mechanical engineering is the design of more environmentally benign surface vehicles that provide efficient individual and public transportation. Innovations in the field require competence in vehicle dynamics, control of vehicle dynamics, power sources and power transmission, lightweight structures and systems, alternatively fueled power systems, including electrical drives and fuel cells, and mechanical systems.

Suggested technical electives:

Aerospace Science and Engineering 127, 129, 139
Civil and Environmental Engineering 130, 149, 160
Engineering 122, 160 (only one unit of credit towards technical electives requirement)
Mechanical Engineering 121, 134, 152

Suggested Advisors. P. A. Erickson, M. Hill, J. Park, N. Sarigul-Klijn, S. Velinsky

Transportation Systems. As society recognizes the increasing importance of optimizing transportation systems to minimize environmental degradation and energy expenditure, engineers will need to consider major innovations in the way people and goods are moved. Such innovations will require competence in vehicle dynamics, propulsion and control, and an understanding of the problems caused by present-day modes of transportation. Vehicle control requires an understanding of sensors and actuators, and the integration of yet-to-be-proposed concepts into overall vehicular dynamics. Competence in these areas allows for the development of alternative propulsion concepts, such as electric, hybrid, and fuel cell.

Suggested technical electives:

Aerospace Science and Engineering 127, 129
Biological Systems Engineering 114, 120
Civil and Environmental Engineering 131, 149
Engineering 122, 160 (only one unit of credit towards Technical Electives requirement)
Mechanical Engineering 134, 150B, 161, 163

Suggested Advisors. P.A. Erickson, J.W. Park, S. Velinsky

Mechanical Engineering Program Requirements

Students are encouraged to adhere carefully to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

Exclusive of General Education units, the minimum number of units required for the Mechanical Engineering major is 148.

	UNITS
Lower Division Required Courses	**78**
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-22B	6
Physics 9A-9B-9C	15
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
Choose one; a grade of C- or better is required:	4
English 3, University Writing Program 1, 1Y or 1V, Comparative Literature 1, 2, 3, 4, Native American Studies 5	
Choose one:	4
Communication 1, 3, Engineering 3	
Upper Division Required Courses	**70-74**
Engineering 100, 102, 103, 104, 105, 190	22
Mechanical Engineering 106, 108, 109, 150A, 165, 172	24
Mechanical Engineering 185A & 185B (taken in consecutive quarters), or Aerospace Science and Engineering 130A & 130B	8
Applied Mathematics Electives, choose one:	4
Chemical Engineering 140, Civil & Environmental Engineering 114, Computer Science Engineering 130, Engineering 180, Mathematics 118A, 128A, 128B, Mechanical Engineering 115, 151, Statistics 130A, 131A	
System Dynamics/Mechanical Design Electives; choose one:	4
Engineering 122, Mechanical Engineering 121, 139, 150B, 154, 171	
Restricted Electives; choose two:	8
Aerospace Science and Engineering 129, 138, 140, 141, 142; Engineering 122, 188, Materials Science and Engineering 180, 182; Mechanical Engineering 134, 152, 161, 163, 164. Students may also choose from Aerospace Science and Engineering 130A, 130B, Mechanical Engineering 121, 139, 150B, 151, 154, 171 if these courses are not used in satisfaction of other degree requirements.	
Upper Division Composition Requirement	0 or 4
Choose one; a grade of C- or better is required):	
University Writing Program 101, 102E, 104A, 104E, 104 or passing the Upper-Division Composition Exam.	

The Aerospace Science and Engineering Undergraduate Program

Exclusive of General Education units, the minimum number of units required for the Aerospace Science and Engineering major is 195.

	UNITS
Lower Division Required Courses	**74**
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-22B	6
Physics 9A-9B-9C	15
Chemistry 2A-2B or 2AH-2BH	10
Engineering 4	3
Engineering 6 or Mechanical Engineering 5	4
Engineering 17, 35, 45 (or 45Y)	12
Choose one; a grade of C- or better is required:	4
English 3, University Writing Program 1, 1Y or 1V, Comparative Literature 1, 2, 3, 4, Native American Studies 5	
Choose one:	4
Communication 1, 3, Engineering 3	
Upper Division Required Courses	**86-90**
Engineering 100, 102, 103, 104, 105, 190	22
Mechanical Engineering 106, 108, 109, 165, 172	20
Aerospace Science and Engineering 127, 129, 130A, 130B, 133, 135, 138	28
Choose one:	4
Engineering 180, Mechanical Engineering 115, Mathematics 128C	
Technical electives	12
Choose one; must be chosen from the following astronautics electives:	
Aerospace Science and Engineering 140, 141, 142	
The remaining units must be taken from: Mechanical Engineering 139 or Aerospace Science and Engineering 126 or from the above Astronautics Electives list if not used in satisfaction of other degree requirements. Up to four units may be selected from any upper-division engineering course including any engineering 192 or 199 not used in satisfaction of other degree requirements. Courses that cannot be used are Biomedical Engineering 110L, Engineering 160, Computer Science Engineering 188 or any 197T course.	
Upper Division Composition Requirement	0 or 4
Choose one; grade of C- or better is required:	
University Writing Program 101, 102E, 104A, 104E, 104T, or passing the Upper-Division Composition Exam.	

Environmental Horticulture and Urban Forestry

Changes to B.S. Major Requirements

(change—eff. fall 17)

B.S. Major Requirements:

	UNITS

Communications 1 recommended as part of the College English Composition Requirement or the Words and Images Core Literacy Component.

Preparatory Subject Matter 56-62

- Environmental Horticulture 1, 6 7
- Landscape Architecture 30 4
- Biological Sciences 2A, 2B, Plant Sciences 2 14
- Chemistry 2A-2B 10
- Choose one: 3-4
  - Environmental Science and Policy 1, 10, 30
- Physics 1A-1B 6
- Plant Sciences 21 3
- Mathematics 16A or Statistics 13 3-4
- Choose one: 3-4
  - University Writing Program 102B, 102G, 104E, other upper division composition course; may overlap with college composition requirement; may be satisfied by passing the English Composition Exam
- Lower division restricted electives 6
  - Choose one lower division resource science course and one lower division social science/humanities course in consultation with adviser; minimum six units.

Depth Subject Matter 39-43

- Environmental Horticulture 102 or Plant Sciences 100A 3-4
- Choose one: 4-5
  - Environmental Horticulture 105, Plant Sciences 102, Plant Biology 108
- Plant Biology 117 or Plant Sciences 150 4
- Plant Sciences 171 4
- Soil Science 100 5
- Choose two: 7-9
  - Entomology 110, Nematology 100, Plant Pathology 120, Plant Sciences 105, 176
- Internship or research; must be approved by major advisor 3
- Upper division restricted electives 9
  - In consultation with an advisor, choose three upper division courses in the areas of resource sciences and social sciences/humanities; at least one course must come from each of these two areas; minimum 9 units.

Areas of Specialization (choose one)

No course may be used to satisfy more than one requirement.

Floriculture/Nursery Option 18

- Environmental Horticulture 120, 125 8
- Applied Biological Systems Technology 165 2
- Entomology 135 4
- Choose one: 4
  - Plant Sciences 100C, 158, Soil Science 109

Plant Biodiversity/Restoration Option 16-22

- Environmental Horticulture 160, 160L 4
- Choose one: 3-5
  - Environmental Horticulture 150, Evolution and Ecology 100, Plant Biology 116
- *(a)* Choose one: 3-4
  - Environmental Science and Management 141, Environmental Science and Policy 127, 155L, Plant Sciences 130, 150, Wildlife, Fish, and Conservation Biology 155
- *(b)* Choose one: 3-5
  - Environmental Science and Policy 155, Plant Biology 108, 117, 119, Plant Sciences 102, 144, 147/147L, 163, 176, Wildlife, Fish, and Conservation Biology 156, 157
- Select one additional class from section a or b 3-5

Urban Landscape Management Option 16-17

- Environmental Horticulture 100, 133 8
- Applied Biological Systems Technology 165 2
- Plant Sciences 162 3
- Science and Society 18 or Landscape Architecture 150 3-4

Total Units for the Major 111-127

Major Advisor. T.P. Young

Advising Center for the major is located in 1224 Plant and Environmental Sciences 530-752-7738.

