484 Museum Studies Ill: Field Projects (1-12) (See Art 484.)
485 Oral Biology (4) Intense examination of human dentition and oral skeletal structures including dento-facial embryology/growth, histology, gross tooth morphology and pathology. (RE) Prerequisite(s): 480.
490 Primate Evolution (3) Living and fossil primate taxonomy, ecology, and comparative anatomy. Survey of primate fossil record with emphasis on the origin or major primate lineages. Registration Restriction(s): Anthropology major. Registration Permission: Consent of instructor.
491 Foreign Study (1-15) Repeatability: May be repeated. Maximum 15 hours. Registration Permission: Consent of instructor.
492 Off-Campus Study (1-15) Repeatability: May be repeated. Maximum 15 hours. Registration Permission: Consent of instructor.
493 Independent Study (1-15) Repeatability: May be repeated. Maximum 15 hours. Registration Permission: Consent of instructor.
494 Primate Behavior (3) Social organization and behavior of selected primates including group composition, size, and structure; patterns of mating; other social interactions; communication; and cultural behavior. Application of primates studies to human ethology. Registration Restriction(s): Anthropology major.
495 Human Paleontology (4) Intensive survey of the human fossil record from the earliest hominid remains to the earliest origins of modern human form. Registration Restriction(s): Anthropology major.
496 Biology of Human Variability (3) Introduction to human populations; human adaptation, biological features of major human races, relationships of major groups to one another. (Same as Africana Studies 496.) Registration Restriction(s): Anthropology major.

Arabic (127)
121 Elementary Modern Standard Arabic I (4) (See Asian Studies 121.)
122 Elementary Modern Standard Arabic II (4) (See Asian Studies 122.)
221 Intermediate Modern Standard Arabic I (4) (See Asian Studies 221.) (CC)
222 Intermediate Modern Standard Arabic II (4) (See Asian Studies 222.) (CC)

Architecture (133)
101 Introduction to the Built Environment (3) Scope and definition of the built environment in relation to contemporary society, building industry, and allied-design professions. Architectural design as a creative process. Orientation to courses and programs of the school. (RE) Prerequisite(s): 171.
102 Visual Design Theory (2) Principles of visual design, addressing form and space. Exploration of visual ideas through analysis. Introduction of terminology and vocabulary. (RE) Prerequisite(s): 172
107 Honors: Introduction to the Built Environment (3) Students will attend 101 classes with supplementary assignments and/or class meetings. Registration Permission: Consent of architecture program director.
111 Architecture and the Built Environment (3) An introduction to architecture and the built environment for non-architecture majors. Significance of our surroundings, forces that create them. Creative aspects of design. Survey of examples from local to global. Strategies for individual and collective involvement. (AH)
117 Honors: Architecture and the Built Environment (3) Students will attend 111 classes, with supplementary assignments and/or class meetings. (AH) Registration Permission: Consent of architecture program director.
121 Drawing and Perception (2) Exploration of drawing as a means of visual thinking and method of communication, addressing perceptual phenomenon. Exploration of different media, concentrating on freehand drawing. Includes line drawing, tone, shade, shadow, and depth cues. Compositional principles will be introduced. Drawings based on observation, including figure drawing and campus visits. (RE) Corequisite(s): 171.
112 Drawing and Abstraction (2) Exploration of drawing as a means of visual thinking and method of communication, addressing process of abstraction and transformation inherent in drawing. Exploration of different media and techniques of representation. Drawings based on observation, abstraction, and transformation. (RE) Corequisite(s): 172.
172 Design Fundamentals II (4) Fundamentals of architectural design, conceiving form and space. Elements of form and space including lines, planes, volumes, void, and mass. Spatial sequence and scale. Development of architectural representation. (RE) Prerequisite(s): 171. (RE) Corequisite(s): 102 and 122. Registration Restriction(s): Architecture major or interior design major.
180 Introduction to Architecture (2) Introduction to architecture as an intellectual discipline. Design as a creative endeavor central to the discipline and its profession. Registration Restriction(s): Master of Architecture admission.
211 History and Theory of Architecture I (3) Architecture and ideas of building and community form in major world cultures from the prehistoric era to about 1500 AD. (AH) Registration Restriction(s): Architecture major or interior design major.
212 History and Theory of Architecture II (3) Architecture and ideas of building and community form in major world cultures from 1500 AD to the mid-20th century. (AH) (RE) Prerequisite(s): 211.
213 History and Theory of Contemporary Architecture (3) Architectural thought in design practice in late 20th century. Examples of contemporary works and review of theoretical issues. (WC) (RE) Prerequisite(s): 212.
217 Honors: History and Theory of Architecture I (3) Students will attend 211 classes, with supplementary assignments and/or class meetings. (AH) Registration Permission: Consent of architecture program director.
218 Honors: History and Theory of Architecture II (3) Students will attend 212 classes, with supplementary assignments and/or class meetings. (AH) Registration Permission: Consent of architecture program director.
231 Computer Applications in Design I (3) Introduction to computer systems, software and hardware, and their application in architecture. Emphasis on learning how the computer can assist in the design process by modeling, visualizing and analyzing building designs. Introduction to drafting, three-dimensional modeling, and desktop publishing. (RE) Prerequisite(s): 172. Registration Restriction(s): Architecture major or interior design major.
232 Introduction to Architectural Technology (3) Place of building technology in architectural design. Introduces concepts and theory of structures; building materials and construction; and environmental controls. (RE) Prerequisite(s): Physics 161. Registration Restriction(s): Architecture major.
271 Architectural Design I (6) Introduction to contextual determinants in architectural design. Role of the city and the landscape in architectural design. Methods of analyzing place and form in determining design strategies. Representational skills developed including drawing, diagramming and modeling techniques. (RE) Prerequisite(s): 172 and 211. (DE) Prerequisite(s): Mathematics 125. Registration Restriction(s): Architecture major; 2.30 GPA.
272 Architectural Design II (6) Studies in architectural space. The role of function, habitation, movement, structure and scale as determinants of spatial form explored through the design projects ranging in scale from furniture to dwellings. Development of design processes, including analytical skills, diagramming, and determining design organizational strategies. Use of computer aided visualization techniques. (RE) Prerequisite(s): 271 and 212.
281 Principles of Architectural Form (6) Principles of architectural form emphasizing building configuration and order. Design of simple buildings which explore possibilities of site, use, shape, materials, and color. Contact Hour Distribution: 1-hour seminar and 5 hours studio. (RE) Prerequisite(s): 172. Registration Restriction(s): Master of Architecture admission.

Contact Hour Distribution: 1-hour seminar and 5 hours studio.

(RE) Prerequisite(s): 218.

312 Materials and Methods of Construction (3) Properties of interior and exterior building materials and their relation to construction methods and detailing. Theory of material selection and application and the role of materials and methods play in the design process.

(RE) Prerequisite(s): 232.

331 Architectural Structures I (4) Structural properties of building materials under loading and stress. Mechanics of foundations, properties of cross-sections of structural members and analysis of statically determinate trusses, beams, columns, and simple assemblies. (QR)

(RE) Prerequisite(s): 231 and 232.

332 Architectural Structures II (4) Continuation of analysis and design of simple structures of steel, wood, and concrete based upon specific loading requirements. Use of construction and building codes, handbooks and design tables, and selection of structural members.

(RE) Prerequisite(s): 331.

335 Structures in Architecture I (3) Introduction to the structural properties of materials, foundations and simple statically determinate assemblies of buildings.

Registration Restriction(s): Master of Architecture admission.

336 Structures in Architecture II (3) Continuation of analysis and design of simple structures in wood, steel, and concrete. Introduction of building codes, loading tables, and handbooks for selection of structural members.

(RE) Prerequisite(s): 335.

Registration Restriction(s): Master of Architecture admission.

341 Environmental Control Systems I (4) Heating, ventilating, and air-conditioning systems, including passive and active solar energy systems. Plumbing and fire protection systems.

(RE) Prerequisite(s): 231 and 232.


(RE) Prerequisite(s): 231 and 232.

346 Principles of Environmental Control II (3) Introduction to electrical design and wiring, lighting and acoustics in buildings.

Registration Restriction(s): Master of Architecture admission.

371 Architectural Design III (6) Design synthesis. Integration of design determinants and development of building concepts.

(RE) Prerequisite(s): 272 and 213.

