431 Medieval Art of the West, 800-1400 (3) Western European art of the Dark Ages, Romanesque, and Gothic periods. Writing-emphasis course. (Same as Judaic Studies 431; Medieval Studies 431.)

441 Northern European Painting, 1350-1600 (3) From courtly art of late Middle Ages to Northern Renaissance. Jan van Eyck, Roger van der Weyden, and Dürer; early printmakers. Writing-emphasis course. (Same as Medieval Studies 441.)

442 Art of Northern Europe, 1600-1675 (3) Concentrated study of Bruegel, Rubens, Rembrandt, Georges de La Tour, Vermeer, Poussin, and Hals. Writing-emphasis course.

451 The Art of Italy, 1250-1450 (3) Development of exploration of naturalism. Revival of antiquity and development of theories of perspective in the Early Renaissance. Including Duccio, Giotto, Masaccio, Donatello, Botticelli. Writing-emphasis course. (Same as Medieval Studies 451.)


453 Art of Southern Europe, 1575-1700 (3) Concentrated study of Caravaggio, Bernini, and Italian Baroque developments in all media. Spanish Baroque painting and sculpture with special attention to Velasquez. Writing-emphasis course.

454 Renaissance and Baroque Theory (3) Addresses the theory of Western art in the early modern period with emphasis on the development and evolution in European art during the Renaissance and Baroque periods. Writing-emphasis course. (RE) Prerequisite(s): 172 and 173.

461 Art of Southern and Eastern Africa (3) Art traditions of the eastern and southern regions of Africa. Sculpture, painting, pottery, textiles, architecture and human adornment will be examined. Some ancient Stone and Iron Age traditions will be examined, but the main emphasis will be on the diverse ethnic and regional art traditions practiced in the area from the 19th century to the present. Writing-emphasis course. (Same as Africana Studies 461.)

462 Art and Archaeology of Ancient Africa (3) Historical art traditions of sub-Saharan Africa. Topics to be covered include prehistoric rock paintings; art from archaeological sites and ancient kingdoms. The time period covered ranges from the first and second millennia BC for some of the early terracotta sculptures and rock paintings, the 11th through 19th centuries AD for the later ancient kingdoms. Writing-emphasis course. (Same as Africana Studies 462.)

463 Arts of the African Diaspora (3) Examines the aesthetic, philosophical and religious patterns of the African descendants of Brazil, Surinam, the Caribbean and the United States. Emphasis will be placed on the full range of art forms, including the sculptural and performance traditions, as well as architecture, textile, basketry and pottery art forms. Writing-emphasis course. (Same as Africana Studies 463.)

464 Oceanic Art (3) Concentrated study of selected sculpture, textiles, architecture and other traditional art forms of Polynesia, Micronesia and Melanesia. Objects are discussed on the basis of style, style relationship, iconography and the uses to which they were put in their traditional religious, political, and social contexts. Writing-emphasis course.

471 History of North American Art (3) Survey of landmarks in painting, architecture, sculpture, and design from prehistory to 1900. Writing-emphasis course.

472 History of 20th-Century American Art (3) Developments in architecture, painting, and design from 1900. Writing-emphasis course.

473 19th-Century American Painting (3) Development of the Modern and Post-Modern movements in Europe. Investigation of the progression of abstraction through more recent conceptual trends. Analysis of the work of individual artists such as Picasso, Matisse, and many others. Writing-emphasis course.

479 Special Topics in Art History (3) Student- or instructor-initiated course offered at convenience of department. Repeatability: May be repeated. Maximum 12 hours.

483 History of American Sculpture (3) American sculpture from prehistory to the 1960s. Writing-emphasis course.

489 Studies in Art History (3) Concentration in individually selected area. Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor.

493 Independent Study (1-3) Repeatability: May be repeated. Maximum 9 hours. Registration Permission: Consent of instructor.

494 Individual Problems (3) Repeatability: May be repeated. Maximum 12 hours. Registration Permission: Consent of instructor.

Art Media Arts (134)

191 Introduction to Studio Art: Various Media (3) Individual sections for various artistic disciplines. Repeatability: Course may be repeated. Medium may not be repeated. Maximum 12 hours. Registration Restriction(s): Non-majors only (not for BA and BFA – studio art majors and BFA – graphic design majors).

231 Photography I (3) Art of black and white photography. Field and studio shooting, history of photography, basic developing, and enlarging techniques.

235 Introduction to Cinematography as Art (3) Development of basic concepts and techniques for the creation of film as an art form. (Same as Cinema Studies 235.) (RE) Prerequisite(s): 231.

236 Introduction to Video Art (3) Development of basic concepts and techniques for the creation of video works as an art form. (Same as Cinema Studies 236.)

239 Special Topics in Media Arts (3) Student- or instructor-initiated course offered at convenience of department. Repeatability: May be repeated. Maximum 12 hours.

330 Media Arts Portfolio Review (0) Review of prior work in media arts. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated once. (RE) Prerequisite(s): Art History 172 and Art History 173. Comment(s): Successful completion required prior to registration for junior and senior courses.

331 Photography II (4) Individual expression in photographic medium. Repeatability: May be repeated. Maximum 8 hours. (RE) Prerequisite(s): 231.

341 Digital Photography I (4) Studio course introducing theory and techniques of use of computers in photography. (RE) Prerequisite(s): 231 and 331.

342 Large Format Photography I (4) Studio course introducing theory and practice of photography using large format view camera. (RE) Prerequisite(s): 231.

431 Photography III (3-6) Individual development of photographic problems and techniques. Repeatability: May be repeated. Maximum 12 hours. (RE) Prerequisite(s): 331.

432 History of Film and Modern Art (3) Study of the development and interaction between the cinematic arts and the visual arts within the context of modern art history. (Same as Cinema Studies 432.) Comment(s): Available for art history credit.

435 Cinematography as Art (4) Continued development of concepts and techniques for the creation of film as an art form with an emphasis on individual projects. (Same as Cinema Studies 435.) Repeatability: May be repeated. Maximum 12 hours. (RE) Prerequisite(s): 235 and 330.

436 Video Art (4) Continued development of concepts and techniques for the creation of video works as an art form with an emphasis on individual projects. (Same as Cinema Studies 436.) Repeatability: May be repeated. Maximum 12 hours. (RE) Prerequisite(s): 236 and 330.

439 Special Topics in Media Arts (3) Student- or instructor-initiated course offered at convenience of department. Repeatability: May be repeated. Maximum 12 hours. (DE) Prerequisite(s): 341. Registration Permission: Consent of instructor.

441 Digital Photography II (4) Studio course that continues the exploration of the use of the large format camera in photography. (DE) Prerequisite(s): 342.
450 Senior Project (4) Students will engage in self-initiated productions to demonstrate proficiency in media art.
Registration Restriction(s): Minimum student level – senior.

493 Independent Study (1-4)
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Consent of instructor.

494 Individual Problems (3)
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of instructor.

495 Visiting Artist Seminar (3) Study and discussion of contemporary art issues conducted by different visiting artists each semester.
Repeatability: May be repeated. Maximum 12 hours.
Credit Restriction: May not be applied toward the art history requirement.
Registration Permission: Consent of instructor.

Art Printmaking (132)

191 Introduction to Studio Art: Various Media (3) Individual sections for various artistic disciplines.
Repeatability: Course may be repeated. Medium may not be repeated.
Maximum 12 hours.
Registration Restriction(s): Non-majors only (not for BA and BFA – studio art majors and BFA – graphic design majors).

213 Painting I: Introduction (3) Capabilities of oil and acrylic painting on canvas.
(RE) Prerequisite(s): Art 101 and Art 103.

214 Painting II (3) Techniques of expression in oil and/or acrylic.
Repeatability: May be repeated. Maximum 6 hours.
(RE) Prerequisite(s): 213.

215 Watercolor I: Introduction (3) Capabilities of transparent watercolor.
(RE) Prerequisite(s): Art 101 and Art 103.

216 Watercolor II (3) Capabilities of transparent watercolor, with attention to individual exploration of surface, space, and concept.
Repeatability: May be repeated. Maximum 6 hours.
(RE) Prerequisite(s): 215.

219 Special Topics in Drawing/Painting (3) Student or instructor-initiated course offered at convenience of department to enhance and expand the painting, drawing, and watercolor curriculum.
Repeatability: May be repeated. Maximum 12 hours.

313 Painting III (4) Individual expression with varied media on canvas.
Repeatability: May be repeated. Maximum 8 hours.
(RE) Prerequisite(s): 214 and 314.
Comment(s): Total of 8 hours required for students in the painting concentration.

314 Painting Portfolio Review (0) Review of prior work in painting.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated once.
(RE) Prerequisite(s): Art History 172 and Art History 173.
Comment(s): Successful completion required prior to registration for junior and senior courses.

315 Watercolor III (4) Individual expression with varied water-based media on paper.
Repeatability: May be repeated. Maximum 8 hours.
(RE) Prerequisite(s): 216 and 316.
Comment(s): Total of 8 hours required for students in the watercolor concentra-

316 Watercolor Portfolio Review (0) Review of prior work in watercolor.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated once.
(RE) Prerequisite(s): Art History 172 and Art History 173.
Comment(s): Successful completion required prior to registration for junior and senior courses.

413 Painting IV (6) Advanced painting stressing individual concepts and personal expression with varied media.
Repeatability: May be repeated. Maximum 12 hours.
(RE) Prerequisite(s): 313.
Comment(s): Total of 12 hours required for students in the painting concentr-

415 Watercolor IV (6) Advanced painting with water-based media on paper stressing individual concepts and personal approaches.
Repeatability: May be repeated. Maximum 12 hours.
(RE) Prerequisite(s): 315.
Comment(s): Total of 12 hours required for students in the watercolor concentra-

419 Special Topics in Drawing and Painting (3) Student or instructor-initiated course offered at convenience of department to enhance and expand the painting, drawing, and watercolor curriculum.
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of instructor.

493 Independent Study (1-6)
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Consent of instructor.

494 Individual Problems (3)
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of instructor.

495 Visiting Artist Seminar (2) Study and discussion of contemporary art issues conducted by different visiting artists each semester.
Repeatability: May be repeated. Maximum 8 hours.
Credit Restriction: May not be applied toward the art history requirement.
Registration Permission: Consent of instructor.

Art Printmaking (132)

191 Introduction to Studio Art: Various Media (3) Individual sections for various artistic disciplines.
Repeatability: Course may be repeated. Medium may not be repeated.
Maximum 12 hours.
Registration Restriction(s): Non-majors only (not for BA and BFA – studio art majors and BFA – graphic design majors).

262 Intaglio I (3) Metal plate intaglio printing in traditional and contemporary techniques of etching, softground, drypoint, aquatint, and color methods.
(DE) Prerequisite(s): Art 101 and Art 103.

263 Lithography I (3) Stone and aluminum plate lithography applying traditional and contemporary techniques of crayon, tusche, transfer methods, state proofs and photolitography.
(DE) Prerequisite(s): Art 101 and Art 103.

264 Screen Printing I (3) Screen printing as a fine art medium including development and application of various basic stencils in compositional printing.
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): Art 101 and Art 103.

265 Relief (3) Relief printing in traditional and contemporary techniques from wood, linoleum and plastics.
(DE) Prerequisite(s): Art 101 and Art 103.

266 Monoprint and Monotype (3) Investigation of traditional and contemporary techniques.
(DE) Prerequisite(s): Art 101 and Art 103.

269 Special Topics in Printmaking (3) Student or instructor-initiated course offered at convenience of department.
Repeatability: May be repeated. Maximum 12 hours.
(DE) Prerequisite(s): Art 101 and Art 103.

291 Papermaking Workshop (3) Papermaking as a medium for two- and three-dimensional art. Includes sheet forming, embossing, laminating, line work encompasses theory and practice in intaglio, lithography, relief printing, screenprinting, monoprint, papermaking, book arts and/or photo- print processes.
Repeatability: May be repeated once.
(RE) Prerequisite(s): Art 101 and Art 103.
(RO) Corequisite(s): Art History 172 or Art History 173.
Comment(s): Successful completion required prior to registration for junior and senior courses.

360 Printmaking Portfolio Review (0) Review of prior work in printmaking.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated once.
(RE) Prerequisite(s): Art 101 and Art 103.
(RO) Corequisite(s): Art History 172 or Art History 173.
Comment(s): Successful completion required prior to registration for junior and senior courses.

361 Intermediate Print Workshop (1-6) Individual and collaborative studio work encompassing theory and practice in intaglio, lithography, relief printing, screenprinting, monoprint, papermaking, book arts and/or photo- print processes.
Repeatability: May be repeated. Maximum 12 hours.
(RE) Prerequisite(s): 262 or 263.

461 Advanced Print Workshop (1-6) Individual and collaborative studio work encompassing theory and practice in intaglio, lithography, relief printing, screenprinting, monoprint, papermaking, book arts and/or photo-print processes.
Repeatability: May be repeated. Maximum 12 hours.
(RE) Prerequisite(s): 361.

469 Special Topics in Printmaking (3-6) Student- or instructor-initiated course offered at convenience of department.
Repeatability: May be repeated. Maximum 12 hours.
Registration Restriction: Registration Permission: Consent of instructor.

493 Independent Study (1-4)
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Consent of instructor.

494 Individual Problems (3)
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of instructor.
Art Sculpture (143)

191 Introduction to Studio Art: Various Media (3) Individual sections for various artistic disciplines.
Repeatability: May be repeated. Medium may not be repeated. Maximum 12 hours.
Registration Restriction(s): Non-majors only (not for BA and BFA – studio art majors and BFA – graphic design majors).

240 Techniques and Tools (1) Introduction to the equipment in metal shop, wood shop, and foundry. Instruction includes shop safety, operation of tools, and handling of hazardous materials. All students must pass proficiency tests.

241 Beginning Sculpture (3) Introduction to the materials, concepts, technical processes, and history of sculpture. Materials include wood, plaster, steel and plastics.
(RE) Prerequisite(s): Art 103.

242 Figuring the Body (3) Sculpture that involves the human figure, directly or indirectly. Issues relating to the body and personal identity will be explored through various media.
(RE) Prerequisite(s): Art 103.

243 Mold-Making and Casting (3) Examines possibilities and processes related to mold-making. A variety of casting materials will be explored including metals, wax, rubber, plaster, and ceramic shell.
(RE) Prerequisite(s): 241.
(CORE) Prerequisite(s): 240.

245 Metal Fabrication (3) Introduction to steel as a material for the creation of sculpture. Development of welding techniques, design of cold connections, and engineering of structural components.
(RE) Prerequisite(s): 241.
(CORE) Prerequisite(s): 240.

246 Mixed Media Sculpture (3) Includes installation art, performance, and conceptual art. Contemporary issues and materials related to sculpture are examined through research and studio projects.
(RE) Prerequisite(s): Art 103.

249 Special Topics in Sculpture (3) Instructor-initiated course offered at convenience of department.
Repeatability: May be repeated. Maximum 12 hours.
(RE) Prerequisite(s): Art 101 and Art 103.

340 Sculpture Portfolio Review (0) Review of prior work in sculpture and development of new work.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated once.
(RE) Prerequisite(s): 240 and 241.
(DE) Prerequisite(s): Art History 172, 173, 162, 183 (choice of two).
Comment(s): Successful completion required prior to registration for junior and senior courses.

341 Intermediate Sculpture (3) Students begin defining and developing their visual vocabulary relative to contemporary sculptural issues. Emphasis on studio projects, research, and discussion.
Repeatability: May be repeated. Maximum 6 hours.
(RE) Prerequisite(s): 240 and 241.
(DE) Prerequisite(s): 245, 246, and 340.

343 Advanced Mold-Making and Casting (3) Further exploration of casting methods with an emphasis on metals including bronze and aluminum.
(RE) Prerequisite(s): 340.

345 Advanced Metal Fabrication (3) Advanced exploration of construction in steel and other metals through welding, design of cold connections, and engineering of structural components.
(RE) Prerequisite(s): 240 and 243.
(DEV) Prerequisite(s): 340.

346 Advanced Mixed Media Sculpture (3) Advanced investigation into the sculptural possibilities of installation art, performance, and multi-media. Contemporary issues are examined through research and studio projects.
(RE) Prerequisite(s): 241 and 246.
(DE) Prerequisite(s): 340.

441 Advanced Sculpture (3) Individual development of sculptural problems and techniques. Students work independently while participating in group projects, critique, and discussion.
Repeatability: May be repeated. Maximum 12 hours.
Recommended Background: 6 hours of 300-level sculpture courses.

442 Senior Seminar (2) Investigation of professional practices and career opportunities in the field of sculpture. Includes portfolio development, preparation for exhibitions, and public commissions.

449 Special Topics in Sculpture (3) Student- or instructor-initiated course offered at convenience of department.
Repeatability: May be repeated. Maximum 12 hours.
Comment(s): Successful completion of any portfolio review required.

493 Independent Study (1-4)
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Consent of instructor.

494 Individual Problems (3)
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of instructor.

495 Visiting Artist Seminar (2) Study and discussion of contemporary art issues conducted by different visiting artists each semester.
Repeatability: May be repeated. Maximum 8 hours.
Credit Restriction: May not be applied toward the art history requirement.

Asian Languages (144)

131 Elementary Chinese I (5) (Same as Chinese 131.)
132 Elementary Chinese I (5) (Same as Chinese 132.)
(Re) Prerequisite(s): 131.
151 Elementary Japanese I (5) (Same as Japanese 151.)
152 Elementary Japanese II (5) (Same as Japanese 152.)
(Re) Prerequisite(s): 151.
231 Intermediate Chinese I (5) (Same as Chinese 231.) (CC)
(Re) Prerequisite(s): 132.
232 Intermediate Chinese II (5) (Same as Chinese 232.) (CC)
(Re) Prerequisite(s): 231.
251 Intermediate Japanese I (5) (Same as Japanese 251.) (CC)
(Re) Prerequisite(s): 152.
252 Intermediate Japanese II (5) (Same as Japanese 252.) (CC)
(Re) Prerequisite(s): 251.
311 Chinese Literature in English Translation (3) Classical literature. Writing-emphasis course.
(Same as Chinese 311.)
312 Chinese Literature in English Translation (3) Vernacular and modern literature. Writing-emphasis course.
(Same as Chinese 312.)
313 Japanese Literature in English Translation (3) Classical and traditional: masterpieces of poetry, fiction, and drama to 1868. Writing-emphasis course.
(Same as Japanese 313.)
314 Japanese Literature in English Translation (3) Modern: masterpieces of fiction since 1868. Writing-emphasis course.
(Same as Japanese 314.)
315 Asian Film (3) An examination of Asian national cinemas in historical and cultural context. Taught in English. Writing-emphasis course.
(Same as Cinema Studies 315.)
331 Advanced Chinese I (4) (Same as Chinese 331.)
(Re) Prerequisite(s): 232.
332 Advanced Chinese II (4) (Same as Chinese 332.)
(Re) Prerequisite(s): 331.
351 Advanced Japanese I (4) Includes conversation, drill, and composition practice with native speaker, as well as reading and translation.
(Same as Japanese 351.)
(Re) Prerequisite(s): 252.
352 Advanced Japanese II (4) Includes conversation, drill, and composition practice with native speaker, as well as reading and translation.
(Same as Japanese 352.)
(Re) Prerequisite(s): 351.
413 Topics in Japanese Literature (3) When content varies, may be repeated for credit. In English with readings in Japanese for minors. Writing-emphasis course.
(Same as Japanese 413.)
431 Readings in Chinese Literature (3) (Same as Chinese 431.)
Repeatability: May be repeated. Maximum 9 hours.
(Re) Prerequisite(s): 232.
451 Readings in Pre-Modern Japanese Literature (3) (Same as Japanese 451.)
(Re) Prerequisite(s): 252.
452 Readings in Modern Japanese Literature (3) (Same as Japanese 452.)
(Re) Prerequisite(s): 252.
490 Chinese and Japanese Internship (1-15) Career-related experiences in the United States or abroad.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 15 hours.
Registration Restriction(s): Language and world business (Japanese) concentration or language and world business (Chinese) concentration.
491 Chinese and Japanese Foreign Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.
Asian Studies (145)

101 Asian Civilization (3) Comparative study of development of religion, social institutions, and high culture in India and the Islamic World. Writing-emphasis course. (CC)

102 Asian Civilization (3) Comparative study of development of religion, social institutions, and high culture in China and Japan. Writing-emphasis course. (CC)

121 Elementary Modern Standard Arabic I (4) Taped language program. (Same as Arabic 121.)

122 Elementary Modern Standard Arabic II (4) Taped language program. (Same as Arabic 122.)

(RE) Prerequisite(s): 121.

141 Elementary Modern Hebrew I (4) Taped language program. (Same as Hebrew 141.)

142 Elementary Modern Hebrew II (4) Taped language program. (Same as Hebrew 142.)

(RE) Prerequisite(s): 141.

161 Elementary Persian I (4) Taped language program. (Same as Persian 161.)

162 Elementary Persian II (4) Taped language program. (Same as Persian 162.)

(RE) Prerequisite(s): 161.

221 Intermediate Modern Standard Arabic I (4) Taped language program. (Same as Arabic 221.) (CC)

222 Intermediate Modern Standard Arabic II (4) Taped language program. (Same as Arabic 222.) (CC)

(RE) Prerequisite(s): 221.

241 Intermediate Modern Hebrew I (4) Taped language program. (Same as Hebrew 241.) (CC)

242 Intermediate Modern Hebrew II (4) Taped language program. (Same as Hebrew 242.) (CC)

(RE) Prerequisite(s): 241.

261 Intermediate Persian I (4) Taped language program. (Same as Persian 261.) (CC)

262 Intermediate Persian II (4) Taped language program. (Same as Persian 262.) (CC)

(RE) Prerequisite(s): 261.

332 Classical Islam (3) (See Religious Studies 332.)

333 Islam in the Modern World (3) (See Religious Studies 333.)

471 Selected Topics in Asian Studies (3) Content varies. Repeatability: May be repeated. Maximum 9 hours.

491 Foreign Study (1-5)

Repeatability: May be repeated. Maximum 5 hours.

492 Off-Campus Study (1-5)

Repeatability: May be repeated. Maximum 5 hours.

493 Independent Study (1-5)

Repeatability: May be repeated. Maximum 5 hours.

Astronomy (150)

151 A Journey through the Solar System (4) Study of Earth's nearest astronomical neighbors including the sun, planets, asteroids, and comets. Seasons, solar and lunar eclipses, motion of the planets in the night sky, recent planetary space probe discoveries, development of our modern understanding of the origin and evolution of our solar system and its place in the universe, discovery of extrasolar planets in distant solar systems. A minimum of mathematical analysis. A minimum of mathematical analysis. (CC) Repeatability: May be repeated for credit with consent of department. Maximum 9 hours.

152 Stars, Galaxies, and Cosmology (4) Life and death of stars, exotic objects including white dwarfs, supernovae, neutron stars, pulsars, and black holes. Structure of galaxies, formation of large-scale structure in the universe, and cosmological issues such as the big bang, dark matter, dark energy, and the past, present, and projected future behavior of the universe in light of modern astrophysics and particle physics. Conditions for the existence of life in the universe and the possibility of extraterrestrial intelligence. A minimum of mathematical analysis. Credit Restriction: Only one of the three courses (152, 162, or 218) may be taken for credit.

161 A Journey through the Solar System with Laboratory (4) Study of Earth's nearest astronomical neighbors including the sun, planets, asteroids, and comets. Seasons, solar and lunar eclipses, motion of the planets in the night sky, recent planetary space probe discoveries, development of our modern understanding of the origin and evolution of our solar system and its place in the universe, discovery of extrasolar planets in distant solar systems. A minimum of mathematical analysis. Principles for interpretation of astronomical observations are reinforced in laboratory. (NS) Credit Restriction: Only one of the three courses (151, 161, or 217) may be taken for credit.

162 Stars, Galaxies, and Cosmology with Laboratory (4) Life and death of stars, exotic objects including white dwarfs, supernovae, neutron stars, pulsars, and black holes. Structure of galaxies, formation of large-scale structure in the universe, and cosmological issues such as the big bang, dark matter, dark energy, and the past, present, and projected future behavior of the universe in light of modern astrophysics and particle physics. Conditions for the existence of life in the universe and the possibility of extraterrestrial intelligence. A minimum of mathematical analysis. Principles for interpretation of astronomical observations are reinforced in the laboratory. (NS) Credit Restriction: Only one of the three courses (152, 162, or 218) may be taken for credit.

217 Honors: Introductory Astronomy (4) Introduction to astronomy and astrophysics. Historical perspectives in understanding the celestial universe, with emphasis on the laws of physics as they apply to the changing conceptions of the universe; structure of the solar system and celestial motions; evolution and properties of stars; galactic structure and models of the universe; observational technique and interpretation of underly- ing physical laws in laboratory. The 217-218 sequence satisfies the College of Arts and Sciences requirement for a natural science with laboratory. (NS) Contact Hour Distribution: 3 hours lecture and 2 hours lab. Credit Restriction: Credit given for only one sequence for lower-division astronomy. (RE) Corequisite(s): Mathematics 141 or Mathematics 130.

218 Honors: Introductory Astronomy (4) Introduction to astronomy and astrophysics. Historical perspectives in understanding the celestial universe, with emphasis on the laws of physics as they apply to the changing conceptions of the universe; structure of the solar system and celestial motions; evolution and properties of stars; galactic structure and models of the universe; observational technique and interpretation of underlying physical laws in laboratory. The 217-218 sequence satisfies the College of Arts and Sciences requirement for a natural science with laboratory. (NS) Contact Hour Distribution: 3 hours lecture and 2 hours lab. Credit Restriction: Credit given for only one sequence for lower-division astronomy. (RE) Corequisite(s): Mathematics 141 or Mathematics 130.

411 Astrophysics (3) Development of analytical physical models of the galactic structure of the universe, stellar and interstellar matter, and planetary systems. Topical and interdisciplinary approach includes consideration of quasars, pulsars, black holes and current developments in the field. Acceptable for credit toward the physics major. (RE) Prerequisite(s): Physics 136 or Physics 138. (DE) Prerequisite(s): Physics 222 or 232. Registration Permission: Consent of instructor.

490 Special Topics in Astronomy (1-3) Topics of current interest in astronomy and astrophysics. Repeatability: May be repeated for credit with consent of department. Maximum 9 hours.

Audiology and Speech Pathology (160)

300 Introduction to Communication Disorders (3) Nature, etiology, and incidence of speech, hearing, and language disorders.

302 Acoustics and Perception (3) Basic acoustics. Introduction to psychoacoustics and speech perception. (RE) Corequisite(s): 305.


305 Phonetics (3) Basic phonetics including recognition and production of spoken English sounds with analysis of their formation; phonetic transcription of speech; phonetic aspects of dialect variation.

306 Anatomy and Physiology of Speech (3) Anatomy, physiology and embryological development of the speech production mechanism. (RE) Corequisite(s): 305.

320 Speech and Language Development (3) Speech and language development in the normal child.
(RE) Prerequisite(s): 300.

433 Observation of Clinical Practice (1)
(RE) Prerequisite(s): 300 and 320.

434 Clinical Practice in Speech-Language Pathology II (1-4)
Repeatability: May be repeated. Maximum 4 hours.
(RE) Prerequisite(s): 433.
Comment(s): Enrollment for fewer than 2 semester hours must have prior departmental approval.

435 Introduction to Speech Sound Disorders (3) Etiology, diagnosis, and treatment of articulatory and phonological disorders.
(RE) Prerequisite(s): 300 and 305.

(RE) Prerequisite(s): 300 and 306.

445 Clinical Practice in Audiology (1-4)
Contact Hour Distribution: 4 hours and 1 lab.
(RE) Prerequisite(s): 305.

455 Problems in Speech Pathology (1-3)
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

457 Senior Honors Thesis (1-3) Students in the speech pathology program work individually under the direction of a tenure-track faculty member to write an honors thesis. The thesis must be approved by the departmental honors committee.
Repeatability: May be repeated. Maximum 6 hours.

461 Introduction to Language Pathology in Children (3) Etiology, diagnosis, and treatment of language impairments in children.
(RE) Prerequisite(s): 300 and 320.

473 Introduction to Audiologic Assessment (3) Basic principles of clinical audiometry; pure tone, speech, masking, and overview of special auditory tests.
(RE) Prerequisite(s): 303.

475 Appraisal of Speech and Language Disorders (3) Diagnostic procedures for children and adults with speech and language problems including observation and practice with diagnostic tests.
(DE) Prerequisite(s): 300.
Registration Restriction(s): Minimum student level – senior.
Registration Permission: Consent of instructor.

491 Foreign Study (1-15)
Repeatability: May be repeated. Maximum 30 hours.

492 Off-Campus Study (1-15)
Repeatability: May be repeated. Maximum 30 hours.

493 Independent Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.

494 Introduction to Aural Habilitation/Rehabilitation of the Hearing Impaired (3) Introduction to psychosocial aspects, amplification components/characteristics, assistive devices, speech acoustics, speech perception, speech reading, parent-infant, pre-school school years of children, communication impairments/ handicaps/remediation of adults, effects of aging/remediation on the elderly, and case studies.
(RE) Prerequisite(s): 305.

499 Senior Seminar in Communication Sciences and Disorders (3)
Capstone Experience. A writing-emphasis course exploring the forces shaping the profession of communication disorders in the past, present and future.
(DE) Prerequisite(s): 300.
Registration Restriction(s): Minimum student level – senior.
Registration Permission: Consent of instructor.

Biochemistry and Cellular and Molecular Biology (188)

230 Human Physiology (5) Fundamentals of human physiology, primarily from the perspective of cellular and organ-system interactions.
Contact Hour Distribution: 4 hours and 1 lab.
Credit Restriction(s): May not be applied toward the biochemistry and cellular and molecular biology concentration.
(RE) Prerequisite(s): Chemistry 110 or Chemistry 130.

280 Modern Medicine and You (3) New biomedical advances in internal medicine, surgery, obstetrics and gynecology, infectious diseases, cancer treatment, genetic disorders, psychiatry, health promotion, and disease prevention. Team-taught by academic clinicians in their area of specialty. Each session will include: basic biological principles/processes; scientific advances and current status about new diagnostic and treatment procedures of the particular disease state.
Contact Hour Distribution: Meets 2 hours a week.
Grading Restriction: Satisfactory/No Credit grading only.
(RE) Prerequisite(s): Biology 102 or Biology 140.

306 Genetics and Society (3) Introduction to genetics, anthropology and evolution with emphasis on their implications for human society.
(Same as Anthropology 304.)

310 Physiological Chemistry (4) Biochemical principles underlying physiological events in animals. Metabolism of carbohydrates, lipids, proteins, and nucleic acids. Role of vitamins and minerals as coenzymes and prosthetic groups. Action of drugs and hormones.
(Same as Nutrition 310.)

320 Physiology of Reproduction and Lactation (3) (See Animal Science 320.)

321 Introductory Plant Physiology (4) Cell and organismal physiology of plants; metabolic processes, water relations, mineral nutrition, morphogenesis. Effects of age, light, natural rhythms, temperature and other environmental factors on plant growth.
(RE) Prerequisite(s): Chemistry 120 and Chemistry 130.
(DE) Prerequisite(s): Biology 101 and 102 or Biology 130 and 140.

330 Mechanisms of Development (3) A survey course on cellular and molecular basis of embryonic development; differentiation via transcription, RNA processing, and translation; sex determination in humans.
(RE) Prerequisite(s): Biology 140 and Biology 240.
Comment(s): Intended for biology majors in the biochemistry and cellular and molecular biology concentration, but also open to biology majors in other concentrations.

331 Mechanisms of Development Laboratory (2)
Contact Hour Distribution: 2 labs.
(RE) Corequisite(s): 330.

401 Biochemistry-Molecular Biology I (4) First semester of a two-course sequence providing in-depth coverage of biochemistry and molecular biology. Covers amino acid structure and chemistry, protein structure and chemistry, protein folding, enzyme behavior and function, reaction mechanisms, catabolism and energy transfer, synthetic metabolism including photosynthesis, and protein transport.
(RE) Prerequisite(s): Biology 240 and Chemistry 360.
(DE) Prerequisite(s): Chemistry 350 and Chemistry 369.
Comment(s): Intended for biology majors in the biochemistry and cellular and molecular biology concentration, but also open to biology majors in other concentrations.

402 Biochemistry-Molecular Biology II (4) Second semester of a two-course sequence providing in-depth coverage of biochemistry and molecular biology. Covers structure of DNA and RNA, experimental methods of analyzing nucleic acids, mechanisms of RNA and protein synthesis, mechanisms of DNA replication, repair and recombination, chromosome structure and function, regulation of gene expression, genome structure and genomics, and mechanisms of biological regulation.
(RE) Prerequisite(s): 401.
Comment(s): Intended for biology majors in the biochemistry and cellular and molecular biology concentration, but also open to biology majors in other concentrations.

403 Advanced Genetics Laboratory (3) Experiments illustrating methods in nonclassical genetics, including techniques in classical, cyto-molecular and developmental genetics. Using model organisms, especially Drosophila and mouse.
(RE) Prerequisite(s): Biology 240 and Chemistry 360.
(DE) Prerequisite(s): Chemistry 350 and 369.

404 Plant Molecular Biology (4) Introduction to current research approaches and methodologies in plant developmental biology and molecular genetics.
Contact Hour Distribution: Laboratory and lecture.
(RE) Prerequisite(s): Biology 140 and Biology 240.
409 Perspectives in Biochemistry and Cellular and Molecular Biology (3) Current issues in biochemistry, cell biology and molecular biology. Emphasis on current developments and their applications, societal and economic impacts and moral and ethical implications. An oral presentation and a referenced library-research essay are required. A capstone course. Writing-emphasis course. (WC) (RE) Prerequisite(s): 401 or 402. Recommended Background: 9 additional hours of biochemistry and cellular and molecular biology or related courses.

411 Advanced Cellular Biology (3) Cellular structure and function at the molecular and supramolecular level. Topics include protein structure and function, membrane structure and function, signal transduction and cell regulation, mitosis and the cell cycle, cytoskeleton and cell motility, cell-cell interactions and tissues. (RE) Prerequisite(s): 401.

415 Foundations in Neurobiology (3) Basic nerve cell physiology, nervous system organization, sensory and motor systems, neural basis of behavior, and nervous system development and plasticity. (RE) Prerequisite(s): Biology 140 and Physics 222.

416 Neurobiology Laboratory (2) Experiments designed to illustrate concepts of modern neurobiology using electrophysiological, historical, and behavioral neurobiological techniques. (RE) Prerequisite(s): 415.

419 Cellular and Comparative Biochemistry Laboratory (2) Experiments with enzymes, nucleic acids, and membranes and organelles. Chromatography, kinetics, hybridization, sequencing, and immunochromatography methods. (RE) Prerequisite(s): 401.

420 Advanced Topics in Biochemistry and Cellular and Molecular Biology (3) Selected topics of current research interest, e.g., allosteric theory and control of protein function, immunochemistry, regulation of gene expression, bioenergetics, etc. Emphasis on original literature and the experimental basis of current knowledge. Historical background, societal impact, ethical and moral implications, and future development of technologies. Written reports required. Writing-emphasis course. (RE) Prerequisite(s): 401.

421 Cell and Tissue Structure and Function (4) Study of animal cells and tissues at light and electron microscope levels. Contact Hour Distribution: 2 hours and 2 labs. (RE) Prerequisite(s): Biology 140.

429 Cell Biology Laboratory (3) A series of open-ended, discovery-based exercises will be developed to design and test new drugs using modern cell biology and computer technologies. Experimental modules include techniques used in cell isolation, purification, culturing, fluorescence microscope, receptor binding and signal transduction, apoptosis, cell cycle analysis, protein and steroid secretion, computer modeling, and state-of-the-art electron microscopy. Students will actively participate in experiment design, execution, data analysis, and peer evaluation. (RE) Prerequisite(s): 401.

440 General Physiology (3) Principles of cellular and organ-system animal physiology. (RE) Prerequisite(s): Biology 140 and Chemistry 360. Recommended Background: Physics 221 and 222.

452 Independent Research in Biochemistry (1-6) Special experimental problems under direction of a staff member. Repeatability: May be repeated. Maximum 12 hours. (RE) Corequisite(s): 401 and 419.

457 Honors Thesis (1-3) Written preparation and oral presentation of faculty-supervised student research conducted in 452 or equivalent. Repeatability: Not repeatable. May be taken once for 1-3 hours. Credit Restriction(s): Credit may not be applied toward the biochemistry and cellular and molecular biology concentration. (RE) Prerequisite(s): 452. Registration Restriction(s): Biological sciences major/honors biology and cellular and molecular biology concentration.

459 Biophysical Crystallography (3) Theories and practices of X-ray diffraction, neutron diffraction and neutron scattering to elucidate the structure of nucleic acids, proteins, nucleosomes, ribosomes and viruses. Application of 3-D structures in designing drugs against AIDS, cancer, cardiac disease and neurodegenerative disorders. Recommended Background: 401, or two 300-level chemistry courses or Physics 240 or consent of instructor.

460 Cancer Biology (3) Fundamental mechanisms of cancer formation and therapy, including: Cell cycle, cancer epidemiology, cancer pathologies, oncogenes, tumor suppressor genes, DNA repair and metastasis. Recommended Background: Biology 240 or consent of instructor.

465 Human Genetics (3) Genetic and molecular principles and problems of human inheritance. (RE) Prerequisite(s): Biology 240.

471 Biophysical Chemistry (3) Physicochemical principles with applications to biological systems. Thermodynamics; chemical equilibrium; solution chemistry; transport; electrochemistry; kinetics; enzyme catalyzed reactions. (Same as Chemistry 471.) (DE) Prerequisite(s): Chemistry 350 and 360; Biology 130 or 102. Recommended Background: Calculus.

480 Physiology of Exercise (3) (See Exercise Science 480.)

481 Biophysical Chemistry (3) Physicochemical principles with applications to biological systems. Elementary quantum chemistry; interactions of light with biological molecules; optical and magnetic spectroscopy; light scattering; case studies of selected macromolecules. (Same as Chemistry 481.) (DE) Prerequisite(s): Chemistry 350, 360, 369 and Biology 130 or 102. Recommended Background: Calculus.

492 Off-Campus Study (1-6) Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 6 hours. Credit Restriction: Maximum 2 hours may be applied toward the biochemistry and cellular and molecular biology concentration. Registration Permission: Consent of instructor.

493 Independent Study (1-3) Independent study under the direction of a faculty member. Repeatability: May be repeated. Maximum 12 hours. Credit Restriction: Maximum 3 hours may be applied toward the biochemistry and cellular and molecular biology concentration. Registration Permission: Consent of instructor.

Biology (190)

101 Humankind in the Biotic World (4) Introduction to the principles of biology from the perspective of the impacts of plants, animals, and microbes on human life, and the impact of humans on the biosphere, intended for students not majoring in the biological or pre-health sciences. Surveys life from the cell to topics in human health. Topics include: macromolecules and cells, energy flow in biological systems, genetics and information flow from generation to generation, reproduction, biotechnology and genetic engineering, sex and sexuality, human physiology, cancer, drugs (use and misuse). Laboratories involve a mix of skills-oriented exercises and assignments focused on topics. (NS) Contact Hour Distribution: 3 hours lecture and 1 hour lab.

102 Humankind in the Biotic World (4) Introduction to the principles of biology from the perspective of the impacts of plants, animals, and microbes on human life, and the impact of humans on the biosphere, intended for students not majoring in the biological or pre-health sciences. Focuses on the diversity of the Earth’s biota and the interdependence among components. Topics include survey of biodiversity from bacteria to higher plants and animals, genetics and evolutionary processes, population biology, ecology, ecosystems, environmental issues including world population, and global climate change. Laboratories involve a mix of skills-oriented exercises and assignments focused on topics. (NS) Contact Hour Distribution: 3 hours lecture and 1 hour lab.

111 General Botany (4) Introduction to taxonomy through tree identification: basic organization and function of cells, respiration, photosynthesis, genetics (including meiosis, mitosis, Mendelian inheritance); survey of plant kingdom (bacteria, algae, fungi, mosses, ferns, conifers, and flowering plants). (NS) Credit Restriction: Students receiving credit for 111 and 112 may not receive credit for 101 and 102.

112 General Botany (4) Plant growth, anatomy, growth regulation; uptake and transport; origin of life and mechanisms of evolution; ecology; importance to humans and environmental concerns. (NS) Credit Restriction: Students receiving credit for 111 and 112 may not receive credit for 101 and 102.

130 Biodiversity (4) Unifying concepts and principles of biology, illustrated with diversity of life, intended for science majors. Properties of life, from molecules to organisms, origin of life, cells, genetics, introduction to kingdoms, origins of multicellularity, multicellular plants and animals, ideas about evolution, man’s place in nature. Emphasis on common themes in living systems (e.g., metabolism, protein and nucleic sequence similarities, morphology), phylogeny construction, fossils, and the major plant and animal groups. Writing and analysis of lab activities required. (NS) Contact Hour Distribution: 3 hours lecture and 1 hour lab.

Credit Restriction: Students receiving credit for both 101 and 102 may not receive credit for 130.
140 Organization and Function of the Cell (4) Topics include: basic organic chemistry and biomolecules, cell structure (membranes, cell walls, and internal organelles); energetics (respiration and photosynthesis); cell division mitosis; and molecular biology. Labs will stress basic laboratory skills and procedures such as measuring pipetting and mixing solutions, as well as using basic laboratory equipment and tools for analysis of cell components such as electrophoresis and centrifugation. (NS)
(RE) Prerequisite(s): 130 and Chemistry 120.
(RE) Corequisite(s): Chemistry 130.

157 Honors Experimental Biology (4) Integrated lecture/laboratory practicum designed as an inquiry-based course with hands-on experimentation to explore the nature of scientific research and unifying concepts and principles of biology. Properties of life and common themes in living systems using plant and animal subjects for experimentation. (NS) (OC)
Credit Restriction: Students receiving credit for both 101 and 102 may not receive credit for 157.

202 Inside the Biological Sciences (1) Presentations by faculty and other biology professionals emphasizing applied biological research. Familiarizes students with diverse nature and current applications of biology.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 3 hours.

203 Inside the Biological Sciences (1) Presentations by faculty and other biology professionals emphasizing applied biological research. Familiarizes students with diverse nature and current applications of biology.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 3 hours.

240 General Genetics (4) Classical and modern principles of heredity. Topics include meiosis and transmission genetics; molecular genetics and gene expression; population and evolutionary genetics. Laboratories will alternate with pre-experimentation sessions and will include both computer-based simulations and hands-on experience with model genetic systems. Emphasis on development of analytical skills.
(RE) Prerequisite(s): 140 or 112.
(DE) Prerequisite(s): Chemistry 130.

250 General Ecology (4) Relations between organisms and their environment, including human environmental problems. Topics include populations, communities, and ecosystems.
Contact Hour Distribution: 3 hours lecture and 1 hour discussion, field problems, or computer simulations.
(RE) Prerequisite(s): 140 or 112.
(DE) Prerequisite(s): Chemistry 130.
Comment(s): A working knowledge of college algebra is required.