Evolution and Ecology

Changes to A.B & B.S. Major Requirements

(change—eff. fall 17)

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 41-45

- Biological Sciences 2A-2B-2C 15
- Chemistry 2A-2B 10
- Chemistry 8A-8B 6
- Mathematics 17A-17B (17C recommended) or 21A-21B (21C recommended) or Statistics 100 or 102 4-8
- Physics 1A-1B 6

Depth Subject Matter 36

- Biological Sciences 101 4
- Choose one: 3-4
  - Evolution and Ecology 100; Geology 107; Anthropology 151
- Choose one: 4
  - Evolution and Ecology 101; Environmental Science and Policy 100; Wildlife, Fish, and Conservation Biology 151
- Choose additional upper division restricted electives in biological science relevant to the student's interest chosen in consultation with the advisor to achieve a total of 36 or more units 24-25
  - Include at least one course from each of the areas of study below.
  - **Areas of Study:**
    - *(1) Biodiversity:*
      - Evolution and Ecology 105, 108, 112, 114, 140; Microbiology 105; Nematology 110; Plant Biology 116, 148; Plant Sciences 147; Wildlife, Fish, and Conservation Biology 110, 111, 120, 134.
    - *(2) Advanced Evolution and Ecology:*
      - Evolution and Ecology 102, 103, 104, 106, 107, 110, 115, 117, 119, 120, 131, 138, 141, 147, 149, 150, 161, 175, 180A and 180B, 181.
  - Note: A maximum of four units of variable-unit courses (numbered 192, 198, 199) may be applied to upper division elective unit requirements. Courses numbered 197T are not applicable to the upper division elective unit requirement.

Total Units for the Major 77-81

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 56-66

- Biological Sciences 2A-2B-2C 15
- 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

Depth Subject Matter 49

- Biological Sciences 101, 105 (or 102+103), 104 10-13
- Evolution and Ecology 100, 101 8
- Statistics 100, 102 or 130A-130B 4-8
- Choose additional upper division restricted electives in biological science relevant to the student's interest chosen in consultation with the advisor to achieve a total of 49 or more units, including at least a total of two units (six hours per week) of laboratory or fieldwork 20-27
  - Include at least one course from the Biodiversity area of study and two courses from the Advanced Evolution and Ecology areas of study below.
  - **Areas of Study:**
    - *(1) Biodiversity:*
      - Evolution and Ecology 105, 108, 112, 114, 140; Microbiology 105; Nematology 110; Plant Biology 116, 148; Plant Sciences 147; Wildlife, Fish, and Conservation Biology 110, 111, 120, 134.
    - *(2) Advanced Evolution and Ecology:*
      - Evolution and Ecology 102, 103, 104, 106, 107, 110, 115, 117, 119, 120, 131, 138, 141, 147, 149, 150, 161, 175, 180A and 180B, 181.
  - Note: A maximum of 4 units of variable-unit courses (numbered 192, 198, 199) may be applied to upper division elective unit requirements, but not to the upper division laboratory requirement. Courses numbered 197T are not applicable to the upper division elective unit requirement.

Total Units for the Major 105-115

Geographic Studies

Changes to Geographic Studies Minor Requirements

(change—eff. fall 17)

(College of Agricultural and Environmental Sciences)

The minor in Geographic Studies is defined by its concern with place. Geographers strive to answer spatial questions regarding the Earth's surface; to describe and explain the character of regions; to ascertain the ways in which historical and contemporary humans have used and shaped the Earth's surface; and to understand the interactions of physical, biotic, and human systems within our global environment. The minor is compatible with a variety of environmental majors in the college.

The minor is sponsored by the Department of Human Ecology.

Minor Program Requirements:

UNITS

Geographic Studies. 20

- Landscape Architecture 10 3
- Choose at least one course from three areas: 17
  - *Human Geography:*
    - Community and Regional Development 140, 141, 142; Nutrition 120BN; African American and African Studies 100, 107C, 155A, 172, 176, 180, 182; or other upper division courses approved by the advisor.
  - *Physical Geography:*
    - Environmental Science and Management 120, 144; Evolution and Ecology 147; Plant Sciences 144; Wildlife, Fish, and Conservation Biology 110, 111, 120, 156, 157; or other upper division courses approved by the advisor.
  - *Methods in Geography:*
    - Landscape Architecture 150/Applied Biological Systems Technology 150; Environmental Science and Management 185, 186; Applied Biological Systems Technology 181N, 182; Hydrologic Sciences 182; or other upper division courses approved by the advisor.
  - *Individual Study:*
    - Select a maximum of four units of 192 (Internship) or 199 (Research) in any appropriate department.

Minor Advisor. S. E. Greco

International Commercial Law (A Graduate Group)

Suspension of Program

(change—eff. spring 17)

The International Commercial Law program is no longer admitting students; admissions are suspended as of spring 2017.

Management, Graduate School of

Changes to Minor Requirements

(change—eff. fall 17)

Accounting Minor

The UC Davis Graduate School of Management's Undergraduate Accounting Minor gives you the opportunity to enhance your coursework with a carefully crafted series of five upper-division courses. These courses are designed to prepare you for accounting-related careers or advanced study in accounting. All five courses, 20 units total, must be completed to receive the minor certification.

The accounting minor courses are open to all undergraduate and graduate majors at UC Davis.

All minor courses must be taken at UC Davis.

Prerequisites for minor courses are required and you should plan accordingly.

Minor Requirements:

UNITS

Accounting 20

- Management 101 4
- Management 103 4
- Management 105 4
- Management 107 4
- Management 170 4

To complete the minor, students must complete the 20 units of coursework in the minor with a GPA of 2.000 or better. Students may petition to have the minor noted on your transcript by following the process designated by your college, which allows the Graduate School of Management to approve the minor electronically. Contact your college's academic advisor for more information.

Most prerequisites could be used to partially satisfy the University's General Education requirements. No grade lower than a C- will be accepted in any prerequisite course.

Technology Management Minor

The Graduate School of Management offers a minor in Technology Management to undergraduate students. This minor complements students' undergraduate studies with courses in the ways in which engineering and science-based industrial enterprises manage and use knowledge from science, engineering and technology. The minor also provides students with business and management skills that should enable them to use their engineering and science education more effectively in a technology environment.

Minor Requirements:

UNITS

Technology Management 20

Choose five:

- Management 120, 140, 150, 160, 170, 180 20

To complete the minor, students must complete a minimum of 20 units of coursework in the minor with a GPA of 2.0 or better. Students may petition to have the minor noted on their transcript by following the process designated by their college, which allows the Graduate School of Management to approve the minor electronically. Contact your college's academic advisor for more information.

Most prerequisites could be used to partially satisfy the University's General Education requirements for science and engineering majors. No grade lower than a C- will be accepted in any prerequisite course.

Managerial Economics

Changes to B.S. Major Requirements

(change—eff. fall 17)

Depth Subject Matter 52-55

Core 20

Agricultural and Resource Economics 100A, 100B, 106, 155 and Economics 101

Restricted Electives 32-35

Choose at least one of the emphases below:

Business Economics Emphases

Choose 16 units from: 16
- Agricultural and Resource Economics 107, 112, 118, 119, 136, 157, 171A, 171B

Choose the remaining 16 units from the above list or: 16
- Agricultural and Resource Economics 115A, 115B, 120, 121, 130, 132, 138, 139, 140, 143, 144, 145, 146, 150, 156, 165, 175, 176, 194HA-194HB, Economics 115A, 115B, 121A, 121B, 151A, 151B, 160A, 160B or Environmental Science & Policy 175

International Business Economics Emphases

Choose 20 units: 20
- Agricultural and Resource Economics 107, 115A, 115B, 138, 139, 146, Economics 115A, 115B, 160A, 160B, 165, 171

Choose the remaining 12 units from the above list or: 12
- Agricultural and Resource Economics 130, 171A, 171B, 175, 176, Economics 121A, 121B, Political Science 130 or Environmental Science & Policy 175

Environmental and Resource Economics Emphases

Agricultural and Resource Economics 175 and 176 8

Choose 20 units:
- Agricultural and Resource Economics 107, 120, 132, 138, 140, 145, 146, 150, 156, Economics 125, 130, Environmental Science and Policy 168A, 168B, 178.

Choose the remaining four units from the above list or upper-division courses in Agricultural and Resource Economics, Economics, or: 4
- Environmental Science and Policy 160, 161, 163, 165N, 166N, 167, 171, 172, 173 or Environmental Toxicology 138

Agribusiness Economics Emphases

Choose 16 units: 16
- Agricultural and Resource Economics 107, 120, 121, 130, 132, 138, 139, 140, 145, 150.

Select the remaining 16 units from the above list or upper division courses in Agricultural and Resource Economics and/or Economics.

Students must attain a major GPA of at least a C average (2.000) in courses taken for depth subject matter (core and restricted electives). These courses must be taken for a letter grade. All restricted elective courses taken will be calculated as part of the major GPA, including courses with F grades that have not been repeated.

Mathematics

Changes to Major Requirements

(change—eff. fall 16)

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 43-47

Mathematics 21A, 21B, 21C, 21D, 22B, 25 23

Choose one option: 4-7
- (a) Mathematics 22A and 108
- (b) Mathematics 67

Computer Science 30 or Engineering 6 4

Mathematics 22AL or equivalent MATLAB knowledge 0-1

Additional non-Mathematics courses chosen from natural sciences 12

NOTE: Basic knowledge of MATLAB is required for both Mathematics 22A and 67. Students can learn it on their own, enroll in Engineering 6, Mechanical Engineering 5 or in the one unit course Mathematics 22AL (can be taken concurrently).