Comment(s): A minimum 2.30 GPA in all design courses is required.

372 Architectural Design IV (6) Design synthesis. Integration of design determinants, structure, environmental controls, materials and construction.

(RE) Prerequisite(s): 371.

Comment(s): A minimum 2.30 GPA in all design courses is required.

401 Architectural History/Theory I (3) Survey of architectural history and theory from earliest beginnings to about 1600 in Europe, Asia, and the Americas. Examination of theoretical ideas, building forms, and urban patterns in cultural and historical context.

Registration Restriction(s): Master of Architecture admission.

402 Architectural History/Theory II (3) Survey of architectural history and theory from about 1600 through the present day. Examination of theoretical ideas, building forms, and urban patterns in cultural and historical context.

(RE) Prerequisite(s): 401.

Registration Restriction(s): Master of Architecture admission.

403 Introduction to Preservation (3) History, theory, and legal aspects of architectural preservation and restoration.

404 Preservation Technology (3) Techniques of preservation. Methods of analysis, history of materials and technology used in old buildings.

406 Ideas in Architecture (3) Historical and critical review of the major ideas of architecture through the ages.

410 History and Theory of Urban Form (3) Patterns of community development. Selective historical and contemporary examples. Basic urban design issues and exemplary design approaches examined through lectures, readings, essays, and sketch studies including historical change in urban form and design.

412 Non-Western and Indigenous Architecture (3) Building responsive to climate, material availability, and economic level, as designed by anonymous builders. Examples from prehistoric times to the present including the fertile crescent; the Indus Valley; Hindu, Buddhist, and Mughal architecture of India, China, and Japan.

415 Medieval Architecture (3) History of architecture from the decline of Rome to the beginning of the Renaissance. (Same as Medieval Studies 415.)

417 The International Style (3) A survey of architecture of the early modern movement, primarily in Europe and America, covering the years 1900 to 1940.

420 History of American Architecture (3) Consideration of architecture and city planning in the United States from the pre-Columbian period until the mid-20th century.

(RE) Prerequisite(s): 212 or 402.

425 Special Topics in Architecture (1-6) Faculty-initiated courses. Topics vary. Repeatability: May be repeated. Maximum 12 hours.

Registration Restriction(s): Architecture major or interior design major.

431 Structural and Mechanical Applications (3) Case study analysis and selection of structural and mechanical systems, investigating the conceptual integration of technical information into a unified design solution.

(RE) Prerequisite(s): 332 and 342.

(RE) Corequisite(s): 471.

432 Computer Applications in Design II (3) Advanced computer-aided design using three-dimensional modeling software. Design analysis using computer animation, rendering techniques, visualization, and video.

(RE) Prerequisite(s): 231.

433 Computer Applications in Design III (3) Advanced course that integrates three-dimensional modeling and technical analysis using computers to augment building design. Independent studies under faculty direction.

(RE) Prerequisite(s): 231.

434 Visual Thinking in Digital Media (3) Emphasizes form, content, and structure of images moving in time and applications in architecture. Focus is on use of time-based digital media as an analytical tool for clarifying ideas, making observations, and experimentation. Advanced understanding of 2D and 3D digital animation, video editing, and digital audio.

435 Presentation Design I (3) Basic techniques and understanding of graphic presentation design within the profession of architecture. Addresses fundamental design principles, page layout, image manipulation, and typography, employing computer software applications. Conducted through lectures, assigned projects, assigned readings, labs, exams and/or critiques.

(RE) Prerequisite(s): 435.

436 Presentation Design II (3) Advanced techniques and understanding of graphic presentation design within the profession of architecture. Addresses document design, layout and binding, image manipulation, and typography, employing computer software applications. Conducted through lectures, assigned projects, assigned readings, labs, exams and/or critiques.

(RE) Prerequisite(s): 436.

445 Advanced Lighting (3) In-depth analysis and innovative concepts in design of lighting.

(RE) Prerequisite(s): 342 or 346.

462 Professional Practice (4) Management and organizational theories and practices for delivering professional design services. Included are assessment of the building industry and its influence on practice; analysis of the basic management functions within professional firms; and legal and ethical concerns facing practitioners today. Special obligations and privileges of the design professional.

(RE) Prerequisite(s): 471.

463 Architectural Development (3) Principles and practice of the architect as a developer. Impact of economics, finance and urban policy on the design and development of real estate.

471 Architectural Design V (6) Design project from conceptual through design development phase. Specification of component building systems including structure, mechanical, lighting and construction details.

(RE) Prerequisite(s): 372.

(RE) Corequisite(s): 431.

Comment(s): Minimum 2.30 GPA in all design courses is required.

472 Architectural Design VI (6) Order and form in complex buildings developed to address programmatic, structural, energy and environmental issues.

(RE) Prerequisite(s): 471.

Comment(s): Minimum 2.30 GPA in all design courses is required.

473 Architectural Photography (3) Photography as a design, research, and presentation medium. Application of photographic techniques, printing and processing. Color, black and white.

Registration Restriction(s): Architecture major or interior design major.
477 Honors: Independent Study in Architecture (1-6) Individual studies and projects under faculty direction, for honors students only. Credit adjusted to complexity and level of effort required.
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of architecture program director.

480 Programming for Architectural Design VII (3) Faculty-initiated design topic with leeway for interpretation by students. Understanding of programming and project pre-design processes through lectures, readings and preparation of studio project statement. Programming issues clarified and project concepts set forth. Documentation, research, and analysis of program, site, and precedents. Formation of project statement including site documentation, analysis and programming. Combination lecture, seminar, and studio format. First half-semester course.
(Re) Prerequisite(s): 471.
(Re) Corequisite(s): 481.

481 Architectural Design VII (3) Execution of design project as defined in Architecture 480. Faculty-initiated design topic with leeway for student interpretation. Completed projects will address issues of program and site, as identified in Architecture 480. Second half-semester course.
(Re) Prerequisite(s): 471.
(Re) Corequisite(s): 480.
Comment: Successful completion of 480 with grade of C or better. Minimum 2.30 GPA in all design courses is required.

482 Self-Directed Design Project (6) Student-selected project under faculty direction. Formation of project statement, documentation, and analysis of site, program, and precedents. Exploration of design hypothesis that informs the character of a substantial building design.
(Re) Prerequisite(s): 480 and 481.
Comment(s): Minimum 2.30 GPA in all design courses is required.
Registration Permission: Consent of instructor through project approval process.

483 Urban Design (6) Urban design projects responding to specific community conditions. Exploration of urban issues in making and understanding the architecture of the city.
(Re) Prerequisite(s): 471.
Comment(s): Minimum 2.30 GPA in all design courses is required.

485 Development and Design (6) Exploration of image making, consumerism and the allocation of scarce resources. Issues of finance, economics, urban economics, and marketing are analyzed in relation to urban and architectural design. Application of financial feasibility models.
(Re) Prerequisite(s): 471 and 463.
Comment(s): Minimum 2.30 GPA in all design courses is required.

486 Design of Sustainable Architecture (6) Architectural design studio emphasizing concern for the environment, consideration of energy conservation techniques, and use of renewable resources.
(Re) Prerequisite(s): 471.
Comment(s): Minimum 2.30 GPA in all design courses is required.

489 Structural Innovations (6) Building design with innovative structural configuration and technology. Exploration of new materials, detailing, and methods in building construction.
(Re) Prerequisite(s): 471.
Comment(s): Minimum 2.30 GPA in all design courses is required.

491 Foreign Study (1-15) Research and design projects conducted in various locations abroad.
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Consent of architecture program director.

492 Off-Campus Study (1-15) Studies conducted under direction of architect or expert in an allied profession, in service to public service organizations or agencies of government, and public groups.
Repeatability: May be repeated. Maximum 15 hours.
Credit Restriction: Not a design course elective.
Registration Permission: Consent of architecture program director.

493 Independent Study in Architecture (1-6) Individual studies and projects under faculty direction. Credit adjusted to complexity and level of effort required.
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of architecture program director.

494 Foreign Studies Sketchbook (1-3) Investigations of historic urban fabric and architecture in various locations abroad. Analysis and sketch records in sketchbook format required.
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of architecture program director.

Art (140)

101 Studio Fundamentals: Drawing and Design (3) Introduction to basic drawing media, concepts and techniques and to the elements and principles of pictorial organization.