307 Honors: Colloquy in Biological Research (1) Presentations by professional biologists emphasizing rewards of careers in different areas of biology. Nationally recognized speakers invited each term.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 4 hours.
Recommended Background: 8 hours of 200-level or above biology courses.
Registration Restriction(s): Biological sciences major/honors biology concentration or honors microbiology concentration or honors plant biology concentration; minimum student level – sophomore.

308 Honors: Colloquy in Biological Research (1) Presentations by professional biologists emphasizing rewards of careers in different areas of biology. Nationally recognized speakers invited each term.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 4 hours.
Recommended Background: 8 hours of 200-level or above biology courses.
Registration Restriction(s): Biological sciences major/honors biochemistry and cellular and molecular biology concentration or honors biology and evolutionary biology concentration or honors microbiology concentration or honors plant biology concentration; minimum student level – sophomore.

397 Honors: Seminar on Research Skills (3) Required of (but not limited to) Threshold Biology Scholars. Technical and cognitive skills necessary for participation in biological research. Lecture/presentations and small team demonstrations and discussion.
Recommended Background: 8 hours of 200-level or above biology courses.
Registration Permission: Consent of instructor.

398 Honors: Practicum in Biological Research (3-5) Required of (but not limited to) Threshold Biology Scholars. Rotation through 3-5 modules of required and elective experience in participating laboratories.
Recommended Background: 8 hours of 200-level or above biology courses.
Registration Permission: Consent of instructor.

401 Senior Thesis (3-12) Required research experience of Threshold Biology Scholars. Students design research projects, complete research data acquisition, organize thesis documents, and prepare presentations.
Repeatability: May be repeated. Maximum 12 hours.

Biomedical Engineering (192)

271 Biomedical Engineering Principles (3) Application of engineering principles and methods to problem solving in the life sciences and medicine.
(RE) Prerequisite(s): Engineering Fundamentals 152.

300 Engineering Physiology (3) The study of human physiology, with an emphasis on making engineering decisions, and the development of analytical and computational models.
Registration Permission: Consent of instructor.

310 Biomechanics (3) The application of statics, dynamics, mechanics of materials, and fluid mechanics to biomedical engineering problems. The special characteristics of living tissue and biological fluids and their incorporation into computational problems will be introduced.
(RE) Prerequisite(s): Mechanical Engineering 321.

320 FDA Regulation of Biomedical Devices (2) Federal medical device law and regulation requirements; pre-market approval of new medical devices.
Registration Permission: Consent of instructor.

401 Thesis (3) Research and design problems in biomedical engineering with prior approval of a professor.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

408 Cell and Tissue Engineering (3) Mammalian cell culture. Effects of mechanical forces on cells. Tissue engineering of cardiovascular and orthopedic devices.
(RE) Prerequisite(s): 310 and Biology 140.

410 Professional Topics (2) Topics relating to professional responsibilities, communications, and organization. Requires a formal oral presentation by each student on an engineering topic chosen by the student and approved by the instructor. (OC)
(RE) Prerequisite(s): English 102.
Registration Restriction(s): Minimum student level – senior.

430 Biomedical Engineering Laboratory (4) Experience with the unique problems associated with making measurements and interpreting data in living systems. Experiments may include mechanical testing of biological materials, imaging, and physiological measurements (EKG, EMG, EEG, etc.).
(RE) Prerequisite(s): 310.

455 Biomedical Engineering Design I (2) Design of biomedical systems. Economics, optimization, reliability, patents and product liability. Participation in team design efforts. Requires oral and written design reports.
(RE) Prerequisite(s): 310.
(RE) Corequisite(s): 430.

469 Biomedical Engineering Design II (3) Design of complete biomedical device: documentation includes complete specification, design calculations, preparation of working drawings and cost analysis. Requires written and oral reports.
(RE) Prerequisite(s): 455.

473 Applied Biomathematics (3) Applications of biomathematics to the industrial and orthopedic area. Design of orthopedic implant devices; biomechanics of injury and protection.
(RE) Mechanical Engineering 321.
(RE) Corequisite(s): 310.

475 Design of Artificial Internal Organs (3) Design, development and evaluation of artificial internal organs; analysis of transport processes in therapeutic devices for design optimization; current research and development needs. Ethical considerations.
(RE) Prerequisite(s): Aerospace Engineering 341 and Mathematics 231.

494 Special Project in Biomedical Engineering (1-3) Problems related to recent developments and practice.
Repeatability: May be repeated once.
Registration Permission: Consent of instructor.

495 Special Project in Biomedical Engineering (1-3) Problems related to recent developments and practice.
Repeatability: May be repeated once.
Registration Permission: Consent of instructor.

Biosystems Engineering (196)

104 Design Apprenticeship (1) Exposure to design in biosystems engineering. Through apprenticeship with senior design teams in Biosystems Engineering 402. Apprentices will assist with design, construction, testing, analysis, and the presentation of project. Will also include background in engineering design, engineering project management, and engineering design tools.
Contact Hour Distribution: 2-hour lab.
(RE) Prerequisite(s): Engineering Fundamentals 151.
201 Career Opportunities (1) Activities and opportunities in the fields of specialization; required training for each area; projected career activities.

221 Mass and Energy in Biosystems (3) Introduction to thermodynamic concepts for biological systems (energy, mass and energy balances, processes and cycles); psychrometrics and psychometric processes; biological systems and the biosphere (bioenergetics, hydrologic cycle, global energy cycle).

(Re) Prerequisite(s): Chemistry 120 and Engineering Fundamentals 152.

231 Biochemistry for Engineers (3) Fundamentals of biochemistry presented from an engineering point of view and applied to solve engineering-related problems. Topics to be covered include fundamental organic chemistry of amino acids, carbohydrates, lipids and other important biochemicals; the role and control of biological systems; functional biochemicals; protein chemistry; and the replication, transcription, and translation of DNA.

321 Biothermodynamics, Heat and Mass Transfer (3) Application of thermodynamics to biological systems; heat transfer, with emphasis upon conduction and convection applications; introduction to diffusion mass transfer.

(Re) Prerequisite(s): Chemistry 120 and Mathematics 141.

321 Biothermodynamics, Heat and Mass Transfer (3) Application of thermodynamics to biological systems; heat transfer, with emphasis upon conduction and convection applications; introduction to diffusion mass transfer.

(Re) Prerequisite(s): Chemistry 120 and Engineering Fundamentals 152.

401 Biosystems Engineering Design I (2) First course of a capstone design sequence. Review of fundamental engineering principles and design proposal generation. Design proposals will include preliminary engineering analyses, extensive documentation, and multiple individual and group presentations. (OC)

(Re) Prerequisite(s): 431 and 451.
(Re) Corequisite(s): 404.

402 Biosystems Engineering Design II (6) Culmination of capstone design sequence. Intensive design experience on project chosen and approved in 401. Analysis, construction, testing, evaluation and reporting required. Technical lectures on statistics, engineering software, and technical issues relevant to the chosen design project. Weekly oral and written reports and submission of design to external engineering design competition or display required.

(Re) Prerequisite(s): 401 and 444.

321 Biothermodynamics, Heat and Mass Transfer (3) Application of thermodynamics to biological systems; heat transfer, with emphasis upon conduction and convection applications; introduction to diffusion mass transfer.

(Re) Prerequisite(s): 431 and 451.
(Re) Corequisite(s): 404.

411 Mechanical Systems Engineering (3) Fundamentals of power delivery systems and simple mechanisms; selection and design of mechanical, hydraulic, and tractive power transmission systems. Emphasis on off-road vehicles and bioprocessing systems.

(Re) Prerequisite(s): Mechanical Engineering 231 and Mechanical Engineering 321.

416 Hydrologic and Water Quality Engineering (3) An introduction to hydrology including: hydrologic variability, precipitation, evapotranspiration, infiltration, runoff, erosion, water quality and non-point pollution, energy dissipation, streamflow measurement, hydrographs, routing, open channel flow, and urban hydrology. (Same as Civil Engineering 416.)

(Re) Prerequisite(s): Civil Engineering 390 or Aerospace Engineering 341.

431 Bioprocess Engineering (3) Development of interdisciplinary bioprocess engineering; basics of biology in an engineering perspective; enzymatic reaction kinetics; metabolism and bioenergetics; cell growth kinetics; reactor design and optimization; engineering principles applied to bioprocess engineering including mass balance, energy balance, and reaction kinetics; reactor design and systems; introduction to bioseparations; practical aspects of bioprocess engineers and process development.

Contact Hour Distribution: 2 hours and 1 lab.
(Re) Prerequisite(s): 231 and 321.
(Re) Corequisite(s): 326.

444 Practicum (3) Applications of engineering theory and design in selecting, sizing, and fabricating engineering materials, and in developing processes and systems typically used in biosystems engineering.

Contact Hour Distribution: 1 hour and 2 labs.
(Re) Corequisite(s): 401.

451 Electronic Systems (4) Basic electronics with biological applications. Analog and digital electronics; sensing and controlling physical and environmental parameters; sensor selection and interfacing; signal conditioning; process control. Includes laboratory experiments and design projects.

Contact Hour Distribution: 3 hours and 1 lab. Design content – 1 hour.
(Re) Prerequisite(s): Electrical and Computer Engineering 301.

470 Special Problems in Biosystems Engineering (1-3) Selection, analysis solution, and report of problem. Repeatability: May be repeated. Maximum 6 hours.

Registration Permission: Consent of instructor.

480 Selected Topics in Biosystems Engineering (1-3) Current trends and problems in biosystems engineering. Repeatability: May be repeated. Maximum 6 hours.

Biosystems Engineering Technology (194)

202 Materials and Fabrication (3) Properties of materials including wood, metals, concrete, plastics and lubricants; drafting and plan reading; fabrication techniques and processes involving hand tools, power equipment, and arc and gas welding.

Contact Hour Distribution: 1 hour and 2 labs.

212 Surveying (3) Measurement of distances, angles, and areas; differential and profile leveling; topographic surveying and mapping; area computation.

Contact Hour Distribution: 1 hour a one 3-hour lab.
(Re) Prerequisite(s): Mathematics 119 or Mathematics 123.

326 GIS/GPS Applications in Agriculture and Environmental Science (3) Introduction to the application of Geographic Information Systems (GIS) and Global Positioning Systems (GPS) in agriculture and in environmental science. Topics covered will include GIS software and concepts, GPS receivers, data acquisition, and spatial analysis of data to solve problems. Case studies in agricultural demographics, precision agriculture, pasture management, water quality, watershed management, and waste pollution will be used to provide hands-on experience with these emerging technologies.

(Re) Prerequisite(s): Agriculture and Natural Resources 290.

414 CAD Applications to Biosystems Engineering Technology (3) Computer Aided Drafting (CAD) applications in agriculture and environmental science. Essentials of CAD software to create drawings of components, systems, plant growth charts, and process diagrams. Applications in mechanical, structural, and biosystems. 2-D applications with limited exposure to 3-D applications. Computer intensive course. Hands-on experience. Credit Restriction: Students cannot receive credit for both 414 and 514.

Contact Hour Distribution: Two 2-hour labs.
Recommended Background: Computer proficiency.

422 Food and Process Engineering Technology (3) Application of basic engineering principles to agricultural and food processes. Fluid handling, drying, evaporation, thermal processing, heating and cooling, refrigeration systems, and materials handling.

Contact Hour Distribution: 2 hours and 1 lab.
(Re) Prerequisite(s): Physics 101 or Physics 221.

432 Agricultural Machinery and Tractors (3) Functions, selection, and management of agricultural machinery systems. Tractor power ratings, engine and transmission systems, hydraulic systems, hitching, and ballasting. Field and material capacity, field efficiency, cost analysis, and machinery replacement strategies. Functional analyses of tillage operations, planters and drills, no-tillage systems, hay harvest systems, forage and small grain harvesting, and cotton harvesting. Crop drying processes, off-road machinery safety considerations, and operator ergonomics.

Contact Hour Distribution: 2 hours and 1 lab.
(Re) Prerequisite(s): Mathematics 123 or Mathematics 125.

434 Introduction Monitoring and Automation (3) Precision technologies for monitoring and control of agricultural systems. Applications include: yield monitoring; variable rate control and sensing systems for planters, sprayers, soil applied nutrients, water management, crop health, and pest pressure; electronic information transfer; and GPS-based vehicle guidance.

Contact Hour Distribution: 2 hours and 1 lab.
(Re) Corequisite(s): 326.

442 Agricultural Waste Management and Pollution Control (3) Waste renovation fundamentals; characteristics of animal manure, techniques for collecting, transporting, storing, and utilizing livestock waste.

Contact Hour Distribution: 2 hours and 1 lab.
(Re) Prerequisite(s): Mathematics 123 or Mathematics 125.

452 Small Internal Combustion Engines (3) Theory, concepts and mechanical systems of small internal combustion engines; theoretical cycles, selection, operation, adjustment, troubleshooting and repair of single-cylinder engines.

Contact Hour Distribution: 2 hours and 1 lab.
(Re) Prerequisite(s): Mathematics 123 or Mathematics 125.

462 Agricultural Chemical Application Technology (3) Equipment for application of liquid, solid, and gaseous agricultural chemicals; system components; operational characteristics; calibration; selection and management; safety considerations; materials handling and disposal methods.

Contact Hour Distribution: 2 hours and 1 lab.
(Re) Prerequisite(s): Mathematics 123 or Mathematics 125.
474 Environmental Instrumentation and Monitoring (3) Equipment and techniques commonly used to measure all aspects of hydrologic cycle: precipitation, runoff, streamflow, and subsurface water movement. Sampling of all flows for contaminants. Design of monitoring systems. Analysis of data. Contact Hour Distribution: 2 hours and 1 lab. Credit Restriction: Students cannot receive credit for both 474 and 574. (RE) Prerequisite(s): Environmental and Soil Sciences 324.

Business Administration (205)

100 Approaches to the College of Business Administration (1) Integration into the College of Business Administration with emphasis on academic advising, major exploration, career planning, University resources and services, and reinforcement of academic survival skills such as time management and study skills.

Grading Restriction: Satisfactory/No Credit grading only.

201 Business Functions (4) Understanding how business works through application and integration of fundamental business functions. Includes aspects of marketing, finance, logistics, operations, organizational behavior, and information management.

(Re) Prerequisite(s): Accounting 200 and Economics 201.

(Re) Corequisite(s): Statistics 201 or Statistics 207.

320 Business Career Planning and Placement (1) Exploration of career opportunities in business. Process of making the career decision, preparing for and conducting a job campaign. Using the Placement Office.

Grading Restriction: Satisfactory/No Credit grading only.

331 CBM I: Supply Chain Management (2) Coordinating the end-to-end relationships between supply chain members, from inputs to delivery of product/services. Understanding impact of demand and supply information flows across the supply chain. Emphasis on integrating activities through improved processes and relationships to achieve and maintain competitive advantage.

(Re) Prerequisite(s): 201.

(Re) Corequisite(s): 332.

Registration Restriction(s): Majors in the College of Business Administration.

332 CBM I: Demand Management (2) Analysis of current and future markets opportunities. Translation of identified opportunities into strategies to select, acquire, and retain customers that are consistent with overall organizational objectives. Includes design, execution, and evaluation of strategies from the perspective of an organization within a channel of distribution context.

(Re) Prerequisite(s): 201.

(Re) Corequisite(s): 331.

Registration Restriction(s): Majors in the College of Business Administration.

341 CBM II: Lean Operations (2) Design of the product delivery system in manufacturing and service operations. The dynamics of the supply chain. Managing flows in manufacturing and service processes. Specific techniques for designing process design, such as pull replenishment, cellular layout, standard work, and mixed model sequencing.

(Re) Prerequisite(s): 201.

(Re) Corequisite(s): 342.

Registration Restriction(s): Majors in the College of Business Administration.

342 CBM II: Information Management (2) Emphasis on the concepts, structure, and components (input, processes, output, feedback and control) of information systems, and database design and management. Includes the role, function and integration of information systems and technology in business activities.

(Re) Prerequisite(s): 201.

(Re) Corequisite(s): 341.

Registration Restriction(s): Majors in the College of Business Administration.

353 CBM III: Integrated Process Management (3) Behavioral processes in organizations with an emphasis on team dynamics and decision making within the contextual framework of integrated business process management.

(Re) Prerequisite(s): 331 and 341.

(Re) Corequisite(s): 361 and Finance 301.

Registration Restriction(s): Majors in the College of Business Administration.

361 The Firm in a Global Context (3) Domestic and international factors that impact the decision-making process of the firm: domestic and international macroeconomics, regulation, trade policy, technological change, institutional, and cultural systems. Emphasis on relationship between theoretical models and actual problems encountered in the conduct of business.

(Re) Prerequisite(s): 201.

Registration Restriction(s): Majors in the College of Business Administration.

371 International Business (3) Survey of strategic implications of conducting business operations in an international context. Analysis of relevant cross-national environments, including cultural, political, economic and legal characteristics.

(Re) Prerequisite(s): 361.

Registration Restriction(s): Majors in the College of Business Administration.

400 Special Topics (1-9) Topics of current interest in international business. Topics announced prior to offering.

Repeatability: May be repeated if topic is different. Maximum 9 hours.

(Re) Prerequisite(s): 361.

Registration Restriction(s): Majors in the College of Business Administration.

467 Honors: Corporate Executive in Residence Seminar (3) Interaction with top corporate executives from a wide spectrum of business disciplines. Domestic and international strategic planning as it is applied in major U.S. corporations. Executive presentations and small group discussion on goods and services in consumer and industrial settings.

Recommended Background: Business Administration 332 and Finance 301.

Registration Restriction(s): Majors in the College of Business Administration.

(minimum student level – senior.

Registration Permission: Consent of instructor.

491 Foreign Study (1-15)

Repeatability: May be repeated. Maximum 15 hours.

Registration Restriction(s): Majors in the College of Business Administration.

Registration Permission: Consent of instructor.

492 Off-Campus Study (1-15)

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated. Maximum 15 hours.

Registration Restriction(s): Majors in the College of Business Administration.

Registration Permission: Consent of instructor.

Business Law (216)

301 Legal Environment of Business (3) Survey of legal and ethical topics affecting business. Coverage includes legal and business ethics; dispute resolution mechanisms; and substantive and procedural law of regulation, torts, contracts, property, intellectual property, business associations, and employer/employee relations. (Same as Legal Studies 301.)

Registration Restriction(s): Minimum student level – junior.

Chemical Engineering (226)

200 Chemical Engineering Fundamentals (3) Material and energy balances.

(Re) Prerequisite(s): Engineering Fundamentals 152 and Chemistry 130.

(Re) Corequisite(s): 215 and 230.

(De) Corequisite(s): Mathematics 142.

215 Computer Applications in Chemical Engineering (3) Introduction to computer solutions to chemical engineering problems. Includes: modern programming tools, flow sheet simulators, statistics, spreadsheet, graphics.

(Re) Corequisite(s): 200.

230 Introduction to Chemical Engineering Thermodynamics (3) Introduction to the laws of thermodynamics, state functions, and their conceptual basis. Ideal systems, the gas law, Raoult’s law, and deviations from ideal behavior (fugacity and activity). Introduction to chemical and phase equilibria.

(Re) Prerequisite(s): Engineering Fundamentals 152 and Chemistry 130.

(Re) Corequisite(s): 200 and Mathematics 142.

240 Fluid Flow and Heat Transfer (4) Force, energy and mechanical energy balances; flow in tubes, piping systems, packed and fluidized beds; pumping and metering; steady and unsteady state heat conduction; heat transfer in tubes and heat exchangers; radiation.

(Re) Prerequisite(s): 200.

(Re) Corequisite(s): Mathematics 231.

250 Application of Chemical Engineering Thermodynamics (3) Basic concepts related to chemical engineering applications of thermodynamics; emphasis on flow processes, real gases and liquids, estimation of physical properties, phase equilibria of industrial mixtures, compressors, power cycles, and chemical reaction equilibria.

(Re) Prerequisite(s): 200 and 230.

301 Application of Statistical and Numerical Techniques in Chemical Engineering (3) Statistical methods for probabilities, expectations, sampling, and estimation; Numerical methods for regression, integration, solution of systems of linear/nonlinear algebraic and differential equations. (Same as Materials Science and Engineering 301.)

(Re) Corequisite(s): Mathematics 231.

310 Chemical Engineering Laboratory (3) Thermodynamics, fluid flow and heat transfer in chemical engineering.

(Re) Prerequisite(s): 215 and Mathematics 142.

Registration Restriction(s): Chemical engineering major; 2.5 GPA.
340 Mass Transfer and Separation Processes (3) Stagewise operation; application of analytical, graphical and computer methods to design of stagewise separatory operations. Differential operations-application of analytical and computer methods to the design of diffusive processes. Applications include gas absorption, stripping, binary distillation, and extraction.

(Re) Prerequisite(s): 200 and 230. Registration Restriction(s): 2.5 GPA.

360 Process Dynamics and Control (3) Introduction to process modeling and industrial control system design. Mathematical tools for characterizing dynamic behavior of processes; theory and practice of operating and controlling such systems.

(Re) Prerequisite(s): 200 and 240. (Re) Corequisite(s): Mathematics 231. Registration Restriction(s): 2.5 GPA.

380 Seminar (1) Presentation and discussion of topics in the practice of chemical engineering.

Grading Restriction: Satisfactory/No Credit Grading only.

394 Chemical Engineering Co-op (1) Co-op experiences in chemical engineering. Technical report writing and presentations.

Repeatability: May be repeated. Registration Permission: Consent of instructor.

407 Honors Seminar (1) Presentations and discussions on topics of importance to chemical engineers.

Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 2 hours. Registration Permission: Consent of instructor.

408 Honors Seminar (1) Presentations and discussions on topics of importance to chemical engineers.

Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 2 hours. Registration Permission: Consent of instructor.

410 Chemical Engineering Laboratory II (3) Laboratory investigations of mass transfer and chemical reaction phenomena in chemical engineering.

(Re) Prerequisite(s): 310 and 450.

411 Undergraduate Research Experience (3) Research problems in current topics in chemical engineering. Students work in teams to design, perform, and document current research projects.

(Re) Prerequisite(s): 310. Registration Restriction(s): Minimum student level – senior.


445 Separation Process Technology (3) Multicomponent distillation, theory and computer simulations; humidification; specialized technologies, including membrane separation, crystallization, dialysis, adsorption, ion exchange, etc.

(Re) Prerequisite(s): 240.

447 Honors: Transport Phenomena (3) Overview of momentum, heat and mass transfer processes, the analogies, differential and macroscopic balances, applications involving molecular diffusion, including simultaneous mass transfer and chemical reaction.

(Re) Prerequisite(s): 340. Registration Permission: Consent of instructor.

450 Chemical Reactor Fundamentals (3) Homogeneous and heterogeneous reaction kinetics; idealized homogeneous reactor models, both for closed and flow systems; analysis of batch reactor data; multiple reactions; non-isothermal reactions.

(Re) Prerequisite(s): 240 and 301. (De) Prerequisite(s): 340. Registration Permission: Consent of instructor.

467 Honors: Engineering Internship in Process Control (4) Selected students work in small groups on industrial problems in process dynamics and control. Directed by faculty and engineers from host company.

(Re) Prerequisite(s): 360. Registration Permission: Consent of instructor.

477 Honors: Applied Process Automation Laboratory (3) Interfacing flexible batch continuous processes to automation systems. Top down analysis with bottom up implementation, hierarchical structures and object-oriented concepts are used to design automation solutions including human-machine-interfaces. Workstations with modern industrial equipment provide an interactive graphics and visualization environment.

Recommended Background: 360. Registration Permission: Consent of instructor.

487 Honors: Applied Process Automation Design Projects (3) Industrial programmable logic controllers (PLCs) and industrial automation and human-machine-interface (HMI) design software are used on workstations to develop automation solutions by small teams of students. Advanced control strategies, networking and internet issues.

Registration Permission: Consent of instructor.

488 Honors: Design Internship in Green Engineering (3) Students work in small teams on applying green engineering principles to authentic industrial design problems. Directed by faculty and professionals from host industry.

(Re) Prerequisite(s): 480.

490 Process Design and Economic Analysis (3) Students work in small teams on applying sound engineering principals to authentic industrial design problems. Directed by faculty and professionals from host industry.

(Re) Prerequisite(s): 480.

494 Special Problems in Chemical Engineering (3) Chemical engineering problems related to recent developments in industrial practice or engineering research.

Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor.

498 Honors Thesis (3) Research in problems related to recent developments in chemical engineering.

Registration Permission: Consent of instructor.

Chemistry (235)

100 Principles of Chemistry (4) Bonding and molecular structure, gas laws, liquid and solid state, solutions, colloids, acids and bases, oxidation and reduction, kinetics and equilibria. (NS)

Contact Hour Distribution: 3 hours and 1 lab. Credit Restriction: Credit may be received for only one of the following courses – 100, 120, or 128.


Contact Hour Distribution: 3 hours and 1 lab. (De) Prerequisite(s): 100 or 130 or 138 or consent of department head.

120 General Chemistry I (4) A general course in theoretical and descriptive chemistry. Modern atomic theory, chemical bonding, stoichiometry, quantitative treatment of gas laws, quantitative aspects of solution chemistry, kinetics. (NS)

Contact Hour Distribution: 3 hours and 1 lab. Credit Restriction: Credit may be received for only one of the following courses – 100, 120, or 128.
128 Honors: General Chemistry I (4) (NS)  
Contact Hour Distribution: 3 hours and 1 lab.  
Credit Restriction: Credit may be received for only one of the following courses – 100, 120, or 128.

130 General Chemistry II (4)  
A general course in theoretical and descriptive chemistry. Chemical equilibria, thermodynamics, descriptive chemistry of nonmetals and metallic elements, electrochemistry, introduction to organic and biochemistry. (NS)  
Contact Hour Distribution: 3 hours and 1 lab.  
(RE) Prerequisite(s): 120 or 128.

138 Honors: General Chemistry II (4) (NS)  
Contact Hour Distribution: 3 hours and 1 lab.  
(RE) Prerequisite(s): 129.

150 Chemistry and Society (3)  
Food and agricultural chemistry; chemistry of life; chemistry in medicine; air and water pollution; energy and fuels.  
Contact Hour Distribution: 3 hours lecture.  
Credit Restriction: May not be used toward a major or minor in chemistry.

160 Chemistry and the Home (3)  
Chemistry and the consumer; household products; chemistry in the kitchen and around the home.  
Contact Hour Distribution: 3 hours lecture.  
Credit Restriction: May not be used toward a major or minor in chemistry.

200 Introduction to Chemical Research (1)  
Participation in an active research program in analytical, inorganic, organic, physical, or polymer chemistry. Students work with researchers to acquire expertise in planning experiments, interpreting results, and formulating hypotheses.  
Repeatability: May be repeated. Maximum 4 hours.  
Credit Restriction: May not be used toward a major or minor in chemistry.  
Comment(s): Chemistry course numbered 230 or higher is a corequisite.  
Registration Permission: Consent of department head.

230 Inorganic Chemistry (3)  
Periodicity, valence, bonding, and the descriptive chemistry of the elements; coordination compounds; nuclear chemistry; transition elements, inner transition elements.  
Contact Hour Distribution: 2 hours and 1 lab.  
(RE) Prerequisite(s): 130 or 138.

240 Chemical Programming (2)  
Use of the computer in solving problems encountered in chemistry.  
Contact Hour Distribution: 1 hour and 1 lab.  
(RE) Prerequisite(s): Prior to or concurrent with this course.

301 Industry/Laboratory Internship (3)  
Supervised by industry/laboratory technical staff at an approved facility. Consists of a full-time "hands-on" individual assignment for entire semester as a member of a theoretical or experimental team.  
Grading Restriction: Satisfactory/No Credit grading only.  
Credit Restriction: May not be applied toward a major or minor in chemistry.  
(RE) Prerequisite(s): 130 or 138.  
Registration Permission: Consent of department head.

310 Analytical Chemistry (3)  
Principles and practices of quantitative measurements in chemical systems. Acid-base, complexometric, and redox equilibria; applications of titrimetric analysis; potentiometry; elementary spectrophotometry; chemical separations including chromatography, ion exchange, and solvent extraction.  
(RE) Prerequisite(s): 130 or 138.

319 Analytical Chemistry Laboratory (1)  
Experiments on topics covered in 310.  
(RE) Corequisite(s): 310.

320 Advanced Analytical Chemistry (3)  
Modern electroanalytical methods; mass spectrometry; optical spectroscopic techniques; magnetic resonance methods; advanced chromatographic theory.  
(RE) Prerequisite(s): 310.

329 Advanced Analytical Chemistry Laboratory (2)  
Experiments on topics covered in 320.  
(RE) Corequisite(s): 320.

350 Organic Chemistry I (3)  
Compounds of carbon and their reactions. Reaction mechanisms, synthesis, spectroscopic and other physical properties.  
(RE) Prerequisite(s): 130 or 138.

360 Organic Chemistry II (3)  
Compounds of carbon and their reactions. Reaction mechanisms, synthesis, spectroscopic and other physical properties.  
(RE) Prerequisite(s): 350.  
(RE) Corequisite(s): 369.

369 Organic Chemistry Laboratory (2)  
Experiments on topics discussed in 350-360.  
Contact Hour Distribution: 1-hour lecture and 4-hour lab.  
(RE) Corequisite(s): 360.

400 Research in Chemistry (3)  
Advanced students work with faculty on projects requiring knowledge and skills acquired in chemistry curriculum. Written reports are required. May be followed by either 400 or 408 (but not both).  
Repeatability: May be repeated. Maximum 6 hours.  
Registration Restriction(s): Chemistry major; minimum student level – senior.  
Registration Permission: Consent of department head.

401 Advanced Industry/Laboratory Internship (3)  
Supervised by industry/laboratory technical staff at an approved facility and by a chemistry faculty member serving as liaison between the laboratory and the university. Consists of a full-time "hands-on" individual assignment for entire semester as a member of a theoretical or experimental team. Final comprehensive written report required.  
Recommended Background: Chemistry course numbered 230 or higher.  
Registration Permission: Consent of department head.

405 Topics in the Development of Chemistry (3)  
Historical development of topics such as the atomic theory; chemical industry; interrelationship of population, energy, and food. Subject matter may vary from one offering to another. Assignments include readings from older original literature (Dalton, Faraday, Kekule) and from current journals and monographs. Includes the use and misuse of evidence, the impact of chemistry on society, how scientists reach conclusions, and the nature of scientific controversy. Written reports are required. Writing-emphasis course.

406 Senior Seminar (1)  
Discussions by faculty and students of current research and topics from recent literature. Oral and written reports required. All chemistry majors are encouraged to enroll. (OC)  
Repeatability: May be repeated. Maximum 2 hours.  
Registration Restriction(s): Chemistry major; minimum student level – senior.

408 Honors: Research in Chemistry (3)  
Advanced students work with faculty on research projects requiring knowledge and skills acquired in chemistry curriculum. An honors thesis is written and is defended orally before a faculty committee.  
(RE) Prerequisite(s): 400.  
Registration Permission: Consent of department head.

420 Selected Topics in Chemistry (1-3)  
Topics of current significance in chemistry.  
Repeatability: May be repeated. Maximum 6 hours.  
Credit Restriction: Only 3 credits may be applied to a major or minor in chemistry.  
Registration Permission: Consent of instructor.

430 Advanced Inorganic Chemistry (3)  
Atomic and molecular structure, bonding theories, descriptive chemistry of the elements, kinetics and mechanism of inorganic reactions, applications of modern techniques for characterization, coordination and organometallic chemistry.  
(RE) Prerequisite(s): 230.

439 Advanced Inorganic Chemistry Laboratory (1)  
Modern experimental techniques in inorganic chemistry, including synthesis, analysis, and handling of air-sensitive materials.  
(RE) Corequisite(s): 430.  
Comment(s): Open only to chemistry majors (Bachelor of Science in Chemistry) or with consent of instructor.

450 Advanced Organic Chemistry (3)  
Modern organic reactions of mechanistic, synthetic, and theoretical interest. Content reflects current trends in the area.  
(RE) Prerequisite(s): 360.

471 Biophysical Chemistry (3)  
(See Biochemistry and Cellular and Molecular Biology 471.)

473 Physical Chemistry I (3)  
Properties of gases; first, second and third laws of thermodynamics; chemical equilibria; simple phase equilibria; properties of solutions;  
Credit Restriction: Students may not receive credit for both 471 and 473.  
(RE) Prerequisite(s): 130 or 138.  
(DE) Prerequisite(s): Mathematics 241 or 247; Physics 136 or 139 or 222 or 231.

479 Physical Chemistry Laboratory I (2)  
Experiments on topics discussed in 471 or 473.  
Contact Hour Distribution: 1 lab.  
(RE) Corequisite(s): Biochemistry and Cellular and Molecular Biology 471 or Chemistry 473.

481 Biophysical Chemistry (3)  
(See Biochemistry and Cellular and Molecular Biology 481.)

483 Physical Chemistry II (3)  
Introduction to statistical thermodynamics; kinetics of chemical reactions; introduction to quantum mechanics and applications to electronic structure of atoms and molecules; molecular spectroscopy;  
Credit Restriction: Students may not receive credit for both 481 and 483.  
(RE) Prerequisite(s): 130 or 138.  
(DE) Prerequisite(s): Mathematics 241 or 247 and Physics 136 or 138 or 222 or 231.
489 Physical Chemistry Laboratory II (2) Experiments on topics discussed in 481 or 483.
Contact Hour Distribution: 1 lab.
(RE) Corequisite(s): Biochemistry and Cellular and Molecular Biology 481 or Chemistry 483.

490 Introductory Polymer Chemistry (3) Fundamental principles stressing the role of chemistry in the interdisciplinary field of polymer science. Relation of molecular structure to bulk properties of polymers.
(RE) Prerequisite(s): 360.
(RE) Corequisite(s): Biochemistry and Cellular and Molecular Biology 471 or Chemistry 473.

Child and Family Studies (245)

101 Introduction to Child and Family Studies (2) Orientation to the Child and Family Studies Department, including requirements for the major, introduction to the faculty and their work, exposure to professional organizations, and learning about potential career possibilities. Includes observations.

106 Introduction to ECE (3) History of ECE programs, practices, and policies; overview of children’s development and behavior; introduction of application of developmental theory to curriculum development and classroom methods; summary of current ECE issues and research; introduction of impact of family, schools, and community on children’s learning; readings, observations, colloquy, and exposure to a broad spectrum of ECE professionals.

210 Human Development (3) Conception through adulthood in various social/ecological contexts; interrelationships among various aspects of development: physical, cognitive, emotional, social; normative, non-normative development. (SS)

211 Development in Infancy and Early Childhood (3) Development from conception through early childhood; interrelationships among cognitive, emotional, social, physical aspects of ontogeny; normative, non-normative development. Includes observation.
(RE) Prerequisite(s): 210.

213 Development in Middle Childhood and Adolescence (3) Development during middle childhood and adolescence; interrelationships among cognitive, emotional, social, physical aspects of ontogeny; normative and non-normative development. Includes observation.
(RE) Prerequisite(s): 210.

220 Marriage and Family: Roles and Relationships (3) Emerging, declining roles, changing relationships among family members across life cycle from various theoretical approaches; impact of gender roles on marital relationships, marital quality, power, decision-making, communications, conflict management, combining work-family roles. (Same as Women’s Studies 230.) (SS)

240 Human Sexuality (3) Sexuality through cultural, social, familial, and psychological factors.

312 Families in Middle and Later Adulthood (3) Adult life in society from youth through elderhood; adjustment to internal, environmental changes through adulthood; interrelationships among various aspects of development: physical, cognitive, emotional, social. Includes observation.
(RE) Prerequisite(s): 210.

320 Family Interaction (3) Dynamics of family interactions and influences of diversity, including parent-child relations, development of parenting skills, and intrafamily verbal and nonverbal communication processes, patterns, and problems. Registration Restriction(s): Minimum student level – junior.

345 Family Resource Management (3) Theory and application of managerial functioning in family settings; analysis of goals, resource use, information systems, constraints within families. Observation and analysis of diverse family practices.
Registration Restriction(s): Minimum student level – junior.

350 Early Childhood Education I: Environments for Children (4) Classroom management, behavior guidance, organization of day care environments, communication, interpersonal skills, interaction with children, child stress reduction and management in classroom.
Contact Hour Distribution: Includes laboratory participation.
(RE) Prerequisite(s): 105 and 211.

351 Early Childhood Education II: Curricula and Program Development for Young Children (4) Planning effective early learning programs for young children relating knowledge of children’s growth and development to appropriate experiences in art, music, number, logic, media, physical knowledge; planning, implementing, evaluating curriculum activities.
Contact Hour Distribution: Includes laboratory participation.
(RE) Prerequisite(s): 350.

353 Reading, Language, and Literacy (3) Theory and methods for creating learning environments for the development of language, emergent literacy, and reading and writing skills from infancy through eight years.
(RE) Prerequisite(s): 350.

360 Family Stress (3) Family’s response to stressful circumstances; skills for intervention into family systems; violence, abuse, divorce, illness, death.
Registration Restriction(s): Minimum student level – junior.

385 Diversity Among Children and Families (3) Social class, race, ethnicity, culture, and religion are studied singly and in combination with gender and disabilities as shapers of the life chances and opportunities of individuals, children and families.
Registration Restriction(s): Minimum student level – junior.

395 Introduction to Research Methods and Statistics (3) Basic research methods and statistics for child/human development, family studies, early childhood education, and related fields; sampling, measurement, design, data analysis; quantitative and qualitative methods; natural and contrived settings; principles for understanding research that impact children and families.
(RE) Prerequisite(s): 210 and 220.

405 Development of Professional Skills (3) Development of interpersonal and other professional skills along with ethical guidelines needed for working with children, families, and other professionals from diverse backgrounds. (OC) (WC)
(RE) Prerequisite(s): 210 and 220.
Registration Restriction(s): Child and family studies major; minimum student level – junior.

(RE) Prerequisite(s): 351 and 470.
Registration Restriction(s): Qualification – admission to teacher education.

423 Pre-K Teaching Methods (6) The knowledge, skills and dispositions needed to become an inquiry-based, reflective practitioner who is a teacher of young children (birth through five years of age), in pre-kindergarten and kindergarten classrooms; involves lecture and field placement components.
(RE) Prerequisite(s): 350.
Registration Restriction(s): Qualification – admission to teacher education.

440 Family Life and Parent Education (3) Emphasis on skills required to develop family life education programs implemented in community settings. Overview of current approaches to the process of parenting and parent education programs.
(RE) Prerequisite(s): 320.
Registration Restriction(s): Child and family studies major.

460 Directed Study in Child and Family Studies (1-3) Individual learning experience arranged for students under supervision of faculty.
Registration Restriction(s): Child and family studies major.

470 Practicum: Pre-K Teaching (6-12) Responsibility for planning and guiding groups of infants, toddlers, or preschoolers under supervision of a classroom teacher and coordinator. Includes weekly seminar.
Grading Restriction: Satisfactory/No Credit grading only.
(RE) Prerequisite(s): 351 and 405.
Comment(s): Fall and spring practicum placements begin on first day of registration and end on the last day of the final examination period. The practicum follows the ELC calendar and does not include fall or spring breaks. Summer practicum begins the day following spring commencement and ends on the last day of summer term. Priority for summer practicum is given to students who have completed all other program requirements, except practicum, prior to the summer session.

471 Practicum: Child Development (3-12) Supervised experiences working with children and families in early childhood settings.
Grading Restriction: Satisfactory/No Credit Grading only.
Registration Restriction(s): Child and family studies major.

472 Practicum: Student Teaching PreK-K (12) Field placement in Pre-K-K classroom settings with responsibility for curriculum planning and the supervision, assessment, and teaching of young children. Includes weekly seminar. This course is only for students in the Pre-K-K Teacher Licensure program and is designed to meet Pre-K-K licensure requirements.
Grading Restriction: Satisfactory/No Credit grading only.
(RE) Prerequisite(s): 405 and 423.
Comment(s): Fall placements are based on public school calendars and the beginning date will vary. Spring placements begin on the first day of registration. All placements end on the last day of the final examination period (Placements follow the school calendar, not the UT calendar and they do not include UT fall or spring breaks).
Carnegie Mellon University-Campus

COURSES OF INSTRUCTION 213

480 Practicum: Community Placement (9-12) Supervised experiences with an area agency serving the needs of children and families.
Grading Restriction: Satisfactory/No Credit grading only.
(RE) Prerequisite(s): 405.
Comment(s): Summer practicum placement begins the Monday after spring commencement and concludes the last day of the summer session.
Registration Restriction(s): Minimum student level – senior.

481 Research in Child and Family Studies (3-6)
(RE) Prerequisite(s): 395.
Recommended Background: 9 hours in child and family studies.
Registration Restriction(s): 3.0 GPA.
Registration Permission: Consent of instructor.

485 Special Topics in Child and Family Studies (1-9) Personal or professional interest in human development or family studies.
Repeatability: May be repeated. Maximum 9 hours.
Recommended Background: 9 hours in child and family studies.
Registration Restriction(s): Minimum student level – junior.
Registration Permission: Consent of instructor.

490 Practicum: Research (3-12) A supervised research experience with emphasis on the identification and examination of key aspects of research methods: constructs, research questions and hypotheses, research design, measurement, and analysis.
Grading Restriction: Satisfactory/No Credit grading only.
Recommended Background: 15 hours in child and family studies.
Registration Restriction(s): 3.25 GPA; minimum student level – junior.
Registration Permission: Consent of instructor.

497 Honors: Child and Family Studies (3-6) Issues or topics affecting children and/or families, designed to meet particular interests of the student.
Repeatability: May be repeated. Maximum 12 hours.
(RE) Prerequisite(s): 395 and 405.

498 Honors: Child and Family Studies (1-9) Personal or professional interest in human development or family studies.
Repeatability: May be repeated. Maximum 9 hours.
Recommended Background: 9 hours in child and family studies.
Registration Restriction(s): Minimum student level – junior.
Registration Permission: Consent of instructor.

Chinese (249)
131 Elementary Chinese I (5) (See Asian Languages 131.)

132 Elementary Chinese II (5) (See Asian Languages 132.)

231 Intermediate Chinese I (5) (See Asian Languages 231.) (CC)

232 Intermediate Chinese II (5) (See Asian Languages 232.) (CC)

311 Chinese Literature in English Translation (3) (See Asian Languages 311.)

312 Chinese Literature in English Translation (3) (See Asian Languages 312.)

331 Advanced Chinese I (4) (See Asian Languages 331.)

332 Advanced Chinese II (4) (See Asian Languages 332.)

431 Readings in Chinese Literature (3) (See Asian Languages 431.)

Cinema Studies (251)
235 Introduction to Cinematography as Art (3) (See Art Media Arts 235.)