Depth Subject Matter 35-36

A. *Core* 16
- Mathematics 125A 4
- Mathematics 125B 4
- Mathematics 135A 4
- Mathematics 150A 4

B. Choose one Plan: 16

Up to four of these 16 units may be approved upper division courses outside of the Department of Mathematics with extensive use of mathematics.

Plan 1: General Mathematics 16

Choose four: 16
- Mathematics 111-185B, excluding Mathematics 180, worth at least four units each.

Plan 2: Secondary Teaching 16
- Mathematics 111 4
- Mathematics 115A 4
- Mathematics 141 4

Choose one: 4
- Mathematics 111-185B, excluding Mathematics 180, worth at least four units.

NOTE: Students who wish to satisfy the single subject matter waiver for the teaching credential should see an advisor as early as possible.

C. Capstone Course: 3-4

Choose one: 3-4
- Mathematics 189, 192 (Internship in Applied Mathematics), 194 (Undergraduate Thesis), 180 (Special Topics) or an approved substitute in consultation with the Undergraduate Vice Chair.

Total Units for the Major 78-83

Applied Mathematics

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 42-49

Mathematics 21A, 21B, 21C, 21D, 22B, 25 23

Choose one option: 4-7
- (a) Mathematics 22A and 108
- (b) Mathematics 67

Mathematics 22AL or equivalent basic knowledge of MATLAB 0-1

Computer Science 30, 40 8

Choose one two-quarter sequence: 7-10
- Physics 9A-9B; Biological Sciences 2A-2B; Chemistry 2A-2B; Economics 1A-1B;

Statistics 32, 100; or other applied preparatory courses approved by your advisor.
NOTE: Basic knowledge of MATLAB is required for both Mathematics 22A and 67. Students can learn it on their own, enroll in Engineering 6, Mechanical Engineering 5 or in the one unit course Mathematics 22AL (can be taken concurrently).

Depth Subject Matter 47-48

A. *Core* 32
Mathematics 119A 4
Mathematics 125A 4
Mathematics 125B 4
Mathematics 135A 4
Mathematics 150A 4
Mathematics 185A 4
Choose two:
Mathematics 128A, 128B, 128C 8
B. *Enrichment Courses* 12
1. Choose two:
Mathematics 111-Mathematics 185B worth at least four units each; excluding Mathematics 180 8
2. One approved upper division course outside the Department of Mathematics with extensive use of mathematics 4
C. Capstone Course:
Choose one:
Mathematics 180 (Special Topics), 189, 192 (Internship in Applied Mathematics), 194 (Undergraduate Thesis), an approved substitute in consultation with the Undergraduate Vice Chair 3-4

Total Units for the Major 89-97

Mathematics

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 34-39

Mathematics 21A, 21B, 21C, 21D, 22B, 25 . 23
Choose one option: 4-7
(a) Mathematics 22A and 108
(b) Mathematics 67
Computer Science 30 or Engineering 6 4
Plan 1: 5
Physics 9A
Plan 2: 3-5
Choose one: 3-5
Physics 7A, 9A, Statistics 13, 32, 100
NOTE: Basic knowledge of MATLAB is required in both Mathematics 22A and 67. Students can learn it on their own, enroll in Engineering 6, Mechanical Engineering 5 or in the one unit course Mathematics 22AL (can be taken concurrently).

Depth Subject Matter 47-48

Choose one plan:
Plan 1: General Mathematics
A. *Core* 28
Mathematics 150A 4
Mathematics 150B 4
Mathematics 150C 4
Mathematics 135A 4
Mathematics 125A 4
Mathematics 125B 4
Mathematics 185A 4
B. *Enrichment* 20
Choose four: 20
MAT 111- 185B, excluding Mathematics 180, worth at least four units each. Up to four units can be approved upper division units outside the Department of Mathematics with extensive use of mathematics.
C. Capstone Course: 3-4
Choose one: 3-4
Mathematics 189, 192 (Internship in Applied Mathematics), 194 (Undergraduate Thesis), 180 (Special Topics), or an approved substitute in consultation with the Undergraduate Vice Chair.
Plan 2: Mathematics for Secondary Teaching
A. *Core* 28
Mathematics 150A 4
Mathematics 135A 4
Mathematics 125A 4
Mathematics 125B 4
Mathematics 111 4
Mathematics 115A 4
Mathematics 141 4
B. *Enrichment* 20
Choose four: 20
Mathematics 111-185B, excluding Mathematics 180, worth at least four units each. Up to four units can be approved upper division units outside the Department of Mathematics with extensive use of mathematics.
C. Capstone Course: 3-4
Choose one: 3-4
Mathematics 189, 192 (Internship in Applied Mathematics), 194 (Undergraduate Thesis), 180 (Special Topics), or an approved substitute in consultation with the Undergraduate Vice Chair.

Total Units for the Major 81-87

Mathematical Analytics and Operations Research

B.S. Major Requirements:

Preparatory Subject Matter 43-47

Mathematics 21A, 21B, 21C, 21D, 22B, 25 . 23
Choose one option: 4-7
(a) Mathematics 22A and 108
(b) Mathematics 67
Mathematics 22AL or equivalent basic knowledge of MATLAB 0-1
Computer Science 30 4
Economics 1A, 1B 8
Statistics 32 or 100 4
NOTE: Basic knowledge of MATLAB is required for both 22A and 67. Students can learn it on their own; enroll in Engineering 6, Mechanical Engineering 5, or in the one unit course Mathematics 22AL (can be taken concurrently).

Depth Subject Matter 54-55

A. Core 35
Mathematics 125A, 125B 8
Choose one: 4
Mathematics 128A, 128B, 128C
Mathematics 135A, 135B 8
Mathematics 150A 4
Mathematics 160 4
Mathematics 168 4
B. Enrichment Courses 16
1. Choose two: 8
Mathematics 111-185B, excluding 180; Statistics 131B, 131C, 137
2. Choose two: 8
Economics 100, 121A, 121B, 122, 134, 140, 145; Agricultural and Resource Economics 155, 156, 157
C. Capstone Course: 3-4
Choose one: 3-4
Mathematics 189, 192 (Internship in Applied Mathematics), 194 (Undergraduate Thesis), 180 (Special Topics) or an approved substitute in consultation with the Undergraduate Vice Chair.

Total Units for the Major 97-102

Mathematical and Scientific Computation

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 35-39

Mathematics 21A, 21B, 21C or Mathematics 17A, 17B, 17C; 21D, 22B, 25 23
Choose one option: 4-7
(a) Mathematics 22A and 108
(b) Mathematics 67
Mathematics 22AL or equivalent basic knowledge of MATLAB 0-1
Computer Science 30, 40 8
NOTE: Basic knowledge of MATLAB is required in both Mathematics 22A and 67. Students can learn it on their own, enroll in Engineering 6, Mechanical Engineering 5 or in the one unit course Mathematics 22AL (can be taken concurrently).

Depth Subject Matter 47-48

A. *Core* 28
Mathematics 150A 4
Mathematics 135A 4
Mathematics 125A 4
Mathematics 125B 4
Mathematics 128A 4
Mathematics 128B 4
Mathematics 128C 4
B. *Enrichment* 12
Choose two Mathematics courses from Mathematics 111-Mathematics 185B; excluding Mathematics 180, worth at least four units each 8
C. 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
D. Capstone Course:
Choose one: 3-4
Mathematics 189, 192 (Internship in Applied Mathematics), 194 (Undergraduate Thesis), 180 (Special Topics) or an approved substitute in consultation with the Undergraduate Vice Chair.

Total Units for the Major 82-87

Middle East/South Asia Studies

Changes to Iran & Persian Studies Minor Requirements

(change—eff. fall 16)

Iran & Persian Studies 20-24

Middle East/South Asia 100 4
Middle East/South Asia 180 4
Choose one: 4
History 190D, 193D
Choose one: 4
Middle East/South Asia 181A, 182A
Choose additional electives from Core Course list: 4-8
Core Course List:
Middle East/South Asia 131A/Cinema & Technocultural Studies 146A, Middle East/South Asia 151A, 181A, 182A, Comparative Literature 155, History 190D, 193D.