103 Studio Fundamentals: Three-Dimensional Design (3) Projects dealing with real space and three-dimensional materials.

150 The idea of Graphic Design (3) An overview of design as visual message-making and as an act of cultural interpretation. Contemporary and historic design and its forms are examined, along with an introduction to design and creative concepts, and the role of criticism and theory. Student assessment will come from exams, short writings and visual laboratory projects.

201 Arrowmont Special Topics (1-2) Various media.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 12 hours.

295 Intermediate Design and Color (3) Further exploration of basic techniques of two-dimensional design, with emphasis on color theory and technique.
(Re) Prerequisite(s): 101 and 103.

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

301 Student Exhibition (1) Exhibition of student work, including off-campus venues, e.g. Gallery 1010.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 2 hours.
Registration Permission: Consent of instructor.

481 Museum Studies I: Museums, Purpose and Function (3) Purposes, functions, and development of museums of art, history, natural and applied science. (Same as Anthropology 481.)

482 Museum Studies II: Exhibition, Planning and Installation (3) Exhibition concept development and implementation. Exhibition design and installation techniques. Publicity, production, matting and framing, shipping and storage. (Same as Anthropology 482.)

484 Museum Studies III: Field Projects (1-12) Special field projects including restoration, preservation, registration, and other related research on or off campus. (Same as Anthropology 484.)
Repeatability: May be repeated. Maximum 12 hours.

491 Foreign Study (1-6)
Repeatability: May be repeated. Maximum 12 hours.

492 Off-Campus Study (1-6)
Repeatability: May be repeated. Maximum 12 hours.

493 Independent Study (1-3)
Repeatability: May be repeated. Maximum 15 hours.

494 Individual Problems (3)
Repeatability: May be repeated. Maximum 12 hours.

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.

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

Art Ceramics (135)

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).

221 Ceramics: Handbuilding I (3) Introduction to handbuilding, glazing, clay preparation, and firing.
Repeatability: May be repeated. Maximum 6 hours.

222 Ceramics: Throwing I (3) Introduction to throwing, glazing, clay preparation, and firing.
Repeatability: May be repeated. Maximum 6 hours.

225 Portfolio Practicum – Handbuilding (3) Intense post-introductory studio experience to develop work for application to 320 (Ceramics: Portfolio Review).
Registration Restriction(s): Studio art majors only.
Registration Permission: Consent of department.
COURSES OF INSTRUCTION

226 Portfolio Practicum – Throwing (3) Intense post-introductory studio experience to develop work for application to 320 (Ceramics: Portfolio Review).
Registration Restriction(s): Studio art majors only.
Registration Permission: Consent of department.

229 Ceramics: Special Topics (3) Student- or instructor-initiated courses to be offered at convenience of department.
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of instructor.

320 Ceramics: Portfolio Review (0) Review of prior work in ceramics.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated once.
(De) Corequisite(s): 221, 222, and Art Sculpture 240.
Comment(s): Successful completion required prior to registration for junior and senior courses.

321 Ceramics: Handbuilding II (4) Continued investigation of handbuilding with an emphasis on the development of individual ideas and expression.
(RE) Prerequisite(s): 320.

322 Ceramics: Throwing II (4) Continued investigation of throwing with an emphasis on the development of individual ideas and expression.
(RE) Prerequisite(s): 320.

421 Ceramics: Advanced Handbuilding (6) Continued investigation of ceramic form with an emphasis on the development of individual direction.
Repeatability: May be repeated. Maximum 12 hours.
(RE) Prerequisite(s): 321 and 322.

422 Ceramics: Advanced Throwing (6) Continued in-depth investigation of ceramic form with an emphasis on the development of individual direction.
Repeatability: May be repeated. Maximum 12 hours.
(RE) Prerequisite(s): 321 and 322.

424 Ceramics: Clays and Glazes (3) Clay chemistry, clay bodies, glaze theory, and calculation. Formulating, mixing, and testing of clay bodies and glaze formulas.
(RE) Prerequisite(s): 320.

429 Ceramics: Special Topics (3) Student- or instructor-initiated courses to be offered at convenience of department.
Repeatability: May be repeated. Maximum 12 hours.
(RE) Prerequisite(s): 320.

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.

Art Design/Graphic (136)

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).

251 Beginning Graphic Design I (3) Introduction to the elements and principles of graphic design including typography and layout. Survey of graphic design tools, materials, and processes. Emphasis on visual problem-solving.
Repeatability: May be repeated. Maximum 6 hours.
(RE) Prerequisite(s): Art 101 and Art 103.

252 Beginning Graphic Design II (3) Continuation of 251 and the exploration of the elements and principles of graphic design including typography and layout. Survey of graphic design tools, materials, and processes. Emphasis on visual problem-solving.
Repeatability: May be repeated. Maximum 6 hours.
(RE) Prerequisite(s): 251.

256 Individual Problems in Graphic Design (3)
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

259 Special Topics: Graphic Design (3) Student- or instructor-initiated course offered at discretion of department.
Repeatability: May be repeated. Maximum 12 hours.
Comment(s): Prerequisite(s) determined by department for individual topic.

350 Graphic Design Portfolio Review (0) Review of prior work in graphic design.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated once.
(RE) Prerequisite(s): 251.
Comment(s): Successful completion required prior to registration for junior and senior courses. Successful completion of the General Education Culture and Civilizations Option 2 (completing a 2-course sequence in a foreign language at the intermediate level) required.

351 Intermediate Graphic Design I (3) Concept development and the study of graphic design elements including typography and imagery and their interrelationships within the graphic design layout.
(RE) Prerequisite(s): 350.

352 Intermediate Graphic Design II (3) Investigation of sign, symbols, marks, and identity systems.
(RE) Prerequisite(s): 351.

356 Graphic Design Production (3) Traditional and computer-generated techniques for the production of print media in graphic design. Introduction to computer systems, software, and techniques.

400 Typography (3) Principles of typography, as well as classical and contemporary type forms, as vehicles for communication. An intensive introduction to the fundamentals of type, from individual letterforms to large bodies of textual information. Attention to formal, technological, historical, and critical issues.
(De) Prerequisite(s): Art 295 and Art Design/Graphic 251.

405 Computer Enhanced Graphic Design (3) Exploration of new technologies and their significance to graphic design.
Repeatability: May be repeated. Maximum 12 hours.
(RE) Corequisite(s): 351 and 356.

410 Advanced Typographic Investigation (3) Expands on principles introduced in Typography (Art Design/Graphics 400). Projects will include work in reflective as well as electronic environments with an emphasis on personal exploration.
(De) Prerequisite(s): 400.

425 Illustration (3) Develops skills and critical analysis for effective visual communication. Projects will explore the relationship between image and meaning. Students will explore a variety of media as they develop a personal visual vocabulary.
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): Art 295 and Art Design/Graphics 251.

444 Graphic Design Center Practicum (3) Practical work experience in a student-managed, on-site studio.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

450 Design in Culture (3) A consideration of design as an act of cultural interpretation. Historic and contemporary design and design issues are examined through presentations, discussions, readings, and writing. Student assessment will come from writing, projects, presentations, and contributions to class discussion.

451 Advanced Graphic Design (3) Theory and techniques of visual problem-solving as applied to advanced applications of graphic design.
(RE) Prerequisite(s): 352.

452 Graphic Design Seminar (3) Discussion of design and professional issues including politics, economics, and ethics for the graphic designer. Culminates in a student-initiated project.
(RE) Prerequisite(s): 451.

455 Graphic Design Professional Seminar (3) Professional practices including client relationships, design management, and business practices. Assembly, organization, and editing of the professional portfolio.
(De) Corequisite(s): 452.

456 Graphic Design Practicum (1-12) Practical work experience in the graphic design field. Must be pre-arranged with the department.
Repeatability: May be repeated. Maximum 12 hours.
(RE) Prerequisite(s): 351 and 356.

459 Special Topics in Graphic Design (3) Student- or instructor-initiated course offered at discretion of department.
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of instructor.