236 Introduction to Video Art (3) (See Art Media Arts 236.)

281 Introduction to Film Studies (3) (See English 281.)

312 Popular Culture and American Politics (3) (See Political Science 312.)

315 Asian Film (3) (See Asian Languages 315.)

316 Luso-Brazilian Cinema and Literature (3) (See Portuguese 316.)

323 German Film (3) (See German 323.)

325 Russian Film (3) (See Russian 325.)

334 Film and American Culture (3) (See English 334.)

400 Special Topics (3)
Repeatability: May be repeated. Maximum 6 hours.

420 French Cinema (3) (See French 420.)

421 Topics in Italian Literature and Cinema (3) (See Italian 421.)

433 History of Film and Modern Art (3) (See Art Media Arts 433.)

434 Hispanic Culture Through Film (3) (See Spanish 434.)

435 Cinematography as Art (3) (See Art Media Arts 435.)

436 Video Art (3) (See Art Media Arts 436.)

465 Latin American Film and Culture (3) (See Spanish 465.)

469 Sexuality and Cinema (3) (See Women's Studies 469.)

482 Special Topics in Global Cinema (3) (See Modern Foreign Languages and Literatures 482.)

489 Special Topics in Film (3) (See English 489.)

491 Foreign Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.

492 Off-Campus Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.

493 Independent Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.

Civil Engineering (254)
205 Professional Development I (2) Introduction to civil engineering specialties, history, and achievements; Professional responsibility, communication, and organizations.
(OC) (WC) (RE) Prerequisite(s): Engineering Fundamentals 151 or 157.
Registration Restriction(s): Minimum student level – sophomore.

210 Geometrics (4) Introduction to the measurement, representation, analysis, management, retrieval and display of spatial data concerning both the earth’s physical features and the built environment. Covers land and construction surveying, controls, error analysis, use of CADD and an introduction to global positioning systems (GPS) and geographical information systems (GIS) used in civil engineering.
Contact Hour Distribution: 3 hours and 1 lab.
Registration Restriction(s): Minimum student level – sophomore.

261 Structural Analysis I (3) Reactions; shear and moment diagrams; forces in trusses; uniaxial stress and strain; area moments of inertia; torsion.
(RE) Prerequisite(s): Engineering Fundamentals 202.

305 Professional Development II (1) Legal and ethical responsibilities, continuous improvement, career planning, and leadership.
(RE) Prerequisite(s): 205.

309 Applied Professional Responsibility (1) Introduction to the American Society of Civil Engineers (ASCE), the primary civil engineering professional society, and interaction with the local branch and state section of the ASCE. This class provides a framework for the participation in professional practice activities, service to the community, and educational outreach. These activities may be coordinated through the Student Chapter of ASCE, through the department, through the college, or through other approved groups. May include participation in the annual ASCE Regional Student Chapter Conference.
Repeatability: May be repeated. Maximum 3 hours.
Credit Restriction: May not be used as credit toward graduation.
Registration Restriction(s): Majors in the College of Engineering; minimum student level – sophomore.

Contact Hour Distribution: 2 lectures and 1 lab.
(RE) Prerequisite(s): 205 and 261.

330 Introduction to Soil Behavior (4) Physical and mechanical properties of soils, theory of compaction, seepage, and effective stress. Consolidation theory, time rate and settlement, shear strength of sands and clays, and analysis of homogeneous slopes.
Contact Hour Distribution: 3 hours and 1 lab.
(RE) Prerequisite(s): 321.
(RE) Corequisite(s): 361.

351 Transportation Engineering I (3) Transportation problems and perspectives, rural and urban; use of systematic planning processes; development of alternatives and the evaluation of civil engineering projects. Civil engineering decision-making and applications of economic analysis. Design of transportation terminals, airports, parking, etc.
(RE) Prerequisite(s): 210.

352 Transportation Engineering II (3) Introduction to design, construction, maintenance, and operation of various transportation modes, their guideways and terminals, primarily highways and railroads.
(RE) Prerequisite(s): 210.

361 Structural Analysis II (3) Stress and strain in beams and columns; Mohr’s circle; influence lines; deflections and beams and trusses; analysis of indeterminate structures; moment distribution.
(RE) Prerequisite(s): 261.

380 Water and Waste Treatment (3) Principles of unit operations employed in physical, chemical, and biological treatment of water, wastewater, and solid wastes.
(RE) Prerequisite(s): Chemistry 130 and Engineering Fundamentals 152.

390 Hydraulics (4) Basic laws and properties of incompressible fluids. Units and dimensional analysis; drag forces; continuity, energy, and momentum equations; pipe flow; flow measurement; open channel flow and culverts; pump characteristics.
Contact Hour Distribution: 3 hours and 1 lab.
(RE) Prerequisite(s): Engineering Fundamentals 152 and Mathematics 231.
(DE) Prerequisite(s): Civil Engineering 205 or Biosystems Engineering 243.
490 Water Resources Engineering (3) Application of hydrologic/hydraulic principles for development of water resource project design and management of water resources; assessment of environmental impacts to surface water and groundwater; regulatory framework for water supply and water quality. (RE) Prerequisite(s): 395 or Biosystems Engineering 416.

Classics (257)

111 Beginning Latin (4) Credit Restriction: Not available to students eligible for 150.

112 Beginning Latin (4) Credit Restriction: Not available to students eligible for 150. (RE) Prerequisite(s): 111.

121 Beginning Greek (4) (RE) Prerequisite(s): 122.

122 Beginning Greek (4) (RE) Prerequisite(s): 122.

150 Latin Transition (4) Designed to prepare students for enrollment in 251. Credit Restriction: Since 150 is a review of elementary Latin, students who receive credit in this course may not also receive credit for any other 100-level Latin course and, therefore, also forfeit the 6 hours of elementary language credit awarded through placement examination. Comment(s): Placement exam required.

201 Introduction to Classical Civilization (3) Introductory survey of civilization of ancient Greece and Rome. Includes aspects of history, literature, art and archaeology, philosophy and religion. Writing-emphasis course. (CC)

221 Early Greek Mythology (3) Archaic Greek religion through comprehensive study of Greek myths with emphasis on how they reflect the early Greek vision of the universe and humanity’s place in it. Origins and development of Greek myths and the rise of organized religion, from Bronze Age to about 450 BC. Readings include Hesiod and Aesop’s Fables. Writing-emphasis course. (AH)

222 Classical Greek and Roman Mythology (3) Use of myth in literature, history, religion and philosophy of Greece and Rome from about 450 BC to about 350 AD. Two foci are the latter half of the 5th century BC and the last quarter of the 1st century BC. Includes oriental intrusions into Greece and Rome, including early Christianity. Readings include Sophocles, Euripides, Homer, Roman poetry, and modern scholarship. Writing-emphasis course. (AH)

232 Archaeology and Art of Ancient Greece and Rome (3) Survey from the earliest human presence in the Mediterranean to the end of the Roman Empire (c. 200,000 BC–AD 476). For prehistoric times emphasis on material remains and anthropological theory used to recreate the cultures of the Minoans, Mycenaeans, Dark Age Greeks, and Etruscans. Focus on the historical Greek and Roman periods emphasis on developments in architecture, sculpture, vase painting, wall painting, mosaics, and minor arts. Relationship of art to society. Writing-emphasis course. (AH)

251 Intermediate Latin: Grammar Review and Readings (3) (CC) (DE) Prerequisite(s): 112 or 150 or placement exam.

252 Intermediate Latin: Vergil’s Aeneid (3) (CC) (RE) Prerequisite(s): 251.

253 Greek and Roman Literature in English Translation (3) Major literature of ancient Greece from Homer to Tacitus. Writing-emphasis course. (AH)

261 Intermediate Greek: Grammar Review and Readings (3) Systematic review of Attic Greek and readings from selected authors. (CC) (RE) Prerequisite(s): 122.

264 Intermediate Readings in Greek (3) Content varies. (CC) (RE) Prerequisite(s): 261.

273 Medical and Scientific Terminology (3) Greek and Latin roots from which medical and scientific terminology is derived. Extensive practice in analysis of terms. Practice in use of Latin nomenclature.

301 History of Early Greece (3) Greek history from the earliest human occupation of Greece to the Greek recovery after the Persian Wars, with an emphasis on the 8th-6th centuries BCE. Readings and discussion to include: Bronze Age Greece and Crete; economy and society in the early Iron Age; the emergence and evolution of the Greek city-state; social tensions and the development of classical democracy; ideologies of militarism, empire, and civil strife. Writing-emphasis course. (Same as History 301.)

302 History of Classical and Hellenistic Greece (3) Greek history from the Persian Wars to the Achaean War, with an emphasis on the 5th-4th centuries BCE. Readings and discussion to include: Classical Athens and Sparta; the Peloponnesian War; crises of the Greek city-states; the rise of Macedonia; Alexander the Great and the expansion of the Greek world; monarchism; the arrival of Rome in the eastern Mediterranean. Writing-emphasis course. (Same as History 302.)
303 History of the Roman Republic (3) (See History 303.)
304 History of the Roman Empire (3) (See History 304.)
305 History of the Late Roman Empire (3) (See History 305.)
351 Cicero and Sallust (3)
(Re) Prerequisite(s): 252.
352 Roman Lyric Poetry (3) Poetry of Catullus, Horace, and the elegists.
(Re) Prerequisite(s): 351.
362 Roman Law (3) This course covers the historical development of Roman law in the Classical period (50 BC-250 AD) with particular attention to the analysis of case-law in the areas of contract, property, or delict. (Same as Legal Studies 362.)
381 Greek Civilization (3) Major aspects of ancient Greek civilization: religion, fine arts, political life, pan-Mediterranean relations, the prominence of Athens; the role of modern archaeology in interpretation; emphasis on the 6th and 5th centuries BC. Writing-emphasis course.
382 Roman Civilization (3) Major aspects of ancient Roman civilization: political institutions, art and architecture, history, culture and daily life, emphasizing the late Republic and early Empire. Writing-emphasis course.
383 Women in the Greek and Roman World (3) The condition of women in the apparently male-dominated world of Classical Greece and Classical Rome. Evidence from literature, vase paintings, and other arts is examined from the age of Homer to the 2nd century AD with emphasis on Athens in the 5th century BC and Roman Italy in the 1st and 2nd centuries AD. Writing-emphasis course. (Same as Women's Studies 383.)
401 Greek Poetry (3) Epic, lyric, drama. Authors vary.
(Re) Prerequisite(s): 261.
402 Greek Prose (3) History, philosophy, and oratory. Authors vary.
(Re) Prerequisite(s): 261.
405 Selected Readings from Greek Literature (3) For advanced students in Greek. The study of plays, the historical writings, the poetry of ancient Greece in the original Greek. Repeatability: May be repeated. Maximum 9 hours.
(Re) Prerequisite(s): 261.
406 Selected Readings from Greek Literature (3) For advanced students in Greek. The study of plays, the historical writings, the poetry of ancient Greece in the original Greek. Repeatability: May be repeated. Maximum 9 hours.
414 Cicero and Techniques of Latin Prose Composition (3) For advanced students in Latin. Practice in prose composition, the writings of Cicero the model.
(Re) Prerequisite(s): 351 or 352.
431 Selected Readings from Latin Literature (3) For advanced students in Latin. Oratory, historical writings, and poetry of ancient Rome in the original Latin. Repeatability: May be repeated. Maximum 9 hours.
(Re) Prerequisite(s): 351 or 352.
432 Selected Readings from Latin Literature (3) For advanced students in Latin. Oratory, historical writings and poetry of ancient Rome in the original Latin. Repeatability: May be repeated. Maximum 9 hours.
(Re) Prerequisite(s): 351 or 352.
435 Medieval Latin (3) Selected readings from the Latin prose and poetry of medieval Europe.
(Re) Prerequisite(s): 351 or 352.
436 Cities and Sanctuaries of the Greek and Roman World (3) Major cities and sanctuaries in Greece, the Greek colonies, and the Roman Empire. Approach is archaeological, focusing on physical evidence — landscapes, architecture and artifacts — as well as description of ancient authors. Cities include various types — planned and unplanned, seaports, caravan centers, government and commercial centers. The sanctuaries also vary in function including prophetic centers, athletic centers, theater centers, and healing centers. Writing-emphasis course. (Same as Anthropology 436.)
441 Special Topics in Classical Civilization (3) Topics in art, literature, religion, and society of Greece and Rome. Repeatability: May be repeated. Maximum 9 hours.
442 Intensive Survey of the Archaeology of the Prehistoric Aegean (3) Survey of archaeology and art of the Aegean from the earliest humans to the rise of the Greek polis in the 8th century BC. Highlights include early Cycladic art, Minoan and Mycenaean complex societies. Thera, cultural interconnections with Egypt and the Near East, and the Trojan War. Emphasis on anthropological and modern art-historical approaches. Writing-emphasis course. (Same as Anthropology 442.)
443 Intensive Survey of the Archaeology of Greece (3) Survey of the archaeology and art of Greece and the Greek-speaking areas from the Orientalizing through Hellenistic periods (c. 700–30 BC). Developments in architecture, sculpture, and vase painting seen in the context of changes in society. Archaeological evidence for daily life, economy, and political institutions. Writing-emphasis course. (Same as Anthropology 443.)
444 Intensive Survey of the Archaeology of Etruria and Rome (3) Survey of the archaeology of Italy and the Roman World from prehistoric times to the fall of the Roman Empire (1000 BC–AD 476). Highlights are the rise and decline of Etruscan culture, the development of Roman architecture, art, and urban planning, art and architecture used for political propaganda, and Roman cosmopolitan culture during the Empire. Writing-emphasis course. (Same as Anthropology 444.)
491 Foreign Study (1-15) Repeatability: May be repeated. Maximum 15 hours.
492 Off-Campus Study (1-15) Repeatability: May be repeated. Maximum 15 hours.
493 Independent Study (1-15) Repeatability: May be repeated. Maximum 15 hours.

College Scholars Honors (509)
317 College Scholars Seminar (1 Sequence) (317 and 318) is required of all College Scholars each year and may be taken in any order.
Grading Restriction: Satisfactory/No Credit grading only.
Registration Restriction(s): College scholars major.
318 College Scholars Seminar (1 Sequence) (317 and 318) is required of all College Scholars each year and may be taken in any order.
Grading Restriction: Satisfactory/No Credit grading only.
Registration Restriction(s): College scholars major.
491 College Honors: Foreign Study (1-15) Repeatability: May be repeated. Maximum 15 hours.
Registration Restriction(s): College scholars major.
492 College Honors: Off-Campus Study (1-15) Repeatability: May be repeated. Maximum 15 hours.
Registration Restriction(s): College scholars major.
493 College Honors: Independent Study (1-15) Repeatability: May be repeated. Maximum 15 hours.
Registration Restriction(s): College scholars major.
498 Honors: College Scholars Studies (2-12) Designed for College Scholars working on senior thesis, project, or performance.
Registration Restriction(s): College scholars major.

Communication and Information (248)
150 Communication in an Information Age (3) Overview of human, mass, and mediated communication. Introduction to finding, organizing, and evaluating information.

Communication Studies (250)
201 Introduction to Communication Studies (3) Fundamental theories and practices with particular reference to interpersonal, group, organizational, and public communication.
(Re) Prerequisite(s): Communication and Information 150.
207 Honors: Introduction to Communication Studies (3) Analysis and exploration of the fundamental theories and practices in communication studies.
(Re) Prerequisite(s): Communication and Information 150.
210 Public Speaking (3) Preparation and delivery of informative and persuasive speeches. Topics include research, organization, adapting to an audience, topic selection, reasoning, and evaluating the discourse of others. (OC)
220 Interpersonal Communication (3) Process by which thoughts, feelings, and actions affect and are affected by the face-to-face communication situation.
240 Business and Professional Communication (3) Basic principles of communication within organizations. Topics and activities may include organizational/communication theory, group problem solving, case studies, interviewng, and formal presentations. (OC)
250 Advanced Public Speaking (3) Theory and practice of informative and persuasive speaking.
(Re) Prerequisite(s): 210 or 240.
260 Communication and Society (3) Study of communication strategies and public opinion, with emphasis on communication media; posters, film, songs, demonstrations, drama, and public address.

270 Argumentation and Debate (3) Reasoned decision-making with emphasis on analysis, evidence, reasoning, constructing and refuting arguments.

271 Intercollegiate Forensics (1) For students actively participating in intercollegiate debate. 
Repeatable: May be repeated. Maximum 4 hours.

272 Intercollegiate Forensics (1) For students actively participating in intercollegiate debate.
Repeatable: May be repeated. Maximum 4 hours.

300 Nonverbal Communication (3) Exploration of nonverbal communication from human communication perspective; origins and research, usage and coding of nonverbal behavior, research strategies, and theoretical approaches.

310 Persuasion (3) Methods which contribute to effective and ineffective persuasion. Topics include credibility, message construction, and receiver variables.

320 Interpersonal Communication Processes (3) Social dimensions of interpersonal communication and relationships.

330 Group Communication (3) Small group decision-making; evidence, argumentation, leadership, roles, and norms as they affect critical thinking in groups.

340 Research Methods in Communication Studies (3) Survey of contemporary methods used for research in communication studies. Emphasis on interpreting and evaluating communication research reports. 
(RE) Prerequisite(s): 201 or 207. 
(NE) Corequisite(s): Mathematics 115 or Statistics 201.

350 Communication Theory (3) Analysis and critique of fundamental theories with particular reference to interpersonal, group, organizational, and public communication.

(NE) Prerequisite(s): 201 or 207. 
(NE) Prerequisite(s): 340.

371 Intercollegiate Forensics (1) For students actively participating in intercollegiate debate.
Repeatable: May be repeated. Maximum 4 hours.

372 Intercollegiate Forensics (1) For students actively participating in intercollegiate debate.
Repeatable: May be repeated. Maximum 4 hours.

397 Honors Seminar (1) 
Comment(s): Required of students enrolled in the Honors program.

400 Topics in Communication Studies (3) 
Repeatable: May be repeated. Maximum 6 hours. 
Comment(s): Topics, scope of subject matter, and prerequisites to be determined by department.

407 Honors Seminar (3) In-depth survey of communication research topics. Topics rotate among health, interpersonal, organizational, and public communication.
Repeatable: May be repeated. Maximum 12 hours.

420 Communication and Conflict (3) Communication as a significant factor in the development, management, and resolution of conflict at the interpersonal, small group, organizational, or societal levels.

425 Interpersonal Health Communication (3) Interpersonal communication in health care settings. Topics include provider-client interactions, social support groups, stigma and disease, and contemporary models explaining the use of health-related information.

430 Family Communication (3) Dynamics of interactions within family systems, marriage, and parent-child relationships. Study of verbal and nonverbal communication processes, patterns, and problems.

440 Organizational Communication (3) Organizational setting and those variables of the communication process that affect the quality of human interaction both within and outside the organization.

445 Internship (1-3) Supervised career-related experiences using communication studies theories and techniques in government and for profit or nonprofit organizations, culminating in a written and oral report. 
Grading Restriction: Satisfactory/No Credit grading only.
Repeatable: May be repeated. Maximum 6 hours.
Registration Restriction(s): Communication studies major; 3.0 GPA; minimum student level – junior.

450 Propaganda (3) Study of political, commercial, and social propaganda in the United States, World War I to present. Writing-emphasis course.

455 Political Persuasion (3) Study of the communication processes utilized by political candidates, office holders, and social movement organizers.

466 Rhetoric of the Women’s Rights Movement to 1930 (3) Historical and critical study of public address in the campaign for women’s rights in the United States from the 1830s to the 1920s. Writing-emphasis course. 
(Same as Women’s Studies 466.)

469 Freedom of Speech (3) Historical and philosophical perspectives on freedom of expression; legal issues in free speech controversies in the U.S. Writing-emphasis course. 
(Same as American Studies 469; Legal Studies 469.)

476 Rhetoric of the Contemporary Feminist Movement (3) Historical and critical study of rhetoric in the campaign for women’s rights in the United States from the 1940s to present. Writing-emphasis course. 
(Same as Women’s Studies 476.)

491 Foreign Study (1-6) Participation in school-sponsored study-abroad program. Application forms and proposal deadlines available in school office.
Repeatable: May be repeated. Maximum 6 hours. 
Credit Restriction: Maximum of 3 hours may be applied to the major.
Registration Restriction(s): 2.75 GPA; minimum student level – junior.

492 Off-Campus Study (1-15) 
Repeatable: May be repeated. Maximum 15 hours.
Registration Restriction(s): 3.0 GPA; minimum student level – junior.

493 Independent Study (1-6) Selected readings/research in an area of communication studies to be determined by the student in consultation with supervising faculty member and, ordinarily, in an area of study not covered by school curriculum. Application forms and proposal deadlines available in school office.
Repeatable: May be repeated. Maximum 6 hours. 
Credit Restriction: Maximum of 3 hours may be applied to the major.
Registration Restriction(s): 3.0 GPA; minimum student level – junior.

497 Senior Honors Thesis (3) Required of students enrolled in the Honors program.

498 Senior Honors Thesis (3) Required of students enrolled in the Honors program.

499 Proseminar in Communication Studies (3) Major theoretical perspectives in communication studies, their interrelationships and applications; consideration of the significance and ethical implications of communication studies in modern society.

(NE) Prerequisite(s): 201 or 207. 
(NE) Prerequisite(s): 340 and 350. 
Recommended Background: 12 or more hours of communication studies courses. 
Registration Restriction(s): Minimum student level – senior.

Comparative and Experimental Medicine – Graduate School of Medicine (262)

411 Undergraduate Research Participation (1-3) Experience in active biomedical research projects under supervision of faculty. Students in pre-medicine and other biology majors may conduct research projects within designated areas.
Grading Restriction: Satisfactory/No Credit grading only. 
Repeatable: May be repeated with consent. Maximum 9 hours.

Comparative Literature (260)

202 Cross-Cultural Perspectives in World Literature (3) Literary perspectives and values in different time periods and cultures approached from an international context and including an introduction to the theory, methods, and objectives of comparative literature. Variable content. Writing-emphasis course.

401 Special Topics in Comparative Literature (3) 
Repeatable: May be repeated. Maximum 9 hours.

402 Special Topics in Comparative Literature (3) Content varies. 
Repeatable: May be repeated. Maximum 9 hours.

452 Modern Drama, 1880-1945 (3) (See English 452.)

454 Twentieth-Century International Novel (3) (See English 454.)

491 Foreign Study (1-6) 
Repeatable: May be repeated. Maximum 6 hours.

492 Off-Campus Study (1-6) 
Repeatable: May be repeated. Maximum 6 hours.

493 Independent Study (1-6) 
Repeatable: May be repeated. Maximum 6 hours.
Computer Science (266)

100 Introduction to Computers and Computing (3) Basic concepts of computer hardware and software. Microcomputer systems and workstations. Networking and the Internet. The interdisciplinary science of computing. (QR)

Contact Hour Distribution: 2-hour lab required.
Credit Restriction: May not be applied toward the computer science major or minor.

102 Introduction to Computer Science (4) Problem solving and algorithm development. Organization and characteristics of modern digital computers with emphasis on developing good programming habits, building abstractions with procedures and data, and programming in a modern computer language. (QR)

Credit Restriction: Students who have received credit for 140 or 160 may not receive credit for 102 without consent of instructor.

140 Data Structures (4) Advanced problem solving and algorithm development, structured programming, data structures and applications, I/O techniques, lists, queues, trees, algorithms, files.

Contact Hour Distribution: 3-hour lab required.
(Re) Prerequisite(s): 102.

160 Computer Organization (4) Number systems, Boolean algebra, combinational and sequential circuits, registers, processor functional units and control, pipelining, memory and caching, stored program computing, memory management, computer system organization, assembly language programming.

Contact Hour Distribution: 3-hour lab required.
(Re) Prerequisite(s): 102.

291 Lower-Division Special Topics (1-3) Topics vary. Programming languages, operating systems and application software packages. Repeatability: May be repeated. Maximum 9 hours.

300 Scripts and Utilities (1) Practical tools available under Unix to enable students to become more efficient in performing labs and research projects. Topics to be covered include: sh, cat, grep, find, sort, at, ed, sed, awk, perl, python, make, rcs, jgraph, gcc/cpp/purify/quantify.

Grading Restriction: Satisfactory/No Credit grading only.
(Re) Prerequisite(s): 140.

302 Fundamental Algorithms (3) Design, analysis, and implementation of fundamental algorithms, such as sorting and searching, and their data structures.

Contact Hour Distribution: 3-hour lab required.
(Re) Prerequisite(s): 140 and 160.

311 Discrete Structures (3) Equivalence relations, partial orderings. Combinations, permutations, analysis of algorithms. Finite automata and regular languages.

(Re) Prerequisite(s): 140 and Mathematics 300.
(De) Prerequisite(s): 160.

340 Foundations of Software Engineering (3) Principles of analysis and design of information systems. Principles of program design and verification, formal objects, formal specifications.

Contact Hour Distribution: 3-hour lab required.
(Re) Prerequisite(s): 311.

350 Introduction to Technical Computing (3) For students in the sciences, engineering, or mathematics. Basic ideas of algorithm design and data structures using a high-level technical language in an interactive environment. Topics may include data analysis, plotting and visualization, and numerical computation.

Contact Hour Distribution: 2-hour lab required.
Credit Restriction: Does not fulfill any requirements for the computer science major.
(Re) Prerequisite(s): Mathematics 142.

360 Systems Programming (3) Introduction to user-level systems programming, file control, process control, memory management, system utilities, network programming.

Contact Hour Distribution: 3-hour lab required.
(Re) Prerequisite(s): 302.

365 Programming Languages and Systems (3) Language paradigms (procedural, functional, object-oriented, logic); language design and implementation issues and language issues related to parallelism.

(Re) Prerequisite(s): 302.
Registration Restriction(s): Computer science major.

370 Introduction to Scientific Computing (3) The design, analysis, and implementation of numerical algorithms for solving problems in science and engineering. Emphasis on program design, including data structures, computational complexity, scientific computing environments, and high-performance software packages.

Contact Hour Distribution: 3-hour lab required.
Credit Restriction: Students may not receive credit for both Computer Science 370 and Mathematics 371.
(Re) Prerequisite(s): 140 and Mathematics 251.
(De) Prerequisite(s): 160.

380 Theory of Computation (3) Countability and diagonalization. Finite automata and regular sets. Push-down automata and context-free languages. Introduction to Turing machines and undecidability.

(Re) Prerequisite(s): 311.


Registration Restriction(s): Minimum student level – senior.

420 Advanced Topics in Machine Intelligence (3) Topics such as search, learning, expert systems, neural networks, pattern recognition and natural language processing. Emphasis on faculty research.
Repeatability: May be repeated. Maximum 9 hours.
Recommended Background: Completion of core courses.

430 Advanced Topics in Hardware Systems (3) Topics such as architecture, parallel processors, microprogramming, networks and communications. Emphasis on faculty research.
Repeatability: May be repeated. Maximum 9 hours.
Recommended Background: Completion of core courses.

460 Advanced Topics in Software Systems (3) Topics such as operating systems, compilers, parallel computation, software engineering, database systems and programming languages. Emphasis on faculty research.
Repeatability: May be repeated. Maximum 9 hours.
Recommended Background: Completion of core courses.

470 Advanced Topics in Scientific Computation (3) Topics such as numerical methods, supercomputers and computer modeling and simulation of physical systems. Emphasis on faculty research.
Repeatability: May be repeated. Maximum 9 hours.
Recommended Background: Completion of core courses.

471 Numerical Analysis (3) (See Mathematics 471.)

472 Numerical Algebra (3) (See Mathematics 472.)

480 Advanced Topics in Theoretical Computer Science (3) Topics such as theory of computation, complexity theory, formal languages and graph theory and its applications. Emphasis on faculty research.
Repeatability: May be repeated. Maximum 9 hours.
Recommended Background: Completion of core courses.

493 Independent Study (1-15) Special project in area of student’s primary interest. Directed by Computer Science faculty, perhaps jointly with student’s faculty advisor. Intended for students with a specific project to pursue in conjunction with a faculty member. Project may be from a department other than Computer Science, in which case a faculty member from the appropriate department will help oversee the project. Repeatability: May be repeated. Maximum 15 hours.
Credit Restriction: Maximum of 6 hours may be applied to the major.
Registration Permission: Consent of instructor.

494 Special Topics in Computer Science (1-3) Repeatability: May be repeated. Maximum 9 hours.

Counselor Education (255)

205 Student Development (1-3) Practice in acquiring knowledge and skill in areas such as interpersonal relations, career decision-making, communication and self-awareness. Individual and small-group format.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 6 hours.

206 Facilitation of Technical Work Teams (3) Psychological and cultural dynamics of technical work team performance. Supervised experience in leading work teams.
Grading Restriction: Letter grade only.
Registration Restriction(s): Students in the College of Engineering; minimum student level – sophomore.

212 Career and Personal Development (3) Systematic approaches to facilitating career development and life planning.

215 Learning Skills and Study Systems (3) Approaches to enhancing academic performance through study skills, efficient reading and understanding of personal factors.

Grading Restriction: Letter grade only.
Registration Restriction(s): Students in the College of Engineering; minimum student level – sophomore.

404 Special Topics (1-3) Instructor initiated course offered at convenience of the department on various topics of current interest.
Repeatability: May be repeated. Maximum 15 hours.
406 Engineering Communication and Performance Field Work (3)
Capstone experience for the engineering communication and performance minor.
Grading Restriction: Satisfactory/No Credit grading only.
(RE) Prerequisite(s): 306.

410 Sex Role Development: Implications for Education and Counseling (3)
Theories and research concerning the development of sexual role and its relevance in educational and counseling settings.
(Same as Women’s Studies 410.)

431 Personality and Mental Health (3)
Perspectives of mental health with applications to education and other social institutions.
(Same as Educational Psychology 431.)

480 Interviewing and Counseling Techniques (3)
An introduction to basic helping skills necessary to the preparation of counselors, teachers, and others involved in human service delivery.

493 Independent Study (1-5)
Independent investigation of problems in educational and counseling psychology.
Repeatability: May be repeated. Maximum 15 hours.

Cultural Studies in Education (271)

400 Professional Studies: Teachers, School, and Society (2)
Focus on roles and responsibilities of teachers, on how schools are organized and the relationship between the schools and the broader society.

Dance (274)

101 Practicum: Dance Production (1)
Supervised technical and promotional production aspects of university dance company.
Repeatability: May be repeated. Maximum 2 hours.

201 Practicum: Dance Performance (1-2)
Preparation and presentation of university dance company performances.
Repeatability: May be repeated. Maximum 16 hours.
Comment(s): Audition required.

210 Ballet: Level I (2)
Instruction and practice in elementary classical ballet techniques.
Repeatability: May be repeated. Maximum 4 hours.

220 Jazz: Level I (2)
Instruction and practice in elementary jazz dance styles and techniques.
Repeatability: May be repeated. Maximum 4 hours.

230 Modern: Level I (2)
Instruction and practice in elementary modern dance techniques.
Repeatability: May be repeated. Maximum 4 hours.

240 Tap: Level I (2)
Instruction and practice in elementary tap dance techniques.
Repeatability: May be repeated. Maximum 4 hours.

310 Ballet: Level II (2)
Instruction and practice in intermediate classical ballet techniques.
Repeatability: May be repeated. Maximum 12 hours.

320 Jazz: Level II (2)
Instruction and practice in intermediate jazz dance styles and techniques.
Repeatability: May be repeated. Maximum 12 hours.

330 Modern: Level II (2)
Instruction and practice in intermediate modern dance styles and techniques.
Repeatability: May be repeated. Maximum 12 hours.

340 Tap: Level II (2)
Instruction and practice in intermediate tap dance techniques.
Repeatability: May be repeated. Maximum 12 hours.

380 Special Topics (1-3)
Selected disciplinary or professional areas of dance.
Repeatability: May be repeated.

410 Ballet: Level III (2)
Instruction and practice in advanced classical ballet techniques.
Repeatability: May be repeated. Maximum 16 hours.

415 Teaching Creative Dance for Children (2)
Theory, methods, materials and practical experience in the presentation and integration of creative dance in grades K-6. A mini-teaching experience is involved in this class.

420 Jazz: Level III (2)
Instruction and practice in advanced jazz and musical theater dance styles and techniques.
Repeatability: May be repeated. Maximum 16 hours.

430 Modern: Level III (2)
Instruction and practice in advanced modern dance techniques.
Repeatability: May be repeated. Maximum 16 hours.

440 Composition I (2)
Choreographic skills emphasizing the basic techniques and concepts of dance composition. This course focuses on the choreography of solos and duets.
Recommended Background: Minimum of 4 hours of 310, 320, 330, 340, 410, 420, 430.

445 Composition II (2)
Choreographic skills emphasizing the advanced techniques and concepts of dance composition. This course will focus on the choreography of group works and the technical aspects of production.
(Re) Prerequisite(s): 440.

480 Dance History through the 19th Century (3)
Survey of the dance of various societies and cultures from pre-history through the 19th century.

493 Dance in the 20th Century (3)
Survey of the history and philosophy of dance in the 20th century.

495 Dance Pedagogy (3)
Principles and methods of the teaching of dance with practical application in a mini-teaching experience.
Registration Restriction(s): Minimum student level – junior.

Ecology and Evolutionary Biology (278)

202 Ecology and Evolutionary Biology Colloquium (1)
Weekly discussions of current topics in ecology, behavior, and evolutionary biology including undergraduate research and career opportunities, for declared and potential departmental majors. Course familiarizes students with the contemporary research and with its applications and introduces them to departmental faculty and resources.
Grading Restriction: Satisfactory/No Credit grading only.
(De) Prerequisite(s): Biology 130 or Biology 101 and 102 or Biology 111 and 112.

240 Human Anatomy (4)
Gross and microanatomy of the human.
Credit Restriction: May not be applied toward the ecology and evolutionary biology concentration.
Contact Hour Distribution: 3 hours lecture and 3 hours lab.
(De) Prerequisite(s): Biology 130 or Biology 101 and 102 or Biology 111 and 112.

304 Socio-Economic Impact of Plants (3)
Significance of plants in origin and development of human cultures, evolution of cultivated plants, and role of plants in present civilization.
Contact Hour Distribution: Includes occasional field trips.
Credit Restriction: May not be applied toward the ecology and evolutionary biology concentration.

305 Evolution and Society (3)
Issues and controversies surrounding the teaching and learning of evolution in America today. Writing-emphasis course. (Same as Anthropology 305.)
Credit Restriction: May not be applied toward the ecology and evolutionary biology concentration.
(De) Prerequisite(s): Biology 130 or Biology 101 and 102 or Biology 111 and 112 or Anthropology 110.

309 Biology of Human Affairs (3)
Current topics in biology and their public relevance, especially the interaction between biology and government. Issues include conservation, health, agriculture, national parks, population, etc.

330 Field Botany (3)
Principles of taxonomy, basic ecological concepts and identification, recognition, collection and preservation of local, native and naturalized plants.
(Re) Prerequisite(s): Biology 140.

360 Comparative Invertebrate Biology (4)
Origins, phylogeny and functional anatomy of invertebrates with emphasis on diversity of life forms and adaptations to specific local environments.
Contact Hour Distribution: 2 hours and 2 labs.

370 Ethology and Sociobiology (3)
Basic concepts in the evolutionary approach to behavior, including applications to psychology, the social sciences, and the humanities.
(Same as Psychology 370.)

400 Undergraduate Research (1-2)
Research projects under supervision of faculty.
Repeatability: May be repeated. Maximum 8 hours.
Credit Restriction: Maximum of 4 hours may be applied toward the biological sciences major.
Registration Permission: Consent of instructor.

402 Practicum in Ecology and Evolutionary Biology (2)
Participation in individualized practical applications of ecology, behavior, and evolutionary biology in community, government, and industry.
(De) Prerequisite(s): Biology 240 and Biology 250.
Registration Permission: Consent of instructor.

407 Senior Honors Thesis (3)
Written preparation and oral presentation of faculty-supervised student research.
(Re) Prerequisite(s): 400.
Registration Restriction(s): Biological sciences major/honors ecology and evolutionary biology concentration.
409 Perspectives in Ecology and Evolutionary Biology (3) Forefront considerations of ecology, behavior, and evolutionary biology. Emphasis on current developments for applications, including societal and economic impacts and moral and ethical implications. An oral presentation and a referenced library-research essay are required. Writing-emphasis course.

410 Plant Evolutionary Morphology (4) Morphology, development, natural history, and evolution of fungi, cyanobacteria, non-vascular plants (algae and bryophytes), and vascular plants (ferns, fern allies, gymnosperms, and flowering plants).

(DE) Prerequisite(s): Biology 102 or Biology 111 or Biology 130.

411 Minicourse in Ecology and Evolutionary Biology (2) Selected advanced topics in ecology, behavior, and evolutionary biology, concentrated in time and subject matter.

Repeatability: May be repeated. Maximum 4 hours.
Credit Restriction: Maximum 4 hours may be applied toward the departmental major.
Comment(s): See Timetable for prerequisite(s).

412 Minicourse in Ecology and Evolutionary Biology (2) Selected advanced topics in ecology, behavior, and evolutionary biology, concentrated in time and subject matter.

Repeatability: May be repeated. Maximum 4 hours.
Credit Restriction: Maximum of 4 hours may be applied toward the departmental major.
Comment(s): See Timetable for prerequisite(s).

414 Plant Anatomy (3) Cells, tissues and organs, their development in vegetative and reproductive structures of vascular plants. Emphasis on seed plants.

(DE) Prerequisite(s): Biology 111 and 112 or Biology 130 and 140.

419 Science as Method (3) The dynamic process of scientific discovery, as opposed to a static body of knowledge. Topics included will be comparisons of science, nonscience, and pseudoscience, successful and unsuccessful science, the ethics of scientific research, and the philosophical aspects of the scientific enterprise. Implications for teaching and writing about science will be covered. (Same as Philosophy 419.)

Recommended Background: Introductory science or philosophy course.

421 Community Ecology (3) Interactions between individuals, species, communities and environments, including competition, coexistence, predation, herbivory, causes and consequences of biological diversity; biological invasions; application of advanced sampling and analysis techniques; local to global environmental change. Includes periodic field trips or laboratories.

(Re) Prerequisite(s): Biology 250.

423 Plant Ecology (3) Interactions between individuals, species, communities and their environments. Circulation of energy and matter in ecosystems. Includes weekly field trips or laboratory periods and at least two weekend field trips.

(Re) Prerequisite(s): Biology 250.

446 Introduction to Oceanography (4) Basic oceanography, including physical, chemical, geological and biological processes and patterns. Emphasis on oceanic sub-systems such as upwellings, polar oceans, hydrothermal vents, gyres, coral reefs, estuaries, and coastal regions. Field trip to coast required.

(Re) Prerequisite(s): Chemistry 130 and Biology 250.

450 Comparative Animal Behavior (3) Principles and methods of ethology with emphasis on ecological, developmental, physiological and evolutionary aspects. (Same as Psychology 450.)

459 Comparative Animal Behavior Laboratory (3) Introduction to observational and experimental research in ethology. (Same as Psychology 459.)

(Re) Corequisite(s): 450.


(Re) Prerequisite(s): Biology 240.

461 Special Topics in Organismal Biology (3) Evolution, ecology, biogeography, classification, and anatomy of selected animal and plant taxa.

Repeatability: May be repeated if topic differs. Maximum 12 hours.
(Re) Prerequisite(s): Biology 240.

465 Evolutionary and Functional Vertebrate Morphology (4) A detailed study of the structure and function of the vertebrates. Analysis of evolutionary pattern of vertebrates using the comparative method and data from anatomy, developmental biology and functional morphology within a phylogenetic context. Laboratory requires intensive dissection to learn vertebrate anatomy, evolutionary trends and specializations.

Contact Hour Distribution: 2 hours and 2 labs.
(Re) Prerequisite(s): Biology 140.

470 Aquatic Ecology (3) Introduction to the physio-chemical nature of inland waters with description of biotic communities and their interrelations.

Contact Hour Distribution: 2 hours and 1 lab.
(Re) Prerequisite(s): Chemistry 130 and Biology 250.

474 Ichthyology (4) Evolution, classification, collection and identification, distribution and biology of fishes with emphasis on freshwater fauna of eastern North America.

Contact Hour Distribution: 2 hours and 2 labs.
(Re) Prerequisite(s): Biology 250.

475 Field Ornithology (2) Intensive one week field course intended to introduce students to the behavior, ecology, and field identification of birds.

(Re) Prerequisite(s): Biology 250.

484 Conservation Biology (3) Application of principles and techniques of ecological research to conservation of biological diversity at genetic, population, community, and ecosystem levels.

(Re) Prerequisite(s): Biology 240 and Biology 250.

490 Undergraduate Seminar (1) Student oral presentations of topics related to developmental and working concepts of ecology and evolution.

Repeatability: May be repeated. Maximum 2 hours.
Registration Restriction(s): Biological sciences major; minimum student level – junior.

493 Independent Study (1-9) Independent study under the direction of a faculty member.

Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

495 Evolutionary Ecology (3) Basic concepts in evolutionary and ecological genetics. Biogeography, climate, population genetics, evolution and natural selection, population growth and regulation, competition, niche, experimental ecology, predation, phylogenetics in ecology, biodiversity and conservation.

Credit Restriction: Students may not receive credit for both 495 and 595.
(Re) Prerequisite(s): Biology 250.

Economics (283)

201 Introductory Economics: A Survey Course (4) Theory of consumer behavior, theory of firms, supply and demand, costs of production, market models, national income and employment theory, money and banking, monetary and fiscal policy, debt, and international economics.

(ES) Prerequisite(s): Mathematics 126.

207 Honors: Introductory Economics (4) Honors course for students of superior ability and interest. Students accepted on the basis of their records. (SS)
Comment(s): 28 ACT composite or 1250 composite SAT required.

300 Special Topics I (3) Variable topics treated at the introductory level.

(Re) Prerequisite(s): 201 or 207.

311 Intermediate Microeconomics (3) Theories of consumer behavior, production functions and costs, price and behavior of firms in perfectly competitive, monopolistic and imperfectly competitive markets, input prices, income distribution, welfare and general equilibrium.

Credit Restriction: Students may not receive credit for both Economics 311 and 312.
(Re) Prerequisite(s): 201 and Statistics 201.

312 Managerial Economics (3) Microeconomic fundamentals of managerial decision-making and strategy intended for business students. Topics include supply and demand interactions, production and cost, consumer behavior and demand, optimization, market structure, pricing strategy, risk and uncertainty, and game theory.

Credit Restriction: Students may not receive credit for both Economics 311 and 312.
(Re) Prerequisite(s): 201 and Statistics 201.
Registration Restriction(s): Majors in the College of Business Administration.

313 Intermediate Macroeconomics (3) Measurement of income and prices, aggregate demand, output, employment, price determination, inflation, business fluctuations, fiscal and monetary policies and growth.

(Re) Prerequisite(s): 201 and Statistics 201.

322 The Global Economy: Trade and Development (3) Analyses of international trade and finance, and their effects on economic development. Course utilizes a policy-oriented approach drawing upon introductory economic principles. Overview of relevant topics such as theories of economic development, poverty and income inequality, comparative advantage and commodity composition of trade, regional economic integration, foreign investment, finance, and debt. Writing-emphasis course.

Credit Restriction: Students may not receive credit for both Economics 322 and 329.
(Re) Prerequisite(s): 201 or 207.
329 International Economics for Business (3) Statement of international transactions, exchange rate determination, risk management strategies, currency crises, monetary arrangements, comparative advantage, tariff and non-tariff trade distortions, trade policies, protectionist arguments, regional integration. Credit Restriction: Students may not receive credit for both 322 and 329. (RE) Prerequisite(s): Business Administration 361. Comment(s): Students must be in the international business collateral or dual concentration.

Registration Restriction(s): Majors in the College of Business Administration.