Music

Changes to A.B. Major & Minor Requirements

(change—eff. fall 17)

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 40-43

Choose one track:

Track 1: Music Composition 42
- Music 123, 124A, 124B 9
- Music 121 or 122 4
- Music 131 (three quarters) 6
- Music 195 2
- Choose at least six units: 6
  - Music 140-151
- Music 101A, 101B 8
- Music 103 3
- Choose at least four units: 4
  - Music 102, 105, 106, 107A, 107B, 108A, 108B, 110A-G, 113, 114, 115, 116, 121, 122, 126, 127, 129A-D, 192, 198, 199

Track 2: Music History, Theory, and Ethnomusicology 43
- Music 123, 124A, 124B 9
- Music 121 and/or 122 8
- Music 131 (three quarters) 6
- Music 195 2
- Choose at least six units: 6
  - Music 140-151
- Choose at least 12 units: 12
  - Music 101A, 101B, 102, 103, 105, 106, 108A, 108B, 110A-G, 113, 114, 115, 116, 121, 122, 126, 127, 129A-D, 192, 198, 199

Track 3: Music Performance 40
- Music 123, 124A, 124B 9
- Music 121 or 122 4
- Music 131 (three quarters) 6
- Music 195 2
- Choose at least 13 units: 13
  - Music 140-151
- Choose at least six units: 6
  - Music 101A, 101B, 102, 103, 105, 106, 108A, 108B, 110A-G, 113, 114, 115, 116, 121, 122, 126, 127, 129A-D, 192, 198, 199

Total Units for the Major 64-85

Note: A maximum of 19 units in performance courses (Music 131, Music 140-151) apply toward the degree; see Unit Credit Guidelines, College of Letters and Science degree requirements section. Faculty of the College of Letters and Science bylaws 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 Track 46-50
- Music 101A, 101B 8
- Music 123, 124A, 124B 9
- Music 103 3
- Music 121 or 122 4
- Music 131 (one year) 6
- Choose at least six units: 6
  - Music 140-151
- Two quarters of Music 194H for a total of at least six units resulting in a Senior thesis 6
- Choose at least four-eight units: 4-8
  - Music 102, 105, 106, 107A, 107B, 107C, 108A, 108B, 110A-G, 113, 114, 115, 116, 121, 122, 126, 127, 129A-D, 192, 198, 199

Music History, Theory and Ethnomusicology Honors Track 47
- Music 123, 124A, 124B 9
- Music 121 and/or 122 8
- Music 131 (three quarters) 6
- Choose at least 6 units from:
  - Music 140-151 6
  - Two quarters of Music 194H for a total of at least six units resulting in a Senior thesis 6
  - Choose at least 12 units from:
    - Music 101A, 101B, 102, 103, 105, 106, 108A, 108B, 110A-G, 113, 114, 115, 116, 121, 122, 126, 127, 129A-D, 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 Advisors. C. Reynolds (A-F), A. Triest (G-M), L. San Martin (N-Z)

Minor Program Requirements:

UNITS

Music 22

- Choose a minimum of 16 units: 16
  - Music 105, 106, 107A, 107B, 110A-G, 115, 116, 126, 127, 129A-D
- Choose a minimum of six units: 6
  - Music 140-151

Native American Studies

Changes to Major Program Requirements; Plan III

(change—eff. fall 17)

Plan III—South American Emphasis 20

- Choose two: 8
  - Native American Studies 107, 110A, 110B, 110C, 110D, 120 (Study Abroad)
- Choose two: 8
  - African American and African Studies 107A, 155A, 163, 180, Anthropology 103, 144, 175, History 162, 165, Political Science 143A, Sociology 104, Spanish 170 170S, 171, 171S (Summer Abroad)
- Choose one: 4
  - History 163B, 164, 167, Political Science 143A

Changes to Minor Program Requirements

(change—eff. fall 16)

Minor Program Requirements:

The Native American Studies minor provides an interdisciplinary introduction to the Native experience in the Americas through coursework in history, literature, art, performance, languages, values, philosophy, religion, current events, political economic, and the environment.

UNITS

Native American Studies 24

- Choose one lower division Native American Studies course 4
- Choose five upper division Native American Studies courses 20

Natural Sciences

Changes to Major Admissions

(change—eff. fall 17)

The Natural Sciences major is closed to on-campus transfers beginning 2017-2018.

Students interested in exploring a career in math or science education are encouraged to consider coursework in the CalTeach/MAST program which include an exploration of effective teaching practices and methods and include an active internship in local K-12 and UC Davis classrooms. for additional information, see *http://mast.ucdavis.edu*.

Physics

Changes to Physics Major Requirements: A.B. & B.S, Astrophysics Emphasis, Applied Physics—Atmospheric Physics Concentration, Applied Physics—Physical Electronics Concentration, Applied Physics—Geophysics Concentration, Applied Physics—Materials Science Concentration, & Applied Physics—Physical Oceanography Concentration,

(change—eff. fall 17)

Physics

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 45-52

- Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE 19-25
- Mathematics 21A, 21B, 21C, 21D, 22A, 22B 22
- Physics 80 4

Depth Subject Matter 35-37

- Physics 104A, 105A, 110A, 110B, 112, 115A, 122A or 122B 28
- Choose at least one: 4
  - Physics 129A, 130A, 140A, 151, 152, 153
- Physics 102 (1 unit) 0-1
  - Physics 102 waived if 104B taken.
- Choose at least one additional fixed-unit upper division Physics course; excluding 160 3-4

Total Units for the Major 80-86

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 49-55

- 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
- Physics 80 4

Depth Subject Matter 56-64

- Physics 104A, 105A, 105B, 110A, 110B, 110C, 112, 115A, 115B 36
- Physics 102 (1 unit) or 104B 1-4
- Laboratory Requirement 4-12
  - Physics 122A or 122B or 116A, B and C
- Concentration Courses 12
  - Two courses from one specialty (General Relativity/Astrophysical Applications, Condensed Matter, or Nuclear/Particle Physics) and one course from a different specialty. Lists of courses in each specialty are available from the department

Additional upper division Physics courses excluding 160, for a total of 15 upper division Physics courses of three or more units each. With prior departmental approval, one course from mathematics, engineering, or natural science may be used to meet this requirement. May include only one from: 194H, 195, 198, 199 0-9

Total Units for the Major 108-117

Astrophysics Emphasis

UNITS

Preparatory Subject Matter 49-55

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
Physics 80 4

Depth Subject Matter 59-65

Physics 104A, 105A, 108, 108L, 110A, 110B, 112, 115A, 115B, ... 32
Physics 102 or 104B 1-4
Laboratory Requirement 4
Choose one: 4
Physics 122A and 122B, 157
Physics 151, 152, 153, 156 16
Choose two electives: 6-9
Physics 105B, 110C, 116A, 129A, 130A, 130B, 150 (only with an astrophysics topic and prior departmental approval), 154, 155, Geology 163; May include only one from: Physics 194H, 195, 199

Total Units for the Major 108-120

Recommended

Computer Science Engineering 40; Astronomy 25

Applied Physics—Atmospheric Physics Concentration

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 45-51

Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE 19-25
Mathematics 21A, 21B, 21C, 21D, 22A, 22B22
Computer Science Engineering 30 (or equivalent programming course) 4

Depth Subject Matter 61-65

Physics 104A, 105A, 110A, 110B, 112, 115A, 116A, 116B 32
Physics 102 (1 unit) or 104B 1-4
Laboratory Requirement 4
Choose one:
Physics 116C, 122A, 122B
Concentration Courses 20
Physics 105C; Atmospheric Science 120, 121A, 121B; Geology 150A
Additional Electives 4
Choose one:
Physics 104B or 116C; Geology 116N; Atmospheric Science 128; Mathematics 118A or 118B

Total Units for the Major 106-115

Program Variance. Similar courses from other departments may be substituted for courses in the depth subject matter requirements by obtaining prior written permission from the Undergraduate Curriculum Committee Chairperson.

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 53-59

Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE 19-25
Mathematics 21A, 21B, 21C, 21D, 22A, 22B22
Computer Science Engineering 30 (or equivalent programming course) 4
Engineering 17 4
Physics 80 4

Depth Subject Matter 61

Physics 102, 104A, 105A, 110A, 110B, 112, 115A 28
Laboratory Requirement 4
Physics 122A or 122B
Concentration Courses 13
Physics 110C, 140A; Electrical and Computer Engineering 100
Additional Concentration Electives 16
Choose four:
Electrical and Computer Engineering 110A, 110B, 140A, 140B, 150A, or 150B

Total Units for the Major 114-120

Program Variance. Similar courses from other departments may be substituted for courses in the depth subject matter requirements by obtaining prior written permission from the Undergraduate Curriculum Committee Chairperson.