493 Independent Study (1-6)
Repeatability: May be repeated. Maximum 12 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 Drawing (137) 
191 Introduction to Studio Art: Various Media (3) Individual sections for various artistic disciplines. 
Repeatability: Course may be re-taken. 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). 
211 Drawing I (3) Development of drawing skills from a variety of sources including life drawing. Projects will emphasize composition, technique and content. 
(RE) Prerequisite(s): Art 101. 
212 Drawing II (3) Further development of drawing skills based on both observation and content. 
Repeatability: May be repeated. Maximum 6 hours. 
(PE) Prerequisite(s): 211. 
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. 
Registration Permission: Consent of instructor. 
311 Drawing III (4) Development of personal drawing techniques and concepts through class problems. 
Repeatability: May be repeated. Maximum 8 hours. 
(PE) Prerequisite(s): 212 and 312. 
312 Drawing Portfolio Review (0) Review of prior work in drawing. 
Grading Restriction: Satisfactory/No Credit grading only. 
Repeatability: May be repeated once. 
(PE) Prerequisite(s): Art History 172 and Art History 173. 
Comment(s): Successful completion required prior to registration for junior and senior courses. 
411 Drawing IV (6) Individualized pursuit of personal drawing techniques and concepts. Supplemented by individual and group critiques and weekly life drawing sessions. 
Repeatability: May be repeated. Maximum 12 hours. 
(PE) Prerequisite(s): 311. 
Comment(s): Total of 12 hours required for students in the drawing concentration. 
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. 

Art Education (141) 
301 Foundation of Art Education (3) Basic philosophy and structure including directed learning activities in two- and three- dimensional design, art appreciation, and teaching methodology. 
302 Multiculturalism in Visual Art (3) Selected cognitive and productive experiences involving multicultural visual art. 
Registration Permission: Consent of instructor. 
303 Concepts of Sculpture and Crafts (3) Processes in teaching of sculpture and crafts including pertinent literature and research. 
(PE) Prerequisite(s): 301. 
350 Field Experience (1) Tasks related to teaching and to teacher roles. 
Grading Restriction: Satisfactory/No Credit grading only. 
Repeatability: May be repeated. Maximum 2 hours. 
Registration Restriction(s): Qualification – admission to teacher education. 

400 Curriculum Planning and Teaching Strategies (3) Program development, instructional methods, professional literature, contemporary issues, simulation and micro teaching situations. 
(RE) Prerequisite(s): 301. 
Registration Restriction(s): Qualification – admission to teacher education. 

Art History (139) 
162 Art of Africa, Oceania, and Pre-Columbian America (3) Survey of the traditional arts of the cultures of Black Africa, the Pacific and the Americas (focusing primarily on the period before the European conquest). Sculpture, painting, pottery, textiles, architecture and human adornment will all be examined. (Same as Africana Studies 162.) (AH) 
167 Honors: Art of Africa, Oceania, and Pre-Columbian America (3) Consent of instructor required. Survey of the traditional arts of the cultures of Black Africa, the Pacific and the Americas. Study grounded in reading, writing and discussion. Writing-emphasis course. (AH) 
172 Western Art I (3) Major monuments in western art with emphasis on Europe from prehistory through the Middle Ages. (AH) 
Contact Hour Distribution: 2-hour lecture and 1-hour discussion each week. 
173 Western Art II (3) Major monuments in the history of European and American art from the Renaissance to the present. (AH) 
Contact Hour Distribution: 2-hour lecture and 1-hour discussion each week. 
177 Honors: Western Art I (3) Consent of Department required. Major monuments in western art with emphasis on Europe from prehistory through the Middle Ages. Study grounded in reading, writing, and discussion. Writing-emphasis course. (AH) 
178 Honors: Western Art II (3) Consent of Department required. Major monuments in the history of European and American art from the Renaissance to the present. Study grounded in reading, writing, and discussion. Writing-emphasis course. (AH) 
183 Asian Art (3) Selected works of painting, sculpture, architecture, and other forms in India, China, Japan, and to a lesser extent, Korea and Southeast Asia from antiquity through the 19th century. (AH) 
187 Honors: Asian Art (3) Consent of instructor required. Selected works of painting, sculpture, architecture and other forms in India, China, Japan, Korea, and Southeast Asia, from antiquity through the 19th century. Study grounded in reading, writing, and discussion. Writing-emphasis course. (AH) 
279 Special Topics in Art History (3) Student- or instructor-initiated course offered at convenience of department. 
Repeatability: May be repeated. Maximum 12 hours. 
376 Seminar in Art History (3) Variable theme; emphasis on methodology and skills in writing. Required for art history majors. Writing-emphasis course. 
Repeatability: May be repeated with consent of instructor. Maximum 6 hours. 
Recommended Background: 12 hours of art history courses. 
Registration Restriction(s): Minimum student level – junior. 
403 History of Photography (3) Survey of the history of photography from the introduction of the daguerreotype and calotype to more recent trends. Emphasis will be placed on aesthetics and the use of photography as a medium for artistic expression. 
411 Art of South and Southeast Asia (3) Survey of the art and architecture of the Indian subcontinent and Southeast Asia from 2000 BC to the 20th century. The major achievements of each period are examined in relation to their religious, political, and social contexts. Writing-emphasis course. 
415 Art of China (3) Survey of the art and architecture of China from the Neolithic period to the 20th century. The major achievements of each period are examined in relation to their religious, political, and social contexts. Writing-emphasis course. 
416 Chinese Art of the 20th and 21st Centuries (3) Survey of Chinese art from the late 19th century through the present. Hong Kong, Taiwanese, and expatriate artists are also considered. Writing-emphasis course. 
419 Art of Japan (3) Survey of the art and architecture of Japan from the Neolithic period to the 20th century. The major achievements of each period are examined in relation to their religious, political, and social contexts. Writing-emphasis course. 
425 Early Christian and Byzantine Art to 1350 (3) Art in Italy and the Eastern Empire from the beginnings of Christian art to c. 1350. Mosaic and painting, sculpture and architecture. Writing-emphasis course. (Same as Judaic Studies 425.)
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. 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, and iron and copper works and the workshops of blacksmiths. The time period covered ranges from the first and second millennia BC for some of the early terracotta sculpture 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, iconographic, and the uses to which they were put in their traditional religious, political, and social contexts. Writing-emphasis course.

470 African-American Art (3) Traces the artistic and social legacy of African-American art from the eighteenth century to the present day. Specifically, this class will focus on the ways in which artists used creativity to confront, deny, or complicate understandings of racial identity and racism. Examines broad scope of artistic production including painting, sculpture, photography, multimedia, fiction writing, and video art. Writing-emphasis course. (Same as Africana Studies 470.)

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

473 19th-Century American Art (3) Examines painting, sculpture, and print culture from the Revolutionary War to the turn of the 20th century. Writing-emphasis course.

474 Theory of 20th-Century Art in Europe and America (3) Addresses the theoretical basis for the modern movement. Emphasis on analyzing and discussing individual works of art in light of contemporary writings by artists and theorists. Writing-emphasis course. (RE) Prerequisite(s): 172 and 173.


476 History of 20th-Century Painting and Sculpture in Europe (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) Corequisite(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.

440 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 440.) Repeatability: May be repeated. Maximum 12 hours. (RE) Prerequisite(s): 236 and 330.
Art Painting (138)

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 Restricion(s): Non-majors only (not for BA and BFA – studio art majors and BFA – graphic design majors).

213 Painting I: Introduction (3) Capacities 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.

   (RE) Prerequisite(s): Art 101 and 103.

216 Watercolor II (3) Capacities 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 and drawing and watercolor curriculum.
   Repeatability: May be repeated. Maximum 12 hours.
   (RE) Prerequisite(s): 213.

313 Painting III (4) Individual expression with varied media on canvas.
   Repeatability: May be repeated. Maximum 8 hours.
   (RE) Prerequisite(s): 214 and 214.
   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 concentration.

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 concentration.

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 concentration.

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.

419 Special Topics in Painting (3) Student- or instructor-initiated course offered at convenience of department to enhance and expand the painting and 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 (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).

240 Graphic Design I (4) Techniques of expression in print media involving design.
   Repeatability: May be repeated. Maximum 6 hours.
   (RE) Prerequisite(s): Art 101 and Art 103.

241 Graphic Design II (4) Techniques of expression in print media involving design.
   Repeatability: May be repeated. Maximum 6 hours.
   (RE) Prerequisite(s): 240.

261 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 photolithography.
   (DE) Prerequisite(s): Art 101 and Art 103.

266 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.

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.

311 Papermaking Workshop (3) Papermaking as a medium for two-and three-dimensional art. Includes sheet forming, imbedding, laminating, embossing, pulp dyeing, inlaying, casting, and other related techniques. Emphasis on development of a personal form.
   (DE) Prerequisite(s): Art 101 and Art 103.