331 Government and Business (3) Antitrust and regulatory economics: problems in regulation and social control of business organization, oligopoly models. Writing-emphasis course. (RE) Prerequisite(s): 201 or 207.

333 Law and Economics (3) Analysis of legal decisions and rulings as they affect the allocation and distribution of resources in the economy. Topics include property law, contracts, torts and administrative law, with applications drawn from various areas in economics and case law. Writing-emphasis course. (RE) Prerequisite(s): 201 or 207.


361 Regional and Urban Economics (3) Overview of regional differences. Theory of industrial and agricultural location and human migration, economic basis for land use patterns, central places, and urban form, regional and urban structure, growth, and methods of analysis, examination of urban problems. Writing-emphasis course. (RE) Prerequisite(s): 201 or 207.

362 Environmental and Natural Resource Policy (3) Application of introductory microeconomic principles to contemporary environmental and natural resource policy issues such as air pollution, global climate change, population growth, forest management, and endangered species protection. Writing-emphasis course. (RE) Prerequisite(s): 201 or 207.

371 Public Finance: Expenditure Analysis (3) Problems of collective consumption, external effects, public investment, social decision making. Writing-emphasis course. (RE) Prerequisite(s): 201 or 207.

372 Macroeconomic Analysis (3) Economic analysis of international transactions and money supply process. (RE) Prerequisite(s): 313.

381 Introduction to Econometrics (3) Introductory probability, statistics, and econometrics from an economic perspective, with emphasis on problems in regulation and social control of business organization, oligopoly models. Writing-emphasis course. (RE) Corequisite(s): 311 or 313.

400 Special Topics II (3) Variable topics for advanced students. (RE) Prerequisite(s): 311 and 313. Registration permission: Consent of instructor.

413 Macroeconomics: Business Cycles and Growth (3) Analysis of macroeconomic short-run fluctuations and long-term growth. Coverage will also include the role of monetary and fiscal policy on aggregate output, employment, and interest rates. (RE) Prerequisite(s): 313.

421 International Economics (3) Balance of payments, exchange rate determination, monetary and fiscal policies, monetary arrangements, comparative advantage, tariff and non-tariff trade distortions, protection, arguments, and regional integration, with analyses based upon intermediate-level economic theory. (RE) Prerequisite(s): 311.

435 Industrial Organization (3) Monopoly and competition in United States economy, interrelationship of market structure, business behavior, and economic performance. (RE) Prerequisite(s): 311.

436 Economics of Health and Health Care (3) Medical care and health status; demand for medical care and insurance; physician and hospital supplies; government provision of services and insurance; regulation of health care markets. Writing-emphasis course. (RE) Prerequisite(s): 311.

441 Labor Economics (3) Extension of economic principles to labor markets, public policy questions, demand and supply, theory of wage differentials, unemployment, unions in the private sector, investment in individuals, education and training, mobility. (RE) Prerequisite(s): 311.

463 Environmental Economics (3) Economic foundations for public decision-making about environmental resources, utilizing tools from intermediate microeconomic theory. Emphasis on the welfare economic approach for the provision of public goods, with specific emphasis on market failure, externalities, benefit-cost analysis, and methods for valuing environmental resources and human health. (RE) Prerequisite(s): 311.

472 Public Finance: Taxation and Fiscal Federalism (3) Analysis of federal, state, and local government revenue systems, to include individual and corporate income, sales, and property taxes and other tax and non-tax revenue sources. Consideration of current policy issues and relationships among levels of government. (RE) Prerequisite: 311.

482 Introduction to Mathematical Economics (3) Application of basic mathematical tools (e.g., calculus, matrix algebra, etc.) to major topics of economic theory. (RE) Prerequisite(s): 311. Comment(s): Grade of B or better in 311 is required.

492 Economics Off-Campus Study (1-3) Internship or other supervised economic experience with firm, government agency or other relevant organization. Student must seek approval from a faculty member prior to starting work, register for credit in the first semester following work completion, and write a paper describing the economic nature of the work performed. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 3 hours. (RE) Prerequisite(s): 311 and 313. Registration Restriction(s): Economics major. Registration Permission: Consent of faculty member.

493 Independent Study (1-3) Directed research on subjects of mutual interest to student and faculty member. Student must meet with the faculty member before registering. Repeatability: May be repeated. Maximum 3 hours. (RE) Prerequisite(s): 311 and 313. Comment(s): GPA of 3.0 or better in economics courses required. Registration Restriction(s): Economics major. Registration Permission: Consent of faculty member.

498 Honors Thesis (3) Completion of undergraduate thesis. Registration Restriction(s): Honors economics concentration. Registration Permission: Consent of faculty advisor.

499 Analysis of Economic Problems (3) Study of the effects of economics on modern society and the practice of economics from a value-oriented perspective. Students will integrate learning from all fields of economics and other disciplines where appropriate, and work as teams to prepare economic analyses of selected economic problems facing modern society. Writing-emphasis course. (RE) Prerequisite(s): 311 and 313. Recommended Background: 9 other hours of upper-division economics courses. Registration Restriction(s): Economics major.

Education (289)

100 Special Topics (1-3) Study in selected disciplinary or professional areas represented in the College of Education, Health, and Human Sciences. Topics to be determined as needs/issues are identified and as resources are available to support the course. Repeatability: May be repeated. Maximum 3 hours.

Education of the Deaf and Hard of Hearing (285)

410 Practicum with Deaf/Hard of Hearing (3) Supervised practicum with hearing impaired students in preschool, public school, and/or residential school setting.

415 Language Development of Deaf/Hard of Hearing I (3) Language problems of hearing impaired contrasted with scope and sequence of normal language development. Formal linguistic systems used to describe language development problems.


419 Speech Development of Deaf/Hard of Hearing (4) Theories of speech development, approaches in training perception and production of speech, and aural habilitation. Practicum experiences.

424 Nature of Hearing Impairments (3) Anatomy and physiology of hearing; nature and causes of hearing loss; methods and instrumentation for assessment of hearing level; interpretation of audiologic services to medical and other rehabilitative disciplines.
Educational Psychology (310)

210 Psychoeducational Issues in Human Development (3) Understanding and application of the psychology of human development to teaching/learning process in educational settings. Primarily for students entering teaching or human services.

215 Learning Skills and Study Systems (3) Approaches to enhancing academic performance through study skills, efficient reading and understanding of personal factors.

401 Professional Studies: Applied Educational Psychology (2) Application of concepts, principles, techniques and models from educational psychology to facilitate student learning and creation of effective learning environment.

Registration Restriction(s): Qualification – admission to teacher education.

404 Special Topics (1-3) Instructor initiated course offered at convenience of the department on various topics of current interest.

Repeatability: May be repeated. Maximum 15 hours.

431 Personality and Mental Health (3) (See Counselor Education 431.)

432 The Disadvantaged Student: Psychoeducational Perspectives (3) Theory and research regarding etiology, psychosocial behavior and appropriate interventions.

460 Self-Management in the Helping Professions (3) Applications of self-management strategies to career, social, emotional and health domains for both helping professionals and their clientele.

Recommended Background: Introductory course in psychology.

493 Independent Study (1-15) Independent investigation of problems in educational and counseling psychology.

Repeatability: May be repeated. Maximum 15 hours.

Electrical and Computer Engineering (319)

206 Electrical Engineering Computations (4) Engineering problem solving and algorithm development by programming computers. Emphasis on software engineering, object-oriented design, building applications within procedures and data, and programming in a modern computer language. Includes Level 1 design projects which require laboratory work.

255 Introduction to Logic Design of Digital Systems (4) Standard codes, number systems, base conversions and computer arithmetic. Boolean algebra, minimization and synthesis techniques for combinational and sequential logic. Use of VHDL for logic synthesis. Implementation of circuits using MSI and LSI components. Includes Level 1 design projects which require laboratory work.

300 Circuits (5) Fundamental laws of circuit analysis. Ohm's Law, Kirchhoff's current and voltage laws, the law of conservation of energy, circuits containing independent and dependent voltage and current sources, resistance, conductance, capacitance and inductance analyzed using meshes and nodal analysis, superposition and thevenin and norton transforma-

Registration Permission: Consent of associate department head.

301 Circuits and Electro Mechanical Components (3) DC and AC cir-
cuits, transistors, transformers, motors, generators. (RE) Prerequisite(s): Physics 231 and Mathematics 231.

302 Electronics and Computer Circuits (3) Analog circuits, operational amplifiers, digital systems and logic circuits, semiconductor devices. (RE) Prerequisite(s): 301.

313 Probability and Random Variables (3) Axioms of probability, set theory, independence, conditional probability, Bayes' Theorem, permutations and combinations, histograms, probability density, moments, func-
tions of a random variable, joint probability density, central limit theorem, samples and populations, sample mean and variance, curve fitting, corre-
tation of time signals. (RE) Prerequisite(s): Mathematics 231.

315 Signals and Systems I (3) Continuous- and discrete-time functions, function transformations, signal energy and power, solution of linear differential equations, system properties, convolution, continuous and discrete-time Fourier series, continuous and discrete-time Fourier transforms, Bode diagrams, correlation. (RE) Prerequisite(s): 300.

316 Signals and Systems II (3) Sampling theory, theory and application of Laplace transforms, feedback, root locus, gain and phase margin, theo-
ry and application of z Transforms, digital filters, discrete-time state vari-
cables. (RE) Prerequisite(s): 315.


335 Electronic Devices (4) Semiconductor physics, theory of p-n junctions, diodes, field-effect transistors, and bipolar transistors; modeling of diode and transistor devices; analysis and design of diode switching and rectifier circuits; basic transistor switching circuits and single stage amplifiers; electronic circuit simulation using SPICE Chemical Engineering. Includes 1-credit laboratory work involving Level 1 design projects. (RE) Prerequisite(s): 300.
336 Electronic Circuits (3) Multistage transistor amplifier biasing; gain stages, and output stages; frequency and transient response of open loop linear amplifiers; fundamentals of integrated circuits, operational amplifier applications in basic feedback configurations; basic transistor switching circuits. Includes laboratory experiments and design projects.

(DE) Prerequisite(s): 300 and Mathematics 241.
(OC) Prerequisite(s): Physics 232.

341 Fields (3) Coulomb’s law, Gauss’ law, Ampère’s law, Maxwell’s equations for electrostatic and magnetostatic cases; Maxwell’s equations for dynamic case, dynamic potentials, uniform plane wave propagation. Transmission lines.

(ER) Prerequisite(s): 315.
(OC) Prerequisite(s): Physics 232.

342 Analog Communication Amplitude and Frequency Modulation (3) Probability and random variables, signal-to-noise ratio, propagation models, link budget analysis, bandpass signals, amplitude modulation, frequency modulation, spread-spectrum. Includes Level 1 design projects which require laboratory experiments.

(ER) Prerequisite(s): 315.

355 Computing System Fundamentals (3) Introduction to machine-level computer organization and programming. Basic microprocessor architectures; memory architectures; structured assembly language programming; intra- and inter-computer communication; I/O systems; device drivers; multi- and distributed processor systems; issues in computer security. Includes Level 1 design projects which require laboratory work.

(ER) Prerequisite(s): 206 and 255.

395 Junior Seminar (1) Presentations and discussions related to professional development, including registration, ethics and current topics in electrical engineering.

Grading Restriction: Satisfactory/No Credit grading only.

400 Senior Design (5) A major design project that focuses the student's attention on professional practice, accumulated background of curricular components, and recent developments in the field. This major design emphasis is directed to topics within the field of electrical and computer engineering. Includes Level 3 design projects which require laboratory work.

(OC) Prerequisite(s): 316 and 342.
(ER) Prerequisite(s): 355.

415 Automatic Control Systems (3) Automatic control systems for physical systems with linear models. The methods presented include steady-state error analysis, stability, root locus, Nyquist theory, and Bode plots.

(ER) Prerequisite(s): 316.

416 Computer Control Systems (3) Computer controlled systems using state variables and z-transform model representations with sampling theory and its effect of digital control design. Design of digital controllers in both the state space and frequency domains. Includes Level 1 design projects.

(ER) Prerequisite(s): 316 and 325.

421 Electric Energy Systems (3) Structure and operation of the electrical energy grid; load flow; economic loading; planning; control; reliability. Balanced and unbalanced faults; system protection; system stability. Includes Level 1 design projects.

(ER) Prerequisite(s): 316.

422 Power Systems Operations and Planning (3) Dynamic phenomena in power systems. Transient stability assessment and enhancement; direct and indirect methods for stability determination in nonlinear systems. Operations planning, unit commitment, economic dispatch, frequency regulation and automatic generation control. Volt-var control, load management, cogeneration and other topics of contemporary concern. Includes Level 1 design projects.

(ER) Prerequisite(s): 421.

423 Electric Machines (3) Principles of electromechanical energy conversion. Design procedures for AC and DC machine windings; construction and performance constraints. Effects of machine parameters on steady state and dynamic performances; the d-q model; reference frames. Includes Level 1 design projects.

(ER) Prerequisite(s): 316 and 325.

431 Operational Amplifier Circuits (3) Linear and non-linear active circuits using commercial operational amplifiers. Includes operational instrumentation, isolation, bridge, rms and logarithmic converters, multipliers and function generators, rectifiers, references, active filters, modulation and demodulation, sinusoidal generators. Noise fundamentals and calculations in op-amp circuits. Design for specified pole-zero functions. Emphasis on applications including transducer interfacing. Includes Level 1 design projects which require laboratory work.

(ER) Prerequisite(s): 316 and 336.
(OC) Prerequisite(s): 342.

432 Electronic Amplifiers (3) Feedback amplifier principles; wideband linear amplifier design; low-noise preamplifier design; audio power amplifier design. Introduction to radio-frequency amplifier design; oscillator principles. Includes laboratory experiments and design projects. Level 2 design projects require laboratory work.

(ER) Prerequisite(s): 335.

441 Digital Communications (3) Quantization and pulse code modulation. Binary and Mary signaling, spectra of line codes, link budget analysis, binary communication in the presence of noise, matched filtering and equalization, bandpass digital transmission, introduction to multiple access techniques. Includes Level 1 design projects.

442 Communication System Design (3) Application of communication theory to system design. Hardware and software design and simulation. Modern communication system design. Includes Level 1 design projects.

(ER) Prerequisite(s): 441.

443 Antennas and Propagation (3) Introduction to antenna theory including fundamental antenna concepts and parameters (directivity, gain, patterns, etc.) and signal propagation. Theory and design of linear and loop antennas, arrays, and other simple antennas. Includes Level 1 design projects.

(ER) Prerequisite(s): 316 and 341.
(OC) Prerequisite(s): 342.

456 Electromagnetic Compatibility (3) Principles and practices to avoid interference among and within electrical devices. Parameters and coupling for dipole, biconical, and log-periodic antennas. High frequency transmission line circuit elements. Radiated and conducted emissions and susceptibility. Crosstalk, shielding, electrostatic discharge, and EMC regulations. Includes Level 1 design projects which require laboratory work.

(ER) Prerequisite(s): 316 and 341.
(OC) Prerequisite(s): 342.

451 Computer Systems Architecture (3) Architecture and design of microcomputers with microprocessors or microcontrollers. Instruction set architectures, software interfaces, processor structures, memory hierarchy, and interfacing. Includes Level 1 design projects which require laboratory work.

(ER) Prerequisite(s): 355.

453 Introduction to Computer Networks (3) Principles of computer networking and software design of network protocol with an emphasis on the internet and TCP/IP protocol suite. Includes Level 1 design projects.

(ER) Prerequisite(s): 206.

455 Embedded Systems Design (3) Design and development of embedded systems for data acquisition and special-purpose computing systems, such as peripheral interfacing, serial/parallel communications and bus systems. Assembly language programming, software architecture, and machine architecture of microcontrollers. Includes Level 1 design projects which require laboratory work.

(ER) Prerequisite(s): 355.

471 Introduction to Pattern Recognition (3) Introduction to statistical decision theory, adaptive classifiers, and supervised and unsupervised learning. Students will explore the application of these techniques in areas of current interest such as face recognition, speech processing, remote sensing, data mining and bioinformatics. Includes Level 1 design projects.

(ER) Prerequisite(s): 316.

472 Introduction to Digital Image Processing (3) Basic methods for digitizing, storing, processing, and displaying images. Computational procedures for image enhancement, restoration, coding, and segmentation. Includes Level 1 design projects.

(ER) Prerequisite(s): 316.

481 Power Electronics (3) Principles and characteristics of power semiconductor devices, single-phase and polyphase phase-controlled converters, converter control, AC voltage controller. Includes Level 1 design projects and laboratory work.

(ER) Prerequisite(s): 316 and 325.
(OC) Prerequisite(s): 336.

482 Power Electronic Circuits (3) Voltage-fed inverters, PWM principles, control of inverters, dc-dc converters, dc machine drives, resonance converters, step motor drives, brushless dc machine principles. Includes Level 1 design projects.

(ER) Prerequisite(s): 481.

491 Special Topics (3) Topics relating to basic design and current practice. Includes Level 1 or Level 2 design projects which may require laboratory work.

Repeatability: May not be repeated for credit. Course may not be repeated to satisfy senior requirements for graduation.

495 Senior Seminar (1) Current topics in electrical engineering.

Repeatability: May not be repeated for credit.
Elementary Education (322)
325 Teaching Science and Social Studies in Elementary and Middle Schools (3) Methods and materials for teaching science and social studies in early and middle schools. Terminal approach to teaching of both fields including inquiry, multisensory activities and group approaches.
Registration Restriction(s): Qualification – admission to teacher education.

326 Teaching Language Arts/Reading in Elementary and Middle Schools (3) Language and language development as applied to teaching of oracy (listening-speaking) and certain aspects of literacy (reading process/readiness and writing). Includes methods and materials.
Registration Restriction(s): Qualification – admission to teacher education.

351 Laboratory and Field Studies in Elementary Education (1-2) Simulated and actual experiences in which students apply concepts and skills from professional methods courses in a variety of school settings and levels.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 3 hours.
(RE) Corequisite(s): 422.
Registration Restriction(s): Qualification – admission to teacher education.

356 Elementary and Middle School Teaching Laboratory Experience (1) Simulation and micro-teaching experiences to develop planning skills and give feedback to students relative to their ability to apply learning to school settings.
Grading Restriction: Satisfactory/No Credit grading only.
Registration Restriction(s): Qualification – admission to teacher education.

421 Elementary and Middle School Science and Social Studies Instruction (3) Methods and materials for teaching science and social studies; Development of functional relationships and individual entities of the two fields.
Comment(s): Not open to students with recent course or background in teaching science and/or social studies.
Registration Restriction(s): Qualification – admission to teacher education.

422 Elementary and Middle School Teaching Methods I (6) Methods and materials for teaching elementary and middle school reading, language arts, science, social studies and mathematics. Emphasis on planning, implementation and evaluation of integrative learning experiences. Must be taken prior to professional internship year.
Registration Restriction(s): Qualification – admission to teacher education.

424 Studies in Elementary Education (1-3) Variable topics on teaching in Early Elementary (K-3), Middle Elementary (4-8), and Skills (K-8).
Repeatability: May be repeated. Maximum 8 hours.
Registration Restriction(s): Qualification – admission to teacher education.
Registration Permission: Consent of instructor.

429 Language Arts/Reading instruction in Elementary and Middle Schools (3) Language and language development as applied to teaching of oracy (listening-speaking) and aspects of literacy (reading process/readiness and writing).
Comment(s): Not open to students with recent course in language arts methods.
Registration Restriction(s): Qualification – admission to teacher education.

445 Early Childhood Education: Program Development and Teaching in Kindergarten (3) Curriculum planning, classroom organization and management practices for teaching young children; relationship of kindergarten to total elementary school.
Registration Restriction(s): Qualification – admission to teacher education.

Engineering Fundamentals (323)
100 Engineering Skills Development (1-3) Exercises in the skills and tools essential to the practice of engineering.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be applied toward any engineering degree.
Registration Permission: Consent of instructor.

105 Computer Methods in Engineering Problem Solving (1) Introduction to computer applications used in engineering problem solving and communications. Introduction to programming concepts including conditional statements and looping; the development and implementation of logic flow diagrams.
Grading Restriction: Satisfactory/No Credit grading only.
(RE) Corequisite(s): 151 or 157.
Comment(s): 153 is an acceptable corequisite for transfer students.

151 Physics for Engineers I (4) Calculus based study of basic physics concepts including rotational dynamics, statics, oscillations, waves, fluids, heat and temperature, and first and second law of thermodynamics. Introduction to team work. Introduction to the engineering disciplines, examination of engineering principles and design issues; oral and written presentation skills.
Grading Restriction: A, B, C, No Credit grading.
(RE) Corequisite(s): Mathematics 141.
Comment(s): A higher level math course in the engineering curriculum is an acceptable corequisite.

152 Physics for Engineers II (4) Calculus based study of basic physics concepts including rotational dynamics, statics, oscillations, waves, fluids, heat and temperature, and first and second law of thermodynamics. Introduction to team work. Introduction to the engineering disciplines, examination of engineering principles and design issues; oral and written presentation skills.
Grading Restriction: A, B, C, No Credit grading.
(RE) Corequisite(s): Mathematics 142.

153 Introduction to Engineering (2) Introduction to engineering for entering students with previous credit in mechanics physics. Introduction to the engineering profession and disciplines. Introduction to engineering problem solving and design through individual and team projects. Oral and written reports required.
Recommended Background: Advanced placement or transfer credit for calculus based mechanics physics.

157 Honors: Physics for Engineers I (4) Honors version of 151 for well-prepared students.
Grading Restriction: A, B, C, No Credit grading.
(RE) Corequisite(s): Mathematics 141.
Comment(s): A higher level math course in the engineering curriculum is an acceptable corequisite.
Registration Restriction(s): Qualification – admission to Chancellor's Honors Program.

202 Engineering Mechanics (2) Review of vector algebra. Statics of two-dimensional trusses and frames, including methods of joints and sections. Geometric properties of cross sections, including first and second moments and location of centroid. Inertial properties of rigid bodies, including moment of inertia and location of mass center.
Grading Restriction: Satisfactory/No Credit grading only.

230 Computer Solution of Engineering Problems (2) Primary focus is on development of computer programs in a modern programming language to solve engineering problems.
Grading Restriction: Satisfactory/No Credit grading only.

Grading Restriction: Satisfactory/No Credit grading only.

Grading Restriction: A, B, C, No Credit grading.


409 English (339)
101 English Composition I (3) Intensive instruction in writing, focusing on analysis and argument. Strategies for reading critically, analyzing texts from diverse perspectives, developing substantive arguments through systematic revision, addressing specific audiences, integrating sources, and expressing ideas with clarity and correctness.
Grading Restriction: A, B, C, No Credit grading.
Comment(s): Students wishing additional help with writing should also register for English 104.

102 English Composition II (3) Advancing concepts introduced in English 101, intensive writing instruction focused on inquiry and research. Strategies for formulating and investigating questions, locating and evaluating information, using varied sources and research methods, developing positions on intercultural and interdisciplinary issues from diverse texts (print, digital, and multimedia), and presenting research using appropriate rhetorical conventions.
Grading Restriction: A, B, C, No Credit grading.

103 Writing Workshop I (1) Self-paced Writing Center tutorial for students wanting additional instruction while enrolled in English 101 or having ACT English and composite scores at or below 18 (or SAT verbal/composite scores at or below 450/880). Individual instruction in mechanics, paragraph development and essay structure.
Credit Restriction: To receive credit, students must participate at least two hours per week and must also pass the 101 class in which they are currently enrolled.
Grading Restriction: Satisfactory/No Credit grading only.

104 Writing Workshop II (1) Self-paced Writing Center tutorial for students wanting additional instruction while enrolled in English 101 or having ACT English and composite scores at or below 18 (or SAT verbal/composite scores at or below 450/880). Individual instruction in mechanics, paragraph development and essay structure.
Credit Restriction: To receive credit, students must participate at least two hours per week and must also pass the 101 class in which they are currently enrolled.
Grading Restriction: Satisfactory/No Credit grading only.
121 Academic English for Non-Native Speakers (4) Development of English academic literacy, including reading, writing, vocabulary, and grammar, as well as some attention to listening, oral presentation, and pronunciation.

Contact Hour Distribution: Meets 4 hours a week.

Comment(s): Admission by English placement exam. Required of all non-native English-speaking students who demonstrate on the English Placement Examination a need for work in English structures, reading, or writing.

131 Composition for Non-Native Speakers of English I (3) Paragraph and composition organization and development with emphasis on informative and persuasive writing. Includes grammar and mechanics. Individual conferences.

Grading Restriction: A, B, C, No Credit grading.

Comment(s): Admission by English placement exam.

132 Composition for Non-Native Speakers of English II (3) Writing based on reading and discussion. Analysis of works of literature. Emphasis on research techniques and writing research papers. Individual conferences.

Grading Restriction: A, B, C, No Credit grading.

(Re) Prerequisite(s): 101 or 131.

Comment(s): Admission by English placement exam.

201 British Literature I: Beowulf through Johnson (3) Major literary works from three periods – Middle Ages, Renaissance and Restoration, and 18th century. Writing-emphasis course. (AH)

(Re) Prerequisite(s): 102 or 118.

202 British Literature II: Wordsworth to the Present (3) Major literary works from three periods – Romantic, Victorian, and 20th century. Writing-emphasis course. (AH)

(Re) Prerequisite(s): 102 or 118.

206 Introduction to Shakespeare (3) An overview of Shakespeare’s world and his work. (WC)

207 Honors: British Literature I (3) Enriched section of 201. (AH)

(Re) Prerequisite(s): 102 or 118.

Registration Restriction(s): 3.25 GPA.

208 Honors: British Literature II (3) Enriched section of 202. (AH)

(Re) Prerequisite(s): 102 or 118.

Registration Restriction(s): 3.25 GPA.

221 Literature of the Western World I: Ancient, Medieval, and Renaissance (3) Writing-emphasis course. (AH)

(Re) Prerequisite(s): 102 or 118.

222 Literature of the Western World II: Enlightenment, Romantic, and Modern (3) Writing-emphasis course. (AH)

(Re) Prerequisite(s): 102 or 118.

231 American Literature I: Colonial Era to the Civil War (3) Development of American literature from its beginnings to the Civil War. Writing-emphasis course. (AH)

(Re) Prerequisite(s): 102 or 118.

232 American Literature II: Civil War to the Present (3) Development of American literature from Civil War to the present. Writing-emphasis course. (AH)

(Re) Prerequisite(s): 102 or 118.

233 Major Black Writers (3) Black American literature as a literary tradition. Writing-emphasis course. (Same as Africana Studies 233) (AH)

(Re) Prerequisite(s): 102 or 118.

237 Honors: American Literature I: Colonial Era to the Civil War (3) Enriched section of 231. (AH)

(Re) Prerequisite(s): 102 or 118.

Registration Restriction(s): 3.25 GPA.

238 Honors: American Literature II: Civil War to the Present (3) Enriched section of 232. (AH)

(Re) Prerequisite(s): 102 or 118.

Registration Restriction(s): 3.25 GPA.

251 Introduction to Poetry (3) Poetry as a distinct mode of artistic expression. Critical tools for perceptive reading of poems. Writing-emphasis course. (AH)

(Re) Prerequisite(s): 102 or 118.

252 Introduction to Drama (3) Critical tools for perceptive reading of play texts. Writing-emphasis course. (AH)

(Re) Prerequisite(s): 102 or 118.

253 Introduction to Fiction (3) Fiction from the eighteenth through the twentieth centuries, emphasis on the novel. Critical tools necessary for judging varieties of fiction. Writing-emphasis course. (AH)

(Re) Prerequisite(s): 102 or 118.

254 Themes in Literature (3) Study of important themes in English, American, and World literatures. Some sample themes are religion, crime, war, ecology, science, exploration, revolution, colonization initiation, education, Multi-genre focus. See Timetable for topics. Writing-emphasis course (AH) (WC)

(Re) Prerequisite(s): 102 or 118.

255 Public Writing (3) Rhetorical strategies for effective communication about public issues. Students will learn to write for multiple audiences and may be asked to participate in collaborative writing projects with business, academic, or public organizations. (WC)

(Re) Prerequisite(s): 102 or 118.

263 Introduction to Creative Writing (3) Practice in writing poetry and fiction, combined with study of models and techniques. Writing-emphasis course.

(Re) Prerequisite(s): 102 or 118.

281 Introduction to Film Studies (3) Selected world cinema feature films. Critical techniques necessary for understanding and analysis of narrative cinema. Basic elements of film expression and contours of film history. Writing assignments. (Same as Cinema Studies 281.)

(Re) Prerequisite(s): 102 or 118.

295 Business and Technical Writing (3) Principles of written communication in science and business. (WC)

(Re) Prerequisite(s): 102 or 118.

301 British Culture to 1660 (3) English literature in the context of parallel developments in art, architecture, music, and social and intellectual history. Writing-emphasis course.

(Re) Prerequisite(s): 102 or 118.

302 British Culture: 1660 to Present (3) English literature in the context of parallel developments in art, architecture, music, and social and intellectual history. Writing-emphasis course.

(Re) Prerequisite(s): 102 or 118.

321 Introduction to Old English (3) Language and literature of England from c. 700 to c. 1100. Reading of prose works and shorter poetry in Old English. Cultural context of Anglo-Saxon England explored through critical essays, histories, and primary texts in translation. Focus on manuscript evidence and medieval and modern textual practices. Writing-emphasis course. (Same as Linguistics 321.)

(Re) Prerequisite(s): 102 or 118.

331 Race and Ethnicity in American Literature (3) Examines the role of ethnic and racial identity in the literature of the United States. Writing-emphasis course. (Same as Africana Studies 331.)

(Re) Prerequisite(s): 102 or 118.

332 Women in American Literature (3) Women as writers and as subjects in American literature from its beginnings to the present. Writing-emphasis course. (Same as Women’s Studies 332.)

(Re) Prerequisite(s): 102 or 118.

333 Black American Literature and Aesthetics (3) Black American literature and aesthetics since 1899 with emphasis on cultural evaluations and the principles of being “American.” Writing-emphasis course. (Same as Africana Studies 333.)

(Re) Prerequisite(s): 102 or 118.

334 Film and American Culture (3) American films as both works of art and social documents. Relationship between the medium of film and American culture in the 20th century. Writing-emphasis course. (Same as American Studies 334; Cinema Studies 334.)

(Re) Prerequisite(s): 102 or 118.

351 The Short Story (3) American, British, and international. Content varies.

(Re) Prerequisite(s): 102 or 118.
355 Rhetoric and Writing (3) Strategies of writing on personal and academic subjects. Discussion of student and professional writing. (WC) (RE) Prerequisite(s): 102 or 118.

360 Technical and Professional Writing (3) For students who need to sharpen their technical communication skills. Writing of definitions, process descriptions, proposals, abstracts, executive summaries, and major reports. (WC) (RE) Prerequisite(s): 102 or 118. Registration Restriction(s): Minimum student level – junior.

363 Writing Poetry (3) Introduction to writing poetry. (WC) (RE) Prerequisite(s): 102 or 118.

364 Writing Fiction (3) Introduction to writing novels and short stories. (WC) (RE) Prerequisite(s): 102 or 118.

365 Writing Drama and the Screenplay (3) Introduction to writing one-act and full-length plays, as well as screenplays. (RE) Prerequisite(s): 102 or 118.

371 Foundations of the English Language (3) Phonology, morphology, and syntax of English. History of the English language to 1800. (Same as Linguistics 371.) (RE) Prerequisite(s): 102 or 118.

372 The Structure of Modern English (3) Survey of approaches – traditional, descriptive, and generative-transformational – to the structure of modern English. (Same as Linguistics 372.) (RE) Prerequisite(s): 102 or 118.

376 Colloquium in Literature (3) Methods and objectives of literary study; conferences to plan student's program in major. (RE) Prerequisite(s): 102 or 118. Recommended Background: 200-level literature package.

381 Introduction to Folklore (3) Essential terms and concepts in modern folklore/folk-life studies. Emphasis on North American materials – folktale, folksong, myth, legend, proverb, riddle, superstition, dance, games, and architecture. (Same as American Studies 381.) (RE) Prerequisite(s): 102 or 118.

389 Literature of the English Bible (3) Types of literature in the Bible – legend, folktale, history, biography, poetry, prophecy, apocalyptic. (Same as Religious Studies 389.) (RE) Prerequisite(s): 102 or 118.

398 Junior-Senior Honors Seminar (3) Seminar for students admitted to English honors program. Variable content determined by instructor, but usually focused on a particular literary period, genre, or issue. (WC) (RE) Prerequisite(s): 102 or 118. Comment(s): Enrollment limited to 15. See Director of Undergraduate Studies in English for details.

401 Medieval Literature (3) Reading and analysis of selected medieval literary masterpieces in modern English. Writing-emphasis course. (Same as Medieval Studies 405.) (RE) Prerequisite(s): 102 or 118.

402 Chaucer (3) Reading and analysis of the Canterbury Tales and Troilus and Criseyde in Middle English. (Same as Medieval Studies 406.) (RE) Prerequisite(s): 102 or 118.

404 Shakespeare I: Early Plays (3) Shakespeare's dramatic achievement before 1601. Reading and discussion of selected plays from romantic comedies, including Twelfth Night; English histories, including Henry IV; and early tragedy, including Hamlet. (RE) Prerequisite(s): 102 or 118.

405 Shakespeare II: Later Plays (3) Shakespeare's dramatic achievement between 1601 and 1613. Reading and discussion of selected plays from romantic tragedies, including Othello; problem plays, including Measure for Measure; and dramatic romances, including The Tempest. (RE) Prerequisite(s): 102 or 118.

406 Renaissance Drama (3) English theatre between 1590 and 1640. Representative plays by Shakespeare's contemporaries – Marlowe, Webster, Jonson. (RE) Prerequisite(s): 102 or 118.

409 Spenser and his Contemporaries (3) Principal achievements in prose and poetry of 16th-century authors – Spenser, Wyatt, Marlowe, More, Sidney and Bacon. (RE) Prerequisite(s): 102 or 118.

410 Milton, Donne, and their Contemporaries (3) Principal achievements in prose and poetry of the first two-thirds of the 17th century. Poetry of Milton, Donne, Marvell. Prose of Browne, Bacon, Walton. (RE) Prerequisite(s): 102 or 118.

411 Literature of the Restoration and Early 18th Century: Dryden to Pope (3) Survey of English literature and culture from 1660 to 1745. (RE) Prerequisite(s): 102 or 118.

412 Literature of the Later 18th Century: Johnson to Burns (3) Survey of English literature and culture from 1745 to 1800. (RE) Prerequisite(s): 102 or 118.

413 Restoration and 18th-Century Genres and Modes (3) Study of one major genre or literary mode such as drama, novel, poetry, nonfiction, prose, satire, romance, or epic written between 1660 and 1800. Repeatability: May be repeated. (RE) Prerequisite(s): 102 or 118.

414 Romantic Poetry and Prose I (3) Emphasis on Wordsworth, Coleridge, and Blake, with readings from Lamb, De Quincey, and other prose writers. (RE) Prerequisite(s): 102 or 118.

415 Romantic Poetry and Prose II (3) Emphasis on Keats, Shelley and Byron, with readings from Hazlitt, Peacock, and other prose writers. (RE) Prerequisite(s): 102 or 118.

416 Early Victorian Literature (3) May include poetry by Tennyson and the Browning; prose by Carlyle, Newman, and Mill. (RE) Prerequisite(s): 102 or 118.

419 Later Victorian Literature (3) May include poetry by the Pre-Raphaelites, Arnold, Hopkins, and Hardy; prose by Arnold, Ruskin, and Carroll; plays by Gilbert and Wilde. (RE) Prerequisite(s): 102 or 118.

420 The 19th-Century British Novel (3) Major novelists from Scott to Hardy. (RE) Prerequisite(s): 102 or 118.

421 Modern British Novel (3) Authors such as Joyce and Woolf through contemporary British fiction writers. (RE) Prerequisite(s): 102 or 118.

422 Women Writers in Britain (3) Emphasis on the literary consciousness and works of women writers in Britain. Course content will vary. Authors covered may include Marie de France, Margery Kempe, Aemilia Lanyer, Elizabeth Cary, Aphra Behn, Frances Burney, Mary Wollstonecraft, Mary Shelley, George Eliot, Virginia Woolf, and Doris Lessing. Writing-emphasis course. (Same as Women's Studies 422.) Repeatability: May be repeated. Maximum 6 hours. (RE) Prerequisite(s): 102 or 118.

423 Colonial and Post-Colonial Literature (3) Emphasis on historical and theoretical methodologies for reading colonial and post-colonial literature. Repeatability: May be repeated with instructor's consent. Maximum 6 hours. (RE) Prerequisite(s): 102 or 118.

431 Early American Literature (3) From the earliest texts to 1830, including exploration and discovery, Native American, colonial, revolutionary, and early national works. (RE) Prerequisite(s): 102 or 118.

432 American Romanticism and Transcendentalism (3) Prose and poetry of the American Renaissance, from c. 1830 to the end of the Civil War. Includes writers such as Cooper, Poe, Hawthorne, Melville, Emerson, Thoreau, Stowe, Douglass, Whitman, Dickinson. (RE) Prerequisite(s): 102 or 118.

433 American Realism and Naturalism (3) Literature from the time of the Civil War to World War I, including such writers as Twain, Howells, James, Jewett, Freeman, Crane, Norris. (RE) Prerequisite(s): 102 or 118.

434 Modern American Literature (3) World War I to the present. (RE) Prerequisite(s): 102 or 118.

435 American Novel before 1900 (3) From earliest sentimental novels through Brown and Cooper, and major figures to 1900, including Hawthorne, Melville, Stowe, Clemens, and James. (Repeatability: May be repeated. Maximum 6 hours. (RE) Prerequisite(s): 102 or 118.

436 Modern American Novel (3) Authors such as Faulkner, Steinbeck, Welty. (RE) Prerequisite(s): 102 or 118.

441 Southern Literature (3) Southern writing from colonial period into the 20th century, including frontier humorists, local color writers, and southern literary renaissance. (RE) Prerequisite(s): 102 or 118.

442 American Humor (3) Development of American humor from the early 19th century into the 20th century, with particular emphasis on Mark Twain. (Same as American Studies 442.) (RE) Prerequisite(s): 102 or 118.

443 Topics in Black Literature (3) Content varies according to particular genres, authors, or theories from 1845 to the present, including Langston Hughes and the Harlem Renaissance, Richard Wright and Gwendolyn Brooks, writing by black women, international black literature in English, and black American autobiography. (Same as Africana Studies 443.) (RE) Prerequisite(s): 102 or 118.
451 Modern British and American Poetry (3) From Yeats and Frost to Auden, Stevens, and more recent poets. (RE) Prerequisite(s): 102 or 118.

452 Modern Drama, 1880-1945 (3) Survey of British, American, and international drama from the advent of modern drama to the end of World War II. (Same as Comparative Literature 452.) (RE) Prerequisite(s): 102 or 118.

453 Contemporary Drama (3) Survey of British, American, and international drama since World War II. (RE) Prerequisite(s): 102 or 118.

454 20th-Century International Novel (3) Fiction in English translation from such writers as Kafka and Camus through contemporary authors. (Same as Comparative Literature 454.) (RE) Prerequisite(s): 102 or 118.

455 Persuasive Writing (3) Focuses on writing and analyzing persuasive texts in public, private, and academic contexts. (WC) (RE) Prerequisite(s): 355.

456 Contemporary/Postmodern Literature (3) Studies in literature written after World War II. Content will vary. Repeatability: May be repeated with consent of instructor. Maximum 6 hours. (RE) Prerequisite(s): 102 or 118.

460 Technical Editing (3) Editing technical material for publication. Principles of style, format, graphics, layout, and production management. (RE) Prerequisite(s): 360.

462 Writing for Publication (3) Principles and practices of writing for publication. Dissertations, theses, articles, and reports in science and technology. (RE) Prerequisite(s): 360.

463 Advanced Poetry Writing (3) Development of skills acquired in basic poetry-writing course. (RE) Prerequisite(s): 363.

464 Advanced Fiction Writing (3) Development of skills acquired in basic fiction-writing course. (RE) Prerequisite(s): 364.

466 Writing, Layout, and Production of Technical Documents (3) Principles of design for desktop publishing. Production of various documents to be incorporated into a professional portfolio. (RE) Prerequisite(s): 360.

470 Special Topics in Rhetoric (3) Topics vary. Repeatability: May be repeated with consent of department. Maximum 6 hours. (RE) Prerequisite(s): 355.

471 Sociolinguistics (3) Language in relation to society. Empirical and theoretical focus. Emphasis on large-scale units—tribes, nations, social groups. (Same as Linguistics 471.) (DE) Prerequisite(s): 371 or 372 or Linguistics 200.

472 American English (3) Phonological, morphological, and syntactic characteristics of major social and regional varieties of American English, with attention to their origins, functions, and implications for cultural pluralism. (Same as Linguistics 472.) (DE) Prerequisite(s): 371 or 372 or Linguistics 200.

474 Teaching English as a Second or Foreign Language I (3) Introduces major issues surrounding teaching ESL/EFL, including political implications of teaching ESL/EFL; introduction to second language acquisition; learner variables in language learning; traditional and innovative approaches to ESL/EFL; basic features of American English grammar necessary for teaching ESL. (Same as Linguistics 474.) (RE) Prerequisite(s): 102 or 118. Recommended Background: Second year of a foreign language.

476 Second Language Acquisition (3) How humans learn second languages. Examines theoretical models and research on such issues as differences between first and second language acquisition; the effect of age; cognitive factors in second language acquisition; learner variables; sociocultural factors; and implications for second/foreign language instruction. (Same as Linguistics 476.) (RE) Prerequisite(s): 102 or 118.

477 Pedagogical Grammar for ESL Teachers (3) Aspects of English syntax and morphology presenting difficulties for non-native learners of English. Basic and complex sentence structures; the noun and article system; and verb tense, aspect, modality, and complementation. (Same as Linguistics 477.) (RE) Prerequisite(s): 102 or 118.

479 Literary Criticism (3) Historical survey of major works of literary criticism. (RE) Prerequisite(s): 102 or 118.

480 Fairy Tale, Legend, and Myth: Folk Narrative (3) Study of forms of folk narrative: normally includes Grimm’s, Andersen’s, Irish, English, Appalachian, African, and Native American tales. (RE) Prerequisite(s): 102 or 118.

481 Studies in Folklore (3) Topic varies. Repeatability: May be repeated if topic differs. Maximum 6 hours. (RE) Prerequisite(s): 102 or 118.

482 Major Authors (3) Content varies. Concentrated study of at least one of the most influential writers in British or American literary history (e.g., Donne, Pope, Austen, Tennyson, Whitman, Faulkner, Lawrence, Baldwin, or Morrison). Repeatability: May be repeated. Maximum 6 hours. (RE) Prerequisite(s): 102 or 118.

483 Special Topics in Literature (3) Topic varies. Repeatability: May be repeated. Maximum 6 hours. (RE) Prerequisite(s): 102 or 118.

484 Special Topics in Writing (3) Original writing integrated with reading, usually taught by a professional author. Repeatability: May be repeated. Maximum 6 hours. (RE) Prerequisite(s): 102 or 118.