Applied Physics—Geophysics Concentration

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 45-51

Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE 19-25
Mathematics 21A, 21B, 21C, 21D, 22A, 22B22
Computer Science Engineering 30 (or equivalent programming course) 4

Depth Subject Matter 60-61

Physics 104A, 105A, 110A, 110B, 112, 115A, 116A, 116B 32
Laboratory Requirement 4
Choose one:
Physics 122A, 122B, 116C
Concentration Courses 13
Choose one:
Physics 104B; Geology 161, 162 (courses offered in alternating years)
Additional Electives 11-12
Choose three:
Physics 105B or 116C or 151; Geology 146 or 163; Atmospheric Science 120 or 121A or 121B

Total Units for the Major 105-112

Program Variance. Similar courses from other departments may be substituted for courses in the depth subject matter requirements by obtaining prior written permission from the Undergraduate Curriculum Committee Chairperson.

Applied Physics—Materials Science Concentration

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 45-51

Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE 19-25
Mathematics 21A, 21B, 21C, 21D, 22A, 22B22
Computer Science Engineering 30 (or equivalent programming course) 4

Depth Subject Matter 57-60

Physics 102, 104A, 105A, 110A, 110B, 112, 115A, 116A, 116B 32
Physics 102 (1 unit) or 104B 1-4
Laboratory Requirement 4
Choose one:
Physics 122A, 122B, 116C
Concentration Courses 20
Physics 115B, 140A, 140B, Material Science and Engineering 174, 180

Total Units for the Major 102-111

Program Variance. Similar courses from other departments may be substituted for courses in the depth subject matter requirements by obtaining prior written permission from the Undergraduate Curriculum Committee Chairperson.

Applied Physics—Physical Oceanography Concentration

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 45-51

Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE 19-25
Mathematics 21A, 21B, 21C, 21D, 22A, 22B22
Computer Science Engineering 30 (or equivalent programming course) 4

Depth Subject Matter 63

Physics 102, 104A, 105A, 110A, 110B, 115A, 116A, 116B 32
Laboratory Requirement 4
Choose one:
Physics 122A, 122B, 116C
Concentration Courses 23
Physics 105C; Atmospheric Sciences 120, 121A, 121B; Geology 116N, 150A
Additional Electives 4
Choose one:
Physics 104B* or 112 or 116C; Mathematics 118A or 118B
* Substitutions: Physics 102 is waived for students who take Physics 104B.

Total Units for the Major 108-114

Program Variance. Similar courses from other departments may be substituted for courses in the depth subject matter requirements by obtaining prior written permission from the Undergraduate Curriculum Committee Chairperson.

Political Science

Changes to Political Science A.B., Public Service A.B., & International Relations A.B. Major Requirements

(change—eff. fall 17)

Political Science

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 24

Choose three: 12
Political Science 1, 2, 3, 4
Choose one: 4
Political Science 1, 2, 3, 4, 5, 7, 11A-11D, 12A, 12B
Political Science 51 (required course) 4
Statistics 13 or 32 4

Depth Subject Matter 44-45

Four courses in one of the fields of concentration listed below 16
Three courses in another field of concentration listed below 12
Two courses in another field of concentration listed below 8
Two other upper division courses in Political Science. Only five units of Political Science 192 may be counted toward the depth subject matter. 8-9

Fields of Concentration

American Politics; courses with Political Science 1 recommended:
Political Science 100, 102, 104-109, 150-155, 160, 162-166, 168, 170-172, 174-176, 180, 183, 187, 195, 196A.
Comparative Politics; courses with Political Science 2 recommended:
Political Science 126, 140A-140E, 142A-142C, 143A-143B, 144A-144B, 146A-146B, 147A-147D, 148A-148C, 179, 196B.
International Relations; courses with Political Science 3 recommended:

Political Science 120-124, 126, 129, 130-132, 134-137, 139, 190, 196C, International Relations 131.
Political Theory; courses with Political Science 4 recommended:
Political Science 110, 112-117, 118A-118C, 119, 187, 196D

Total Units for the Major 68-69

Political Science—Public Service

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 24

Political Science 1 4
Choose three:
Political Science 2, 3, 4, 5, 7 12
Statistics 13 (or equivalent) 4
Political Science 51 (required course) 4

Depth Subject Matter 44-46

Core program 12
Choose three:
Political Science 100, 102, 104, 105, 106, 108, 109, 113, 114, 180
Internship, choose one: 6
Political Science 192A, 192B, 192W
Research paper, Political Science 193 2-4
Fields of concentration 24
Select six upper division courses from two or three fields of concentration listed below with at least two courses in each field selected; at least 16 of the units must be in political science; Core Program courses may not be counted toward this requirement.

Fields of Concentration

Field (1) Policy Process:
Political Science 100, 102, 104, 105, 106, 108, 109, 140A, 160, 162, 163, 164, 165, 166, 168, 170, 171, 172, 174, 175, 180, 183, 187, 195; Economics 130, 131
Field (2) Policy Interpretation (public/pre-law):
Political Science 119, 150, 151, 152, 153, 155
Field (3) State & Local Policy:
Political Science 100, 102, 104; Environmental Science and Policy 173; Sociology 143A
Field (4) Foreign Policy:
Political Science 122, 130, 131, 132, 134, 139
Field (5) Environmental Policy:
Political Science 107; Environmental Science and Policy 160, 161, 162, 166, 168A, 168B, 169, 171, 172, 173, 179
Field (6) Economic Policy:
Economics 100A, 130, 131, 151A, 151B
Field (7) Social Policy:
Sociology 104, 124, 141, 150, 151, 154, 155, 175, 181
Field (8) Policy Analysis Tools:
Economics 102, 140; Political Science 114
Field (9):
Political Science 194HA, 194HB

Total Units for the Major 68-70

Major Advisor. Consult Department office.

International Relations

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 28-54

Economics 1A or Anthropology 2 4
History 4C or 10C 4
Economics 1B 4
Political Science 2, 3, 51 12
Choose one:
Political Science 12Y, Statistics 13, Sociology 46B 4-5
Note: Preparatory Subject Matter does not cover all potential prerequisite courses for upper division curriculum.

Foreign language 0-30

One of the following series in a single language, or certified fluency at the highest level required below:
Arabic 1, 2, 3, 21, 22, 23 30
Chinese 1, 2, 3, 4, 5, 6 30
or Chinese 1A, 4, 5, 6 30
or Chinese 1CN, 2CN, 3CN 15
or Chinese 1BL, 2BL, 3BL 15
French 1, 2, 3, 21, 22 25
German 1, 2, 3, 20, 21 23
Hebrew 1, 2, 3, 21, 22, 23 30
Hindi/Urdu 1, 2, 3, 21, 22, 23 30
Italian 1, 2, 3, 4, 5 21
or Italian 1, 2, 3, 8A, 8B 21
Japanese 1, 2, 3, 4, 5, 6 30
or Japanese 1A, 4, 5, 6 30
Portuguese 1, 2, 3, 21, 22 25
Russian 1, 2, 3, 4, 5 23
Spanish 1, 2, 3, 21, 22 25
or Spanish 31, 32, 33 15
Note: The language curricula are subject to change; please check with an advisor for the major. A language not listed above may be substituted only with prior written approval of the International Relations Program Committee.

Depth Subject Matter 36-48

Tracks I, II and II:
Twelve upper division courses
Track IV:
Nine upper division courses
Choose one track:

Track I: World Trade and Development

Emphasizes contemporary economic relations of industrialized and developing countries.

For Advanced Industrialized Focus: 20
Economics 100A; 101; 160A-160B, Political Science 123
Choose two from Group A 8
Choose one from Group B 4
Choose four to fulfill Area Studies Requirement 16
For Developing Countries Focus: 12
Economics 115A-115B, 162
Political Science 123, 124 8
Choose one from Group A 4
Choose two from Group B 8
Choose four to fulfill Area Studies Requirement 16
Group A; Advanced Industrialized Countries:
Agricultural and Resource Economics 138, Anthropology 127, Community and Regional Development 118, 141, Economics 102, 110B, International Relations 104, Political Science 130, 140A, 140B, 140C, 140D, 140E, Sociology 138, 139, 141, 183
Group B; Developing Countries:
Anthropology 122A, 122B, 126A, 126B, 127, Community and Regional Development 153A, 153B, 153C, 180, Economics 110B, International Agricultural Development 103, International Relations 104, Political Science 124, 126, 142A, Science and Society 121, Sociology 138, 141, 145A, 145B

Track II: Peace and Security

Focuses on political and security relationships among states and non-state actors, examining questions of war, peace, alliances, and diplomacy.

Choose five courses spanning two disciplines: 20
Economics 162, History 120, 174B, 174C, Political Science 120, 121, 130, 132
Choose three additional courses from at least two departments: 12
Comparative Literature 157, Economics 122, History 145, 146A, 146B, Philosophy 118, Political Science 112, 122, 124, 126, 131, 140A, 140B, 140C, 140D, 140E, Religious Studies 131, 134, Sociology 100, 118, 157, Women's Studies 102
Choose four courses to fulfill Area Studies Requirement 16

Track III: Global Environment, Health, and Natural Resources

Familiarizes students with new sources of global interdependence such as biodiversity, natural resource conflicts, population growth, and world health.