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.
   (RE) 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 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.

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 Sculpture (143) 

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).

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. 
(RE) Corequisite(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. 
(RE) Corequisite(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. 

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 245. 
(DE) 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 II (5) (Same as Chinese 132.)

151 Elementary Japanese I (5) (Same as Japanese 151.)
152 Elementary Japanese II (5) (Same as Japanese 152.)

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 /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.)

321 Japanese Graphic Novels and Animation (3) Reading and analysis of major contemporary Japanese graphic novels with special attention to related works of film and television animation. All readings are in English translation. Writing-emphasis course. (Same as Japanese 321.)

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.
431 Readings in Chinese Literature (3) \(\text{(Same as Chinese 431.)}\)
Repeatability: May be repeated. Maximum 9 hours.
(RE) Prerequisite(s): 232.

451 Readings in Pre-Modern Japanese Literature (3) \(\text{(Same as Japanese 451.)}\)
(RE) Prerequisite(s): 252.

452 Readings in Modern Japanese Literature (3) \(\text{(Same as Japanese 452.)}\)
(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.
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. \(\text{(CC)}\)

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

121 Elementary Modern Standard Arabic I (4) Taped language program. \(\text{(Same as Arabic 121.)}\)

122 Elementary Modern Standard Arabic II (4) Taped language program. \(\text{(Same as Arabic 122.)}\)
(RE) Prerequisite(s): 121.

141 Elementary Modern Hebrew I (4) Taped language program. \(\text{(Same as Hebrew 141.)}\)

142 Elementary Modern Hebrew II (4) Taped language program. \(\text{(Same as Hebrew 142.)}\)
(RE) Prerequisite(s): 141.

161 Elementary Persian I (4) Taped language program. \(\text{(Same as Persian 161.)}\)

162 Elementary Persian II (4) Taped language program. \(\text{(Same as Persian 162.)}\)
(RE) Prerequisite(s): 161.

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

222 Intermediate Modern Standard Arabic II (4) Taped language program. \(\text{(Same as Arabic 222.) (CC)}\)
(RE) Prerequisite(s): 221.

241 Intermediate Modern Hebrew I (4) Taped language program. \(\text{(Same as Hebrew 241.) (CC)}\)

242 Intermediate Modern Hebrew II (4) Taped language program. \(\text{(Same as Hebrew 242.) (CC)}\)
(RE) Prerequisite(s): 241.

261 Intermediate Persian I (4) Taped language program. \(\text{(Same as Persian 261.) (CC)}\)

262 Intermediate Persian II (4) Taped language program. \(\text{(Same as Persian 262.) (CC)}\)
(RE) Prerequisite(s): 261.

332 Classical Islam (3) \(\text{(See Religious Studies 332.)}\)

333 Islam in the Modern World (3) \(\text{(See Religious Studies 333.)}\)

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.
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.

(REE) Corequisite(s): 305.

303 Introduction to Hearing Science (3) Introduction to disorders of hearing. Fundamental aspects of auditory anatomy and physiology.

(REE) Corequisite(s): 302.

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.

(REE) Prerequisite(s): 305.

320 Speech and Language Development (3) Speech and language development in the normal child.


(REE) 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.

(REE) 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.

(REE) Prerequisite(s): 300 and 305.


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

445 Clinical Practice in Audiology (1-4)  
Repeatability: May be repeated. Maximum 6 hours.

(REE) Prerequisite(s): 473 and 494.

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 who 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.

(REE) 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.

(REE) 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 and school years of children, communication impairments/ handicaps/remediation of adults, effects of aging/remediation on the elderly, and case studies.

(REE) Prerequisite(s): 305.

(REE) Corequisite(s): 473.

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 molecular biology concentration.

(REE) Prerequisite(s): Chemistry 100 or Chemistry 130.

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

(SEE 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 coenzyme and prosthetic groups. Action of drugs and hormones. (SEE as Nutrition 310.)

Credit Restriction(s): Not available for credit if credit has been previously received for Biochemistry and Cellular and Molecular Biology 401 or 410 or 420. Credit may not be applied toward the biochemistry and cellular and molecular biology concentration.

(REE) Prerequisite(s): Biology 140 or Biochemistry and Cellular and Molecular Biology 230.

(REE) Prerequisite(s): Chemistry 100 and 110 or Chemistry 120 and 130.

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.

(REE) Prerequisite(s): Chemistry 120 and Chemistry 130.

(REE) 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.

(REE) 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.

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, calabism and energy transfer, synthetic metabolism including photosynthesis, and protein transport.

(REE) Prerequisite(s): Biology 240 and Chemistry 360.

(REE) 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, chromosomal structure and function, regulation of gene expression, genome structure and genomics, and mechanisms of biological regulation.

(REE) 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 modern 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.

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.

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

411 Advanced Cellular Biology (3) Cellular structure and function at the molecular and supramolecular levels. 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 immunochromographic 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, immunoochemistry, 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.

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 or honors biochemistry 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 and cancer pathology, 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 application to biological systems. Thermodynamics, chemical equilibrium, solution chemistry, transport, electrochemistry, kinetics, enzyme-catalyzed reactions. (Same as Chemistry 471.)

(De) Prerequisite(s): Chemistry 350 and 369, Biology 130 or 102. Recommended Background: Calculus.

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

481 Biophysical Chemistry (3) Physicochemical principles with application 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, 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: Minimum 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.

Comment(s): Although not required, it is strongly recommended that 101 and 102 be taken in sequence.

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 its components. Topics include – surveys 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.

Comment(s): Although not required, it is strongly recommended that 101 and 102 be taken in sequence.

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)

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)

130 Biodiversity (4) Unifying concepts and principles of biology, illustrated with diversity of life. Properties of life, molecular basis, 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 nucleotide sequence similarities, morphogenesis, phylogeny, construction, fossils, and the major plant and animal groups. Writing and analysis of lab activities required. Intended for science majors. (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 biochemistry, 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 introduce modern methods for analysis of cell components such as electrophoresis and centrifugation. \((\text{NS})\)

(\text{RE} \text{Prerequisite(s)}: 130 and Chemistry 120.)

(\text{RE} \text{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. \((\text{NS})\) \((\text{OC})\)

\text{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.

\text{Grading Restriction: Satisfactory/No Credit grading only.}

\text{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.

\text{Grading Restriction: Satisfactory/No Credit grading only.}

\text{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 problem-solving sessions and will include both computer-based simulations and hands-on experience with model genetic systems. Emphasis on development of analytical skills.

\text{(RE) Prerequisite(s): 140 or 112.}

\text{(DE) Prerequisite(s): Chemistry 130.}

250 General Ecology (4) Relations between organisms and their environment, including human environmental problems. Topics include population, communities, and ecosystems.

\text{Contact Hour Distribution: 1 hour lecture and 1 hour discussion, field problems, or computer simulations.}

\text{(RE) Prerequisite(s): 140 or 112.}

\text{(DE) Prerequisite(s): Chemistry 130.}

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.

\text{Grading Restriction: Satisfactory/No Credit grading only.}

\text{Repeatability: May be repeated. Maximum 4 hours.}

\text{Recommended Background: 8 hours of 200-level or above biology courses.}

\text{Registration Restriction(s): Biological sciences major/honors biochemistry and cellular and molecular biology concentration or honors ecology and evolutionary 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.

\text{Grading Restriction: Satisfactory/No Credit grading only.}

\text{Repeatability: May be repeated. Maximum 4 hours.}

\text{Recommended Background: 8 hours of 200-level or above biology courses.}

\text{Registration Restriction(s): Biological sciences major/honors biochemistry and cellular and molecular biology concentration or honors ecology and evolutionary biology concentration or honors microbiology concentration or honors plant biology concentration: minimum student level – sophomore.}

307 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.

\text{Recommended Background: 8 hours of 200-level or above biology courses.}

\text{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.

\text{Repeatability: Not repeatable for credit. May be taken once for 3-5 hours.}

\text{Recommended Background: 8 hours of 200-level or above biology courses.}

\text{Registration Permission: Consent of instructor.}

401 Senior Thesis (3-12) Required research experience of Threshold Biology Scholars. Design, complete research data acquisition, organize thesis documents, and prepare presentations.