485 Special Topics in Language (3) (Same as Linguistics 485.) Repeatability: May be repeated with consent of department. Maximum 6 hours. (RE) Prerequisite(s): 102 or 118.

486 Special Topics in Criticism (3) Content varies. Special topics in theoretical and practical approaches to British and American literature. Repeatability: May be repeated with consent of department. Maximum 6 hours. (RE) Prerequisite(s): 102 or 118.

489 Special Topics in Film (3) Content varies. Particular directors, film genres, national cinema movements, or other topics. (Same as Cinema Studies 489.) Repeatability: May be repeated with consent of department. Maximum 6 hours. (RE) Prerequisite(s): 102 or 118.

491 Foreign Study: Drama in Stratford and London (1-4) Seeing, studying, and writing about drama as performed in London and Stratford-upon-Avon during the summer. Repeatability: May be repeated once with instructor’s permission. (RE) Prerequisite(s): 102 or 118.

492 Off-Campus Study: Drama in New York (3) Seeing, studying, and writing about drama as performed in New York City. (RE) Prerequisite(s): 102 or 118.

493 Independent Study (1-6) Tutorial in subjects not adequately covered in regular courses. Repeatability: May be repeated. Maximum 6 hours. (RE) Prerequisite(s): 102 or 118.

495 Introduction to Rhetoric and Composition (3) Introduction to the historical, theoretical, and empirical modes of inquiry in rhetoric and composition and their implications for the teaching of composition. (RE) Prerequisite(s): 355.

496 The Rhetoric of Legal Discourse (3) Applying basic principles of persuasive writing to legal materials. Writing position papers, briefs, and memoranda, students learn issue identification and argument. Critical reading and discussion of both professional and student writing. Introductory legal research techniques. No prior legal knowledge necessary. (Same as Legal Studies 496.) (RE) Prerequisite(s): 355.

498 Senior Honors Thesis (3) Second semester of English honors program. Working individually, the student produces a substantial critical or creative project under the direction of two members of the professorial staff. (RE) Prerequisite(s): 398.

499 Senior Seminar (3) Intensive study of an author, period, genre, or problems in language, literary history, or theory. Content varies, but all sections address problems of value from an interdisciplinary perspective. Substantial research paper required. Capstone experience. Writing-emphasis course. (WC) (RE) Prerequisite(s): 102 or 118. Comment(s): Completion of 15 upper-division hours in English required. Registration Restriction(s): English major.

English Education (340)

141 Efficient Reading and Study Skills (2) Improvement of reading comprehension and rate, intensive vocabulary enrichment, study skills as they relate to content area subjects. Grading Restriction: Satisfactory/No Credit grading only.
456 Teaching Speech and Drama, Grades 7-12 (3) Purposes, techniques, materials and evaluation for teaching speech and drama in secondary schools. Required for certification in speech. Registration Restriction(s): Qualification – admission to teacher education.

459 Teaching English in the Secondary School (3) Techniques of teaching composition, language, and literature. Registration Restriction(s): Qualification – admission to teacher education.

460 Teaching Reading and Literature in the Secondary School (3) Teaching basic reading skills and literature.

Environmental and Soil Sciences (345)

120 Soils and Civilizations (3) Investigation of the close linkage between soil conservation and degradation and the consequences to ancient civilizations and environmental degradation and its societal impacts during modern times. Comparison of past soil management practices to present-day issues of soil salinization, erosion, and siltation. Introduction to the role of soil resources in current global environmental issues and conflicts. (CC)

210 Introduction to Soil Science (4) Differences in soils: soil genesis; physical; chemical; and biological properties of soil; relation of soil to land use and pollution; soil management relative to tillage, erosion, moisture supply, temperature, aeration, fertility and plant nutrition. Contact Hour Distribution: 3 hours lecture and one 2-hour lab.

220 Waters and Civilizations (3) Investigation and discussion of the societal impacts on ancient and modern civilizations of water issues including irrigation, flood control, droughts and desertification, dam construction, aquifers, drinking water, water pollution, and water rights. (CC) Contact Hour Distribution: 3 hours lecture.

242 Soil Morphology (1) Intensive course involving describing, classifying and interpreting soils in preparation for regional and national soil judging contests. Contact Hour Distribution: 1 hour and 1 lab. Repeatability: May be repeated. Maximum 4 hours. Registration Permission: Consent of instructor.

301 Professional Development (1) Techniques of effective professional communications; professional ethics; interviewing and the job search. (OC) Registration Restriction(s): Minimum student level – junior.

324 Soil and Water Conservation (3) Investigation of hydrologic principles regarding soil and water conservation. Topics include: hydrologic cycle, water quality, soil properties, erosion prediction and control, and techniques to protect natural resources. Contact Hour Distribution: 2 hours lecture and one 2-hour lab. (RE) Prerequisite(s): 210. (RE) Prerequisite(s): 210.

334 Soil Nutrient Management and Fertilizers (3) Influence of soil properties on nutrient availability to plants. Management of inorganic and organic fertilizer materials and the determination of their fate in the soil-plant system. Nutrient management as it relates to agricultural sustainability and soil quality. Contact Hour Distribution: 2 hours and 1 lab. (RE) Prerequisite(s): 210.

355 Environmental Soil Biology (3) Biology and biochemistry of the soil environment as it applies to environmental and agricultural processes. Topics include microbial ecology, biogeochemical cycling of soil elements, soil quality and biomediation. (RE) Prerequisite(s): Biochemistry 110 and Microbiology 210.

359 Teaching English in the Secondary School (3) Techniques of teaching composition, language, and literature. Contact Hour Distribution: 2 hours and 1 lab.

405 Mycology (3) Identification, biology and control of pathogens associated with specific host production operations. (RE) Prerequisite(s): 100. Credit Restriction: Students receive credit for both 405 and 505. Recommended Background: Biology 130 and Ecology and Evolutionary Biology 110.

410 Diseases and Insects of Ornamental Plants (3) Symptoms, identification and management of diseases and insect pests that affect plants in greenhouse, nursery, and landscape environments.

411 Forest Insects and Diseases (3) Insects and pathogens associated with trees and shrubs will be identified and their impacts on host plants evaluated.

422 Internship (1-6) Supervised experience with a departmentally-approved employer. Student is responsible for making arrangements. Requirements include maintaining a daily log, supervisor evaluations, and a final report. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor.

424 Soil Genesis and Classification (3) Soil genetics and formation; observing and describing morphology of agricultural and forest soils; chemical and physical properties, classification. Includes 3 weekend field trips. Contact Hour Distribution: 2 hours and 1 lab. (RE) Prerequisite(s): 210.

444 Transport Processes in Soil (3) Basic understanding of soil physical properties and processes; influence of soil physical properties on water and chemical movement in soil; practical experience in the measurement and analysis of soil physical properties, water flow, and chemical movement in soil. (RE) Prerequisite(s): 210 and Physics 221.

462 Environmental Climatology (3) Study of atmosphere as environment. Physical, chemical and biological factors affecting climates of various earth environments; meteorological process affecting biosystems. Climatic change and the human impact on the atmosphere, consequences of climatic change and mitigation policies, microclimates and urban climates, atmospheric pollution, extreme events and ozone depletion. Design and operation of weather information systems; automated weather stations. Recommended Background: Computer proficiency.

493 Problems in Environmental and Soil Sciences (1-3) Special research problems in environmental sciences. Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor.

Exercise Science (347)

100 Orientation to Exercise Science (1) Overview of discipline and professional areas for incoming exercise science majors. Must be taken prior to admission to the exercise science major.

260 Exercise Science Practicum (1) First practicum experience to support and clarify career goals. Grading Restriction: Satisfactory/No Credit grading only. (RE) Prerequisite(s): 100.
325 Athletic Training Techniques (3) Prevention of athletic injuries through sound conditioning programs and practices; recognition and immediate treatment of injuries.

(Re) Prerequisite(s): 332.
Registration Restriction(s): Exercise science major.

332 Applied Anatomy (3) Structure and roles of bones, joints and muscles in human movement and exercise; related biomechanical principles.

350 Physical Activity Epidemiology (3) Epidemiological examination of the relationship of physical activity with the morbidity and mortality of chronic disease and related risk factors.

380 Special Topics (1-3) Study in selected disciplinary or professional areas of exercise science.

Repeatability: May be repeated. Maximum 6 hours.

411 Physical Activity for Special Populations (3) Nature of various disabilities and implications for physical activity programming. Course requirements include out-of-class practicum working with individuals who have disabilities.

(Re) Prerequisite(s): 332.
Registration Restriction(s): Exercise science major; 2.5 GPA.

414 Fitness Testing and Exercise Prescription (3) Relationship of exercise to cardiorespiratory function, body composition, strength and flexibility. Measurement and evaluation of fitness in normal populations.

(Re) Prerequisite(s): Biochemistry and Cellular and Molecular Biology 230.
Registration Restriction(s): Exercise science major; 2.5 GPA.


(Re) Prerequisite(s): 332 and Physics 221.
Registration Restriction(s): Exercise science major; 2.5 GPA.

426 Exercise Science Practicum II (1-6) Supervised experience in exercise/fitness areas.

Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 10 hours.
Registration Restriction(s): 2.5 GPA.

440 Strength and Conditioning Programs (3) Covers scientific and practical foundations of strength and conditioning programs and program design applied to healthy adults, athletes, youth, and older adults. Provides teaching experiences with young adults and requires the development of educational materials. This course is designed to prepare students for nationally recognized strength and conditioning certification exams.

(Re) Prerequisite(s): 332 and Biochemistry and Cellular and Molecular Biology 230.
(De) Prerequisite(s): Physical Education 252.
Registration Restriction(s): Exercise science major; 2.5 GPA.

480 Physiology of Exercise (3) Lecture and laboratory class dealing with function of the body in muscular work. Topics include physiological aspects of fatigue, training, and adaptation to environment. (Same as Biochemistry and Cellular and Molecular Biology 480.)
Contact Hour Distribution: 2 lectures and 1 lab.
(Re) Prerequisite(s): Biochemistry and Cellular and Molecular Biology 230 or Biochemistry and Cellular and Molecular Biology 440.
(De) Prerequisite(s): 426.
Registration Restriction(s): Exercise science major; 2.5 GPA.

490 Exercise Physiology/Fitness Internship (12-15) Full-time practicum in exercise/fitness at approved agency.

Grading Restriction: Satisfactory/No Credit grading only.
(Re) Prerequisite(s): 414 and 422.
Registration Restriction(s): Exercise science major; 2.5 GPA.
Registration Permission: Consent of instructor.

493 Directed Independent Studies (1-3) Independent study in a specialized area with exercise science.

Repeatability: May be repeated. Maximum 9 hours.
Registration Restriction(s): Exercise science major; 2.5 GPA.
Registration Permission: Consent of instructor.

497 Honors Research Project (3-6) Senior research project done under supervision of a faculty member. Includes design of research project, writing proposal for institutional review board approval, data collection and analysis, and presentation of results. Project should be approved with two semesters of study remaining.
Registration Restriction(s): Minimum student level—senior.

Finance (349)

301 Financial Management (3) Principles of financial management. Investment, financing and asset management functions of the firm.

(Re) Prerequisite(s): Business Administration 201.

402 Special Topics in Finance (3-6) Junior- and senior-level finance seminar.
Repeatability: Not repeatable for credit. May be taken once for 3-6 hours.
(Re) Prerequisite(s): 301.
(Re) Corequisite(s): Accounting 301.
Registration Restriction(s): Majors in the College of Business Administration.

425 Investment and Portfolio Management (3) Rigorous introduction to the fundamental principles and concepts of the valuation of stocks and bonds (financial assets) in competitive and efficient financial markets. Risk and return analysis of portfolios of financial assets, capital market theory, security market theory, and financial market microstructure.

(Re) Prerequisite(s): 301.
(Re) Corequisite(s): Accounting 301.
Registration Restriction(s): Majors in the College of Business Administration.

435 Financial Markets and Institutions (3) Examine the process of capital formation and allocation, including an evaluation of money and capital markets. Study the theories and mathematics of interest rate determination and characterize the financial services firms, which participate in these markets. Review the corporate policies and practices of financial service firms, including management of interest-rate, default, technology, and regulatory risks.

(Re) Prerequisite(s): 301.
(Re) Corequisite(s): Accounting 301.
Registration Restriction(s): Majors in the College of Business Administration.

455 Financial Management: Theory and Practice (3) Decision-making topics in financial management including valuation, capital budgeting under uncertainty, cost of capital, capital structure theory and dividend policy. Major writing requirement.

(Re) Prerequisite(s): 425.
Registration Restriction(s): Majors in the College of Business Administration.

475 Insurance and Financial Planning Management (3) Course will cover the basic principles of risk management and insurance; and the basic principles of financial, estate, and retirement planning.

(Re) Prerequisite(s): 301.
(Re) Corequisite(s): Accounting 301.
Registration Restriction(s): Majors in the College of Business Administration.

485 Real Estate Finance and Investment Analysis (3) Explores the utilization of cash flow models to evaluate the financing of and investment in real property. In addition to examining financial feasibility analysis in detail, emphasis is also placed on understanding the factors influencing the dynamics of urban land markets and the government policy issues that must be addressed in urban areas.

(Re) Prerequisite(s): 301.
(Re) Corequisite(s): Accounting 301.

492 Off-Campus Study (1-3) Professional internship with practicing professionals under the direction of a faculty member.

Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 3 hours.
Credit Restriction: Free elective credit only.
Registration Restriction(s): Finance major.
Registration Permission: Consent of instructor.

493 Independent Study (1-3)
Grading Restriction: Letter grade only.
Repeatability: May be repeated. Maximum 3 hours.
Registration Restriction(s): Finance major.
Registration Permission: Consent of instructor.

495 Investment Fund Management (1-3) Members of this class (or investment team) manage over a half-million dollar portfolio of common stocks on behalf of the Tennessee Valley Authority (TVA). This team also engages in a 25-university investment performance competition sponsored by TVA.
Repeatability: May be repeated. Maximum 3 hours.
Comment(s): 3.0 in all upper-division business courses required.
Registration Permission: Consent of instructor.

First Year Studies (355)

101 First Year Studies (1) Integration into the academic community, including the nature and purpose of a college education, expectations for academic success, organization of university disciplines, and special emphasis on academic and career planning. Meets once a week.
Grading Restriction: A, B, C, No Credit grading.

401 Peer Mentor Techniques (1) Training of upper-class students as mentors and advisors for freshmen. Includes cognitive and developmental theories of the college-age student, teaching and learning styles, group communication and listening techniques, mentoring and advising skills.

Registration Permission: Consent of instructor.
402 Peer Mentor Practicum (1) Peer mentoring of first year studies students. 
Grading Restriction: Satisfactory/No Credit grading only.
(Re) Prerequisite(s): 401.
Registration Permission: Consent of instructor.

Food Science and Technology (390)
101 Science of Foods (3) (See Hotel, Restaurant, and Tourism 101.)
150 History and Culture of Food (3) Impact of people and historical events on the production, distribution, and consumption patterns of food; the role of food as an indicator of cultural, societal, and historical changes around the world; major, technological advances in food processing and 

events on the production, distribution, and consumption patterns of food; 

preservation processes, refrigeration, freezing, evaporation, psychrometry, 

control.

420 Field Observations in Food Processing (3) Introduction to, observation of and familiarization with processing, packaging, quality control and distribution of different types of foods.
Contact Hour Distribution: 3 hours lecture.

269 Meat Evaluation and Grading (2) Grading standards for quality and yield; principles for evaluating beef, pork and lamb, and application of standards for institutional meat cuts. Practice grading, judging carcasses and cuts, and application of purchase specifications.

301 Professional Development (1) Professional development requirements, resources and opportunities. Individual written and oral report and group discussion on careers and food companies.
Registration Restriction(s): Minimum student level – sophomore.

290 Food Preservation and Packaging (3) Principles, methods and equipment used for preservation of foods.
Contact Hour Distribution: 2 hours lecture and 1 lab.
Recommended Background: Microbiology 210.

401 Professional Food Science Communication (1) Individual reports and group discussion on current topics.
Repeatability: May be repeated. Maximum 3 hours.
Registration Restriction(s): Minimum student level – junior.

410 Food Chemistry (3) Reactions of water, proteins, lipids, carbohydrates, minerals, enzymes, vitamins, and additives in foods.
Contact Hour Distribution: 3 hours lecture.
(Re) Prerequisite(s): Chemistry 110 or Chemistry 350.

415 Food Analysis (4) Principles, methods and techniques for qualitative and quantitative analyses of composition and physical, chemical, and biological properties of food and food ingredients.
Contact Hour Distribution: 3 hours and one 2-hour lab.
(Re) Prerequisite(s): Chemistry 110 or 350.

419 Food Chemistry Lab (1) Interaction of water, proteins, lipids, carbohydrates, minerals, enzymes, vitamins, and additives in foods and methods of evaluation of chemical properties of foods.
Contact Hour Distribution: One 2-hour lab.
(Re) Corequisite(s): 410.

420 Food Microbiology (2) Physical, chemical and environmental factors moderating growth and survival of foodborne microorganisms; pathogenic and spoilage microorganisms affecting quality of foods and their control.
(Re) Prerequisite(s): Microbiology 210 or Microbiology 310.

429 Food Microbiology Lab (3) Methods for examination, enumeration, cultivation and identification of foodborne microorganisms.
(Re) Corequisite(s): 420.

430 Sensory Evaluation of Food (3) Principles and methods of sensory evaluation of foods.
Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: A statistics course.

441 Food Engineering (3) Units and dimensions, physical properties, transport processes, fluid flow, heat transfer, thermal and nonthermal preservation processes, refrigeration, freezing, evaporation, psychrometrics, mass transfer, membrane separations, dehydration.
Contact Hour Distribution: 2 hours and one 2-hour lab.
(Re) Prerequisite(s): Physics 101 or Physics 221.

442 Special Topics in Food Science and Technology (1-3) Topics of current concern to the food industry.
Repeatability: May be repeated. Maximum 9 hours.

445 Application of Food Chemistry and Processing Principles (4) Interactions and functions of dairy, egg, cereal and other plant based ingredients during the production and storage of processed food products.
Contact Hour Distribution: 3 hours lecture and 1 lab.
(Re) Prerequisite(s): 410 and 340.

461 Fresh Meats (3) Basic principles in the conversion of muscle to meat and the factors that contribute to the utilization and marketing of quality fresh meat products.

462 Manufactured Meat Technology (2) Basic principles of manufacturing value-added meat products.
Contact Hour Distribution: 1 hour lecture and 1 hour lab.

490 Food Laws and Regulations (3) A comprehensive examination of the laws and regulations designed to preserve the safety, wholesomeness, and nutritional quality of the United States food supply with an in-depth analysis and discussion of precedent case studies and their impacts on laws and regulations.
Comment(s): Core courses in food science and technology will serve as an essential basis for understanding of material covered in this course.
Registration Restriction(s): Minimum student level – senior.

491 Practical Experience in Food Science and Technology (1-12) 
Specialized research in an area of interest under faculty direction. Field experience in supervised internship in the food industry.
Repeatability: May be repeated. Maximum 12 hours.

495 Quality Assurance and Sanitation Practices (3) Design and evaluation of a food processing operation to produce a safe and acceptable quality food product.
Registration Restriction(s): Minimum student level – senior.

Foreign Language/ESL Education (394)
100 Foundations of World Languages (3) Introduction to modern foreign languages and Latin. Required for certification in modern foreign languages and Latin.
Recommended Background: Completion or near completion of foreign language hours for certification.
Registration Restriction(s): Qualification – admission to teacher education.

Forestry (396)
100 Forests and Forestry in American Society (3) Introductory course examining the role of forests in shaping American culture and society and exploring the evolution of the forestry profession in North America.

214 Tree Biology (3) An introduction to the anatomy and development of woody plants, their reproduction, growth requirements, and function.
(Re) Prerequisite(s): Biology 111 or 101.

215 Forest Ecology (3) Ecological interactions among tree species, other plant and animal species, and their environment. Forest ecosystem classification; energy, nutrient, and hydrologic cycles; site quality. Perturbations and growth, survival and forest composition; forest succession; fire ecology. Regeneration ecology through establishment and stand dynamics. Physiological ecology, ecological strategies, and adaptations of trees.
Contact Hour Distribution: 2 hours and 1 lab.
(Re) Prerequisite(s): Forestry, Wildlife and Fisheries 212.

305 Prescribed Fire Management (2) Prescribed fire ecology, use, and management in forest stands.
Grading Restriction: Satisfactory/No Credit grading only.
(Re) Prerequisite(s): Forestry, Wildlife and Fisheries 312.

306 Forest Protection (3) Biological and economic considerations of native and exotic pathogens, insects, and vertebrates, and damage from weather in the forest ecosystem. One or more all day or overnight field trips may be required.
Contact Hour Distribution: 2 hours and 1 lab.
(Re) Prerequisite(s): Forestry, Wildlife and Fisheries 212.

314 Economics of Forest and Wildland Resources (2) Basic principles of forest resource economics; microeconomic applications in forestry; non-market valuation and analysis; financial analyses of private and public forest resource management decisions.
(Re) Prerequisite(s): Economics 210.

321 Wildland Recreation (3) Philosophical foundation of recreation; planning, development, and management of forest recreation resources; interpretation of forest resources. Overnight weekend field trips may be required. (WC)

322 Silvicultural Practices (2) Application of silvicultural techniques: tree improvement; use of herbicides; fire management.
(Re) Prerequisite(s): Forestry, Wildlife and Fisheries 312.
(Re) Corequisite(s): 305 and 323.

323 People and Forest Practices (1) Examination of how people, institutions and society at large affect and are affected by forest management practices. Case studies and field applications will concentrate on the wide variety of linkages that exist in society among people and forests. Application of basic skills of collaborative problem solving will be emphasized. Overnight field trips are required.
Grading Restriction: Letter grade only.
(Re) Corequisite(s): 305 and 322.
326 Land Measurement Techniques (2) Surveying techniques; road layout and construction as applied to forestry; timber harvest techniques. (RE) Prerequisite(s): Forestry, Wildlife and Fisheries 313. (RE) Corequisite(s): 305 and 323.

329 Forest Resource Inventory (3) Tree, log and lumber scaling and grading; land inventory and stand mapping; volume estimation. (RE) Prerequisite(s): Forestry, Wildlife and Fisheries 313. (RE) Corequisite(s): 305 and 323.

330 Ecosystem Prescription Preparation (1) Analysis of resources on assigned tract of land and synthesis of situation to address problem assigned. Oral presentation and written report required. (RE) Corequisite(s): 305 and 323.

331 Wood Properties and Uses (2) Wood as a biological material; detailed examination of the woody cell wall; influence of environmental and site conditions on wood formation; physical and mechanical properties of wood and the relationship of the woody cell wall to these properties; wood use in important commercial products. Day field trip may be required. (RE) Prerequisite(s): Biology 112. (RE) Corequisite(s): 332.

332 Wood Identification (1) Cell structure and arrangement as a tool for species identification; microscopic and hand lens identification of important commercial softwoods, hardwoods and foreign woods; laboratory procedures for making temporary slides for microscopic examination; student use of reference collection of wood samples. Day field trip may be required. (RE) Prerequisite(s): Forestry, Wildlife and Fisheries 212. (RE) Corequisite(s): 331.

414 Tree Physiology (3) Tree structure, growth and development, and function, and how these are related to the environment and to cultural practices. Influence of environmental variables on plant growth and distribution; effects of forest management practices on growth and function. Credit Restriction: Students cannot receive credit for both 414 and 514. (RE) Prerequisite(s): Biology 112 or Biology 102.

415 Forest Conservation Workshop (1-3) How forest biology, ecology and management relate to conservation issues, how current conservation issues can be integrated into classroom work and student projects, environmental education strategies. Repeatability: May be repeated. Maximum 3 hours. Credit Restriction: May not be taken by forestry or wildlife and fisheries majors. Registration Permission: Consent of instructor.

420 Forest Resource Management (3) Introduction to forest-level management concepts from an economic perspective. Harvest determination; goal setting under multiple-use concepts; taxes; classical approaches to regulation, linear programming and harvest scheduling; goal programming.

422 Forest and Wildland Resource Policy (3) Policy formulation; criteria for policy determination; forest and wildland law and regulation; theory of conflict resolution; formal and informal resolution. Registration Restriction(s): Minimum student level – senior.

423 Wildland Recreation Planning and Management (3) Planning processes, master and site planning, site design projects; management strategies, methods of visitor and recreation site management; case studies. Weekend field trips may be required. Contact Hour Distribution: 2 hours and 1 lab.

492 Practicum in Forestry (1-6) Supervised experience at departmental-approved employment location. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 6 hours. Registration Restriction(s): Minimum student level – junior.

493 Independent Study in Forestry (1-15) Special research or individual problem in forestry. Repeatability: May be repeated. Maximum 15 hours. Registration Permission: Consent of instructor.

495 Internship in Wildland Recreation (1-6) A highly structured field experience guided by specific learning objectives. Students earn one credit per two weeks of full-time field experience. The student is responsible for field placement. Must be pre-approved by the instructor and the field supervisor. Repeatability: May be repeated. Maximum 6 hours. Registration Restriction(s): Minimum student level – junior.

496 Internship in Forestry (1-6) Supervised experience at departmental-approved employment location arranged by the student. Students earn one credit per two weeks of full-time field experience. Internship learning objectives must be pre-approved by the advisor/instructor and the field supervisor. Daily log, supervisor evaluations, and final report required. Repeatability: May be repeated. Maximum 6 hours. Registration Restriction(s): Minimum student level – junior.

Forestry, Wildlife and Fisheries (398)

211 Introduction to Forestry, Wildlife and Fisheries (3) History of natural resources policies and practices; social perspectives and attitudes concerning natural resources and their use; techniques of integrated natural resources management, ecological principles, current policies, social trends, and forest and wildland resource use.

212 Dendrology and Silvics of North American Trees (3) Identification, classification, and nomenclature of important North American trees and wooly shrubs; forest associations; silvicultural characteristics of trees and stands as the basis for the practice of silviculture. Day field trips may be required. Contact Hour Distribution: 2 hours and 1 lab. (RE) Prerequisite(s): Biology 102 or Biology 112.

250 Conservation (3) Use and abuse of wildland resources. Historical perspectives and current management of forests, wildlife, and fish of North America including aspects of outdoor recreation and pollution problems. (NS)

312 Principles of Silviculture (3) Principles for treating forest stands to achieve selected objectives. (WC) Contact Hour Distribution: 2 hours and 1 lab. (RE) Prerequisite(s): Statistics 201.

313 Measurements and Sampling (2) Measurement techniques and sampling methods for vegetation; estimation of animal populations; map and aerial photo use. Contact Hour Distribution: 1 hour and 1 lab. (RE) Prerequisite(s): Statistics 201.

317 Principles of Wildlife and Fisheries Management (3) Ecological relationships of wild animals with other animals and their habitats. Biological, social and economic aspects of their management. (RE) Prerequisite(s): Chemistry 100 or 120.

410 Wildlife Habitat Evaluation and Management (3) Ecological relationships between wildlife and their habitat. Evaluation, modeling, and management of wildlife habitat. Effects of land-use practices on wildlife habitat. Weekend field trips required. Contact Hour Distribution: 2 hours and 1 lab. (RE) Prerequisite(s): 317.

412 Managing Natural Resource Organizations (3) Human, bureaucratic and managerial factors influencing the effectiveness of natural resource organizations. Alternative stakeholder and public involvement objectives, strategies and mechanisms including client-customer, partnership and adversarial. Conflict resolution, proactive collaborative problem solving and alliance building. Contact Hour Distribution: 2 hours and 1 lab. (RE) Prerequisite(s): 317.

416 Planning and Management of Forest, Wildlife and Fisheries Resources (3) Integrated forest and wildland resource management through developing land management plans and analyzing case studies including conflict resolution. Contact Hour Distribution: 1 hour and 2 labs. Registration Restriction(s): Minimum student level – senior.

420 International Natural Resource Issues (2) Identification and analyses of issues regarding forestry, wildlife, fisheries, and associated natural resources beyond U.S. borders. Biophysical, economic, and cultural elements impacting natural resources at the international level. Cases – Northern Europe, Latin America, Indonesia, and Africa.

French (405)

111 Elementary French (3) Language laboratory required. Credit Restriction: Not available to students eligible for 150.

112 Elementary French (3) Language laboratory required. Credit Restriction: Not available to students eligible for 150. (RE) Prerequisite(s): 111.

150 Intermediate French Transition (3) This course is designed to prepare students for enrollment in 211. Credit Restriction(s): For elective credit only. Since 150 is a review of elementary French, students who receive credit in this course may not also receive credit for any other 100-level French course and, therefore, also forfeit the 6 hours of elementary language credit awarded through placement examination.

211 Intermediate French (3) (CC) (RE) Prerequisite(s): 150 or 112 or departmental placement exam. Contact(s): Students who place in 200-level courses from high school will receive 6 hours of elementary French credit.

212 Intermediate French (3) (CC) (RE) Prerequisite(s): 211. Contact(s): Students who place in 200-level courses from high school will receive 6 hours of elementary French credit.
<table>
<thead>
<tr>
<th>COURSES OF INSTRUCTION</th>
<th>231</th>
</tr>
</thead>
<tbody>
<tr>
<td>217 Honors: Intermediate French (3)</td>
<td></td>
</tr>
<tr>
<td>For students of superior ability in</td>
<td></td>
</tr>
<tr>
<td>French. Students follow enriched</td>
<td></td>
</tr>
<tr>
<td>program with emphasis on speaking</td>
<td></td>
</tr>
<tr>
<td>ability and reading, including</td>
<td></td>
</tr>
<tr>
<td>literary selections (CC)</td>
<td></td>
</tr>
<tr>
<td>Comment(s): Incoming freshmen admitted</td>
<td></td>
</tr>
<tr>
<td>on basis of diagnostic test, high</td>
<td></td>
</tr>
<tr>
<td>school average, and performance on</td>
<td></td>
</tr>
<tr>
<td>ACT.</td>
<td></td>
</tr>
<tr>
<td>218 Honors: Intermediate French (3)</td>
<td></td>
</tr>
<tr>
<td>For students of superior ability in</td>
<td></td>
</tr>
<tr>
<td>French. Students follow enriched</td>
<td></td>
</tr>
<tr>
<td>program with emphasis on speaking</td>
<td></td>
</tr>
<tr>
<td>ability and reading, including</td>
<td></td>
</tr>
<tr>
<td>literary selections. (CC)</td>
<td></td>
</tr>
<tr>
<td>(RE) Prerequisite(s): 217.</td>
<td></td>
</tr>
<tr>
<td>Comment(s): Incoming freshmen are</td>
<td></td>
</tr>
<tr>
<td>admitted on the basis of diagnostic</td>
<td></td>
</tr>
<tr>
<td>test, high school average, and</td>
<td></td>
</tr>
<tr>
<td>performance on ACT. Students with a</td>
<td></td>
</tr>
<tr>
<td>grade of A in 211 may enter 218 with</td>
<td></td>
</tr>
<tr>
<td>permission of instructor. Credit for</td>
<td></td>
</tr>
<tr>
<td>300 is given to students receiving</td>
<td></td>
</tr>
<tr>
<td>a grade of A or B in 218.</td>
<td></td>
</tr>
<tr>
<td>300 Transitional Grammar Review and</td>
<td></td>
</tr>
<tr>
<td>Reading (3) For students who</td>
<td></td>
</tr>
<tr>
<td>have completed the intermediate-level</td>
<td></td>
</tr>
<tr>
<td>sequence and who need additional</td>
<td></td>
</tr>
<tr>
<td>preparation in reading comprehension,</td>
<td></td>
</tr>
<tr>
<td>vocabulary acquisition, and key</td>
<td></td>
</tr>
<tr>
<td>areas of grammar. Credit Restriction:</td>
<td></td>
</tr>
<tr>
<td>May not be applied toward the major</td>
<td></td>
</tr>
<tr>
<td>or minor. (RE) Prerequisite(s): 212 or</td>
<td></td>
</tr>
<tr>
<td>218.</td>
<td></td>
</tr>
<tr>
<td>301 Elements of French for Upper</td>
<td></td>
</tr>
<tr>
<td>Division and Graduate Students (3)</td>
<td></td>
</tr>
<tr>
<td>Elements of language, elementary and</td>
<td></td>
</tr>
<tr>
<td>advanced readings. Grading Restriction: No auditors. Credit Restriction: No credit for students who have completed 111 and 112 or equivalent. Comment(s): Open to graduate students (for undergraduate credit) preparing for language examinations and upper-division students desiring reading knowledge of the language.</td>
<td></td>
</tr>
<tr>
<td>302 Elements of French for Upper</td>
<td></td>
</tr>
<tr>
<td>Division and Graduate Students (3)</td>
<td></td>
</tr>
<tr>
<td>Elements of language, elementary and</td>
<td></td>
</tr>
<tr>
<td>advanced readings. Grading Restriction: No auditors. Credit Restriction: No credit for students who have completed 111-112 or equivalent. Comment(s): Open to graduate students (for undergraduate credit) preparing for language examinations and upper-division students desiring reading knowledge of the language.</td>
<td></td>
</tr>
<tr>
<td>333 Intermediate Composition and</td>
<td></td>
</tr>
<tr>
<td>Grammar (3) Emphasizes writing skills. Review of major grammatical points in French. (RE) Prerequisite(s): 212 or 218.</td>
<td></td>
</tr>
<tr>
<td>334 Intermediate Conversation (3)</td>
<td></td>
</tr>
<tr>
<td>Emphasizes speaking skills. Further</td>
<td></td>
</tr>
<tr>
<td>review of French grammar. Required of all French majors. (RE) Prerequisite(s): 333.</td>
<td></td>
</tr>
<tr>
<td>345 French for Business (3)</td>
<td></td>
</tr>
<tr>
<td>Contemporary French language as it</td>
<td></td>
</tr>
<tr>
<td>applies to business transactions.</td>
<td></td>
</tr>
<tr>
<td>Understanding and composing business</td>
<td></td>
</tr>
<tr>
<td>letters; oral communication and</td>
<td></td>
</tr>
<tr>
<td>elements of French culture related to</td>
<td></td>
</tr>
<tr>
<td>good business practices. Credit</td>
<td></td>
</tr>
<tr>
<td>Restriction: Either 334 or 345 may be</td>
<td></td>
</tr>
<tr>
<td>applied toward the major, but not both. (RE) Prerequisite(s): 333.</td>
<td></td>
</tr>
<tr>
<td>351 History of French Literature (3)</td>
<td></td>
</tr>
<tr>
<td>Chronological view of French literature in relation to the specific historical developments that have influenced it. (RE) Prerequisite(s): 333.</td>
<td></td>
</tr>
<tr>
<td>352 History of French Literature (3)</td>
<td></td>
</tr>
<tr>
<td>Chronological view of French literature in relation to the specific historical developments that have influenced it. (RE) Prerequisite(s): 333.</td>
<td></td>
</tr>
<tr>
<td>400 Consecutive and Simultaneous</td>
<td></td>
</tr>
<tr>
<td>French-English and English-French</td>
<td></td>
</tr>
<tr>
<td>Translation (3) Consecutive translation to and from English. Introduction to simultaneous translation to English. (RE) Prerequisite(s): 333.</td>
<td></td>
</tr>
<tr>
<td>410 Medieval French Literature (3)</td>
<td></td>
</tr>
<tr>
<td>Major representative works of Medieval French literature. Texts in modern French. Writing-emphasis course. (Same as Medieval Studies 410.) (RE) Prerequisite(s): 351 or 352.</td>
<td></td>
</tr>
<tr>
<td>411 French Literature of the 16th</td>
<td></td>
</tr>
<tr>
<td>Century (3) Highlights of 16th-century</td>
<td></td>
</tr>
<tr>
<td>French literature. Excerpts from</td>
<td></td>
</tr>
<tr>
<td>Rabelais and Montaigne; readings of</td>
<td></td>
</tr>
<tr>
<td>poems from the writers from Lyon and</td>
<td></td>
</tr>
<tr>
<td>members of the Pléiade. Writing-</td>
<td></td>
</tr>
<tr>
<td>emphasis course. (RE) Prerequisite(s):</td>
<td></td>
</tr>
<tr>
<td>351 or 352.</td>
<td></td>
</tr>
<tr>
<td>412 French Literature of the 17th</td>
<td></td>
</tr>
<tr>
<td>Century (3) Masterpieces of 17th-</td>
<td></td>
</tr>
<tr>
<td>century French literature. Writing-emphasis course. (RE) Prerequisite(s): 351 or 352.</td>
<td></td>
</tr>
<tr>
<td>413 French Literature of the 18th</td>
<td></td>
</tr>
<tr>
<td>Century (3) Major works of the</td>
<td></td>
</tr>
<tr>
<td>Enlightenment. Writing-emphasis course. (RE) Prerequisite(s): 351 or 352.</td>
<td></td>
</tr>
<tr>
<td>414 French Literature of the 19th</td>
<td></td>
</tr>
<tr>
<td>Century (3) French Romanticism and</td>
<td></td>
</tr>
<tr>
<td>its counter movements: Realism,</td>
<td></td>
</tr>
<tr>
<td>Parnassianism and Naturalism. Writing-</td>
<td></td>
</tr>
<tr>
<td>emphasis course. (RE) Prerequisite(s):</td>
<td></td>
</tr>
<tr>
<td>351 or 352.</td>
<td></td>
</tr>
<tr>
<td>415 French Literature of the 20th</td>
<td></td>
</tr>
<tr>
<td>Century (3) Evolution of 20th-century</td>
<td></td>
</tr>
<tr>
<td>French literature. Writing-emphasis</td>
<td></td>
</tr>
<tr>
<td>course. (RE) Prerequisite(s): 351 or</td>
<td></td>
</tr>
<tr>
<td>352.</td>
<td></td>
</tr>
<tr>
<td>420 French Cinema (3) The French</td>
<td></td>
</tr>
<tr>
<td>cinema from its earliest days through</td>
<td></td>
</tr>
<tr>
<td>the New Wave directors. May be applied toward the French major. Writing-emphasis course. (Same as Cinema Studies 420.) (RE) Prerequisite(s): 351 or 352.</td>
<td></td>
</tr>
<tr>
<td>421 Phonetics (3) Foundation in the</td>
<td></td>
</tr>
<tr>
<td>science of phonetics. Practical</td>
<td></td>
</tr>
<tr>
<td>exercises and individual</td>
<td></td>
</tr>
<tr>
<td>performance. Writing-emphasis course. (RE) Prerequisite(s): 333.</td>
<td></td>
</tr>
<tr>
<td>422 Advanced Grammar (3) Improving</td>
<td></td>
</tr>
<tr>
<td>one's written French by studying</td>
<td></td>
</tr>
<tr>
<td>basic and more refined structures of</td>
<td></td>
</tr>
<tr>
<td>the French language. Writing-</td>
<td></td>
</tr>
<tr>
<td>creative free-style compositions.</td>
<td></td>
</tr>
<tr>
<td>Writing-emphasis course. (RE)</td>
<td></td>
</tr>
<tr>
<td>Prerequisite(s): 333.</td>
<td></td>
</tr>
<tr>
<td>423 Advanced Conversation (1) Informal conversation with native speaker on contemporary topics. Stresses in-class contact rather than outside preparation. Contact Hour Distribution: Meets 2 hours a week. (RE) Prerequisite(s): 333.</td>
<td></td>
</tr>
<tr>
<td>424 Advanced Conversation (1) Informal conversation with native speaker on contemporary topics. Stresses in-class contact rather than outside preparation. Contact Hour Distribution: Meets 2 hours a week. (RE) Prerequisite(s): 333.</td>
<td></td>
</tr>
<tr>
<td>425 Introduction to Descriptive</td>
<td></td>
</tr>
<tr>
<td>Linguistics (3) Initiation into the</td>
<td></td>
</tr>
<tr>
<td>theory and practice of techniques of</td>
<td></td>
</tr>
<tr>
<td>linguistic analysis in the subfields</td>
<td></td>
</tr>
<tr>
<td>of phonetics, phonology, morphology,</td>
<td></td>
</tr>
<tr>
<td>syntax, semantics, pragmatics and</td>
<td></td>
</tr>
<tr>
<td>historical linguistics; discussion of</td>
<td></td>
</tr>
<tr>
<td>their relevance to the learning and</td>
<td></td>
</tr>
<tr>
<td>teaching of foreign languages and to</td>
<td></td>
</tr>
<tr>
<td>the study of literary texts. Writing-</td>
<td></td>
</tr>
<tr>
<td>emphasis course. (Same as German 425; Linguistics 425; Russian 425; Spanish 425.) Recommended Background: Linguistics 200.</td>
<td></td>
</tr>
<tr>
<td>426 Methods of Historical Linguistics (3) (See German 426.)</td>
<td></td>
</tr>
<tr>
<td>429 Romance Linguistics (3) Development of Classical Latin through Vulgar Latin into major Romance Languages. Writing-emphasis course. (Same as Linguistics 429; Spanish 429.)</td>
<td></td>
</tr>
<tr>
<td>430 Theatrical French (4) Comprehensive introduction to dramatic texts, performance, and theatrical production in French. Students collaborate in the creative staging of a French play and they actively participate in its public performance. May be applied toward the major as a literature course. Writing-emphasis course. (RE) Prerequisite(s): 351 or 352.</td>
<td></td>
</tr>
<tr>
<td>431 Highlights of French Civilization (3) Survey of French civilization from the Gauls to World War II. Historical events, daily life, all forms of arts. Writing-emphasis course. (RE) Prerequisite(s): 351 or 352.</td>
<td></td>
</tr>
<tr>
<td>432 Contemporary French Culture (3) Current French cultural issues placed in historical perspective with a comparative emphasis. In English with readings in French for majors. May be applied toward the French major. Writing-emphasis course.</td>
<td></td>
</tr>
<tr>
<td>433 French and Francophone Women</td>
<td></td>
</tr>
<tr>
<td>Writers (3) Works by women writers in</td>
<td></td>
</tr>
<tr>
<td>French considered in cultural context.</td>
<td></td>
</tr>
<tr>
<td>In English; readings in French for</td>
<td></td>
</tr>
<tr>
<td>majors. May be applied toward the</td>
<td></td>
</tr>
<tr>
<td>French major. Writing-emphasis</td>
<td></td>
</tr>
<tr>
<td>course. (Same as Women's Studies 433.)</td>
<td></td>
</tr>
<tr>
<td>434 Literature of Quebec (3) Survey of literature of Quebec, as well as French literature connected with North America. Readings include explorer and missionary works, such as the Voyages of Champlain and the Journals of the Jesuits, as well as the literature of contemporary Quebec. Writing-emphasis course. (RE) Prerequisite(s): 351 or 352.</td>
<td></td>
</tr>
<tr>
<td>440 Capstone Experience in French (3) Synthesizing senior colloquium and tutorial in which students reflect on the raison d'être of the discipline from a multidimensional point of view. Writing-emphasis course. Registration Restriction(s): Minimum student level – senior.</td>
<td></td>
</tr>
<tr>
<td>445 Advanced French for Business (3) Study of advanced contemporary French language and culture as they relate to business transactions. A comparative approach is used to explore differences and disparities between Francophone business culture(s) and those of North America and Japan. Students build upon their knowledge of business terminology while being sensitized to cultural differences and the dangers of simplistic stereotyping. Writing-emphasis course. (RE) Prerequisite(s): 345.</td>
<td></td>
</tr>
<tr>
<td>450 Special Topics (3) Selected topics in French studies. Repeatability: May be repeated if topic differs. Maximum 6 hours.</td>
<td></td>
</tr>
</tbody>
</table>
490 Internship (1-15) Career-related experiences in the United States or abroad. 
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 15 hours. 
Registration Restriction(s): French major/language and world business concentration.