Note: Some courses shown below have additional prerequisites.
Economics 162 4
Political Science 123 4
Environmental Science and Policy 161 or 162 4
Choose one: 4
Anthropology 101, 131, Environmental Science and Policy 164, Philosophy 120
Choose two: 7-8
Agricultural and Resource Economics 147, 175, 176, Anthropology 103, Applied Biological Systems Technology 182, Economics 115A, 125, Environmental Science and Policy 164, International Agricultural Development 170, Philosophy 120, Physics 160, Political Science 107, 175, Sociology 160
Choose two from one of the following groups: 4-8
Atmospheric and Marine Environments:
Atmospheric Science 116, 149, Environmental and Resource Sciences 131, Environmental Science and Management 120, 121, Environmental Science and Policy 166N, Geology 116N
Land Use and Energy Supply:
Anthropology 104N, Community and Regional Development 142, Environmental and Resource Sciences 144, Environmental Science and Policy 167, Geology 130, 134, Plant Sciences 101, 144, 150, 160, Political Science 171
Health and Human Populations:
Anthropology 102, 121, 129, 131, Environmental Science and Policy 121, Environmental Toxicology 101, Internal Medicine-Infectious Diseases 141, Nutrition 111AV, 111B, 118, Sociology 170
Choose four courses to fulfill Area Studies Requirement 16

Track IV: Peoples and Nationalities

Examines social and cultural foundations of national development and international relations.

Choose two: 8
Anthropology 102, 123AN, 130A, Sociology 118, 181
Choose one each from three of the following four groups: 12
The Mixing of Peoples:
Anthropology 130BN, 139AN; Community and Regional Development 176; International Relations 104; Political Science 126
Women:
Anthropology 126B, 139BN; Human Development 103; Sociology 145B; Women's Studies 102, 182
Religion:
Anthropology 124, 134; Philosophy 105; Religious Studies 106, 161, 170; Sociology 146
Development and its Impact on Social Cleavages:
Anthropology 122B, 126A, 126B; Community and Regional Development 180, Political Science 124, 142A; Science and Society 121, Sociology 145A, 145B
Four courses to fulfill Area Studies Requirement 16
Education/Internship Abroad for a minimum of one quarter

Area Studies Requirement

Choose four:
Courses must incorporate at least two of three groups (History, Social Analysis, Culture and Literature); we encourage students to take all four courses from one

region, but will accept a minimum of three from one region and one from a different region. Tracks I, II and III students who choose to take advantage of an Education Abroad experience may fulfill the Area Studies requirement by completing three courses instead of four; all three courses must be from one region.

Africa and the Middle East
- *History:* History 113, 115A, 115B, 115C, 115D, 115F, 193B, 193C
- *Social Analysis:* African American and African Studies 107C, 110, 111, 156, 176, 177, Anthropology 140A, 140B, 142, Community and Regional Development 153C, Political Science 135, 136, 146A, 146B, Religious Studies 163, 167, Women's Studies 184, 185
- *Culture and Literature:* African American and African Studies 153, 157, 162, Art History 150, Comparative Literature 147, 166, Dramatic Art 155A, French 124, Jewish Studies 111

East and South Asia
- *History:* History 191E, 191F, 194C, 194D, 194E, 195B, 196B
- *Social Analysis:* African American and African Studies 107C, Anthropology 143A, 143B, 147, 148A, 148B, 148C, 149B, Community and Regional Development 153A, Economics 171, Political Science 148A, 148B, 148C, Religious Studies 157, 165, Sociology 147, 188
- *Culture and Literature:* Anthropology 145, Art History 153, 163C, Chinese 101, 103, 104, 105, 110, 132, Comparative Literature 110, Dramatic Art 154, East Asian Studies 113, Japanese 103, 104, 105, 106, 131, 132, 133, 135, 136, Religious Studies 156

Latin America
- *History:* History 159, 162, 163B, 164, 165, 166B, 167, 168
- *Social Analysis:* African American and African Studies 107A, 180, Anthropology 144, 146, Chicana/o Studies 130, Native American Studies 120, 133B, Political Science 143A, 143B, Sociology 158
- *Culture and Literature:* African American and African Studies 163, Art History 151, Chicana/o Studies 160, Comparative Literature 152, 165, Dramatic Art 155A, Native American Studies 184, Portuguese 163, Spanish 149, 151N, 153, 154, 155, 156, 157, 158, 160, 170, 172

Russian and East/Central Europe
- *History:* History 138B, 138C, 143
- *Social Analysis:* Political Science 144A, 144B
- *Culture and Literature:* Russian 123, 124, 129, 130, 133, 150

Western Europe
- *History:* History 140, 141, 142A, 144B, 145, 146A, 146B, 147B, 147C, 151D
- *Social Analysis:* African American and African Studies 107C, Community and Regional Development 153B, Political Science 137, 147A, 147B, 147C, 147D, 161
- *Culture and Literature:* Film Studies 121, 176A, 176B, French 108, 120, 121, 133, German 112, 114, 115, 117, 118B, 118C, 118E, 120, 126, 129, 141, 142, 143, 168, 185, Italian 107, 108, 120A, 120B, Spanish 137N, 138N, 139, 140N, 141, 142, 148, 157, 170

Total units for the major 64-102

Major Advisor. Daniel Kono *(Political Science)*

Psychology

Changes to Psychology Biological Emphasis B.S. Major Requirements

(change—eff. fall 17)

Biological Emphasis

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 53-61
- Psychology 1 or the equivalent 4
- Psychology 41 4
- Statistics 13 or 100 4
  - Strongly recommended that Psychology 41 and Statistics 13 or 100 be completed in the first year.
- Mathematics 16A-16B or 17A-17B or 21A-21B 6-8
- Physics 10 or 10C or 7A-7B 3-8
- Biological Sciences 2A, 2B, 2C 15
- Chemistry 2A, 2B 10
- Chemistry 8A-8B or 118A-118B or 128A-128B 6-8

Public Health Sciences

New Minor

(change—eff. fall 17)

Minor Program Requirements:

The Public Health Sciences minor offers undergraduate students a foundation of knowledge for those who plan to enter the field of public health immediately following graduation and for those planning to earn an advanced degree in Public Health or a related field including medicine, nursing, and dentistry.

UNITS

Public Health Sciences 20
- Public Health Sciences 101, 102, 190 8
- Choose one: 3
  - Public Health Sciences 104, 113*
    * Prior to Winter 2018 Public Health Sciences 113 was Public Health Sciences 105 (2 units); prior to Fall 2018 Public Health Sciences 113 was 2 units.
- Electives 10-11
  - For a full list of electives, see *http://www.ucdmc.ucdavis.edu/phs/education/undergraduate.html*.

Sociology

Changes to A.B. Degree Requirements; Law and Society emphasis

(change—eff. fall 17)

Law and Society emphasis:

Preparatory Subject Matter 30
- Sociology 1 5
- Choose one:
  - Sociology 3, 4, 11 4
- Sociology 46A, 46B 9
- Choose one:
  - Anthropology 2, 20; Political Science 1, 3, 4, 7 4
- Choose one:
  - History 4A, 4B, 4C, 6, 7A, 7B, 7C, 8, 9A, 9B, 10C, 15, 17A, 17B 4
- Choose one:
  - Philosophy 5, 14, 24 4

Depth Subject Matter 43-44
- Sociology 100, 155 8
- Choose 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; University Writing Program 104B; Women's Studies 140 3-4
- Choose one additional elective upper division Sociology course not already used to fulfill other major requirements: 4
  - Sociology 190X, 191, 192/193, 194H, 195

Total Units for the Major 73-74

Statistics

Changes to A.B. Major, B.S. Major, & Minor Requirements

(change—eff. fall 17)

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 20-23
- Mathematics 16A, 16B, 16C; or 17A, 17B, 17C; or 21A, 21B, 21C 9-12
- Mathematics 22A 3
- Computer Science Engineering 10 or 30 or 40 (or the equivalent) 4
- Statistics 32 4

Depth Subject Matter 45-48
- Statistics 106, 108, 138 or the equivalent 12
- Statistics 130A, 130B 8
- Choose one: 4
  - Statistics 137, 141, 141A
- Choose three: 12
  - Statistics 104, 135, 137, 141 or 141A, 141B or 141C; 144, 145, 160; Mathematics 168; one approved four unit course:
    - Statistics 194HB, 194HB, 199
- Three upper division courses approved by major advisor; they should follow a coherent sequence in a single discipline in the social sciences where statistical methods and models are applied and should cover the quantitative aspects of the discipline.