\text{Repeatability: May be repeated. Maximum 12 hours.}

\text{Biomedical Engineering (192)}

271 Biomedical Engineering Principles (3) Application of engineering principles and methods to problem solving in the life sciences and medicine.

\text{(RE) Prerequisite(s): Engineering Fundamentals 152.}

300 Engineering Physiology (3) Study of human physiology with discussions of selected topics in pathophysiology. Emphasis on topics from a quantitative rather than a descriptive point of view. Discussion of clinical correlates of physiological processes.

\text{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.

\text{(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.

\text{Registration Permission: Consent of instructor.}

401 Thesis (3) Research and design problems in biomedical engineering with prior approval of a professor.

\text{Repeatability: May be repeated. Maximum 6 hours.}

\text{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.

\text{(RE) Prerequisite(s): 310 and Biology 140.}

410 Professional Topics (2) Topics relating to professional responsibility, communications, and organization. Requires a formal oral presentation by each student on an engineering topic chosen by the student and approved by the instructor.

\text{(OC) Prerequisite(s): English 102.}

\text{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, ECG, etc.).

\text{(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.

\text{(RE) Prerequisite(s): 310.}

\text{(DE) 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.

\text{(RE) Prerequisite(s): 455.}

473 Applied Biomechanics (3) Applications of biomechanics to the industrial and orthopedic areas. Design of orthopedic implant devices; biomechanics of injury and protection.

\text{(RE) Mechanical Engineering 321.}

\text{(DE) 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.

\text{(RE) Prerequisite(s): Aerospace Engineering 341 and Mathematics 231.}

494 Special Project in Biomedical Engineering (1-3) Problems related to recent developments and practice.

\text{Repeatability: May be repeated once.}

\text{Registration Permission: Consent of instructor.}

495 Special Project in Biomedical Engineering (1-3) Problems related to recent developments and practice.

\text{Repeatability: May be repeated.}

\text{Registration Permission: Consent of instructor.}

\text{Biosystems Engineering (196)}

104 Design Apprenticeship (1) Exposure to design in biosystems engineering through apprenticeship with senior design teams in Biosystems Engineering 402. Apprentees will assist with design, construction, testing, analysis, and presentation of projects. Apprentees will also background in engineers' design, engineering project management, and engineering design tools.

\text{Contact Hour Distribution: 2-hour lab.}

\text{(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 psychrometric processes; biological systems and the biosphere (bioenergetics, hydrologic cycle, global energy cycle).

Contact Hour Distribution: 2 hours and 1 lab.
(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 nature of pH in biological solutions; fundamental biochemistry of proteins and enzymes; introduction to bioenergetics and metabolic pathways, and the replication, transcription, and translation of DNA.

(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.

Contact Hour Distribution: 2 hours and 1 lab.
(RE) Prerequisite(s): 221.

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.

Contact Hour Distribution: 2-hour lecture, 2-hour recitation, 4-hour lab.
(RE) Prerequisite(s): 401 and 444.

404 Engineering Project Management (3) Fundamentals and theory of engineering design and engineering project management, use of computerized project management tools, ethical responsibilities and contemporary issues in biosystems engineering, incorporation of economic considerations in engineering design, individual professional and portfolio development.

(RE) Corequisite(s): 401.

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

Contact Hour Distribution: 2 hours and 1 lab.
(RE) Prerequisite(s): Mechanical Engineering 231 and Mechanical Engineering 327.

416 Hydrologic and Water Quality Engineering (3) An introduction to hydraulics including hydrologic variability, precipitation, evapotranspiration, infiltration, runoff, erosion, water quality and 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; metabolic and biochemical pathways; cell growth kinetics and product formation; 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): 321.

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, flow 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, matching, and management of agricultural machinery systems. Tractor power output, engine and drive system, hydraulic systems, hitching, and ballast. 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, personnel, and operator ergonomics.

Contact Hour Distribution: 2 hours and 1 lab.
(RE) Prerequisite(s): Mathematics 123 or 151.

434 Production 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) Prerequisite(s): Mathematics 123 or Mathematics 125.

442 Agricultural Waste Management and Pollution Control (3) Waste removal 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 mechanics 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 113 or 123.

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 systems.

Contact Hour Distribution: 2 hours and 1 lab.
(RE) Prerequisite(s): Mathematics 123 or 151.
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.

207 Honors: 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.

217 Leadership Seminar: Approaches (1) Introduction to approaches and frameworks of leadership within the business context.
Comment(s): Admission to the College of Business Administration's Global Leadership Scholars Program is required.

317 Leadership Seminar: Thesis Preparation (2) Approaches to contemporary business research design: literature review, research methodologies, measurement, data analysis, and interpretation.
(RE) Prerequisite(s): 217.
Comment(s): Admission to the College of Business Administration's Global Leadership Scholars Program is required.

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, and 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 products and 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, 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 into 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.

357 Honors: CBM III: Integrated Process Management (2) 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 307.
Comment(s): Admission to the College of Business Administration's Global Leadership Scholars Program is required.

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.

410 Leadership Perspectives (3) A holistic approach to the development of personal and professional leadership skills. Topics include: organizational culture within differing institutional frameworks, models of leadership, individual motivation, mentorship, effective and artful communication, opportunity identification.
Registration Restriction(s): Minimum student level – junior.

417 Leadership Seminar: Applications (2) Approaches to leading and leadership development through interaction with current industry leaders from multiple business and community environments.
(RE) Prerequisite(s): 317.
Comment(s): Admission to the College of Business Administration's Global Leadership Scholars Program is required.

427 Leadership Seminar: Capstone (2) Application of leadership concepts and methodologies in business and community environments.
(RE) Prerequisite(s): 417.
Comment(s): Admission to the College of Business Administration's Global Leadership Scholars Program is required.

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.

493 Independent 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.

497 Honors Thesis (3) Supervised thesis research.
(RE) Prerequisite(s): 317.
Comment(s): Admission to the College of Business Administration's Global Leadership Scholars Program is required.

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, 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 conducton; 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 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): 200 and Mathematics 142.
  Registration Restriction(s): Chemical engineering major; 2.50 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 design of diffusive processes. Applications include gas absorption, stripping, binary distillation, and extraction.
  (RE) Prerequisite(s): 200 and 230.
  Registration Restriction(s): 2.50 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): 2.50 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. Maximum 6 hours.
  Registration Permission: Consent of instructor.

  Grading Restriction: Letter grade only.
  (RE) Prerequisite(s): 450.

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 Advanced Separations (3) Multi-component distillation and extraction, reactive distillation, membrane based separations, chromatography, crytallization and electrophoresis for biomolecular, chemical, and pharmaceutical applications.
  (RE) Prerequisite(s): 340.

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.

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.

475 Applied Microbiology and Bioengineering (3) Cross-disciplinary course combining basic concepts in microbiology, biochemistry, reaction kinetics, and biochemical and environmental engineering. Commercial processes, biodegradation/wastewater treatment, analysis of basic bioreactor systems, biosensors, and immobilization methods.

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.

478 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.

480 Equipment Design and Economic Methods (4) Design, optimization, and costing of chemical plant equipment. Introduction to economic evaluation methods, capital investment, discounted cash flows, and net present value.
  (RE) Prerequisite(s): 360 and Chemistry 350.
  (RE) Corequisite(s): 445 and 450.

481 Green Engineering (3) Principles and practical aspects of the design, commercialization, and use of processes and products for determining their feasibility and economic potential while minimizing the generation of pollution at the source and risk to human health and environment.
  Registration Permission: Consent of instructor.

483 Introduction to Reliability Engineering (3) (See Nuclear Engineering 483.)

484 Introduction to Maintainability Engineering (3) (See Nuclear Engineering 484.)

486 Chemical Process Safety (3) Introduction to chemical process safety augmented with case studies. Topics include safety strategies and accident prevention; toxic substances in the workplace and industrial hygiene; accidental release of hazardous materials and dispersion modeling; fires and explosions – design for prevention; design of emergency pressure relief systems; and identifying potential hazards.
  (RE) Prerequisite(s): 200 and 240.
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 (1-3) 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, thermochemistry, descriptive chemistry of non-metallic 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): 128.

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.

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, and 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): 130 or 138.

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, and 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.

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.
Registration Restriction(s): Chemistry major; minimum student level – senior.

406 Senior Seminar (1) Discussions by faculty and students of current research and topics from recent literature. Oral and written reports are 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): 439. 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 138 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 Department of Child and Family Studies, including requirements for the major, introduction to the faculty and their work, exposure to professional organizations, and learning about potential career possibilities. Includes observations.