491 Foreign Study (1-15) 
Repeatability: May be repeated. Maximum 15 hours. 
Registration Restriction: Consent of program chair.

492 Off-Campus Study (1-15) 
Repeatability: May be repeated. Maximum 15 hours. 
Registration Restriction: Consent of program chair.

493 Independent Study (1-15) 
Repeatability: May be repeated. Maximum 15 hours. 
Registration Restriction: Consent of program chair.

Geography (415)
101 World Geography (3) Selected topics and world regions, especially those with problems or situations of contemporary interest, to illustrate geographical points of view, concepts, and techniques. (SS) 
Comment(s): 101 and 102 do not have to be taken in sequence.
102 World Geography (3) Selected topics and world regions, especially those with problems or situations of contemporary interest, to illustrate geographical points of view, concepts, and techniques. (SS) 
Comment(s): 101 and 102 do not have to be taken in sequence.
108 Honors: World Geography (4) For freshmen and sophomores of superior ability who are interested in the geographical approach to important world problems and issues. Credit Restriction: Students may not receive credit for both 102 and 108. 
Comment(s): Open to students who have received an A in 101.
131 Geography of the Natural Environment I (4) Characteristics and processes of the earth's surface and lower atmosphere; their interaction to produce a world pattern of distinctive environments significant to humanity. Covers elements and controls of climate, atmospheric circulation, precipitation and storms, the hydrological cycle, world climate and vegetation patterns, and climate change. (NS) 
Contact Hour Distribution: 3 hours lecture and 2 hours lab.
132 Geography of the Natural Environment II (4) Characteristics and processes of the earth's surface and lower atmosphere; their interaction to produce a world pattern of distinctive environments significant to humanity. Covers earth materials, tectonic activity, geomorphic processes and landforms, soils, and human impacts on the landscape. (NS) 
Contact Hour Distribution: 3 hours lecture and 2 hours lab. 
(Re)Prerequisite(s): 131.
210 Introductory Technical Geography (1) Covers basic concepts required in 310, 410, 411, and 413. Recommended to be taken prior to or concurrently with these courses. The shape of the Earth, map scales, coordinate systems, and projections. Self-paced, online course with written (offline) final exam.
310 Introduction to Cartography (3) Properties, sources, uses, design, and production of maps as tools for geographical analysis. Introduction to desktop mapping techniques and data display using basic thematic map styles. 
Contact Hour Distribution: 2 hours lecture and 2 hours lab.
320 Cultural Geography: Core Concepts (3) Background and method of cultural geography: basic concepts and theories focusing on cultural landscape, culture regions, cultural ecology, innovation and diffusion, cultural integration, and world patterns of cultural phenomena. 
334 Meteorology (3) Dynamic atmosphere and resulting weather events. Nature of individual weather elements, their measurement and analysis over time and space. 
(Re)Prerequisite(s): 131.
345 Population and Environment (3) Global and local patterns of population distribution and change as they relate to culture, economic development, technology, and the environment and the future. Writing-emphasis course.
361 Regional Geography of the United States and Canada (3) Physical, economic, and social distributions as they interrelate to and give distinctive character to regions of the United States and Canada. Writing-emphasis course.
363 Geography of the American South (3) Geographical appraisal of the southeastern United States, including physical environment and human resources. Origin and development of contemporary economic and cultural traits of the area. Writing-emphasis course.
365 Geography of Appalachia (3) Interrelation of physical, economic, and social patterns that give distinctive character to the region and its parts, especially in southern Appalachia. Appalachia in perspective in the contemporary American scene. Writing-emphasis course.
366 Geography of Tennessee (3) Survey of the geography of the State of Tennessee including its cultural, economic, and physical resources, as well as an examination of the state's diversity, development, and its geographic connections within the Southeast region and beyond. Writing-emphasis course.
371 Geography of Europe (3) Physical, cultural, and economic characteristics of Europe. Emphasis on the geographical dimensions of change in contemporary Europe. Writing-emphasis course.
373 Geography of South America (3) Physical, cultural, and economic characteristics of the countries of South America. Writing-emphasis course. (Same as Latin American Studies 373.)
379 Geography of Africa (3) Physical, cultural, and economic characteristics of Africa, with particular emphasis on the area to the south of the Sahara. Writing-emphasis course. (Same as Africana Studies 379.)
410 Global Positioning Systems and Geographic Data (3) Theory, field, and laboratory use of Global Positioning Systems for capturing digital geographic data; management of geographic data, including coordinate systems, datum issues, scanning digitizing, map standards, and uncertainty in Geographic Information Systems.
Contact Hour Distribution: 2 hours lecture and 2 hours lab.
411 Introduction to Geographic Information Science (3) Concepts and methods of spatial analysis and their application using geographic information systems software and techniques. Emphasizes both theoretical and applied aspects of GIS. 
Contact Hour Distribution: 2 hours lecture and 2 hours lab. 
(Re)Prerequisite(s): 310.
412 Advanced Cartography Techniques (3) Cartographic design and data display techniques for reference and thematic maps. Basic principles and methods of map reproduction. 
Contact Hour Distribution: 2 hours lecture and 2 hours lab. 
(Re)Prerequisite(s): 310.
413 Remote Sensing: Types and Applications (4) Principles and uses of remote sensing imagery, digital data, and spectral data, with particular emphasis on geographic interpretation and mapping techniques. 
Contact Hour Distribution: 3 hours lecture and 2 hours lab. 
(Re)Prerequisite(s): Mathematics 115 or Statistics 201.
414 Spatial Databases and Data Management (3) Types, sources, acquisition, and documentation of spatial data. Spatial database management methods and strategies for data sharing. 
Contact Hour Distribution: 2 hours lecture and 2 hours lab. 
(Re)Prerequisite(s): 411.
415 Quantitative Methods in Geography (4) Geographic application of statistical techniques, point pattern analysis, spatial analyses, and correlation and regression techniques. 
Contact Hour Distribution: 3 hours lecture and 2 hours lab per week. 
(Re)Prerequisite(s): Mathematics 115 or Statistics 201.
419 Practicum in Cartography/Remote Sensing (2-6) Supervised practice in design and production of maps and other graphic materials in the Cartographic Services Laboratory or a similar organization. 
Repeatability: May be repeated. Maximum 6 hours. 
Registration Permission: Consent of department.
421 Geography of Folk Societies (3) Geographical study of folk culture, emphasizing traditional material culture and rural settlement, with examples drawn from eastern North America and selected foreign areas.
423 Geography of African Popular Culture (3) Geographical study of regional variation in popular cultures, especially focused on youth cultures in the United States. Writing-emphasis course. (Same as American Studies 423.)
432 Dendrochronology (4) Principles, techniques, and interpretation in tree-ring science. Applications in geography, climate, ecology, forestry, archaeology, and earth sciences. 
Contact Hour Distribution: 3 hours lecture and 2 hours. 
(Re)Prerequisite(s): 132.
433 The Land-Surface System (3) Characteristics of surface form, water, vegetation, and surface materials, and their regional interrelationships. People as evaluators and agents of change. 
(Re)Prerequisite(s): 132.
434 Climatology (3) General circulation system leading to world pattern of climates. Climatic change and modification, and interrelationships of climate and human activity.
(Re) Prerequisite(s): 131.

435 Biogeography (3) Study of the changing distribution patterns of plants and animals on a variety of spatial and temporal scales. The effects of plate tectonics, Pleistocene climatic change, and human activity of world biota.
Recommended Background: Introductory physical geography or coursework in botany or ecology.

436 Water Resources (3) Global water resources and hydrologic processes, including water availability, flooding, and water quality issues examined from physical and economic geographic perspectives.
(De) Prerequisite(s): 132.

439 Plant Geography of North America (3) Characteristics and distribution of major plant communities of Canada, the U.S., Mexico, and Central America. Relationships to climate, soil, fire, and human disturbance. Long-term history and future prospects.
Recommended Background: Introductory physical geography or coursework in botany or ecology.

441 Urban Geography of the United States (3) Concepts and theories concerning development and significance of systems of cities and internal morphology of cities in the United States. Writing-emphasis course.

442 Urban Social Geography (3) Geographical study of urban culture; social production of neighborhoods; social and behavioral aspects of territoriality, residential mobility, segregation, and the rise of post-industrial and global cities.

443 Rural Geography of the United States (3) Geographical appraisal of rural areas of the United States, including small towns and urban fringes. Problems and potentials of rural America. Writing-emphasis course.

449 Geography of Transportation (3) Examination of transportation systems, emphasizing their effects on trade patterns, land use, location problems, and development.

450 Process Geomorphology (3) (See Geology 450.)

454 Terrain Analysis (3) Analysis of landscape history from digital elevation datasets and traditional topographic maps. Basement materials and structures; and erosional and depositional evidence, including fluvial, glacial, aeolian, and shoreline features, of past climatic and biological regimes.
(De) Prerequisite(s): 132 or Geology 101 and 102 or Geology 107 and 108.

466 Teaching and Learning Geography (3) Preparation of prospective teachers in the content, skills, strategies, and understandings needed for the effective teaching and assessment of geography in the K-12 schools. Course organization and content based largely on that of the National Geography Standards.

490 Internship (3) Career-related experience for geography majors with business, nonprofit, and government organizations.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of department.

491 Foreign Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Consent of department.

492 Off-Campus Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Consent of department.

493 Independent Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Consent of department.

494 Undergraduate Research Experience (1-3) Supervised participation in active research projects.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of department.

495 Special Topics in Geography (1-4) Topics vary.
Repeatability: May be repeated with consent of instructor. Maximum 8 hours.
Registration Permission: Consent of instructor.

497 Honors: Senior Thesis (3) Students develop undergraduate thesis topic under the guidance of a faculty advisor.
Comment(s): Completion of 75 hours with 3.2 GPA required.
Registration Permission: Consent of thesis advisor.

498 Honors: Senior Thesis (3) Completion of senior thesis.
Comment(s): Grade of A in 497 is required.
Registration Permission: Consent of thesis advisor.

499 Proseminar in Geography (3) Major themes in geography, especially trends over the past 40 years. A required course for geography majors.
Comment(s): To enroll, students must have completed 12 hours in geography.
Registration Restriction(s): Minimum student level - senior.

Geology (424)

101 The Dynamic Earth (4) Physical processes within and upon the Earth's surface, including the formation of rocks, plate tectonics and earthquakes, and landscapes. (NS)
Contact Hour Distribution: 3 hours lecture and one 2-hours lab or field period.

102 Earth, Life, and Time (4) Fossils, evolution and ancient environments, plus a review of 4.5 billion years of Earth history. (NS)
Contact Hour Distribution: 3 hours lecture and one 2-hours lab or field period.

103 The Earth's Environments (4) Contemporary problems and solutions related to nature and human disturbance of the environment. Topics include: natural hazards, global climate change, pollution, resource depletion. (NS)
Contact Hour Distribution: 3 hours lecture and one 2-hours lab or field period.

107 Honors: The Dynamic Earth (4) Laboratory and field emphasis to understanding physical processes, including the formation of rocks, plate tectonics, earthquakes, and landscapes. (NS)
Contact Hour Distribution: One 2-hour lab and 2 field trips.
Credit Restriction: Students may not receive credit for both 101 and 107.

108 Honors: Earth, Life, and Time (4) Laboratory and field emphasis to understanding fossils, evolution, and ancient environments throughout 4.5 billion years of Earth history. (NS)
Contact Hour Distribution: One 2-hour lab and 2 field trips.
Credit Restriction: Students may not receive credit for both 102 and 108.

201 Biodiversity: Past, Present, and Future (3) Introduction to how biodiversity has changed through time, especially past mass extinctions and current extinctions from human activities. Topics include measurement of biodiversity, how biodiversity originates, and the dynamics of extinction. (NS)
Credit Restriction: May not be applied toward the geology major.

202 Earth as an Ecosystem: Modern Problems and Solutions (3) Study of the earth as an integrated system between physical and biological processes. Focus is on human disturbances such as habitat destruction and pollution. (NS)
Credit Restriction: May not be applied toward the geology major.

203 Geology of National Parks (3) Geologic principles, processes, and earth materials responsible for the spectacular landscapes of national parks. Focus on interactions among internal earth processes, surficial earth processes, and human interactions. Writing-emphasis course. (NS)
Contact Hour Distribution: 3 hours lecture and an optional field trip.
Credit Restriction: May not be applied toward the geology major.

205 Age of the Dinosaurs (3) Survey of the major groups of dinosaurs: skeletal structure, ecology, environments, evolutionary history, and extinction. (NS)
Credit Restriction: May not be applied toward the geology major.

310 Mineralogy (4) Introduction to the concepts of crystal chemistry, x-ray diffraction, optical mineralogy, and geochemical analysis of the important rock-forming minerals. Laboratory includes hand-specimen, x-ray diffraction, and microscopic identification of minerals.
Contact Hour Distribution: 3 hours lecture and one 2-hour lab.
(Re) Prerequisite(s): Chemistry 120.
(De) Corequisite(s): Chemistry 130.
Recommended Background: Two 100-level geology courses.

320 Paleobiology (4) Critical analysis of the preserved record of ancient life, with emphasis on recognition of evolutionary patterns, processes, and extinctions; interpretation of ancient environments; and the integrated use of fossils and other geological features in solving problems of geologic correlation and age dating. Statistical and qualitative approaches applied to field and laboratory data.
Contact Hour Distribution: 3 hours lecture and one 2-hour lab.
Recommended Background: Two 100-level geology courses.

330 Igneous and Metamorphic Petrology (4) Study of the properties of crystalline rocks, the processes that produce them, and the tectonic environments in which they form. Topics include interpretation of rock textures, phase diagrams, geochemical and isotopic compositions, magma generation and differentiation, effects of temperature, pressure, and fluids on mineral equilibria and kinetics.
Contact Hour Distribution: 3 hours lecture and one 2-hour lab.
(Re) Prerequisite(s): 310.
340 Earth Sedimentary Processes (4) Earth surface processes, including weathering and soil formation, the hydrologic cycle, physical sediment transport, biological and chemical sedimentation, and sediment diagenesis, applied to interpretation of the stratigraphic record.

Contact Hour Distribution: 3 hours lecture and one 2-hour lab.
Recommended Background: Two 100-level geology courses or consent of instructor.

370 Earth Structure and Geophysics (4) Stress and strain; mechanics and recognition of geologic structures (faults, joints, folds, foliations, lineations, microstructures); introductory plate tectonics; introductory earthquake and seismology. Laboratory: geologic map interpretation, cross-section construction, fabric diagrams, fault-plane solutions, strain analysis, seismic interpretation. Field work includes field observation and measurement, recording data, regional geology.

Contact Hour Distribution: 3 hours lecture and one 2-hour lab.
(Re) Prerequisite(s): 310, 330, 340, and Physics 135 or consent of instructor.

380 Planetary Geoscience (4) Geologic, geophysical, and geochemical systems and processes at planetary scales. Topics include accretion, differentiation, outgassing, seismology, magnetism, geochronology, remote sensing, processes modifying surface morphology and materials, geochemical cycles, planetary exploration.

Contact Hour Distribution: 3 hours lecture and one 2-hour lab.
(Re) Prerequisite(s): 330 and 370.

381 Minerals and Energy Resources: Geologic Constraints and Environmental Impacts (3) Distribution and estimates of mineral and energy resources. Environmental impact of exploitation and utilization of conventional and alternate resources. Writing-emphasis course.

401 Quantitative Methods in Geology (3) Applications of calculus and differential equations to problems in the earth sciences. Examples of the diffusion equation in hydrogeology; the wave equation in geophysics; mechanical modeling and boundary conditions in structural geology and tectonics.

Contact Hour Distribution: 3 hours lecture.
(Re) Prerequisite(s): Mathematics 142.
Recommended Background: Two 100-level geology courses.


Contact Hour Distribution: 2 lectures and one 2-hour lab.
(Re) Prerequisite(s): 310.

411 Optical Mineralogy (2) Laboratory course on the principles of optical mineralogy. Use of petrographic microscope to identify rock-forming minerals with applications to petrology and environmental mineralogy.

(Re) Prerequisite(s): 310.

412 Elements of X-ray Diffraction (2) Laboratory course on principles and applications of X-ray diffraction. Phase identification, quantitative determination of mineral abundances in mixtures, and crystal structure determination.

(Re) Prerequisite(s): 310.

440 Field Geology (5) Summer field course for advanced undergraduate geology majors and first-year graduate students in geology. Taught off-campus and requires the full time of the student. The course provides a synthesis of the major aspects of the geological sciences in a societal context. Field techniques demonstrated, practiced, and applied to the solution of geologic problems.

Recommended Background: At least 16 hours from 310, 320, 330, 340, 370. Registration Permission: Consent of instructor.

450 Process Geomorphology (3) Integrative approach to the development of the surface of the Earth based upon case histories, maps, remote sensing imagery. (Same as Geography 450.)

Contact Hour Distribution: 2 hours lecture and one 2-hour lab.
Recommended Background: Two 100-level or 200-level geology courses or consent of instructor.

455 Basic Environmental Geology (3) Applications of the geological sciences toward a comprehension of the effects of geological processes on humans and the effects of human activities on the Earth’s environments.

Recommended Background: Two 100-level or 200-level geology courses or consent of instructor.

460 Principles of Geochemistry (4) Applications of chemical principles to geologic systems with emphasis on problem-solving techniques. Topics include phase diagrams, partitioning of trace elements, thermodynamic principles for evaluating stabilities of mineral assemblages, aqueous solutions, and applications of radiogenic and stable isotopes to geologic systems.

Contact Hour Distribution: 3 hours lecture and one 2-hour tutorial.
(Re) Prerequisite(s): Chemistry 130 and Mathematics 142.
Recommended Background: 330.

470 Applied Geophysics (3) Basic principles of data collection, processing, and analysis for several common geophysical techniques will be presented through lectures, computer assignments (labs), and field work. Passive (earthquake) and active (reflection and refraction) seismology, potential fields (gravity and magnetics), heat flow, electromagnetics (including ground penetrating radar), and electrical techniques will be covered.

Contact Hour Distribution: One 3-hour meeting per week consisting of lecture, computer lab, or field work. One optional day or weekend field trip will be scheduled.
(Re) Prerequisite(s): Mathematics 141 and Physics 135.
Recommended Background: 8 hours from 330, 340, or 370 or consent of instructor.

480 Principles of Economic Geology (4) Basic principles of data collection, processing, and analysis for several common geophysical techniques will be presented through lectures, computer assignments (labs), and field work. Passive (earthquake) and active (reflection and refraction) seismology, potential fields (gravity and magnetics), heat flow, electromagnetics (including ground penetrating radar), and electrical techniques will be covered.

Contact Hour Distribution: 3 hours lecture and one 2-hour lab.
(Re) Prerequisite(s): 330.
Recommended Background: 460.

485 Principles of Hydrogeology (3) Physical principles of flow, flow equations, geologic controls, aquifer analysis, water well design/testing, introduction to transport processes. (Same as Civil Engineering 485.)
(Re) Prerequisite(s): Mathematics 141 and Physics 135.
Recommended Background: One 100-level geology course or consent of instructor.

486 Hydrogeology Laboratory (1) Application and demonstration of hydrogeological principles in the field and laboratory.
(Re) Corequisite(s): 485 or Environmental Engineering 535.

490 Special Problems in Geology (1-3) Student- or instructor-initiated course offered at the convenience of the department, with focus on specialized topics in the geological sciences.
Repeatability: May be repeated. Maximum 12 hours.

491 Foreign Study (1-12)
Repeatability: May be repeated. Maximum 12 hours.
Credit Restriction: Maximum of 3 hours may be applied to the geology major. Registration Permission: Consent of instructor.

492 Off-Campus Study (1-12)
Repeatability: May be repeated. Maximum 12 hours.
Credit Restriction: Maximum of 3 hours may be applied to the geology major. Registration Permission: Consent of instructor.

493 Independent Study (1-12) Student- or instructor-initiated independent study.
Repeatability: May be repeated. Maximum 12 hours.
Credit Restriction: Maximum of 3 hours may be applied to the geology major. Registration Permission: Consent of instructor.

German (433)

101 Elementary German (3) Language laboratory required.
Credit Restriction: Not available to students eligible for 150.
Recommended Background: At least two years of German in high school.
Comment(s): Placement exam required.

102 Elementary German (3) Language laboratory required.
Credit Restriction: Not available to students eligible for 150.
(Re) Prerequisite(s): 101.

111 Language Laboratory (0)

112 Language Laboratory (0)

150 Elementary German Transition (3) This course is designed to prepare students for enrollment in German 201.
Credit Restriction: Since 150 is a review of elementary German, students who receive credit in this course may not also receive credit for any other 100-level German course and, therefore, also forfeit the 6 hours of elementary language credit awarded through placement examination.
Recommended Background: At least 2 years of German in high school.
Comment(s): Placement exam required.

201 Intermediate German (3) (CC)
(De) Prerequisite(s): 102 or 150 or placement exam.

202 Intermediate German (3) (CC)
(De) Prerequisite(s): 201.

215 German Special Topics (3)
Repeatability: May be repeated if topic differs. Maximum 6 hours.

301 Introduction to German Literature (3)
Recommended Background: 202 or placement exam.

302 Introduction to German Literature (3)
Recommended Background: 202 or placement exam.
305 Readings in German (3) Topics in both literary and nonliterary fields. Students or student groups are encouraged to suggest topics for future courses.

Repeatability: May be repeated. Maximum 6 hours.

Recommended Background: 202 or placement exam.

311 Conversation and Composition (3)

Recommended Background: 202 or placement exam.

312 Conversation and Composition (3)

Recommended Background: 202 or placement exam.

323 German Film (3) A study of the German cinema from the earliest days to the present. Writing-emphasis course. (Same as Cinema Studies 323.)

331 Elements of German for Upper-Division and Graduate Students (3) Elements of language, elementary and advanced readings and a final 10,000 word translation project.

Grading Restriction: A, B, C, No Credit grading.

Credit Restriction: No credit for students who have completed 101-102.

Comment(s): Open to graduate students (for undergraduate credit) preparing for language examinations and upper-division students desiring reading knowledge of the language.

332 Elements of German for Upper-Division and Graduate Students (3) Elements of language, elementary and advanced readings and a final 10,000 word translation project.

Grading Restriction: A, B, C, No Credit grading.

Repeatability: May be repeated. Maximum 6 hours.

(RE) Prerequisite(s): 331 or 301.

(DE) Prerequisite(s): 302 or 311 or 312.

Comment(s): Open to graduate students (for undergraduate credit) preparing for language examinations and upper-division students desiring reading knowledge of the language.

350 German-Jewish Topics in Literature and Culture (3) Selected themes, issues, figures, movements, and problems in the German-Jewish relationship as reflected in literature and culture from the 1750s to the present. Variable content. Writing-emphasis course. (Same as Judaic Studies 350.)

Repeatability: May be repeated with approval of department. Maximum 6 hours.

363 Modern German Culture (3) German culture from the mid-19th century to the present: customs, art, music, literature, society, and society. Readings in English for non-majors and in German for majors. Fulfills upper-level distribution requirement for foreign studies for those who have not satisfied the history requirement with Western Civilization. Writing-emphasis course.

Credit Restriction: Major credit, but no foreign language credit.

411 Advanced Conversation and Composition (3)

(RE) Prerequisite(s): 311 and 312.

412 Advanced Conversation and Composition (3)

(RE) Prerequisite(s): 311 and 312.

415 German Special Topics (3)

Repeatability: May be repeated if topic differs. Maximum 6 hours.

(RE) Prerequisite(s): 202.

416 Metropolis Revisited (3) The 20th-century German or Austrian metropolis in the mirror of history, literature, theory, art, architecture, and music. Taught in English.

(RE) Corequisite(s): 101 and 102.

419 German Fairy Tales and Literary Fantasies (3) How and why forms of literary fantasies ranging from apocalyptic dreams to enchanted visions have changed over the centuries. Strong interdisciplinary component, tracing interconnections between philosophy, psychology, religion and literary history, as well as exploring the relationship between literary, musical and artistic representations of specific themes.

(RE) Prerequisite(s): 301 and 302.

420 Selected Topics in German Literature from 1750 to the Present (3)

(RE) Prerequisite(s): 301 and 302.

425 Introduction to Descriptive Linguistics (3) (See French 425.)

426 Methods of Historical Linguistics (3) Phonetics, distinctive feature analysis, sound change types, nature of sound change, principles of reconstruction and fundamental assumptions about language change through time. Non-phonological linguistic change, language families, Proto-Indo-European and other proto-languages. (Same as French 426; Linguistics 426; Russian 426; Spanish 426.)

(RE) Prerequisite(s): 311 and 312.

(DE) Prerequisite(s): 301 or 302.

431 Images of Nature and the Body in German Culture (3) Representations of nature from idyllic refuge and object of praise to scientific object and precarious resource. Other themes include sexuality, the body, childhood, and aging. Discussions based on literary and documentary texts and films.

(RE) Prerequisite(s): 301 and 302.

432 German Creative Thinking: Interdisciplinary Dialogues (3) Interdisciplinary connections between German literature and art, music, philosophy, theatrical praxis, psychology, dance, anthropology, history, and the sciences. Comparative analyses of literary and non-fictional texts, films, and other media.

(RE) Prerequisite(s): 301 and 302.

433 Nation, Race, and Ethnicity (3) Examination of cultural constructions of nation, race, and ethnicity and how they have challenged each other and developed in German-speaking countries since the eighteenth century. Close study and analysis of fiction, non-fiction, and films that address controversial topics such as assimilation, integration, racial/ethnic identity formation and multiculturalism.

(RE) Prerequisite(s): 301 and 302.

434 Extraordinary Wo(Men)–Outcasts, Rebels, Martyrs, and Saints (3) Examination of German texts and visual media that have challenged mainstream thinking throughout the centuries. Strong interdisciplinary component, focusing on literary and artistic forms that depict struggles involving religion, politics and gender.

(RE) Prerequisite(s): 301 and 302.

435 Structure of the German Language (3) Contrastive English-German segmental and suprasegmental phonemes, contrastive English-German linguistic structures, selected topics in advanced German grammar and syntactic analysis. (Same as Linguistics 435.)

(RE) Prerequisite(s): 311 and 312.

(DE) Prerequisite(s): 301 and 302.

436 History of the German Language (3) Development of the German language from Indo-European through Proto-Germanic, Old High German, Middle High German to New High German. Internal and external linguistic history of German speech. (Same as Linguistics 436.)

(RE) Prerequisite(s): 311 and 312.

(DE) Prerequisite(s): 301 and 302.

477 German Honors (1) Preparation of honors paper portfolio and oral presentation.

Registration Permission: Consent of department.

478 German Honors (1) Preparation of honors paper portfolio and oral presentation.

Registration Permission: Consent of department.

485 Business German (3) German used in fields of business, government, administration and economics.

(RE) Prerequisite(s): 311 and 312.

490 Internship (1-15) Career-related experiences in the United States or abroad.

Grading Restriction: Satisfactory/No Credit grading only.

Registration Restriction(s): German major/language and world business concentration.

491 Foreign Study (1-15)

Repeatability: May be repeated. Maximum 15 hours.

Registration Permission: Consent of program chair.

492 Off-Campus Study (1-15)

Repeatability: May be repeated. Maximum 15 hours.

Registration Permission: Consent of program chair.

493 Independent Study (1-15)

Repeatability: May be repeated. Maximum 15 hours.

Registration Permission: Consent of instructor.

494 German Community Service Practicum (1) Supervised by the director of the lower-division German program. Students assist German classes at local schools or they perform supervised service with local institutions that promote awareness of German culture among the general public.

Repeatability: May be repeated. Maximum 3 hours. (Maximum 1 hour per semester.)

(RE) Prerequisite(s): 411 or 485.

Registration Permission: Consent of program chair.

497 Senior Honors (1-6)

Repeatability: May be repeated. Maximum 6 hours.

Registration Permission: Consent of program chair.

Global Studies (440)

250 Introduction to Global Studies (3) (See Sociology 250.) (CC)

393 Global Justice and Human Rights (3) (See Philosophy 393.)

482 Special Topics in Global Cinema (3) (See Modern Foreign Languages and Literatures 482.)

491 Foreign Study (1-15)

Repeatability: May be repeated. Maximum 15 hours.

Comment(s): Requires advance approval of hours and topic by program chair.

493 Independent Study (1-15)

Repeatability: May be repeated. Maximum 15 hours.

Comment(s): Requires advance approval of hours and topic by program chair.
Health (449)

110 Personal Health and Wellness (3) Information and behavior necessary to approach health and wellness scientifically and to develop confidence in judgments affecting personal health and wellness.

Credit Restriction: Students who have received credit for 330 may not receive credit for this course.

200 Seminar in Human Sexuality (2) Problems and responsibilities of being male and female as they relate to health and wellness.

Grading Restriction: Satisfactory/No Credit grading only.

225 Alcohol/Drugs and the College Student (2) Problems related to use and abuse of substances potentially harmful to health and wellness.

Credit: alcohol, drugs, tobacco and other substances.

Grading Restriction: Satisfactory/No Credit grading only.

230 Cardiopulmonary Resuscitation (2) Theory and skills to implement basic cardiac life support following cardiac arrest due to such conditions as heart attack, drowning, electrocution, suffocation, poisoning, drug intoxication, and vehicular and other accidents. Educational and preventive aspects of controlling cardiovascular disease. Leads to basic life support certification.

300 Health Education, Promotion, and Behavior (3) Health education goals, roles, target populations in school, community and health care settings; health careers and opportunities; health behavior and intervention techniques; health appraisal techniques; health promotion strategies.

305 Health of Adolescents (3) Profile of health needs, interests, and behaviors of adolescents and attention to the roles and functions of practitioners relating to youth and youth culture.

306 Health Instruction in Elementary Grades (3) School health program for the child in elementary grades. Students become familiar with organization and presenting health concepts, health content, health curricula, community resources, and communicating healthful lifestyle.

310 Advanced First Aid and Emergency Care (3) Theory and practice of first aid and emergency care. Provides essential information for developing functional first aid capabilities of lay persons. Course leads to advanced first aid and emergency care certification. Applicant must be at least 18 years old for certification.

330 Wellness For Health Professions (3) Emphasis on taking personal responsibility for one's health. Includes topics related to the healthy lifestyle and provides specific guidelines of how to change inappropriate behaviors.

Credit Restriction: Students who have received credit for 330 may not receive credit for 110.

375 Health Communications (3) Communication strategies for health educators in various settings. Emphasis on interpersonal relationships, public relations, leadership, small group processes, health teams, and effective use of media.

(RE) Prerequisite(s): 300 or Public Health 300.

400 Consumer Health (3) Major consumer health care providers and health care services. Selecting, purchasing, evaluating and financing medical and health care services/products. (Same as Public Health 400.)

406 Death, Dying, and Bereavement (3) Aspects of dying, death and handling the trauma of loss. Medical, financial, physical, legal, and social implications of death. (Same as Safety 406.)

420 Sex Education as it Relates to Human Sexuality (3) Science of human sexuality. Emphasis on the trends, issues, and content of sex education.

425 Women's Health (3) Factors influencing women's health and women as consumers in nation's health service delivery systems. Study of health problems/concerns of women and techniques for prevention, maintenance and/or correction. (Same as Women's Studies 425.)

426 Health Education Program Planning (3) Principles of curriculum development, administration, implementation, methodology, and evaluation.

(RE) Prerequisite(s): 300 or 375.

430 Suicide and Crisis Intervention (3) Factors which make suicide a serious health problem. Assessment, intervention, and prevention techniques.

435 Substance Use and Abuse (3) Drug and alcohol abuse problems and suspected causes; pharmacology of drugs and effects on society; strategies for intervention and education.

465 Aging and Health (3) Aging process in a health perspective as it relates to health promotion and wellness of the aged.

470 Special Topics (1-3) For advanced students, teachers, school administrators, nurses and other paramedical personnel. Lectures, demonstrations, films, field trips, and supervised research in special health/wellness or health promotion issues.

Repeatability: May be repeated. Maximum 12 hours.

Registration Restriction(s): Minimum student level – junior.
304 History of the Roman Empire (3) 27 BC–AD 211. Age of Augustus, expansion of Roman citizenship, Flavian and Antonine dynasties, barbarians and Romans, the Second Sophistic, the Severans. Writing-emphasis course. (Same as Classics 304.)

305 History of the Late Roman Empire (3) AD 197–491. The Severan empire and the 3rd-century crisis, Diocletian and Constantine, the Christian empire, rise of bureaucratic government, the development of barbarian kingdoms and fall of the invasions empire, from Roman to Byzantine in the east. Writing-emphasis course. (Same as Classics 305.)

307 Honors: Introduction/ Historical Problems (3) Historical analysis, philosophy of history, principles and techniques of research emphasizing the roles of climates of opinion and frames of reference and the problems of evidence, interpretation and objectivity. Required of students working for honors in history.

Registration Permission: Consent of honors director.

312 Medieval History (3) Early Middle Ages – 300-1100. Formation of medieval society and institutions. (Same as Medieval Studies 312.)

313 Medieval History (3) Later Middle Ages – 1100-1400. Height of medieval civilization, and its waning in the 14th century. (Same as Medieval Studies 313.)

314 Renaissance Europe (3) The period traditionally seen as a transition from the Middle Ages to the modern world. Interrelationship of cultural, social, economic, political and intellectual developments, with an emphasis on historical interpretation.

315 Reformation Europe, 1500-1650 (3) The period during which Europe witnessed religious disunity, economic dislocation and insecurity, political centralization, intellectual skepticism, the origins of modern science, war and the witch craze. (Same as Religious Studies 315.)

316 Early Modern Europe, 1650-1800 (3) Dynamic conflict of a search for order in an age of revolutions, seen in the continued push for political centralization, the impact of the scientific revolution, the intellectual flowering known as the Enlightenment, and the English and French Revolutions.

319 Modern Europe, 1750-1914 (3) Political, industrial and intellectual revolutions against traditions. Topics such as the modern population explosion, urbanization, the political emergence of the middle class and the masses, nationalism, imperialism, rationalism and Romanticism in social thought and politics. Writing-emphasis course.

320 Contemporary Europe, 1900-Present (3) The transformation from industrial to post-industrial society and the transformation of the European nation-state. Topics such as war and depression and the consequent political and social instability; totalitarian control; decolonization; the impact of Freud, Einstein and existentialism; welfare states; and the problems of European unification. Writing-emphasis course.


322 Christian Thought in Late Antiquity (3) (See Religious Studies 322.)

323 Deviance and Persecution in the Christian West, 1100-1700 (3) Emergence and shifts in movements of dissent; popular perceptions and ecclesiastical policies and institutions designed to uncover and combat heretics, homosexuals, Jews, and witches. Writing-emphasis course.

330 History of England (3) To 1668. Medieval state, church, and society; origins of Anglo-American law, the monarchy and parliamentary government, the Reformation.

331 History of England (3) 1689 to the present. Seventeenth-century revolutions, commercial, agricultural and industrial revolutions; class conflict, ethnic wars, the state, world wars, economic, political and cultural developments in England and Scotland.

334 History of Germany (3) To 1815. The First Reich's fortune and failure. The development of the German lands, from the medieval empire to its disintegration, through dynastic and religious realignments, to the Austrian-Prussian dualism in the time of Frederick the Great and Maria Theresa, culminating with the end of the older order in the Age of Napoleon.

335 History of Germany (3) Since 1800. The quest for nationhood. The evolution of modern Germany through revolution, industrialization and wars, from Napoleon to the creation of Reichs, to Bismarck's Second Reich, to the Weimar republic to Hitler's Third Reich, to Adenauer's Federal Republic and the present nation.

339 Modern Ireland, 1760-Present (3) Ireland's social, political, economic, and cultural history. Themes include Ireland's status as England's first colony from the Norman period to Cromwell and beyond, peasant revolt, Catholic-Protestant antagonism, nationalist revolutionary movements, the famine, home rule, partition, and independence in the 20th century, with continuing sectarian tensions.

340 History of Russia (3) To the middle of the 19th century.

341 History of Russia (3) From the middle of the 19th century. The transformation from Czarist autocracy to a multi-ethnic empire. Russia's role in European and global politics: the Balkan crisis, World War I, the Russian Revolution, the civil war, and the emergence of the Soviet Union.

342 History of Nazi Germany (3) The coming to power of the Nazi party in Germany, origins of ideology, rise and fall of the Third Reich. Topics include foreign policy, social policy, World War II, Hitler's brutal rule and racial programs, culminating in mass murder and genocide against the Jews of Europe. Writing-emphasis course.

350 Colonial America to 1763 (3) Social and cultural developments in the American colonies from the point of contact between Europeans and native peoples through the mid-18th century. Writing-emphasis course.

351 The American Revolution, 1763-1789 (3) The growing estrangement of the American colonies from the British Empire, the War for Independence, and the creation of a new American republic. Writing-emphasis course.

352 The United States During the Jacksonian Era, 1815-1860 (3) An examination of the major economic and political developments in antebellum America within the framework of the struggle between nationalism and sectionalism.

353 The Civil War and Reconstruction Eras, 1860-1877 (3) An examination of the major political, economic, and social developments in the United States during the Civil War and Reconstruction eras.

354 United States, 1877-1933 (3) America's political, economic, and social development from the Gilded Age through the Great Depression.

355 United States, 1933 to the Present (3) American experience from Roosevelt's New Deal through World War II and the Cold War to present. Emphasizes domestic history but includes military and foreign policy.

356 The 1960s in America (3) The politics, social movements, and cultural rebellions of the 1960s. Topics include race riots, anti-war protests, new art forms, Great Society legislation, the rise of neoconservatism, empowerment movements brought on by the space program, Cold War brinkmanship in Cuba, and the escalation of ground and air wars in Vietnam. Writing-emphasis course. (Same as American Studies 356.)

360 History of Latin America (3) Colonialism and independence – 1500-1825. Writing-emphasis course. (Same as Latin American Studies 360.)

361 History of Latin America (3) National development – 1825 to present. Writing-emphasis course. (Same as Latin American Studies 361.)

366 History and Archaeology of Mesopotamia (3) Mesopotamia (Assyria and Babylonia) from the 5th millennium to the Iron Age. Specific topics will include the development of village and state-level societies, and the emergence of social and political institutions, literacy, imperialism, and intersocietal interaction. Writing-emphasis course.

369 History of the Middle East (3) Rise and spread of Islamic civilization to the 16th century. Writing-emphasis course. (Same as Judaic Studies 369.)

370 History of the Middle East (3) The Middle East from the 16th century to the present. Impact of the West and background of current problems in the area. Writing-emphasis course. (Same as Judaic Studies 370.)

371 African History (3) Survey of sub-Saharan Africa from 700-1700. State creation, trade, spread of Islam. Writing-emphasis course. (Same as Africana Studies 371.)

372 African History (3) Dynamics of Africa's encounter with Europe from 1500 to the present. Slave trade, colonial, and independence eras. Writing-emphasis course. (Same as Africana Studies 372.)

373 Historical Issues (3) Variable content. Broad thematic issues in historical perspective. Especially suitable for non-majors, also open to majors. Lecture-discussion.

374 A History of Imperialism since 1850 (3) Relationships between the West and Africa, Asia, and Latin America since 1870 across a broad spectrum of critical issues. Includes economic interdependence and underdevelopment, ideologies in conflict with non-Western world views, and the search for individual identity in circumstances of cultural disruption. Writing-emphasis course.

375 Revolutions in Historical Perspective (3) Comparative history of major revolutions which transformed political, social, and economic structures in the West, the East, Latin America, China, Mexico, and Iran. Contrasts and common patterns in their causes, phases and outcomes. Relations between leaders and masses. Major theories of revolution. Writing-emphasis course.

381 History of South Africa (3) South African history from the pre-colonial period through the apartheid and post-apartheid eras. Topics include African state formation and resistance to European colonization, the impact of industrialization, the evolution of modern resistance movements, and the first democratic elections in 1994. Writing-emphasis course. (Same as Africana Studies 381.)

Course Code: 237

COURSES OF INSTRUCTION
383 History of Jewish Civilization I (3) Biblical-Talmudic periods (1200 BCE-600 CE). Origins of the Israelites, development of independent Israelite and Jewish states in the ancient Near East, rise of Jewish Diaspora communities, cultural convergences with Hellenism and early Christianity, and the development of Rabbinic Judaism. Writing-emphasis course. (Same as Judaic Studies 383.)

384 History of Jewish Civilization II (3) Medieval-present. The resiliency of Jewish civilization in the face of external pressures; Sephardic and Ashkenazi Jewry in medieval Europe, North Africa and the Middle East; Jewish mysticism; Judaism's encounter with modernity, Hasidism, the Haskala; the Reform movement and Zionism; the Holocaust; the foundation of the State of Israel; and assimilation and the future of Judaism. Writing-emphasis course. (Same as Judaic Studies 384.)

385 Studies in World History (3) Variable content. Selected topics in world history involving analysis of two or more world cultures. Repeatability: May be repeated. Maximum 9 hours.

389 History of China (3) China to 1600. Surveys the history of Chinese society from the Neolithic Revolution to 1600. Governmental structure, social organization, economic and technological developments, religious practices, artistic, intellectual and literary traditions, and cross-cultural exchanges. Writing-emphasis course.

390 History of China (3) China since 1600. Highlights China's transformation from a dynastic system to a modern nation state and examines the forces, internal and external, driving China toward a major revolution in the 20th century. Writing-emphasis course.

391 Chinese Intellectual History (3) Surveys the history of intellectual traditions in China through the present. Examines the formation and transformation of cultural values, the social and political roles of intellectuals, and interactions between elite and popular cultural patterns. Writing-emphasis course.

392 History of Japan (3) Japanese history from mythological origins to the postwar age, with emphasis on politics and society. Topics include the influence of disease on society, Japanese feudalism, popular culture in the 1700s, the Meiji restoration, and Japanese militarism. Writing-emphasis course.

Credit Restriction: Students who have received credit for 365 may not receive credit for 392.

395 The Crusades and Medieval Christian-Muslim Relations (3) The major Christian crusades in the Middle East and Spain, 1050 to 1500; their political and military history; and the larger context of the medieval religious, cultural, intellectual, and diplomatic confrontation between Christians and Muslims. Writing-emphasis course. (Same as Judaic Studies 395.)

407 Honors: Senior Paper (3) Bibliographic search, research and conceptual clarification for the senior paper.

408 Honors: Senior Paper (3) Organization and writing of the senior honors thesis. Required of students working for honors in history. Credit Restriction(s): Grade of A or B required for honors credit.

429 Medieval Intellectual History (3) The evolution of thought in Europe from late antiquity to the advent of Humanism, especially connections between major thinkers and their social, economic, and professional contexts. Writing-emphasis course.