Total Units for the Major 65-71

B.S. Major Requirements:

General Statistics Track

UNITS

Preparatory Subject Matter 31-32
- Mathematics 21A, 21B, 21C, 21D 16
- Mathematics 22A or 67 3-4
- Mathematics 25 4
- Computer Science Engineering 10 or 30 or 40 (or the equivalent) 4
- Any one introductory statistics course; except Statistics 10 4

Depth Subject Matter.....51-52

- Statistics 106, 108, 138 12
- Statistics 131A, 131B, 131C 12
- Choose three: 12
  - Statistics 104, 135, 137, 141 or 141A, 141B, 141C; 144, 145, 160; Mathematics 168; one approved four unit course:
    - Statistics 194HA, 194HB, 199
- Mathematics 125A, 108 or 125B, 167.....12
- Related elective courses..... 3-4
  - One upper division course approved by major advisor; it should be in mathematics, computer science or in quantitative aspects of a substantive discipline.

Total Units for the Major..... 82-84

Applied Statistics Track

Preparatory Subject Matter 27-31

- Mathematics 16A, 16B, 16C; or 17A, 17B, 17C; or 21A, 21B, 21C (21 series recommended).....9-12
- Mathematics 22A..... 3
- Computer science Engineering 10 or 30 or 40; or the equivalent..... 4
- Two introductory courses serving as the prerequisites to upper division courses in a chosen discipline to which statistics is applied.....7-8
- Any one introductory statistics course; except Statistics 10 4

Depth Subject Matter..... 48-52

- Statistics 106, 108, 138 12
- Statistics 141 or 141A..... 4
- Statistics 130A, 130B..... 8
- Choose three: 12
  - Statistics 104, 135, 137, 141B or 141C; 144, 145, 160; Mathematics 168; one approved four unit course:
    - Statistics 194HA, 194HB, 199
- Four upper division elective courses outside of Statistics..... 12-16
  - Electives are chosen with and must be approved by the major advisor. Electives should follow a coherent sequence in one single disciple where statistical methods and models are applied: at least three of them should cover the quantitative aspects of the discipline.

Total Units for the Major..... 75-83

Computational Statistics Track

Preparatory Subject Matter 27

- Mathematics 21A, 21B, 21C, 21D, 22A.....19
- Computer Science Engineering 60..... 4
- Any one introductory statistics course; except Statistics 10 4

Depth Subject Matter..... 52

- Statistics 106, 108; 141 or 141A.....12
- Statistics 131A, 131B..... 8
- Choose two: 8
  - Statistics 104, 135, 137, 138, 144, 145, 160; one approved four unit course:
    - Statistics 194HA, 194HB, or 199
- Programming, Data Management & Data Technologies:..... 8
  - Computer Science Engineering 130 or 145, and 165A
- Scientific Computational Algorithm and Visualization; choose two: 8
  - Computer Science Engineering 122A, 129, 140A, 158, 163; Statistics 141B, 141C
- Choose two: 8
  - Mathematics 124, 128A, 128B, 129, 145, 148, 160, 165, 167, 168

Total Units for the Major..... 79

Statistical Data Science Track

Preparatory Subject Matter 27

- Mathematics 21A, 21B, 21C, 21D, 22A.....19
- Choose one:..... 4
  - Computer Science Engineering 10, 30, 40
- One introductory statistics course; except Statistics 10; 32 or 100 preferred 4

Depth Subject Matter..... 52

- Statistics 106, 108 8
- Statistics 131A, 131B, 131C, 135, 141A, 141B, 141C, 160 40
- Computer Science Engineering 171..... 4
- Mathematics 167 or 168 4
- Choose one:
  - Statistics 104, 137, 138, 144, 145; Mathematics 128A; Computer Science Engineering 122A, 158, 163, 165A; one approved four unit course:
    - Statistics 194HA, 194HB, 199

Total Units for the Major..... 79

Major Advisor. Debashis Paul

Students are encouraged to meet with an advisor 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 advisor to plan the remainder of their undergraduate programs.

Minor Program Requirements:

The Department offers a minor program in Statistics that consists of five upper division level courses focusing on the fundamentals of mathematical statistics and of the most widely used applied statistical methods.

UNITS

Statistics.....20

- Statistics 106, 108, and 130A-130B or 131A-131B 16
- Choose one:..... 4
  - Statistics 101, 104, 135, 137, 138, 141, 141A, 141B, 141C, 144, 145, 160

Preparation. Statistics 13 or 32 or 100. Additional preparatory courses will be needed based on the course prerequisites listed in the catalog.

Sustainable Agriculture and Food Systems

Changes to B.S. Major Requirements

(change—eff. fall 16)

B.S. Major Requirements:

UNITS

English Composition Requirement 4-8

- See College requirement; must include Communications 4-8

Core Courses..... 23-26

- Plant Sciences 15 4
- Community and Regional Development 20 4
- Animal Science 112 or Plant Sciences 150..... 3-4
- 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, six of which must be completed off campus or must involve advanced responsibilities if on campus.

Applied Production.....6-9

- Choose one:..... 2-3
  - Plant Sciences 49, Plant Pathology 40, Viticulture and Enology 101A, 101B, 101C, Environmental Horticulture 120, Plant Science 131
- Choose one:..... 2-3
  - Animal Science 49A-J, Animal Science 41L
  - Choose one: 2-3
    - Applied Biological Systems Technology 49, 52, 101, 142, Food Science and Technology 50

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.

Track I Advisor. W. Horwath, Ph.D.

Preparatory Subject Matter..... 60-61

- Mathematics 16A, 16B 6
- Plant Sciences 120 or Statistics 100.....4
- Chemistry 2A, 2B 10
- Physics 1A.....3
- Biological Sciences 2A, 2B..... 10
- Plant Sciences 2 4
- Animal Sciences 1 or 2..... 4
- Food Science 1..... 3
- Economics 1A 4
- Community and Regional Development 1 ... 4
- Choose one:
  - Philosophy 14, 15, 24 4
- Choose one:
  - 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
- Choose one: 4-5
  - Animal Science 129, Environmental Horticulture 160, Environmental Science and Policy 100, Evolution and Ecology 101, Plant Sciences 105, 142, Wildlife, Fish, and Conservation Biology 154
- Additional upper-division restricted electives chosen in consultation with the track faculty 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.

Track II Advisor. R. Galt, Ph.D.

Preparatory Subject Matter..... 57-64

- Philosophy 5 or 31..... 4
- Choose one:
  - Philosophy 14, 15, 24 4
- Sociology 46B or Statistics 13..... 4
- Choose at least one: 3-6
  - Community and Regional Development 151, Landscape Architecture 150, Statistics 103, Sociology 106
- Chemistry 2A..... 5
- Biological Sciences 2A or 10..... 5
- Plant Sciences 2 4
- Choose one: 3-5
  - Biological Sciences 2B, Environmental Science and Policy 1 or 30, Wildlife, Fish, and Conservation Biology 10 or 11
- Food Science 1..... 3
- Soil Science 10 3
- Economics 1A 4
- Political Science 4..... 4
- Choose one:
  - Anthropology 2, Sociology 1, 3..... 4-5
- Community and Regional Development 1, 2 8

Depth Subject Matter..... 43-44

- Agricultural and Resource Economics 112 or 150..... 4
- Choose one: 3-4
  - Agricultural and Resource Economics 147, 176, Environmental Science and Policy 160, 161, 169, 172, 179
- Choose 12 units: 12
  - Anthropology 101, Community and Regional Development 118, 142, 149, 152, Sociology 130, 160
- Choose one 4:

American Studies 101G, 156, History 108, 109A, 172, Native American Studies 123, 162, Philosophy 109, Women's Studies 104, 136
Additional upper-division restricted electives chosen in consultation with the track faculty advisor 20

Track III: Economics and Policy

Focuses on issues related to agricultural and resource economics, policy and management.

Track III Advisor. T. Tomich, Ph.D.