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

(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 and declining roles. Changing relationships among family members across the life cycle from various theoretical approaches. Impact of gender roles on marital relationships. Marital quality, power, decision-making, communications, conflict management, and 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 the elderly. Adjustment to internal and environmental changes through adulthood. Interrelationships among various aspects of development—physical, cognitive, emotional, and 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, and 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): 106 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, and physical knowledge. Planning, implementing, and 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.

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, and data analysis. Quantitative and qualitative methods; natural and contrived settings; and 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 PreK-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.
Repeatability: May be repeated if topic is different. Maximum 6 hours.
Recommended Background: 9 hours in child and family studies.
Registration Permission: Consent of instructor.
COURSES OF INSTRUCTION

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.

Repeatability: Not repeatable for credit. May be taken once for 6-12 hours.

(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.

Repeatability: May be repeated. Maximum 12 hours.

(Re) Prerequisite(s): 405.

472 Practicum: Student Teaching Pre-K (12) Field placement in Pre-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 Teacher Licensure program and is designed to meet Pre-K licensure requirements.

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: Not repeatable for credit. May be taken once for 9-12 hours.

(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.

480 Practicum: Community Placement (9-12) Supervised experiences with an agency area serving the needs of children and families.

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: Not repeatable for credit. May be taken once for 9-12 hours.

(Re) Prerequisite(s): 405.

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).

481 Research in Child and Family Studies (3-6) Supervised research experiences.

Repeatability: May be repeated. Maximum 6 hours.

(Re) Prerequisite(s): 395.

Recommended Background: 9 hours in child and family studies.

Registration Restriction(s): 3.00 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.

Repeatability: May be repeated. Maximum 12 hours.

(Re) Prerequisite(s): 395 and 405.

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 6 hours.

Recommended Background: 15 hours in child and family studies.

Registration Restriction(s): 3.25 GPA; 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.)

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

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

326 Brazilian Cinema (3) (See Portuguese 326.)

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

365 Writing the Screenplay (3) (See English 365.)

400 Special Topics (3)

Repeatability: May be repeated. Maximum 6 hours.

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

422 Topics in Italian Cinema (3) (See Italian 422.)

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, and 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.
(TE) 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 and moment distribution.

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, and 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 221.

395 Hydrology (3) Concept of hydrologic cycle. Weather patterns, precipitation measurement and distribution, abstraction, and runoff. Storm hydrograph and peak flow analyses, including design floods. Reservoir and channel routing, rainfall and streamflow frequency analyses, and groundwater flow.
(RE) Prerequisite(s): 390.

400 Senior Design Project (3) Open-ended, comprehensive project emphasizing team approach to design process. Includes problem formulation, site planning, project management, drawings and specifications, cost estimating, and various project components typical of those faced by practicing civil engineers. Must be taken during the term of graduation. Summer graduates must take the course during their last preceding term.

401 Review of Engineering Fundamentals (1) Review of selected topics covered on the Fundamentals of Engineering exam. Emphasis is on those topics relating to civil and environmental engineering. Must be taken during the term of graduation. Summer graduates must take the course during their last preceding term.

405 Professional Practice (1) Academic credit for engineering experience conducted through the College of Engineering’s Office of Professional Practice. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 3 hours.

407 Honors Undergraduate Research (3) Research in problems related to recent developments in civil and environmental engineering. Repeatability: May be repeated. Maximum 6 hours. Comment(s): Open to civil and environmental engineering students with a GPA of 3.25 and above.
Registration Permission: Consent of instructor.

409 Special Topics (1-3) Recent developments and current practice in civil and environmental engineering through field internship and/or self-study. Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor and department head.

416 Hydrologic and Water Quality Engineering (3) (See Biosystems Engineering 416.)

435 Foundation Engineering (3) Fundamentals of geotechnics applied to design and analysis of soil-structure systems. Subsurface investigation and design of shallow and deep foundations on rock. Lateral earth pressure and retaining structures.
(RE) Prerequisite(s): 330.

440 Civil Engineering Systems Design and Management (3) Methods of data analysis and modeling of civil engineering systems to enhance resource allocation for specific application to problems of transportation, environmental, water resources, structural analysis materials. Emphasis on microcomputer applications.
(TE) Prerequisite(s): 205 and 261.
Registration Restriction(s): Minimum student level – senior.

442 Construction Methods and Equipment (3) Fundamental operations in construction and equipment selection and productivity. Concrete and steel construction and construction contracts and economics.
Registration Restriction(s): Minimum student level – senior.

451 Highway Engineering (3) Design, construction, operation, and maintenance of highway facilities. Includes application of various engineering principles and techniques to process of planning, locating and design of highway facilities. Covers both geometric and pavement design.
(RE) Prerequisite(s): 352.

453 Airport/Railroad Planning and Design (3) Airport master planning and railroad engineering. Runway configuration, airfield capacity, geometrics, and terminal layout and design. Railroad capacity, geometrics and system layout and design.
(RE) Prerequisite(s): 352.

(TE) Corequisite(s): 471.

471 Introduction to Structural Design (3) Selection of rolled structural steel beam design. Design of structural steel members for axial tension and compression loads, reinforced concrete beams. Use of standard specifications.
(RE) Prerequisite(s): 361.

472 Steel Design (3) Design of plate girders and composite beams. Consideration of members subjected to combined stresses. Design of a typical framed building including connections.
(RE) Prerequisite(s): 471.

474 Reinforced Concrete Design (3) Design of continuous beams, floor slabs, columns with combined axial loads and bending, and footings. Design for torsion.
(RE) Prerequisite(s): 471.

480 Water and Waste Transport (3) Theory and design of water distribution systems and wastewater collection systems.
(RE) Prerequisite(s): 390.

485 Principles of Hydrogeology (3) (See Geology 485.)

486 Air and Waste Management (3) Principles of air quality management, solid waste management, and hazardous waste management. Review of regulations, environmental quality, transport of pollutants, and control technologies, including treatment and disposal.
(RE) Prerequisite(s): 390 or Chemical Engineering 200.

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)

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

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 Aeschylus. 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, 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 is on material remains and anthropological theory used to recreate the cultures of the Minoans, Mycenaeans, Dark Age Greeks, and Etruscans. For the historical Greek and Roman periods, emphasis is 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 I (3) Grammar review and readings. (CC) (DE) Prerequisite(s): 112 or 150 or placement exam.

264 Intermediate Greek: Epic Poetry (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 root words. Practice in use of Latin nomenclature. (AH)

300 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; ancient and modern historiographies of Early Greece. Writing-emphasis course. (Same as History 301.)

301 History of Classical Greece (3) Greek history from the Persian Wars to Alexander the Great, with an emphasis on the 5th-4th centuries BCE. Readings and discussion to include economy and society in Classical Athens and Sparta; the Peloponnesian War; Socrates, the sophists, and intellectual responses to democracy and empire; crises of the Greek city-states; Philip II, Alexander the Great and the rise of Macedon; and ancient and modern historiographies of Classical Greece. Writing-emphasis course. (Same as History 302.)

302 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.)

306 History of Hellenistic Greece (3) Greek history from Alexander the Great to the battle of Actium, with an emphasis on the 3rd-1st centuries BCE. Readings and discussion to include Alexander the Great and the expansion of the Greek world; monarchism, ruler-cult and the Greek city-state; economy and society in Ptolemaic, Seleucid and Antigonid kingdoms; the arrival of Rome in the eastern Mediterranean; ancient and modern historiographies of Hellenistic Greece. Writing-emphasis course. (Same as History 306.)

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) 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.)
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.

Clinical Laboratory Science (247)

101 Introduction to Clinical Laboratory Science (2) Introduction to the profession for those investigating a career in clinical laboratory science. Emphasis on the scientific aspects and clinical significance of laboratory procedures, laboratory safety, professionalism, and career opportunities.

410 Microbiology (4) Laboratory work in bacteriology, mycology, and parasitology. Emphasis on pathogenic bacteria and fungi, their sources, methods of culture, techniques of identification, and evaluation of antibiotic sensitivity. Gross and qualitative chemical examination of feces and methods of identification of protozoa and helminth parasites of man. Registration Restriction(s): Clinical laboratory science major.