430 European Intellectual and Cultural History (3) Renaissance to Revolution – 1300-1789.

431 European Intellectual and Cultural History (3) Romanticism to Relativism – 1750-present.

432 Women in European History (3) Comparative analysis of the roles of women in Medieval, Renaissance and Victorian Europe. Relationship between family structure, sexual attitudes and the economic and political roles of women with an emphasis on autobiographical writings by women. Writing-emphasis course. (Same as Women's Studies 432.)

439 Southeastern Indian History (3) Southeastern Indian history from the protohistoric period to the present. Interaction of Euroamerican, African-American, and Native-American peoples; warfare, slavery, resettlement and other policies from the American Revolution to 20th-century problems such as tribal sovereignty and dependency. Writing-emphasis course.

441 The American West (3) From 1803 to present, with emphasis on diverse ethnic cultures, colonial status, extractive industries, aridity, and the ongoing debate over the preservation of natural resources on federal lands. Writing-emphasis course.

442 Indian-White Relations in United States History (3) Dilemma of two cultures existing side by side; background and formulation of official Indian policy; undermining of policy by frontier circumstances; Indian wars and campaigns; present-day relationship. Writing-emphasis course.

443 History of the South (3) Old South from colonial period through the Civil War.

444 History of the South (3) New South from Reconstruction through the Second Reconstruction.

445 The African-American Experience from the Colonial Period to the Civil War (3) Africans in American society from the colonial period to the Civil War. Impact of the African slave trade on the cultural, economic, and social development of the colonies; slave culture, adaptation, and resistance; freed black people; and the formation of an African-American identity. Writing-emphasis course. (Same as Africana Studies 445.)

446 The African-American Experience from the Civil War to the Present (3) Topics in 19th- and 20th-century African-American history. Writing-emphasis course. (Same as Africana Studies 446.)

449 History of Tennessee (3) Tennessee's history from the 18th century to the present. The nation's broad strategic aims and means used to attain them, shifting strategy, tactics and weaponry involved in wars, and relationship between American society and its armed forces. Writing-emphasis course. (Same as Military Science and Leadership 430.)

452 The American Experience in World War II (3) Diplomacy and warfare in Europe and Asia and the impact of the war on American society.

453 Women in American History (3) Approaches of 432 applied to American society. Writing-emphasis course. (Same as Women's Studies 453.)

454 Cities and Urbanization in American History (3) Origins, growth, and influence of American cities in development of the nation, from colonial era to present. Writing-emphasis course.

459 Jefferson's America, 1789-1815 (3) Nation-building in the United States from the Constitution to the War of 1812. Economic modernization, the new national government, the first political party system, foreign relations, the changing status of women, the growth of cities, and changing ideas about deference, class, and community. Writing-emphasis course.

460 History of Brazil (3) History of Latin America's largest nation. History of boom and bust economic cycles, slavery and the abolition of slavery, populism, military rule, and democratization. Writing-emphasis course. (Same as Latin American Studies 460.)

461 Cuban Revolution in Historical Perspective (3) Cuban history with major emphasis on Cuban Revolution and Cuban-U.S. relations. Writing-emphasis course. (Same as Latin American Studies 461.)

462 History of Mexico (3) Pre-Columbian, colonial, national, and modern Mexican history, emphasizing the 20th century's first true social revolution, the Mexican Revolution, and contemporary social and economic problems. Writing-emphasis course. (Same as Latin American Studies 462.)

470 Studies in British History (3) Variable content. Selected themes and issues in British history. Repeatability: May be repeated. Maximum 9 hours.

471 Studies in Western European History (3) Variable content. Particular aspects of western European history such as witchcraft, revolutions, or nationalism. Repeatability: May be repeated. Maximum 9 hours.

472 Studies in Central European History (3) Variable content. Repeatability: May be repeated. Maximum 9 hours.

473 Studies in Eastern European History (3) Variable content. Selected aspects of eastern European history, especially on Russian and Polish history. Repeatability: May be repeated. Maximum 9 hours.


475 Studies in Latin American History (3) Variable content. Significant issues in Latin American history. Writing-emphasis course. (Same as Latin American Studies 475.)

476 Studies in Asian History (3) Variable content. Particular aspects of Middle Eastern and East Asian history such as modernization in the Middle East, revolution in China, Japanese Fasculism, and others. Repeatability: May be repeated. Maximum 9 hours.

480 Studies in African History (3) Variable content. Different areas of the continent and diverse aspects of the African experience such as African resistance movements, African political parties, the relationship of social and economic development under colonialism to social and economic conditions in modern African nations, and apartheid and resistance in South Africa.

Repeatability: May be repeated. Maximum 9 hours.

481 Studies in History (3) Variable content. Subject matter not covered in other courses.

Repeatability: May be repeated. Maximum 9 hours.

482 Colloquium in History (3) Historical theme or problem; emphasis on questions and skills, with special reference to historical writing, including critical analysis of both primary and secondary sources. Recommended for seniors. Writing-emphasis course.

483 History of United States Foreign Relations Since World War II (3) Examines the ideology and practice of U.S. international relations since World War II.

484 Studies in Jewish History (3) Variable content. Significant topics in the study of Jewish civilization and culture, including the development of the synagogue, Judaism and ethnicity, and the history of Jerusalem. Writing-emphasis course. (Same as Judaic Studies 484.)

Repeatability: May be repeated. Maximum 9 hours.

485 Studies in Cross Cultural History (3) Variable content. Comparative analysis of specific historical issues or specific facets of the relationships between two or more cultures.

Repeatability: May be repeated. Maximum 9 hours.

486 Studies in the Ancient Near East (3) Variable content. History and archaeology of Egypt, Anatolia (Turkey), Cyprus, and Persia (Iran), the rise of social complexity, and social boundaries in antiquity. Writing-emphasis course.

Repeatability: May be repeated. Maximum 9 hours.

487 Oral Histories of War and Peace (3) Oral history methodologies and interviews with veterans and others who have shaped modern American military history. Special focus on World War II and the Korean War.

490 Internship in the Center for the Study of War and Society (3) A structured field work experience in public history at a research center documenting modern U.S. military history, including special projects such as grant writing, interviewing, and archival processing. Writing-emphasis course.

Repeatability: May be repeated. Maximum 6 hours.

Registration Permission: Consent of Director of the Center for the Study of War and Society.

491 Foreign Study (1-15)

Repeatability: May be repeated. Maximum 15 hours.

492 Off-Campus Study (1-15)

Repeatability: May be repeated. Maximum 15 hours.

493 Independent Study (1-15)

Repeatability: May be repeated. Maximum 15 hours.

Hotel, Restaurant, and Tourism (514)

101 Science of Foods (3) Scientific principles involved with selection, preparation, and evaluation of quality food. (Same as Food Science and Technology 101.)

Contact Hour Distribution: 2 hours lecture and 2 hours lab each week.

210 Foodservice Operations Management (3) Principles of menu development, equipment selection, layout, purchasing, production, and service of food in volume.

211 Hotel and Resort Operations (3) Operational theory of lodging and an exploration of the lodging industry in terms of nature of work, organizational structure of lodging segments, the meaning of guest services, differentiation of brands, current industry issues, and evaluation of the market place.

224 Tourism Management (3) Examination of the various components of the tourism industry, motivators to travel, and the various market segments. Includes analyses of the economic, social, cultural, and environmental impacts to tourism.

311 Human Resources Management in Hospitality and Retailing (3) The core concepts of managing an organization’s culturally-diverse workforce include – recruitment and selection, training and development, and employee relations. (Same as Retail and Consumer Sciences 311.)

(RE) Prerequisite(s): 210 or 211.

324 Food and Lodging Cost Control (1-3) Budget, cost analysis, computer, financial statement use in decision-making in lodging and foodservice systems.

(RE) Prerequisite(s): 210 and Accounting 200.

(DE) Prerequisite(s): Mathematics 123 and Mathematics 119.

341 Food Safety and Sanitation for the Food Service Industry; Hazard Analysis Critical Control Point (HACCP) (1) Students will be eligible to become ServSafe certified.

(RE) Corequisite(s): 210.

360 Issues and Trends in Consumer Service (3) (See Retail and Consumer Sciences 360.)

390 Professional Development (3) Development of skills important to career success; focus on business communications, time and stress management, motivational and negotiating skills. (Same as Retail and Consumer Sciences 390.) (WC)

(RE) Prerequisite(s): 326, 310, and English 101 and 102.

Registration Restriction(s): Hotel, restaurant, and tourism major or retail and consumer sciences major.

392 Professional Experience I (6) Supervised educational experiences in selected hospitality operations.

Grading Restriction: Satisfactory/No Credit grading only.

(RE) Prerequisite(s): 390.

Registration Restriction(s): Hotel, restaurant, and tourism major.

410 Strategic Planning for the Hospitality Industry (3) Hospitality management from a strategic planning perspective; development and implementation of restaurant strategy from financial, operational, and customer orientation.

(RE) Prerequisite(s): 390.

423 Marketing for Hospitality and Tourism (3) Marketing principles and practices specifically applied to the hospitality and tourism industry. Includes the analyses of various hospitality and tourism marketing strategies and the implications of those strategies. Develops the use of marketing tools as an integral part of the hospitality and tourism operation.

(RE) Prerequisite(s): 211 and 224.

(DE) Prerequisite(s): 210 and Marketing 300.

425 Legal Issues in Service Management (3) Legal rights and responsibilities of service industry managers, their staff and clientele.

(RE) Prerequisite(s): 390.

Registration Restriction(s): Hotel, restaurant, and tourism major.

435 Conventions and Meetings: Pursuit and Attainment (3) Discussion of types of conventions/meetings, roles of meeting planners, identifying decision makers, site selection, negotiating, budgeting, marketing and gaining commitment from group.

(RE) Prerequisite(s): 210 or 211.

440 Special Topics: Hotel, Restaurant, and Tourism (1-3) Developments, issues and problems in hotel and restaurant; and tourism. Variable topics.

Repeatability: May be repeated. Maximum 6 hours.

445 Advanced Food Production and Service Management (3) Application of management concepts in menu design, personnel, cost control and production and service of food.

Contact Hour Distribution: 2 hours and 1 lab.

(RE) Prerequisite(s): 390.

450 Advanced Lodging Management (3) Designed to allow students to interpret operational problems currently occurring in the hotel industry in a case study, interactive environment. The student will analyze management opportunities and threats within a hotel and determine reasonable alternatives.

(RE) Prerequisite(s): 211 and 390.

(DE) Prerequisite(s): Marketing 300.

484 International and Multicultural Tourism (3) Examines international and intercultural tourism trends, planning, and development issues. Special emphasis is given to the factors affecting patterns of international travel, planning practices, facilities, and services necessary to attract and host international tourists, and the development and operation of tourism attractions in developing countries. An overseas study tour is required as part of this course.

492 Professional Experience II (9) Supervised managerial training with sponsoring hospitality organizations.

(RE) Prerequisite(s): 392 and 410.

494 Directed Study: Hotel, Restaurant, and Tourism (1-3) Individual student-faculty experience.

Grading Restriction: Satisfactory/No Credit grading only.

Registration Restriction(s): Minimum student level – junior.

Registration Permission: Consent of instructor.

COURSES OF INSTRUCTION 239
Human Resource Management (530)
330 Foundations of Organizational Behavior (3) Behavioral processes in organizations: perception, motivation, power and influence, leadership; behavioral consequences: group behavior, teamwork, politics, conflict, culture, change and development.
(RE) Corequisite(s): Business Administration 353. Registration Restriction(s): Majors in the College of Business Administration.

340 Training Systems: Strategies and Techniques (3) Fundamental knowledge, strategies and techniques of training systems – needs assessment, transfer of training, methods, evaluation. Broadening roles of training due to its strategic nature, changing nature of the workforce, the workplace, and technology. Develop original training modules with multiple components.
(RE) Corequisite(s): Business Administration 353. Registration Restriction(s): Majors in the College of Business Administration.

350 Employee and Labor Relations (3) Evolution of and current practices related to effective workplace relations between the employer and employee. The examination of the union and nonunion environments for the organization. The establishment and maintenance of a safe, healthy, diverse and secure workplace.
(RE) Corequisite(s): Business Administration 353. Registration Restriction(s): Majors in the College of Business Administration.

460 Compensation, Benefits, and Technologies for Human Resource Management (3) Compensation and benefits including direct and indirect compensation. Total reward systems that are used by companies and the common parts of a reward system. Mandated regulations of compensation and benefits, e-HR technologies and systems used for compensation and benefits management.
(RE) Prerequisite(s): Business Administration 353. Registration Restriction(s): Majors in the College of Business Administration.

470 Staffing Organizations (3) Theory, methods, and issues pertaining to technical aspects of successful organizational staffing: legal environment, measurement and validation, performance appraisal and criterion development, selection tests, recruitment.
(RE) Prerequisite(s): Business Administration 353. Registration Restriction(s): Majors in the College of Business Administration.

492 Off-Campus Study (1-6) Practical application and classroom instruction in human resources. Aspects of career development and the transition to the corporate world.
Repeatability: May be repeated. Maximum 6 hours. Registration Restriction(s): Human resource management major. Registration Permission: Consent of instructor.

493 Independent Study (3) Readings, research, and special projects.
Repeatability: May be repeated. Maximum 6 hours. Registration Restriction(s): Majors in the College of Business Administration. Registration Permission: Consent of instructor.

Industrial Engineering (556)
202 Work Methods and Measurement (3) Productivity and work design. Techniques of work methods design including flow, activity, and worker machine charts as well as work methods improvement techniques. Human work design criteria for the improvement of work methods. Stopwatch time studies, predetermined time systems, and work sampling are used to establish, document, and maintain time standards, standard data, and allowances. Learning curves and wage payment systems.
Contact Hour Distribution: 2 hours lecture and 2 hours lab. (RE) Prerequisite(s): Engineering Fundamentals 230. (RE) Corequisite(s): Statistics 251.

250 Sophomore Seminar (1) Exposure to the engineering design process through an apprenticeship with senior design teams in Industrial Engineering 422. Apprentices will maintain a journal describing their activities in observing and assisting the senior design teams. Principles of professional oral communications. Topics and activities may include group problem solving, case studies, and formal presentations on the engineering design process employed by the senior design engineers with which they assisted. Grading will be based on journal submissions, contributions to the design team, and the quality of the presentations.
Contact Hour Distribution: 2-hour lab. Grading Restriction: Satisfactory/No Credit grading only. (RE) Prerequisite(s): Engineering Fundamentals 152. Registration Restriction(s): Industrial engineering major; minimum student level – sophomore.

300 Engineering Data Analysis and Process Improvement (3) Engineering statistical methods as applied to modern engineering and business environments, process improvement, inferences about process output and behavior, and measurement systems. An introduction to the use of designed experiments to improve process.
Contact Hour Distribution: 2 hours lecture. (RE) Prerequisite(s): Statistics 251 or Mechanical Engineering 345. Comment(s): Available to other majors who have completed an introductory course in probability and statistics.

301 Operations Research in Industrial Engineering I (3) Integrated system modeling concepts; linear mathematical programming models including the original simplex procedure, transportation and assignment problems, revised simplex procedure, dual simplex procedure, parametric linear programming (sensitivity analysis), and integer linear programming.
(RE) Prerequisite(s): Mathematics 200. Recommended Background: Completion of an introductory course in probability and statistics.

304 Introduction to Human Factors Engineering (3) Human capabilities and limitations affecting work, work place, and work environment design. Emphasis on human factors methodology, human input requirements, human outputs, the design of human-machine interfaces, the analysis of stress on performance, environmental factors such as noise, lighting, and atmospheric conditions. Focus on designing the task to fit the person.
Comment(s): Available to other majors who have completed an introductory course in probability and statistics. Registration Restriction(s): Minimum student level – junior.

310 Operation Research in Industrial Engineering II (3) Network models including PERT-CPM, introduction to nonlinear programming, dynamic programming, stochastic processes, and queuing theory. Basic decision analysis techniques and their applications in engineering practice.
(RE) Prerequisite(s): 300 and 301. Recommended Background: Completion of a computer-programming course.

330 Manufacturing Materials/Processes (3) Characteristics of materials and processes used in modern manufacturing.
(RE) Prerequisite(s): Materials Science and Engineering 201.

340 Process Improvement through Planned Experimentation (3) Review of fundamentals of continuous improvement, advanced statistical process control techniques, and strategies for short production runs. Use of experimental design techniques to improve processes, including single and multiple-factor designs, blocking and confounding, and fractional designs. Full factorial designs are compared to fractional designs to balance experimental efficiency with loss of information. Lab component utilizes statistical and simulation software to provide hands-on experience.
Contact Hour Distribution: 2-hour lab. Registration Restriction(s): Industrial engineering major; minimum student level – junior.

350 Junior Seminar (1) The role of the industrial engineer in the fields of specialization; necessary training for each specialization, and project- ed career opportunities. Preparation of written communications in science and engineering. Topics and activities include case studies, literature searches, and preparation of written engineering reports including abstracts, executive summaries, and recommendations. (WC) Grading Restriction: Satisfactory/No Credit grading only. Contact Hour Distribution: 2-hour lab.
Registration Restriction(s): Industrial engineering major; minimum student level – junior.

401 Integrated Manufacturing Systems (3) NC and CNC machine tools, robotics and related materials handling systems, hard automation, alternative integrated manufacturing systems, and manufacturing information/control systems.
(RE) Prerequisite(s): 202 and 330.

402 Production System Planning and Control (3) Theory and application of forecasting systems including regression and time series models. Independent demand inventory models, including development of safety stock. All modules of Manufacturing Resource Planning (MRP) Systems: master production scheduling, resource requirements planning, bill of material and inventory file structures, material requirements planning, capacity planning, shop floor and purchase order control. Overview of just-in-time inventory concepts and MRP’s role in manufacturing automation.
(RE) Prerequisite(s): 202 and 310.

403 Industrial Engineering Applications (1) To enhance and integrate the industrial engineering educational experience in preparing senior industrial engineering students for their transition to professional practice.
Grading Restriction: Satisfactory/No Credit grading only. (RE) Corequisite(s): 422. Registration Permission: Consent of instructor.

Registration Restriction(s): Restricted to majors in the College of Engineering; minimum student level – junior.

406 Simulation (3) Simulation of complex production processes using current simulation software. Introduction to modeling concepts, flowcharting, random number generation, design of experiments, simulation logic, and computer animation. Utilization of statistical tools to analyze inputs and outputs to simulation models. Lab component provides hands-on experiences in developing simulation models for relevant industrial engineering case studies.

Contact Hour Distribution: 2 hours lecture and 1 lab.

(REE) Prerequisite(s): 300 and 310.

Recommended Background: Completion of 202 and an introductory course in probability and statistics.

421 Information Systems Analysis and Design (3) Systems engineering approach to analysis and design of systems of information. Topics include: system development life cycle, system analysis methodologies, data analysis techniques, system design, joint application design, and rapid application design. Lab introduces analysis and design software tools.

(REE) Corequisite(s): 402.

Recommended Background: Completion of an introductory course in probability and statistics.

Registration Restriction(s): Industrial engineering major; minimum student level – senior.

422 Senior Problems Analysis (3) Current real-world problems will be drawn from local production and service organizations and presented by personnel from these organizations. Senior industrial engineering student teams will solve these real-world problems under the guidance of their instructor using industrial engineering methodology. These problems emphasize problem definitions, analysis, and presentation with considerations for engineering standards and realistic economic, environmental, ethical, safety, social, political, and other pertinent constraints.

Recommended Background: Completion of one semester of industrial engineering senior-level courses.

Registration Permission: Consent of instructor.


Registration Restriction(s): Minimum student level – senior.

427 Introduction to Lean Systems (3) Introduces a framework to implement improvements within an enterprise. This framework will focus on designing both the physical system and the associated information system. The students will be introduced to the basic concepts of facilities design based upon process design and requirements. The design of the physical and information systems will be based on integrating the concepts, tools, technology, and processes of lean enterprise and Six Sigma. The course includes both lecture and laboratory components where student teams will include case studies, industry based projects, and the preparation of written engineering reports.

(REE) Corequisite(s): 406.

Recommended Background: 350, 401, and completion of an introductory course in probability and statistics.

450 Senior Seminar (1) Selected topics of interest to industrial engineers, including ethics, life-long learning, contemporary issues in engineering. Formal oral presentations and the preparation of articles by the students on the selected topics.

Contact Hour Distribution: 2-hour lab.

Grading Restriction: Satisfactory/No Credit grading only.

Registration Restriction(s): Industrial engineering major; minimum student level – senior.

454 Visual Basic Applications in Engineering (3) Fundamentals of designing, implementing, and distributing certain Visual Basic applications. Techniques for transforming programming problems into programming paradigms, and encoding solutions using the Microsoft Visual Basic 6 rapid application development tool. Develop an understanding of the Visual Basic event-driven programming concepts, terminology, and available tools. Demonstrations and class discussion will supplement the provided class notes. Practical problems and projects will be assigned.

(REE) Prerequisite(s): 421.

Recommended Background: Completion of an introductory course in probability and statistics.

455 Human-Computer Interaction (3) Introduction to the analysis, design, production, and implementation of systems requiring interaction between humans and computers (HCI). Includes human sensory systems, human memory capacity, computer hardware/software requirements, input/output device design, and error message handling.

(REE) Prerequisite(s): 304.

Recommended Background: Completion of an introductory course in probability and statistics.

Registration Restriction(s): Minimum student level – junior.

483 Introduction to Reliability Engineering (3) (See Nuclear Engineering 483.)

484 Introduction to Maintenance Engineering (3) (See Nuclear Engineering 484.)

493 Special Topics in Industrial Engineering (1-3) Recent developments in industrial engineering including new areas of application, new research techniques and new methodologies.

Repeatability: May be repeated. Maximum 6 hours.

Registration Restriction(s): Minimum student level – junior.

494 Special Topics in Industrial Engineering (1-3) Recent developments in industrial engineering including new areas of application, new research techniques and new methodologies.

Repeatability: May be repeated. Maximum 6 hours.

Registration Restriction(s): Minimum student level – junior.

495 Special Topics in Industrial Engineering (1-3) Recent developments in industrial engineering including new areas of application, new research techniques and new methodologies.

Repeatability: May be repeated. Maximum 6 hours.

Registration Restriction(s): Minimum student level – junior.

Information Management (558)

341 Business Process Analysis (3) Topics include strategic uses of information technology in business processes, analysis of business processes (including transaction processing cycles), analysis of business process risk exposures and controls, and conceptual modeling and the development of information systems.

(REE) Corequisite(s): Business Administration 342.

Registration Restriction(s): Majors in the College of Business Administration; minimum student level – junior.

342 Introduction to Database Systems (3) Fundamentals of database technology, database design, database use, database system controls, and database implementation. Focus is on developing the technical and business skills necessary to successfully gather information and improve business processes in technology-driven environments. Students work with modern database management systems software and develop database project management skills.

(REE) Prerequisite(s): 341.

Registration Restriction(s): Majors in the College of Business Administration.

442 e-Enterprise (3) Introduction to Internet enabled business processes that connect buyers, suppliers, and trading partners in dynamic, real-time information sharing partnerships. The course discusses and illustrates how the complete value chain, from procurement of raw materials on the supply side to consumer retailing and customer management on the demand side, is integrated and made potentially more efficient.

(REE) Prerequisite(s): 341.

Registration Restriction(s): Majors in the College of Business Administration.

443 Business Applications and Tools (3) Fundamentals of business application logic, business application architectures, and project management. Students learn to apply advanced tools associated with spreadsheets and databases, including the creation of objects, arrays, macros, and modules (using Visual Basic algorithms), for use in the design and development of object-oriented applications.

(REE) Prerequisite(s): 341.

Registration Restriction(s): Majors in the College of Business Administration.

Information Sciences (560)

102 Technologies for Information Retrieval (3) Principles, selection, and use of computer-based information management applications; software identification and task appropriate uses; telecommunications, utilities, and memory management systems; multiple operating systems and technology for national network connections; information services via computers.

310 Information Seeking: Resources and Strategies (3) Information as critical resource for research and decision-making; emphasis on planning, executing, and evaluating information searches. Focus on topic of student’s major.

330 Books and Related Materials for Children (3) Materials for children in leisure time or classroom activities; criteria for selecting books, magazines, recordings, films and related materials; storytelling and other devices for encouraging reading.
Information Consumer (3) Information in society, information economy, knowledge/learning society; publishing and information providers: hosts, bulletin boards, nets; information overload/anxiety, science fraud, gatekeeping concepts; updating systems, environmental scanning; information consumption techniques.

History of the Book (3) History of writing and various methods of bookmarking.

Writing About Science and Medicine (3) (See Journalism and Electronic Media 450.) (WC)

Introduction to Electronic Communication and Information Resources on the Internet (3) Exploration of worldwide information and communication resources: email, newsgroups, Web logs (blogs), and the World Wide Web. Discussion of information issues: copyright, censorship, privacy and access.

Advanced Electronic Communication and Information Resources on the Internet (3) Exploration of advanced information and communication issues, resources and tools: forms, scripting and search engines.

(Re) Prerequisite(s): 460.

Instructional Technology (569)

Introduction to Instructional Computing (3) Classroom uses of computers, applications for teachers, overview of computer operation and software for teachers of all grades.

Instructional Technology and Educational Studies (570)

Special Topics (1-3) Topics to be assigned. Repeatability: May be repeated. Maximum 12 hours.

Interdisciplinary Programs (581)

Selected Topics (1-3) Topics to be assigned. Repeatability: May be repeated. Maximum 6 hours.

Selected Interdisciplinary Topics (1-12) Acceptable for major or minor credit in any interdisciplinary program with the consent of the Director of Interdisciplinary Programs and the respective chairperson. Repeatability: May be repeated. Maximum 12 hours.

Foreign Study (1-15) Repeatability: May be repeated. Maximum 15 hours. Registration Permission: Consent of Director of Interdisciplinary Studies.

Off-Campus Study (1-15) Repeatability: May be repeated. Maximum 15 hours.

Independent Study (1-15) Repeatability: May be repeated. Maximum 15 hours.

Interior Design (582)

Introduction to Interior Design (2) Orientation to the profession; relationship to allied fields; contemporary development; philosophical approaches. Registration Requirement(s): Interior design major or architecture major. Registration Permission: Consent of instructor.

Visual Studies (3) Classification and properties of two and three-dimensional visual organization; design principles; visual and spatial elements within simple and complex visual systems; role of movement in experiencing scale and volumetric space. Contact Hour Distribution: 3-hour studio. (Re) Prerequisite(s): Architecture 121 and Architecture 171. Registration Requirement(s): Interior design major.

Introduction to Microenvironments (3) Human perceptions in micro-scale environments (residential, commercial, public spaces). Introduction to basic analytic and behavioral programming techniques. Contact Hour Distribution: 3-hour studio. (Re) Prerequisite(s): 171 and Architecture 171.

Human-Environment Systems (3) Role of culture in defining environment; physical, social and conceptual aspects of human-environment systems; impact of environment on human behavior, feelings and values; mutual-casual properties of behavior-environment systems.

Theory of Color (2) Introduction to basic color theory and its application to interior environments. Explores aesthetics and psycho-physiological effects. (Re) Prerequisite(s): 172 and Architecture 172.

Materials and Resources for Interiors (2) The development and application of materials and resources used in interior architectural space. (Re) Prerequisite(s): 172.
Italian (584)

111 Elementary Italian (3) Introduction to Italian. Language laboratory required. (RE) Prerequisite(s): 112.

112 Elementary Italian (3) Introduction to Italian. Language laboratory required. (RE) Prerequisite(s): 111.

211 Intermediate Italian (3) Sequence stresses reading, writing, listening and speaking Italian to prepare for upper-division courses in the language. Language laboratory required. (CC) (RE) Prerequisite(s): 112.

212 Intermediate Italian (3) Sequence stresses reading, writing, listening and speaking Italian to prepare for upper-division courses in the language. Language laboratory required. (CC) (RE) Prerequisite(s): 211.

311 History of Italian Literature (3) Chronological view of Italian literature in relation to the specific historical developments that have influenced it. (RE) Prerequisite(s): 212.

312 History of Italian Literature (3) Chronological view of Italian literature in relation to the specific historical developments that have influenced it. (RE) Prerequisite(s): 212.

314 Highlights of Italian Civilization (3) Survey of Italian civilization with special attention to major social, political and cultural achievements. (RE) Prerequisite(s): 212.

341 Intermediate Grammar, Composition and Conversation (3) Grammatical analysis of Italian prose; review of grammatical principles and their application in translation from English to Italian, both written and oral; exercises in free composition. (RE) Prerequisite(s): 212.

342 Intermediate Grammar, Composition and Conversation (3) Grammatical analysis of Italian prose; review of grammatical principles and their application in translation from English to Italian, both written and oral; exercises in free composition. (RE) Prerequisite(s): 341.

401 Dante and Medieval Culture (3) Introduction to the significance of this great Italian writer. Writing-emphasis course. (Same as Medieval Studies 401.) (RE) Prerequisite(s): 402.

402 Petrarch and Boccaccio (3) Writing-emphasis course. (Same as Medieval Studies 402.) (RE) Prerequisite(s): 401.

403 Literature of the Rinascimento (3) From Pucci to Tasso, the Quattrocento and the Cinquecento. (RE) Prerequisite(s): 404.

404 The Modern Italian Short Story (3) (RE) Prerequisite(s): 403.

406 The Modern Italian Novel (3) (RE) Prerequisite(s): 404.

409 Directed Readings (3) (RE) Prerequisite(s): 406.

410 Italian Theatre (3) Survey of Italian theatre from Renaissance to present. (RE) Prerequisite(s): 411.

414 Italian Cultural Studies (3) This course will examine Italian culture as a set of practices characteristic of Italian society, from its mode of material production to its eating habits, dress codes, celebrations, and rituals. The objective of the course is to achieve a greater understanding of contemporary Italian culture. Writing-emphasis course.

421 Topics in Italian Literature and Cinema (3) Examination of Italian literature and cinema from 1930 to the present focusing on literary works translated into English and adapted into film. Objectives of the course are to investigate the relationship between literature and cinema and to achieve a greater understanding of Italian culture since 1930. Films will be shown in Italian with English subtitles. Writing-emphasis course. (Same as Cinema Studies 421.) Repeatability: May be repeated. Maximum 6 hours.

490 Internship (1-15) Career-related experiences in the United States or abroad. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 15 hours. Registration Restriction(s): Italian major/language and world business concentration.

491 Foreign Study (1-15) Repeatability: May be repeated. Maximum 15 hours.

493 Directed Studies in Interior Design (1-4) Individual or group studio and/or study abroad; academic research, field investigation, or studio experiences. Determination of credit based on particular international experience. Repeatability: May be repeated. Maximum 15 hours.

Japanese (589)

151 Elementary Japanese I (5) (See Asian Languages 151.) (RE) Prerequisite(s): 152.

152 Elementary Japanese II (5) (See Asian Languages 152.) (RE) Prerequisite(s): 151.

251 Intermediate Japanese I (5) (See Asian Languages 251.) (CC) (RE) Prerequisite(s): 252.

252 Intermediate Japanese II (5) (See Asian Languages 252.) (CC) (RE) Prerequisite(s): 251.

313 Japanese Literature in English Translation (3) (See Asian Languages 313.) (RE) Prerequisite(s): 314.

314 Japanese Literature in English Translation (3) (See Asian Languages 314.) (RE) Prerequisite(s): 313.

351 Advanced Japanese I (4) (See Asian Languages 351.) (RE) Prerequisite(s): 352.

352 Advanced Japanese II (4) (See Asian Languages 352.) (RE) Prerequisite(s): 351.

413 Topics in Japanese Literature (3) (See Asian Languages 413.) (CC) (RE) Prerequisite(s): 412.

451 Readings in Pre-Modern Japanese Literature (3) (See Asian Languages 451.) (RE) Prerequisite(s): 450.

452 Readings in Modern Japanese Literature (3) (See Asian Languages 452.) (CC) (RE) Prerequisite(s): 451.

Journalism and Electronic Media (592)


201 Writing for Mass Media (3) Principles and practice of news writing for print and electronic media. Comprehensive overview of the major forms of writing for the mass media. (WC) Credit Restriction(s): Credit not available for majors in the College of Communication and Information. (RE) Prerequisite(s): English 102.


290 Foundations of Video Production (3) A foundational course designed to introduce the process of writing and producing video programs. Includes lectures and lab hours in both studio and field production. Students are introduced to writing and aesthetics while working hands-on with all studio and field equipment in the electronic video process from conception through production to post-production. As part of this class, students will provide production support for on-going cable television programs produced for the campus cable channel. Contact Hour Distribution: Lecture and lab. (RE) Prerequisite(s): 200 and 275.
275 Introduction to Journalism and Electronic Media (3) Overview of print and electronic media, including content selection, delivery methods, economic and ownership structures, and media effects. 
Contact Hour Distribution: Lecture and lab. 

280 Communication Graphics (3) Principles and practice in the visual aspect of communication. Emphasis on graphic design, typography, illustration and photography, printing and production techniques and publication design. 
Contact Hour Distribution: Lecture and lab. 
(RE) Prerequisite(s): 200 or 201. 

290 Photojournalism (3) Principles and practice of photography as a creative tool of communication. Basic camera technique, digital photography, historical and contemporary photojournalism. 
Contact Hour Distribution: Lecture and lab. 

302 Readership and Audience Analysis (3) Measurement and analysis of readership/audience. Broad overview of methods used for newspaper, magazine, radio, television, cable, and the Internet. Applications to both internal decision-making and external communication in media. 
(RE) Prerequisite(s): 275. 

311 Electronic News Writing and Reporting (3) Writing and reporting for electronic news media (radio, television, cable, and the Internet). Lecture and lab course with writing emphasis. Introduction to Computer Assisted Reporting (CAR). 
Contact Hour Distribution: Lecture and lab. 
(RE) Prerequisite(s): 200 and 275. 

315 Print/Web News Writing and Reporting (3) Gathering and writing news for publication in magazines and newspapers. 
(RE) Prerequisite(s): 200. 

320 Mass Media Commercial Writing and Promotion (3) Study of media (print, radio, television, cable, Internet) commercial writing and promotion with an emphasis on writing persuasive messages. Analysis of markets and research data. Planning promotional campaigns. 
(RE) Prerequisite(s): 200 and 275. 

333 Print/Web Editing (3) Methods and practice in judging news, editing copy, writing headlines and designing newspapers and magazines. Emphasis on precise word use and news display. 
Contact Hour Distribution: Lecture and lab. 
(RE) Prerequisite: 315 or Public Relations 320. 

336 Intermediate Video Production (3) Emphasis on concepts related to message design, development, field acquisition, writing, digital videography, producing and directing video productions. Students are introduced to nonlinear digital editing. As part of the class, students provide production support for on-going programs produced for digital cable television channel. 
Contact Hour Distribution: Lecture and lab. 
(RE) Prerequisite: 236. 

360 Electronic Media Performance (3) Development of vocal, visual, and performance skills for announcers, interviewers, newscasters, and reporters. 
Contact Hour Distribution: Lecture and lab. 
(RE) Prerequisite(s): 275. 

365 Sports Broadcasting (3) Introduction to the skills needed to perform as a radio or TV sportscaster. Includes voice and diction training, interviewing athletes, radio and TV sportscasting, and play-by-play techniques. 
Contact Hour Distribution: Lecture and lab. 
(RE) Prerequisite(s): 200 and 275. 


375 Sports Reporting Across the Media (3) An introductory course in gathering, writing and presenting sports news in a variety of formats, including print, photography, radio, television and the Web. 
Contact Hour Distribution: Lecture and lab. 

400 Mass Communication Law and Ethics (3) Emphasis on legal issues affecting print and electronic media, including libel, privacy, copyright, free press-fair trial, governmental regulations of advertising, electronic media and public relations. Also includes ethical standards and practices. (Same as Legal Studies 400.) 

411 Electronic News Gathering (3) Writing, reporting, shooting, editing, and producing for the electronic news media. Lecture and lab course providing students with experience as reporters/producers for a television and cable news program. Includes an overview of electronic news-gathering equipment as well as non-linear video editing. 
Contact Hour Distribution: Lecture and lab. 
(RE) Prerequisite: 311. 

412 Opinion Writing (3) Analysis of editorial positions and practices. Writing editorials/columns for newspapers, magazines, corporate publications, and electronic media (radio, television, cable, Internet), with emphasis upon study and use of rhetorical devices and logic. 

414 Magazine and Feature Writing (3) Techniques of writing features and in-depth articles for mass circulation and specialized magazines or newspapers. Organizing and presenting material, with attention to problems in areas such as business, science, agriculture, and the humanities. (WC) 
(RE) Prerequisite(s): 333. 

415 Magazine Industry Workshop (3) Introduction to the magazine industry including management, design, writing and editing, and interactive analysis of print and electronic format magazines. Planning new products for the marketplace. 
Contact Hour Distribution: Lecture and lab. 
(RE) Prerequisite(s): 414. 

420 Media Sales (3) Problems and practices of newspaper, radio, television, cable, and Internet advertising sales. Practical experience in radio and television sales. Use of ratings and new technology in sales presentations. 
(RE) Prerequisite(s): 302 and 320. 

Contact Hour Distribution: Lecture and lab. 
(RE) Prerequisite: 222. 

430 Public Affairs Reporting (3) Reporting (including database reporting) and writing about courts, government and public agencies. Event and issue-oriented journalism of politics and public affairs. 
(RE) Prerequisite(s): 333. 

433 Editing and Layout for Print/Web (3) Editing and layout for newspapers, magazines, and online publishing. 
Contact Hour Distribution: Lecture and lab. 
(DE) Prerequisite(s): 333. 

436 Advanced Video Production (3) Students are actively involved in the program development process, including conceiving, writing and producing original video productions, as well as maintenance of existing shows airing weekly on the University’s digital cable channel. Advanced post-production techniques, including non-linear digital editing. 
Contact Hour Distribution: Lecture and lab. 
(RE) Prerequisite: 336. 

444 Journalism as Literature (3) Study of writers from the 17th century to the modern era whose works have endured as both journalism and literature. An emerging genre called literary journalism will be examined as a means of cultural reporting with a personal narrative style. (WC) 

446 Video Capstone (3) Overview of production management. The course will be taught in conjunction with visiting professionals from a variety of corporate and commercial video production facilities. In-depth seminars on production management, including budgeting, planning, staffing, producing, directing, and evaluating video projects. Students are involved in managing productions produced for digital cable channel. 
(RE) Prerequisite: 436. 

450 Writing about Science and Medicine (3) Writing workshop to analyze examples of successful science writing and write series of articles for general public based on scientific journals, news conferences, technical meetings and interviews. (Same as Information Sciences 450.) (WC) 

451 Environmental Writing (3) Writing for news media (including the Internet) on such environmental issues as sprawl, forests, air pollution, energy, and invasive species. Students hear presentations from and interview experts in environmental science and reporting. Exemplary environmental writing is analyzed. (WC) 

456 Science Writing as Literature (3) Survey of important science writing for the general public across the spectrum of science, engineering, and medicine. Works by authors such as Arthur C. Clarke, Stephen J. Gould, and Richard Selzer will be analyzed for literary qualities in a quest to understand why some science writing succeeds. (WC) 

457 Media and Society (3) Media processes and effects on society. Major theories/research are introduced and applied to current issues. 
(RE) Prerequisite(s): 200 and 275. 

460 Electronic News Operations (3) Production of news programs for television, cable and the Internet. Advanced course in electronic news gathering, reporting, digital videography, non-linear editing, and producing. Computerized newsroom and studio are utilized. 
Contact Hour Distribution: Lecture and lab. 
(RE) Prerequisite(s): 411. 