Preparatory Subject Matter 60-64
Mathematics 16A, 16B 6
Sociology 46B or Statistics 13 4
Choose one: 4
Agricultural and Resource Economics 106, Statistics 103, Sociology 106
Chemistry 2A 5
Biological Sciences 2A or 10 5
Plant Sciences 2 4
Choose one: 3-5
Biological Sciences 2B, Environmental Science and Policy 1, 30, Wildlife, Fish, and Conservation Biology 10, 11
Food Science 1 3
Soil Science 10 3
Economics 1A, 1B 8
Political Science 4 4
Choose one: 4-5
Anthropology 2, Sociology 1, Sociology 3
Community and Regional Development 1 4
Choose one: 4
Philosophy 14, 15, 24

Depth Subject Matter 43-44
Choose one from:
Agricultural and Resource Economics 112, 150, 157 4
Choose 11-12 units: 11-12
Agricultural and Resource Economics 120, 130, 147, 176, Environmental Science and Policy 160, 161, 169, 172, 179
Choose eight units: 8
Anthropology 101, Community and Regional Development 118, 142, 149, 152, Sociology 130, 160
Additional restricted electives chosen in consultation with an advisor 20

Total units for the major 140-163

Theatre and Dance

Changes to A.B. with Honors Major Requirements

(change—eff. fall 17)

A.B. with Honors Major Requirements:

UNITS

Preparatory Subject Matter 24
Choose one: 4
Dramatic Art 21A, 40A, 40B, 42A, 42B
Dramatic Art 28, 55, 56A, 56B, 56C 20

Depth Subject Matter 56
Choose two: 8
Dramatic Art 142, 150, 155, 155A, 156A, 156B, 156C, 156D, 158, 159
Choose one: 4
Dramatic Art 124A, 124B, 124C, 124D, 124E, 126
Choose one: 4
Dramatic Art 120, 141, 144A, 146A
Choose one: 4
Dramatic Art 127A, 140A, 160A
Choose six units from at least two of: 6
Dramatic Art 145, 180A, 180B, 180C
Dramatic Art 180D 4
Choose one: 2
Dramatic Art 180E, 180F, 180G
Choose 16 units: 16
Dramatic Art 114, 115, 116, 120, 121A, 121B, 121C, 122A, 122B, 122C, 124A, 124B, 124C, 124D, 124E, 125, 126, 127A, 127B, 130, 135, 140A, 140B, 140C, 141, 142, 143, 144A, 144B, 144C, 146A, 146B, 146C, 150, 154, 155A, 156A, 156B, 156C, 156D, 158, 159, 160A, 160B, 170
At least eight of these units must be in a specific area determined in consultation with a faculty advisor and reflecting preparation for the honors project.
Dramatic Art 194HA, 194HB 6
Dramatic Art 195 2

Total Units for the Major With Honors 80

Major Advisor. Consult Department office.

Viticulture and Enology

Changes to B.S. Major Requirements

(change—eff. fall 17)

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 44-51
Biological Sciences 1A or 2A and 1C or Plant Sciences 2 8-10
Chemistry 2A-2B-2C 15
Chemistry 8A, 8B 6
Plant Sciences 21 or equivalent and advisor approval 0-3
Mathematics 16A-16B 6
Physics 1A, 1B or 7A 4-6
Viticulture and Enology 2, 3 5

Depth Subject Matter 48-54
Biological Sciences 102, 103 or 105 3-6
Microbiology 102, 103L or 101 5-7
Plant Sciences 120 or Statistics 106 4
Viticulture and Enology 101A, 101B, 101C, 110, 118 15
Viticulture and Enology 123, 124, 125, 126, 128, 135 and in consultation with the advisor, choose three: 21-22
Viticulture and Enology 123L, 124L, 125L, 126L,127L, 128L. If more than three are taken, the extra courses will count as restricted electives in Area B

Restricted Electives 28
In consultation with advisor, choose 28 units from three of the following five areas. At least 12 units must be from one of the following areas: *(A)* Plant Science, *(B)* Food Science and Microbiology, or *(C)* Economics and Business.
(A) Plant Science Area:
Applied Biological Systems Technology 150, Atmospheric Science 133, Biological Sciences 101, Biotechnology 160, Entomology 110, Hydrologic Science 110, 124, Molecular and Cellular Biology 126, Nematology 100, Plant Biology 111, 112, 123, 143, Plant Pathology 120, Plant Sciences 154, 157, 158, 171, 176, Soil Science 100, 102, 109, 118, Viticulture and Enology 111.
(B) Food Science and Microbiology Area:
Biological Sciences 101, Food Science and Technology 102A, 102B, 104, 104L, 109, 110. 110L, 127, Microbiology 140, 150, 155L, Viticulture and Enology 140.
(C) Economics and Business Area:
Agricultural and Resource Economics 100A, 112, 113, 118, 130, 140, 150, Economics 1A, 1B, Management 11A, 11B, Viticulture and Enology 111, 130.
(D) Language Area:
Maximum 12 units, not counting course 1, of one of the following languages: French, German, Italian, Portuguese or Spanish. At least one course must be Intermediate or Conversational; qualifying Intermediate or Conversational courses are listed below:
French 21, 22, 23, German 11, 20, 21, 22, Italian 4, 5, Spanish 8, 21, 22, 28, 31, 32, 33.
Courses taught in English will not count as restricted electives in this major.
(E) Internship Area:
Choose a maximum of eight units:
Viticulture and Enology 190X, 192, 198, 199, 290 or 298 may be counted as restricted electives by prior arrangement with advisor.
May be increased to 12 units in exceptional circumstances.

Total Units for the Major 120-133

Wildlife, Fish, and Conservation Biology

Changes to B.S. Major Requirements

(change—eff. fall 16)

B.S. Major Requirements:

UNITS

Written/Oral Expression 8
Completing University Writing Program 1 and Communication 1 will simultaneously satisfy the College requirements.
University Writing Program 1 4
Choose one: 4
Communication 1, 3 or Dramatic Art 10

Preparatory Subject Matter 50-51
Biological Sciences 2A, 2B, 2C 15
Chemistry 2A, 2B, 8A, 8B 16
Mathematics 16A, 16B 6
Physics 1A, 1B 6
Choose one: 4
Statistics 100, 102, or Plant Sciences 120
Choose one: 3-4
Wildlife, Fish, and Conservation Biology 10, 11, or 50

Depth Subject Matter 45-50
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 and area of specialization 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 3-4
Wildlife, Fish, and Conservation Biology 122 4
Wildlife, Fish, and Conservation Biology 154 4
Choose three lecture courses and two (laboratory) courses from: 14-15
Wildlife, Fish, and Conservation Biology 110, (110L), 111, (111L), 120, (120L), or 134, (134L)
Wildlife, Fish, and Conservation Biology 100, or 101 & 101L, or 102 & 102L 4-7
Strongly recommended, but not required, Statistics 104, 106, or 108 4
Strongly recommended, but not required, Landscape Architecture 150 3

Strongly recommended, but not required, Anatomy, Physiology and Cell Biology 100 4

Restricted Electives.....12-24

Choose one from the four Areas of Specialization, below. No course can be used to simultaneously satisfy the Depth Subject Matter and the Area of Specialization.

Areas of Specialization

(1) Wildlife and Conservation Biology:
Wildlife, Fish, and Conservation Biology 151
Choose one:
Plant Sciences 102, 131, 144, 147 & 147L, 178, Plant Biology 102, 108, 117, 119, 148
Choose one:
Wildlife, Fish, and Conservation Biology 110, 111, 120, 134, 136, 141, 144, 152, 155 & 155L, 156, 157, 160
Choose one:
Animal Science 103, 104, 170, Environmental Horticulture 160, Entomology 156, Environmental Science and Policy 121, 127, 155, 161, 162, 166N, 170, 171, Evolution and Ecology 107, 115, 138, 147, Environmental Toxicology 101, Plant Sciences 130, 135, 162
Note: Students interested in certification as a Wildlife Biologist from The Wildlife Society should consider additional courses in plant sciences.

(2) Fish Biology:
Wildlife, Fish, and Conservation Biology 120 & 120L
Choose one:
Entomology 116, Evolution and Ecology 112 & 112L or 114.
Choose three courses including at least one course from each of the two groups:
(a) Aquatic Systems
Animal Science 118, Environmental Science and Policy 116N, 150C, 151, 151L, 152, 155, Evolution and Ecology 115, Environmental Science and Management 100, Hydrology 143, Wildlife, Fish, and Conservation Biology 144, 155 & 155L, 157, or 160.
(b) Water Policy/Law
Choose one:
Hydrology 150, Environmental Science and Policy 161, 162, 166N or 169.

(3) Wildlife Health:
Wildlife, Fish, and Conservation Biology 151
Biological Sciences 102 and 103 or Animal Biology 102 and 103
Choose one:
Wildlife, Fish, and Conservation Biology 110, 111, 120, 134, 136, 141, 144, 152, 155 & 155L, 160
Choose one:
Animal Science 103, 104, 170, Anatomy, Physiology, and Cell Biology 100, Microbiology 101, 104 Molecular and Cell Biology 150, Neurobiology, Physiology, and Behavior 101, 140, Veterinary Medicine and Epidemiology 158
Note that this AOS recommends additional preparatory courses; prerequisites for admission to Veterinary Medicine vary among schools and students should confirm the specific requirements of the school(s) to which they wish to apply.
Additional Preparatory (recommended, not required):
Chemistry 2C, 118A, 118B, 118C, Physics 7A, 7B, 7C.

(4) Individualized: Students may, with prior approval of their advisor and the curriculum committee, design their own individualized specialization within the major. The specialization will consist of at least four upper division courses with a common theme.

Total Units for the Degree 115-133

Major Advisor. N.A. Fangue