465 Media and Diversity (3) Major theories/research are introduced regarding media effects on public perceptions and attitudes toward various social groups (e.g., groups based on gender, class, race/ethnicity, and sexual orientation). Discussion of historical and legal implications of media effects. (Same as Women’s Studies 465.) 
(RE) Prerequisite(s): 200 and 275. 
Registration permission: Consent of instructor.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>470</td>
<td>Cable, Broadband, and Interactive Digital Media (3) History and structure of cable television and other broadband delivery systems (DBS, Internet, etc.). Development of digital broadcasting, interactive television, and other broadband media systems and digital technologies. Regulatory, policy, programming, and management issues arising from new media and digital technologies.</td>
<td>(RE) Prerequisite(s): 275.</td>
</tr>
<tr>
<td>475</td>
<td>Sports Writing (3) Writing sports stories, features and columns. Sports writing is considered from the standpoint of sports reporters, sports information specialists and others with an interest in writing about sports.</td>
<td></td>
</tr>
<tr>
<td>485</td>
<td>Media Management (3) Business policies and practices of newspaper, broadcast, cable, and Internet operations. Departmental functions, cost and income analysis, leadership styles and techniques with an emphasis on mid and senior level management. Job-hunting guidelines provided.</td>
<td></td>
</tr>
<tr>
<td>491</td>
<td>Foreign Study (1-15) Repeatability: May be repeated. Maximum 15 hours. Comment(s): Approval of hours and topics by advisor required.</td>
<td></td>
</tr>
<tr>
<td>492</td>
<td>Practicum (1-2) Work and learning experience at newspaper, radio, television, cable, Web, or other non-broadcast facilities. Final written report required. Grading Restriction: Satisfactory/No Credit grading only. Registration Restriction(s): Minimum student level – senior.</td>
<td></td>
</tr>
<tr>
<td>493</td>
<td>Independent Study (3) Repeatability: May be repeated. Maximum 6 hours.</td>
<td></td>
</tr>
<tr>
<td>494</td>
<td>Special Topics (3) Topics vary. Repeatability: May be repeated. Maximum 6 hours.</td>
<td></td>
</tr>
<tr>
<td>498</td>
<td>Internship (3) Full-time (30-40 hours per week) work experience in news, production, or sales and management with non-university professional organization. Educational experience beyond that available at the university. Final term paper. Credit Restriction(s): No retroactive credit for previous work experience. Registration Restriction(s): Minimum student level – senior.</td>
<td></td>
</tr>
<tr>
<td>499</td>
<td>Internship (1-15) Repeatability: May be repeated. Maximum 15 hours.</td>
<td></td>
</tr>
<tr>
<td>492</td>
<td>Off-Campus Study (1-15) Repeatability: May be repeated. Maximum 15 hours.</td>
<td></td>
</tr>
<tr>
<td>493</td>
<td>Independent Study (1-15) Repeatability: May be repeated. Maximum 15 hours.</td>
<td></td>
</tr>
</tbody>
</table>

**Judaic Studies (595)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>311</td>
<td>Ancient Hebraic Religious Traditions (3) (See Religious Studies 311.)</td>
<td></td>
</tr>
<tr>
<td>312</td>
<td>Religious Aspects of Biblical and Classical Literature (3) (See Religious Studies 312.)</td>
<td></td>
</tr>
<tr>
<td>320</td>
<td>Women and Religion (3) (See Religious Studies 320.)</td>
<td></td>
</tr>
<tr>
<td>322</td>
<td>Medieval Philosophy (3) (See Philosophy 322.) (WC)</td>
<td></td>
</tr>
<tr>
<td>350</td>
<td>German-Jewish Topics in Literature and Culture (3) (See German 350.)</td>
<td></td>
</tr>
<tr>
<td>369</td>
<td>History of the Middle East (3) (See History 369.)</td>
<td></td>
</tr>
<tr>
<td>370</td>
<td>History of the Middle East (3) (See History 370.)</td>
<td></td>
</tr>
<tr>
<td>381</td>
<td>Introduction to Judaism (3) (See Religious Studies 381.)</td>
<td></td>
</tr>
<tr>
<td>383</td>
<td>History of Jewish Civilization I (3) (See History 383.)</td>
<td></td>
</tr>
<tr>
<td>384</td>
<td>History of Jewish Civilization II (3) (See History 384.)</td>
<td></td>
</tr>
<tr>
<td>385</td>
<td>Contemporary Jewish Thinkers (3) (See Religious Studies 385.)</td>
<td></td>
</tr>
<tr>
<td>386</td>
<td>Voices of the Holocaust (3) (See Religious Studies 386.)</td>
<td></td>
</tr>
<tr>
<td>395</td>
<td>The Crusades and the Medieval Christian-Muslim Relations (3) (See History 395.)</td>
<td></td>
</tr>
<tr>
<td>405</td>
<td>Modern Jewish Thought (3) (See Religious Studies 405.)</td>
<td></td>
</tr>
<tr>
<td>425</td>
<td>Early Christian and Byzantine Art to 1350 (3) (See Art History 425.)</td>
<td></td>
</tr>
<tr>
<td>431</td>
<td>Medieval Art of the West 800-1400 (3) (See Art History 431.)</td>
<td></td>
</tr>
<tr>
<td>484</td>
<td>Studies in Jewish History (3) (See History 484.)</td>
<td></td>
</tr>
</tbody>
</table>

**Latin American Studies (600)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>251</td>
<td>Introduction to Latin American Studies (3) (See History 255.)</td>
<td></td>
</tr>
<tr>
<td>252</td>
<td>Introduction to Latin American Studies (3) (See History 256.)</td>
<td></td>
</tr>
<tr>
<td>313</td>
<td>Peoples and Cultures of Mesoamerica (3) (See Anthropology 313.)</td>
<td></td>
</tr>
<tr>
<td>314</td>
<td>Peoples and Cultures of South America (3) (See Anthropology 314.)</td>
<td></td>
</tr>
<tr>
<td>315</td>
<td>Aspects of Luso-Brazilian Literature (3) (See Portuguese 315.)</td>
<td></td>
</tr>
<tr>
<td>316</td>
<td>Luso-Brazilian Cinema and Literature (3) (See Portuguese 316.)</td>
<td></td>
</tr>
<tr>
<td>319</td>
<td>Caribbean Cultures and Societies (3) (See Anthropology 319.)</td>
<td></td>
</tr>
<tr>
<td>331</td>
<td>Introduction to Hispanic Culture (3) (See Spanish 331.)</td>
<td></td>
</tr>
<tr>
<td>333</td>
<td>Survey of Spanish-American Literature: 1700 to Present (3) (See Spanish 333.)</td>
<td></td>
</tr>
<tr>
<td>334</td>
<td>Survey of Hispanic Literatures: Beginnings-1700 (3) (See Spanish 334.)</td>
<td></td>
</tr>
<tr>
<td>360</td>
<td>History of Latin America (3) (See History 360.)</td>
<td></td>
</tr>
<tr>
<td>361</td>
<td>History of Latin America (3) (See History 361.)</td>
<td></td>
</tr>
<tr>
<td>373</td>
<td>Geography of South America (3) (See Geography 373.)</td>
<td></td>
</tr>
<tr>
<td>401</td>
<td>Cultural Plurality and Institutional Changes in Latin America (3) (See Spanish 401.)</td>
<td></td>
</tr>
<tr>
<td>402</td>
<td>Latin American Studies Seminar (3) (See Spanish 402.)</td>
<td></td>
</tr>
<tr>
<td>431</td>
<td>Topics in Literature and Language of the Portuguese Speaking World (3) (See Portuguese 431.)</td>
<td></td>
</tr>
<tr>
<td>432</td>
<td>Topics in the Literature and Language of the Portuguese Speaking World (3) (See Portuguese 432.)</td>
<td></td>
</tr>
<tr>
<td>456</td>
<td>Latin American Government and Politics I (3) (See Political Science 456.)</td>
<td></td>
</tr>
<tr>
<td>460</td>
<td>History of Brazil (3) (See History 460.)</td>
<td></td>
</tr>
<tr>
<td>461</td>
<td>Cuban Revolution in Historical Perspective (3) (See History 461.)</td>
<td></td>
</tr>
<tr>
<td>462</td>
<td>History of Mexico (3) (See History 462.)</td>
<td></td>
</tr>
<tr>
<td>465</td>
<td>Latin American Film and Culture (3) (See Spanish 465.)</td>
<td></td>
</tr>
<tr>
<td>475</td>
<td>Studies in Latin American History (3) (See History 475.)</td>
<td></td>
</tr>
<tr>
<td>479</td>
<td>Disenchanted Texts in Hispanic Literature (3) (See Spanish 479.)</td>
<td></td>
</tr>
<tr>
<td>491</td>
<td>Foreign Study (1-15) Repeatability: May be repeated. Maximum 15 hours.</td>
<td></td>
</tr>
<tr>
<td>492</td>
<td>Off-Campus Study (1-15) Repeatability: May be repeated. Maximum 15 hours.</td>
<td></td>
</tr>
<tr>
<td>493</td>
<td>Independent Study (1-15) Repeatability: May be repeated. Maximum 15 hours.</td>
<td></td>
</tr>
</tbody>
</table>

**Legal Studies (617)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>244</td>
<td>Professional Responsibility (3) (See Philosophy 244.) (AH) (OC)</td>
<td></td>
</tr>
<tr>
<td>301</td>
<td>The Legal Environment of Business (3) (See Business Law 301.)</td>
<td></td>
</tr>
<tr>
<td>330</td>
<td>Law in American Society (3) (See Political Science 330.)</td>
<td></td>
</tr>
<tr>
<td>331</td>
<td>Sociological Research (3) (See Sociology 331.)</td>
<td></td>
</tr>
<tr>
<td>340</td>
<td>Women, Politics, and the Law (3) (See Women’s Studies 340.)</td>
<td></td>
</tr>
<tr>
<td>341</td>
<td>Judicial Process (3) (See Political Science 341.)</td>
<td></td>
</tr>
<tr>
<td>362</td>
<td>Roman Law (3) (See Classics 362.)</td>
<td></td>
</tr>
<tr>
<td>392</td>
<td>Philosophy of Law (3) (See Philosophy 392.)</td>
<td></td>
</tr>
<tr>
<td>393</td>
<td>Global Justice and Human Rights (3) (See Philosophy 393.)</td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>Mass Communication Law and Ethics (3) (See Journalism and Electronic Media 400.)</td>
<td></td>
</tr>
<tr>
<td>401</td>
<td>Political Analysis (3) (See Political Science 401.)</td>
<td></td>
</tr>
<tr>
<td>430</td>
<td>United States Constitutional Law: Sources of Power and Restraint (3) (See Political Science 430.)</td>
<td></td>
</tr>
<tr>
<td>431</td>
<td>United States Constitutional Law: Civil Rights and Liberties (3) (See Political Science 431.)</td>
<td></td>
</tr>
<tr>
<td>435</td>
<td>Criminal Law and Procedure (3) (See Political Science 435.)</td>
<td></td>
</tr>
<tr>
<td>442</td>
<td>Administrative Law (3) (See Political Science 442.)</td>
<td></td>
</tr>
<tr>
<td>445</td>
<td>Administration of Justice (3) (See Political Science 445.)</td>
<td></td>
</tr>
<tr>
<td>451</td>
<td>Criminal Justice (3) (See Sociology 451.)</td>
<td></td>
</tr>
<tr>
<td>455</td>
<td>Society and Law (3) (See Sociology 455.)</td>
<td></td>
</tr>
<tr>
<td>469</td>
<td>Freedom of Speech (3) (See Communication Studies 469.)</td>
<td></td>
</tr>
<tr>
<td>470</td>
<td>International Law (3) (See Political Science 470.)</td>
<td></td>
</tr>
<tr>
<td>490</td>
<td>Language and Law (3) (See English 490.)</td>
<td></td>
</tr>
<tr>
<td>493</td>
<td>Independent Study (1-3) Repeatability: May be repeated. Maximum 3 hours.</td>
<td>Registration Permission: Consent of chair.</td>
</tr>
</tbody>
</table>
494 Internship (3)  
Registration Permission: Consent of chair.

496 The Rhetoric of Legal Discourse (3)  
(See English 496.)

499 Mock Trial (1)  
Repeatability: May be repeated. Maximum 8 hours.  
Registration Permission: Consent of chair.

Linguistics (623)

200 Language, Linguistics, and Society (3)  
Introduction to linguistics with focus on language development and use of language by individuals and groups.  
(DE) Prerequisite(s): English 102 or 118 or 132.

321 Introduction to Old English (3)  
(See English 321.)

371 Foundations of the English Language (3)  
(See English 371.)

372 The Structure of Modern English (3)  
(See English 372.)

400 Topics in Linguistics (3)  
Repeatability: May be repeated. Maximum 6 hours.

411 Linguistic Anthropology (3)  
(See Anthropology 411.)

423 The Development of Diachronic and Synchronic Linguistics (3)  
Development of western linguistic thought from the Hebrews and Greeks through modern times. Readings from Boas, Sapir, Bloomfield, and others.  
Recommended Background: 9 hours of courses (300 or above) required for linguistics concentration.

425 Introduction to Descriptive Linguistics (3)  
(See French 425.)

426 Methods of Historical Linguistics (3)  
(See German 426.)

429 Romance Linguistics (3)  
(See French 429.)

431 Topics in Hispanic Linguistics (3)  
(See Spanish 430.)

435 Structure of the German Language (3)  
(See German 435.)

436 History of the German Language (3)  
(See German 436.)

471 Sociolinguistics (3)  
(See English 471.)

472 American English (3)  
(See English 472.)

474 Teaching English as a Second or Foreign Language I (3)  
(See English 474.)

476 Second Language Acquisition (3)  
(See English 476.)

477 Pedagogical Grammar for ESL Teachers (3)  
(See English 477.)

485 Special Topics in Language (3)  
(See English 485.)

490 Language and Law (3)  
(See English 490.)

491 Foreign Study (1-15)  
Repeatability: May be repeated. Maximum 15 hours.

492 Off-Campus Study (1-15)  
Repeatability: May be repeated. Maximum 15 hours.

493 Independent Study (1-15)  
Repeatability: May be repeated. Maximum 15 hours.

Logistics (626)

310 Intermediate Logistics (3)  
The concepts, principles, and methods used to plan, organize, and manage logistics activities in a global environment. Activities covered include: customer service, order fulfillment, inventory, materials and distribution planning, transportation, warehousing, and network design.  
(RE) Prerequisite(s): Business Administration 331.  
Registration Restriction(s): Majors in the College of Business Administration.

411 Logistics Analytical Methods I (3)  
Introduction to the principle analytical tools and models that are used in logistics; application of the analytical tools to logistics problems; using these techniques to support negotiations in a global business world.  
(RE) Prerequisite(s): 310.  
Registration Restriction(s): Majors in the College of Business Administration.

412 Logistics Analytical Methods II (3)  
Advanced analytical tools and techniques used to solve strategic, tactical, and operational global supply chain problems; managing the use of quantitative analytical tools in logistics.  
(RE) Prerequisite(s): 310.  
(RE) Corequisite(s): 411.  
Registration Restriction(s): Majors in the College of Business Administration.

413 Logistics Operations Management (3)  
Analysis of logistics operations and management techniques applied to warehousing/distribution center operations, purchasing and operation of transportation services, and logistics personnel management.  
(RE) Prerequisite(s): 310.  
(RE) Corequisite(s): 411.  
Registration Restriction(s): Majors in the College of Business Administration.

421 Procurement and Supply Management (3)  
Addresses the processes that facilitate the structure, development, and management of value added transactions and relationships between supplier and customer organizations in a global supply chain context. The course examines the management of the business purchasing function, including supplier selection and development, quality control, cost management, and performance measurement.  
(RE) Prerequisite(s): 411.  
Registration Restriction(s): Majors in the College of Business Administration.

460 Strategic Logistics in a Global Supply Chain Environment (3)  
Capstone course for logistics, with emphasis on strategic logistics from a global supply chain perspective. Integrates logistics concepts, framework, processes and tools learned in previous logistics coursework.  
(RE) Prerequisite(s): 411.  
Registration Restriction(s): Majors in the College of Business Administration.

492 Logistics Off-Campus Study (1-6)  
Grading Restriction: Satisfactory/No Credit grading only.  
Repeatability: May be repeated. Maximum 6 hours.  
Registration Restriction(s): Logistics major.  
Registration Permission: Consent of instructor.

493 Independent Study (1-6)  
Directed research on subject of mutual interest to student and staff member.  
Repeatability: May be repeated. Maximum 6 hours.  
Registration Restriction(s): Logistics major.  
Registration Permission: Consent of instructor.

Management (625)

300 Organizational Management (3)  
The study of the theories of organizations and the practice of management within them.  
(RE) Prerequisite(s): Business Administration 201.  
Comment(s): For majors in the College of Business Administration.  
Registration Restriction(s): Minimum student level – junior.

331 Developing Managerial Skills (3)  
Focuses on developing the skills to manage the dynamics of organizational behavior including motivating others, decision-making, using power and influence, resolving conflict, building teams, and leading change.  
(RE) Corequisite(s): Business Administration 331 or Business Administration 341.  
Registration Restriction(s): Majors in the College of Business Administration.

401 Business Strategy/Policy (3)  
Strategy and policy which affect the character and success of the total enterprise. Capstone course which integrates all functional areas in the formulation and implementation of strategy which will enable the organization to reach objectives. Major writing requirement.  
(RE) Prerequisite(s): Business Administration 353 and Business Law 301.  
Comment(s): For seniors.  
Registration Restriction(s): Majors in the College of Business Administration.

402 International Business Strategy (3)  
Provides an understanding of how to design and implement business and corporate strategies that will achieve sustainable competitive advantage in the international arena. Its perspective is that of the general manager who, to be successful, must balance the demands of multiple stakeholders and integrate various organizational activities and business functions into a cohesive unit. Emphasis is placed on the practical application of concepts and theories to real business situations.  
Credit Restriction: Students may not receive credit for Management 401 and 402.  
(RE) Prerequisite(s): Business Administration 353 and Business Law 301.  
Comment(s): Students must be in the international business collateral or dual concentration.  
Registration Restriction(s): Majors in the College of Business Administration.

431 Personnel Management (3)  
Theory, methods, and issues pertaining to successful personnel management. Course content: strategic human resource planning, human resource management, and planning, job analysis, legal issues, recruiting, measurement/decision-making issues, assessing job candidates, resource management, human resource planning, job analysis, legal issues, and their application to general management of new ventures within established companies and entrepreneurial enterprises. Focuses on the components necessary for the development of a business plan.  
(RE) Corequisite(s): 331.  
Registration Restriction(s): Majors in the College of Business Administration.

440 Organizational Psychology (3)  
(See Psychology 440.)

451 Business Planning (3)  
Integration of various functional disciplines and their application to general management of new ventures within established companies and entrepreneurial enterprises. Focuses on the components necessary for the development of a business plan.  
(RE) Prerequisite(s): 431.  
Registration Restriction(s): Majors in the College of Business Administration.

471 International Management (3)  
Factors significant to the manager in international business activities.  
(RE) Prerequisite(s): Business Administration 361.  
Registration Restriction(s): Majors in the College of Business Administration.
472 International Human Resource Management (3) Introduction to international human resource management from the perspective of the multinational firm. Topics include: globalization and human resource strategy, understanding culture in the management of human resources, intercultural differences, selecting employees for international assignments, training and developing expatriate employees, and evaluation and compensation of employees in international assignments. 

(RE) Prerequisite(s): Business Administration 201. Comment(s): For students in language and world business concentration in the College of Arts and Sciences (not for majors in the College of Business Administration).

481 Experiential Cross-Cultural Leadership (3) Examination of the challenges and opportunities of leading people and organizations in cross-cultural settings through experiential methodologies. Topics include: multi-national organizational culture, intercultural communications, intercultural decision-making, managing political risks, and motivation and leadership in cross-cultural settings.

(RE) Prerequisite(s): Business Administration 361. Registration Restriction(s): Majors in the College of Business Administration.

492 Management Off-Campus Study (1-6)
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 6 hours.
Registration Restriction(s): Management major.
Registration Permission: Consent of instructor.

493 Independent Study (3) Readings, research, and special projects.
Repeatability: May be repeated. Maximum 6 hours.
Registration Restriction(s): Management major.
Registration Permission: Consent of instructor.

Marketing (632)

300 Marketing and Supply Chain Management (3) Practical applications-oriented overview of what every manager needs to know in order to effectively provide value to customers of the organization, and improve long-term performance through the systematic, strategic coordination of traditional marketing management techniques, and spreadsheet analysis techniques.

Topics of current interest in marketing. Topic announced prior to offering. 

Repeatability: May be repeated if topic differs. Maximum 6 hours.

(Re) Prerequisite(s): Business Administration 332. Registration Restriction(s): Majors in the College of Business Administration.

340 Marketing Strategy Frameworks (3) Examines the marketing strategies that customer focused organizations use to acquire and retain customers. Students learn skills needed to create and implement these strategies. Topics include market opportunity analysis, marketing strategy planning, segmentation and targeting decisions, value positioning decisions, customer focused strategies (e.g., Integrated Marketing Communication, brand equity, Customer Relationship Management), and translation of customer learning into marketing strategy.

(RE) Prerequisite(s): Business Administration 332. Registration Restriction(s): Majors in the College of Business Administration.

345 Marketing Analytics (2) Develops students' analytical and decision-making skills through specific exercises and examples that apply various statistical and marketing-specific techniques. Students learn how to organize data into customer databases and how to analyze those databases through learning of statistical techniques, decision analysis techniques, and spreadsheet analysis techniques.

(RE) Prerequisite(s): Business Administration 332. (RE) Corequisite(s): 340. Registration Restriction(s): Majors in the College of Business Administration.

350 Customer Value Analysis (3) Examines how organizations conceptualize, gather, analyze, and interpret data needed by managers to learn about customers in markets. Topics include selected consumer/customer behavior theories, customer value determination, and selected marketing research techniques.

(RE) Prerequisite(s): 340. (DE) Prerequisite(s): 345 for marketing majors. Registration Restriction(s): Majors in the College of Business Administration.

400 Special Topics in Marketing (3) Topics of current interest in marketing. Topic announced prior to offering. 

Repeatability: May be repeated. Maximum 6 hours.

(Re) Prerequisite(s): Business Administration 332. Registration Restriction(s): Majors in the College of Business Administration.

452 Product/Service Management (2) Examines how organizations deliver value to customers through product and service strategies. Topics in product management include new product development, product life cycle, product mix management, and brand marketing. Topics in service management include service design, service delivery, service quality/productivity, service failure/recovery, and role of technology.

(RE) Prerequisite(s): 340. (DE) Prerequisite or (DE) Corequisite: 350 for marketing majors and co-concentration students. Registration Restriction(s): Majors in the College of Business Administration.

456 Integrated Marketing Communications Management (2) Examines how organizations communicate value to customers. Communication topics will be presented in the framework of an Integrated Marketing Communication strategy. Topics will include advertising management, sales promotion, publicity and public relations, sponsorship marketing, direct marketing and e-marketing.

(RE) Prerequisite(s): 340. (DE) Prerequisite or (DE) Corequisite: 350 for marketing majors and co-concentration students. Registration Restriction(s): Majors in the College of Business Administration.

458 Sales Force Management (2) Examines how organizations communicate value to customers through face-to-face selling. Focuses on the activities and problems of sales representatives and first line sales managers. Topics include the selling process, sales force organization, recruiting, motivating, forecasting, territory design, and evaluation.

(RE) Prerequisite(s): 340. (DE) Prerequisite or (DE) Corequisite: 350 for marketing majors and co-concentration students. Registration Restriction(s): Majors in the College of Business Administration.

460 Global Marketing Strategy (3) Capstone course for Marketing to integrate concepts, frameworks, processes and tools presented in all prior coursework. Students examine the application of marketing knowledge and skills in a global context, with particular emphasis on how organizations respond with global marketing strategies.

(RE) Prerequisite(s): 350. (DE) Prerequisite(s): Any two of 452, 456, 458. Registration Restriction(s): Majors in the College of Business Administration.

492 Marketing Off-Campus Study (1-6)
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 6 hours.
Registration Restriction(s): Marketing major.
Registration Permission: Consent of instructor.

493 Independent Study (1-6) Directed research on subjects of mutual interest to student and staff member.
Repeatability: May be repeated. Maximum 6 hours.
Registration Restriction(s): Marketing major.
Registration Permission: Consent of instructor.

Materials Science and Engineering (638)

101 Advances in Materials Science and Engineering (1) Review modern advances in materials science and engineering. Explores students to a variety of materials science and engineering case studies to demonstrate the societal impact of materials science and engineering profession.

Grading Restriction: Satisfactory/No Credit grading only.

201 Introduction to Materials Science and Engineering (3) Correlation of atomic structure, crystal structure and microstructure of solids with mechanical, physical and chemical properties of engineering significance.

(RE) Prerequisite(s): Chemistry 120.

220 Selection and Use of Soft Goods Manufacture (3) Study of textile products for apparel and interior furnishings; emphasis on the selection of fibers, yarns, fabrics, finishes and construction details to optimize properties needed for particular end uses.

250 Introduction to Materials Kinetics and Transport Phenomena (4) Mass and energy balances; reaction kinetics; steady state and transient heat transfer; viscous flow of gases and liquids; applications to synthesis and processing of engineering materials and technologies; analytical and numerical problem solving.

Contact Hour Distribution: 3 hours lecture and 1 hour lab.

(RE) Prerequisite(s): Mathematics 142. (RE) Corequisite(s): 201 and Mathematics 231.

260 Materials Engineering Thermodynamics (3) Thermodynamic laws; entropy, internal energy, state functions; one- component and two- component phase equilibria; characteristics of small and large molecular systems; surface energy, elasticity; material defects.

(RE) Prerequisite(s): Engineering Fundamentals 152 and Chemistry 130. (DE) Prerequisite(s): Mathematics 142. (RE) Corequisite(s): 201.

290 Materials Seminar (0) Professionalism, ethical considerations, safety, patents, product liability, field trips, industrial speakers, materials science in a global/societal context, teamwork, contemporary issues, lifelong learning.

Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 4 times.

291 Materials Seminar (1) Professionalism, ethical considerations, safety, patents, product liability, field trips, industrial speakers, materials science in a global/societal context, teamwork, contemporary issues, lifelong learning.

Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 4 hours.
300 Materials Laboratory Procedures (1) Thermometry, sample preparation for microscopic examination; word processing and graphics usage, data analysis, report writing. (RE) Prerequisite(s): 201.

301 Application of Statistical and Numerical Techniques in Engineering (3) (See Chemical Engineering 301.)

302 Mechanical Behavior of Materials I (3) Fundamentals of deformation and fracture in solids including metals, ceramics, polymers, and composites. Topics include: stress and strain tensors; isotropic and anisotropic elasticity; anelastic and viscoelastic deformation; plasticity; tensile testing; mechanisms of plastic deformation in crystalline solids; basic strengthening mechanisms; elementary fracture mechanics. (RE) Prerequisite(s): 201.

304 Principles of Materials Laboratory (1) Laboratory assignments demonstrating fundamental principles of materials science and engineering. (RE) Prerequisite(s): 201. (DE) Corequisite(s): 320 and 340.

320 Diffusion and Phase Transformations (3) Introduction to diffusion in solids; the diffusion equations, point defects and atomic mechanisms of diffusion. Thermodynamics of phase equilibrium. Introduction to the kinetics and morphology of phase transformations. (RE) Prerequisite(s): 201 and 260.

340 Principles of Polymeric Materials (3) Synthesis and molecular structure of polymers; polymerization kinetics; molecular characterization; crystalline and glass transitions; crystallization kinetics; mechanical properties; rheology and processing. (RE) Prerequisite(s): 201.

350 Principles of Electronic, Optical, and Magnetic Materials (3) Fundamental electronic, optical, and magnetic properties of solid state materials. Basic bonding and crystallography correlations to electronic, optical, and magnetic properties of materials. Specific subjects that will be covered include: wave properties of electrons, Schrodinger’s equation, energy bands in crystals, electrical conduction in metals and semiconductors, classical and quantum mechanical treatments of optical properties, and magnetic phenomena. (RE) Prerequisite(s): 201.

360 Principles of Ceramic Materials (3) Characterization of ceramic materials as to their crystal structure, their mechanical, electrical, and optical properties. Ceramic fabrication processes from the initial green body fabrication through the firing state. (RE) Prerequisite(s): 201.

370 Materials Processing (3) Application of fundamentals of mass and energy balances, mechanics, heat and mass transfer, chemical thermodynamics and kinetics to the processing of materials and manufacturing of products. A wide range of materials (metals, ceramics, polymers), geometries (bulk, fibers, films, coatings) and processes (casting, molding, extrusion, forging, powder processing, coating techniques, etc.) are studied as examples of processing technologies. Elementary ideas of process measurement and control. (RE) Prerequisite(s): 201 and 250. (RE) Corequisite(s): 320.

390 Principles of Metallic Materials (3) Property control through composition, mechanical and thermal processing; ferrous and nonferrous alloys; alloy selection. (RE) Prerequisite(s): 201.

405 Structural Characterization of Materials (4) X-ray diffraction and fluorescence; scanning and transmission electron microscopy; microanalytical techniques. (WC)


421 Mechanical Behavior of Materials II (3) Description of stress and strain; linear elastic constitutive equations, isotropic and anisotropic moduli in various materials; yield criteria; brittle fracture; crazing; plastic strain constitutive equations; forming operations and limit criteria. (RE) Prerequisite(s): 302.

429 Introduction to Ceramic Matrix Composites (3) Characteristics of composites, including ceramic matrix composites; macromechanics and materials design; overview of fabrication techniques; microstructural characterization; physical and mechanical property evaluation; current and potential applications. (RE) Prerequisite(s): 201 and 302.

445 Polymer Engineering Processing and Characterization Laboratory (3) Polymer film casting, film blowing, mixing and extrusion are operated and studied. Flow rates, temperatures, pressures and velocity profiles are acquired and used in finite element modeling and simulation to correlate the polymeric material properties and morphology. Supporting instrumentation includes linear viscoelasticity rheometry, capillary viscometry, SEM, OM, FTIR, etc. (RE) Prerequisite(s): 201.

470 Environmental Degradation of Materials (3) Mechanisms, measurement techniques and control of environmental degradation processes in metals, polymers, ceramics and composites; materials selection and design considerations. Recommended for chemical engineering, mechanical engineering, civil engineering, engineering science and mechanics majors. (RE) Prerequisite(s): 201.

472 Fundamental Principles of Composite Materials (3) Physical principles basic to the design, manufacture, and application of fiber reinforced polymers, metals, and ceramics.

474 Biomaterials (3) Metals, polymers and ceramics utilized in orthopedic, cardiovascular, and dental surgical implant devices; corrosion and degradation problems; material properties of primary importance; tissue response to synthetic materials. Recommended for engineering science and mechanics majors. (RE) Prerequisite(s): 201.

476 Overview of Intermetallic Compounds and Composites (3) Fabrication and processing, ultrafine-grained materials nanotechnology, thermodynamics and stability, microstructural characterizations, mechanical properties, corrosion and oxidation properties, theoretical modeling, and design and industrial applications of intermetals and composites. Laboratory demonstrations and group projects. (RE) Prerequisite(s): 201.

480 Materials Selection in Design (3) Systematic materials selection in design. Review of material properties; use of property selection charts and indices. Materials selection, with and without shape constraints; materials processing in design; case studies. Sources of material property data, utilization of material data bases, industrial design, aesthetics, economics, regulations, forces for changes. Registration Restriction(s): Minimum student level – junior.

484 Introduction to Maintainability Engineering (3) (See Nuclear Engineering 484.)


494 Special Project Laboratory (1-3) Group or individual investigation of problems related to materials science and engineering. Repeatability: May be repeated. Maximum 6 hours. (RE) Prerequisite(s): 201.


Mathematics (641)

100 Intermediate Algebra (3) First degree equations and inequalities, polynomials, rational expressions, exponents, graphing, second degree equations and inequalities, systems of equations, introduction to exponential and logarithmic functions. This course is designed to prepare students for enrollment in 119, 120, 201, and 202. Grading Restriction: A, B, C. No Credit grading.

109 Algebra Workshop (1) Self-paced tutorial center for students taking 119, 125, 130, or 141 who need additional help (as determined by placement exams, assessment exams, or classroom performance). Individual and computerized instruction on various pertinent algebra and trigonometry skills. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 3 hours.

113 Mathematical Reasoning (3) Classical and modern topics in number theory, logic, set theory, and probability with emphasis on theory of problem solving. Consumer mathematics and other real-word applications. (QR)

115 Statistical Reasoning (3) An introduction to probability and statistics without calculus. (QR) Credit Restriction: Not available for credit to students in the College of Business Administration.
117 Honors: Mathematical Reasoning (3) Topics will be selected from: number theory, logic, geometry, elementary topology, fractals, or probability with an emphasis on problem solving. Consumer mathematics, fair division, voting theory or other real-world applications may be included. **(QR)** Recommended Background: ACT composite score 31 or SAT 1380.

119 College Algebra (3) A review of algebraic functions, equations, and inequalities for students who satisfy the course prerequisites for 123 or 125 but whose placement test scores indicated additional preparation is necessary.
Grading Restriction: A, B, C. No Credit grading only.
Credit Restriction: Students who receive a grade of C or better in any course numbered 123 or higher (except for 231 or 232) may not subsequently receive credit for 119.
Comment(s): Satisfactory placement test score required. This course should not be taken to remove an entrance requirement.

123 Finite Mathematics (3) For students not planning to major in the physical sciences, engineering, mathematics, or computer science. Exponential and logarithmic functions, interest and annuities, linear systems and matrices, optimization. **(QR)**
(DE) Prerequisite(s): 119 or 130 or satisfactory placement score.
Comment(s): Satisfactory placement test score required.

125 Basic Calculus (3) For students not planning to major in the physical sciences, engineering, mathematics, or computer science. Calculus of algebraic, exponential, and logarithmic functions, with applications. **(QR)**
Credit Restriction: Students who receive a grade of C or better in 141 or 152 may not subsequently receive credit for 125.
(DE) Prerequisite(s): 119 or 130 or satisfactory placement test score.

130 Precalculus I (4) Review of algebraic, logarithmic, exponential, and trigonometric functions.
Grading Restriction: A, B, C. No Credit grading only.
Credit Restriction: Students who receive a grade of C or better in 141 or 151 may not subsequently receive credit for 130.
(DE) Prerequisite(s): 119 or satisfactory placement test score.
Comment(s): For students who satisfy the course prerequisites for 141 or 151, but whose placement test scores indicate additional preparation is necessary. Students who did not study trigonometry in high school may take the non-credit course in trigonometry simultaneously with 130.

141 Calculus I (4) Standard first-year course in single variable calculus, especially for students of science, engineering, mathematics, and computer science. Differential and integral calculus with applications. **(QR)**
(DE) Prerequisite(s): 130 or satisfactory placement test score.

142 Calculus II (4) Standard first-year course in single variable calculus, especially for students of science, engineering, mathematics, and computer science. Differential and integral calculus with applications. **(QR)**
(RE) Prerequisite(s): 141 or 147.

147 Honors Calculus I (4) Honors version of 141 for well-prepared students. **(QR)**
Credit Restriction(s): Credit will not be given for both 147 and 141 or 152.
Comment(s): Satisfactory placement test score required. Students having 32 Mathematics ACT, 700 Quantitative SAT scores, or permission from the instructor may enroll in 147.

148 Honors Calculus II (4) Honors version of 142 for well-prepared students. **(QR)**
(DE) Prerequisite(s): 147.
Comment(s): Students having 32 Mathematics ACT, 700 Quantitative SAT and credit for Mathematics 141, an AP Calculus score of 5, or permission of the instructor may enroll in 148.

151 Mathematics for the Life Sciences I (3) For students majoring in the Life Sciences. Does not serve as a prerequisite for 231 or 241. Topics include: descriptive statistics, linear regression, discrete probability, matrix algebra, difference equations, calculus, and differential equations. Emphasis on applications in the life sciences. Includes computer projects. **(QR)**
(RE) Prerequisite(s): 130 or satisfactory placement test score.

152 Mathematics for the Life Sciences II (3) For students majoring in the life sciences. Topics include: descriptive statistics, linear regression, discrete probability, matrix algebra, difference equations, calculus, and differential equations. Emphasis on applications in the life sciences. Includes computer projects. **(QR)**
Credit Restriction: Students who receive a grade of C or better in 141 cannot subsequently receive credit for 152.
(Re) Prerequisite(s): 151.

171 Computer Literacy for Mathematics (3) Introduction to computers, the Internet, mathematical packages and programming for prospective mathematics majors. **(QR)**
(Re) Prerequisite(s): 141.

200 Matrix Computations (1) Introduction to matrix calculations, including determinants, eigenvalues and eigenvectors.
Credit Restriction: Students who have received a grade of C or better in 251 may not subsequently receive credit for 200.
(Re) Prerequisite(s): 241 or 247.
Comment(s): For students in the College of Engineering and statistics majors in the College of Business Administration.

201 Structure of the Number System (3) Problem solving, sets and relations, numeration systems, integers, elementary number theory, rational numbers and decimals.
Comment(s): Satisfactory placement test score required.

202 Probability, Statistics, and Euclidean Geometry (3) Probabilities in simple experiments, measures of central tendency and variation. Basic plan and three-space geometry, congruence and similarity, constructions with compass and straightedge, transformations, area and volume measurement. Turtle graphs. **(QR)**
Comment(s): Satisfactory placement test score required.

231 Differential Equations I (3) First course, emphasizing solution techniques. Includes first-order equations and applications, theory of linear equations, equations with constant coefficients, Laplace transforms, and series solutions.
(Re) Prerequisite(s): 142 or 148.

241 Calculus III (4) Calculus of functions in two or more dimensions. Includes solid analytic geometry, partial differentiation, multiple integration, and selected topics in vector calculus.
(Re) Prerequisite(s): 142 or 148.

245 Honors: Calculus III (4) **(QR)**
(Re) Prerequisite(s): 148.

251 Matrix Algebra I (3) First course in the algebra of simultaneous linear equations and matrices. Includes Gaussian elimination, determinants, vector spaces, linear transformations, eigenvalues, and eigenvectors.
(Re) Prerequisite(s): 142 or 148.

257 Honors: Matrix Algebra I (3) **(QR)**
(Re) Prerequisite(s): 148.

299 Studies in Mathematics (1-3)
Repeatability: May be repeated. Maximum 9 hours.

300 Introduction to Abstract Mathematics (3) Algebra of sets, functions, relations, mathematical induction, algebraic structure of the real number system, order properties, and completeness.
(Re) Prerequisite(s): 142.

323 Probability and Statistics (3) Discrete and continuous random variables; conditional probability, expectation, moment generating functions; law of large numbers, central limit theorem. Elements of statistical inference, estimation, and hypothesis testing.
(Re) Prerequisite(s): 300.
(De) Prerequisite(s): 241 or 247.

341 Analysis I (3) Introduction to the theory of the real number system, limits of sequences, and functions of a real variable.
(Re) Prerequisite(s): 300.
(De) Prerequisite(s): 241 or 247.

351 Algebra I (3) Introduction to abstract algebra emphasizing integers and polynomial rings.
(Re) Prerequisite(s): 300.
(De) Prerequisite(s): 251 or 257.

Credit Restriction: Students may not receive credit for both Mathematics 371 and Computer Science 370.
(Re) Prerequisite(s): 231.
(De) Prerequisite(s): 251 or 257 or 200 and 241 or 247.
Comment(s): Knowledge of high-level programming language required.

399 Studies in Mathematics (1-3)
Repeatability: May be repeated. Maximum 9 hours.

400 History of Mathematics (3) Development of major ideas in mathematics from ancient to modern times and the influence of these ideas in science, technology, philosophy, art, and other areas. Includes at least one in-class essay examination and 3,000 words of writing outside the classroom. Writing-emphasis course.
(Re) Prerequisite(s): 300.
(De) Prerequisite(s): 251 or 257.

403 Mathematical Methods for Engineers and Scientists (3) Matrix computations, numerical methods, partial differential equations, Sturm-Liouville Theory and special functions as used in engineering and science.
Credit Restriction: Does not satisfy requirements for the mathematics major.
(Re) Prerequisite(s): 231 and 241.
Comment(s): Knowledge of high-level programming language required.
404 Applied Vector Calculus (3) Topics from multivariable and vector calculus including line and surface integrals, the divergence theorem and the theorems of Gauss and Stokes.

(RE) Prerequisite(s): 241 or 247.

405 Models in Biology (3) Difference and differential equation models of biological systems.

(DE) Prerequisite(s): 142 or 148 or 152.

411 Mathematical Modeling (3) Construction and analysis of mathematical models used in science and industry. Projects emphasized. Writing emphasis course.

(RE) Prerequisite(s): 231 and 241.

421 Combinatorics (3) Introduction to problems of construction and enumeration for discrete structures such as sequences, partitions, graphs, finite fields and geometries, and experimental designs.

(RE) Prerequisite(s): 323.

423 Probability I (3) Axiomatic probability, multivariate distributions, conditional probability and expectations, methods of moment generating/characteristic functions. Laws of large numbers and the central limit theorem.

(RE) Prerequisite(s): 323.

424 Probability II (3) Elements of stochastic processes: Random walk, Markov chains and Poisson processes. Other topics as selected by the instructor.

(RE) Prerequisite(s): 423.

425 Statistics (3) Derivation of standard statistical distributions including t, F and X2; independence of sample mean and variance; basic limit theorems; point and interval estimation, Bayesian estimates; statistical hypothesis testing, Neyman-Pearson theorem; likelihood ratio and other parametric and nonparametric tests; sufficient statistics.

(RE) Prerequisite(s): 423.


(RE) Prerequisite(s): 231.

435 Partial Differential Equations I (3) Separation of variables, Fourier series, solution of Laplace, wave, and heat equations.

(RE) Prerequisite(s): 241 or 247.

443 Complex Variables I (3) Introduction to the theory of functions of a complex variable, including residue theory and contour integrals.

(RE) Prerequisite(s): 241 or 247.

445 Advanced Calculus I (3) Introduction to the theory of sequences, series, differentiation, and Riemann integration of functions of one or more variables.

(RE) Prerequisite(s): 445.

446 Advanced Calculus II (3) Introduction to the theory of sequences, series, differentiation, and Riemann integration of functions of one or more variables.

(RE) Prerequisite(s): 445.

447 Honors: Advanced Calculus I (3) Honors version of 445.

(RE) Prerequisite(s): 341.

448 Honors: Advanced Calculus II (3) Honors version of 446.

(RE) Prerequisite(s): 447.

453 Matrix Algebra II (3) Advanced topics in matrix theory, including the Jordan canonical form.

(RE) Prerequisite(s): 251 or 257.

455 Abstract Algebra I (3) Introduction to algebraic structures such as groups, rings, fields, vector spaces and linear transformations.

(RE) Prerequisite(s): 300.

456 Abstract Algebra II (3) Introduction to algebraic structures such as groups, rings, fields, vector spaces and linear transformations.

(RE) Prerequisite(s): 455.

457 Honors: Abstract Algebra I (3) Honors version of 455.

(RE) Prerequisite(s): 351.

458 Honors: Abstract Algebra II (3) Honors version of 456.

(RE) Prerequisite(s): 457.

460 Geometry (3) Axiomatic and historical development of neutral, Euclidean, and hyperbolic geometry stressing proof technique and critical reasoning. Models of Non-Euclidean geometries.

(RE) Prerequisite(s): 300.

461 Topology (3) Includes topology of line and plane, separation properties, compactness, connectedness, continuous functions, homeomorphisms, continua, and topological invariants.

(RE) Prerequisite(s): 300.

(De) Prerequisite(s): 241 or 247.

471 Numerical Analysis (3) Introduction to computation, instabilities, and approximation by polynomials and piecewise polynomials. Quadrature and numerical solution of initial and boundary value problems of ordinary differential equations, including stiff systems. (Same as Computer Science 471.)

(RE) Prerequisite(s): 371.

472 Numerical Algebra (3) Direct and iterative methods for systems of linear equations. Solution of a single nonlinear equation and nonlinear systems. Orthogonal decomposition, least squares and the algebraic eigenvalue problem. (Same as Computer Science 472.)

(RE) Prerequisite(s): 371.

475 Industrial Mathematics (3) Modeling, analysis, and computation applied to scientific/technical/industrial problems.

(RE) Prerequisite(s): 231.

Required Background: Familiarity with operating system and programming language.

490 Readings in Mathematics (1-3) Open to superior students. Independent study with faculty guidance.

Repeatability: May be repeated. Maximum 9 hours.

Comment(s): Consent of faculty mentor to supervise independent work required. Registration Permission: Consent of department head.

495 Seminar in Actuarial Mathematics (1-3) Introduction to principles and problem solving techniques in actuarial sciences with emphasis on the mathematical topics included in the initial actuarial exams.

Repeatability: May be repeated. Maximum 6 hours.

(RE) Prerequisite(s): 300 and 251.

(De) Prerequisite(s): 241.

497 Undergraduate Honors Seminar (2) Forum for presentation of student theses and other undergraduate research projects.

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated. Maximum 6 hours.

498 Senior Honors Thesis (1-3) Students in the mathematics honors program work individually under the direction of a faculty member to write an honors thesis. The thesis must be approved by the departmental honors committee.

Repeatability: May be repeated. Maximum 6 hours.

Registration Permission: Consent of instructor.

Mathematics Education (642)

485 Teaching of Mathematics, Grades 7-12 (3) Preparation of teaching plans, evaluation, materials for teaching mathematics; teaching simulation and directed observation in schools.

Registration Restriction(s): Qualification – admission to teacher education.

Mechanical Engineering (650)

231 Dynamics (3) Kinematics of rigid bodies; center of mass; kinetics of systems of particles; mass moments of inertia; kinetics of rigid bodies; Newton’s laws, work-energy, impulse-momentum.

(RE) Prerequisite(s): Engineering Fundamentals 152 and Engineering Fundamentals 202.

(DE) Prerequisite(s): Mathematics 142.

321 Mechanics of Materials I (3) Concepts of stress and strain; stress-strain relations; applications including axially loaded members, torsion of circular shafts, bending of beams and column stability.

(RE) Prerequisite(s): Engineering Fundamentals 152 and Engineering Fundamentals 202.

(DE) Prerequisite(s): Mathematics 241.

331 Thermodynamics (3) Energy and laws governing energy transformations; thermodynamic properties; thermodynamic cycles; ideal gas mixtures; application to engineering problems.

(RE) Corequisite(s): Mathematics 241.

344 Heat Transfer (3) Heat transfer by conduction, thermal radiation, free and forced convection.

(RE) Prerequisite(s): 331 and 391.

(DE) Prerequisite(s): Aerospace Engineering 341.