411 Microbiology (4) Laboratory work in bacteriology, mycology, and parasitology. Emphasis on pathogenic bacteria and fungi, their sources, methods of culture, techniques of identification, and evaluation of antibiotic sensitivity. Gross and qualitative chemical examination of feces and methods of identification of protozoa and helminth parasites of man. Registration Restriction(s): Clinical laboratory science major.

420 Clinical Chemistry (5) Clinical aspects of biochemistry, including overview of principles and instrumentation with emphasis on practical laboratory application of analytical procedures, specimen collection and handling, significance of results, and quality assurance. Includes blood gas analysis, including radioimmunoassay, and analysis of blood and other body fluids for enzymes, hormones, and other constituents of clinical interest, utilizing both automated and manual techniques, physical characteristics, detection, and use of short half-life radioactive materials for in vivo procedures such as radioimmunoassay which utilize radioisotopes.

Registration Restriction(s): Clinical laboratory science major.

421 Clinical Chemistry (5) Clinical aspects of biochemistry, including overview of principles and instrumentation with emphasis on practical laboratory application of analytical procedures, specimen collection and handling, significance of results, and quality assurance. Includes blood gas analysis, including radioimmunoassay, and analysis of blood and other body fluids for enzymes, hormones, and other constituents of clinical interest, utilizing both automated and manual techniques, physical characteristics, detection, and use of short half-life radioactive materials for in vivo procedures such as radioimmunoassay which utilize radioisotopes.

Registration Restriction(s): Clinical laboratory science major.

430 Hematology and Clinical Microscopy (4) Principles, theories, and instrumentation related to qualitative and quantitative evaluation of cellular elements of blood and other body fluids; factors of hemostasis, quantitative chemical analysis of urine, and renal function studies. Emphasis on microscopic identification of cells and the significance and correlation of laboratory data. Registration Restriction(s): Clinical laboratory science major.

431 Hematology and Clinical Microscopy (4) Principles, theories, and instrumentation related to qualitative and quantitative evaluation of cellular elements of blood and other body fluids; factors of hemostasis, quantitative chemical analysis of urine, and renal function studies. Emphasis on microscopic identification of cells and the significance and correlation of laboratory data. Registration Restriction(s): Clinical laboratory science major.


450 Clinical Serology and Immunology (2) Performance and interpretation of broad range of clinical serological and immunological procedures with emphasis on principles and clinical correlation. Formal lecture series included.

Registration Restriction(s): Clinical laboratory science major.

470 Orientation and Basic Techniques (1) For facilitation of students from campus to hospital community and clinical laboratory. Introduction to medical terminology, ethics, and health team concept. Orientation to basic techniques including procedures for collection and handling of specimens, principles of operation of many laboratory instruments, review of laboratory math, and introduction to quality control procedures. Portions of course extend over entire clinical year. Registration Restriction(s): Clinical laboratory science major.

480 Principles of Supervision and Education in Medicine (1) Seminars in basic principles of management, supervision, and education theories and methods. Comprehensive examination covers entire course.

Registration Restriction(s): Clinical laboratory science major.

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. Repeatability: May be repeated. Maximum 8 hours.

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. Repeatability: May be repeated. Maximum 8 hours.

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. Repeatability: May be repeated. Maximum 16 hours.

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 communicatıon 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, interviewing, 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. 
Repeatability: May be repeated. Maximum 4 hours.

272 Intercollegiate Forensics (1) For students actively participating in intercollegiate debate. 
Repeatability: 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. 
(Re) 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. 
(Re) Prerequisite(s): 201 or 207. 
(DE) Prerequisite(s): 340.

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

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

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

398 Honors Seminar (1) 
Comment(s): Topics, scope of subject matter, and prerequisites to be determined by department.

400 Topics in Communication Studies (3) 
Repeatability: 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 team, and public communication. 
Repeatability: 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. 
Repeatability: May be repeated. Maximum 6 hours. 
Registration Restriction(s): Communication studies major; 3.00 GPA; minimum student level – junior.

450 Propaganda (3) Study of political, commercial, and social propaganda in the United States from 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. 
Repeatability: 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) 
Repeatability: May be repeated. Maximum 15 hours. 
Registration Restriction(s): 3.00 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. 
Repeatability: May be repeated. Maximum 6 hours. 
Credit Restriction: Maximum of 3 hours may be applied to the major. 
Registration Restriction(s): 3.00 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. 
(Re) Prerequisite(s): 201 or 207. 
(DE) 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. 
Repeatability: 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. Includes an introduction to the theories, methods, and objectives of comparative literature. Variable content. Writing-emphasis course.

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

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

452 Modern Drama (3) (See English 452.)

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

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

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

493 Independent Study (1-6) 
Repeatability: May be repeated. Maximum 6 hours.
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 45 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.
306 Facilitation of Individual Technical Performance (3)
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.
Registration Restriction(s): Qualification – admission to teacher education.

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.

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. Maximum 16 hours.

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) Corequisite(s): 440.

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

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

493 Directed Independent Studies (1-3)
Independent study in a specialized area with dance.
Repeatability: May be repeated. Maximum 9 hours.

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

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.
(Re) Prerequisite(s): Biology 130 or Biology 101 and 102 or Biology 111 and 112.

260 Primate Behavior I (3)
An introduction to the study of primate behavior, with emphasis on field observations of primates.
Credit Restriction: May not be applied toward the ecology and evolutionary biology concentration.
Contact Hour Distribution: Includes laboratory work.
(Re) Prerequisite(s): 240 or 260.

280 Animal Behavior (3)
Principles, patterns, and theories of animal behavior, with emphasis on field observations of primate behavior.
Credit Restriction: May not be applied toward the ecology and evolutionary biology concentration.
Contact Hour Distribution: Includes laboratory work.
(Re) Prerequisite(s): 240 or 260.

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.  

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

433 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 subsystems, 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.
226 COURSES OF INSTRUCTION

322 The Global Economy: Trade and Development (3) Analyses of international trade and finance and their effects on economic development. Utilization of 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 International Business 429. (RE) Prerequisite(s): 201 or 207.

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.

381 Introduction to Econometrics (3) Introductory probability, statistics, and econometrics from an economic perspective with emphasis on skills related to gathering, managing, processing, presenting, and interpreting economic data. Includes the use of statistical software in hands-on research projects. Considers common econometric problems such as multicollinearity, heteroscedasticity, and autocorrelation. (RE) Corequisite(s): 311 or 313.

400 Special Topics II (3) Variable topics for advanced students. (RE) Prerequisites: 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): 201 or 207.

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

433 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, and regulation of health care markets. Writing-emphasis course. (RE) Prerequisite(s): 311 or 313.

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, and 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 with respect to 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 relations among various 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 3.00 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, and interpretation of audiologic services to medical and other rehabilitative disciplines.
425 Introduction to the Psychology and Education of the Deaf/Hard of Hearing (3) Primarily for those planning to teach the hearing impaired. Research related to psychology, social adjustment, communication methodology, language development, and education of the hearing impaired. Survey of literature. Visits to programs.

Educational Interpreting (287)

223 American Sign Language I (3) Expressive and receptive skill development in sign communication. Video text and interactive teaching method used. Class conducted totally in sign.

226 American Sign Language II (3) Expressive and receptive skill development in sign communication. Video text and interactive teaching method used. Class conducted totally in sign.

(RE) Prerequisite(s): 223.

335 Interpreting Techniques (3) Introduces students to linguistic techniques to enhance interpreting performance. Introduction of translation techniques that form the basis for interpreting. Students will practice intralingual technique designs to improve English and ASL skills.

340 Principles of Interpreting (3) Theory and psycholinguistic processes involved in interpreting and transliterating between English and American Sign Language. Ethics and etiquette of interpreting in educational and community placements. History, organizations, certification procedures, and trends and issues related to the interpreting profession.

345 Interpreting in Educational Settings (4) Covers issues related to working with deaf and hard of hearing children in mainstream programs. Examines interpreting roles and responsibilities within the classroom setting. Practicum experiences.

350 Voice to Sign Interpretation (3) Interpreting from English to sign language in a variety of physical settings (one-to-one, classroom, assemblies) for students of all ages with varying communication styles. Adjusting interpretation to accommodate different student needs. Cross-cultural communication issues. Interpreting in a manner appropriate to the context. Techniques for reducing visual fatigue and overload.

355 Sign to Voice Interpretation (3) Interpreting from sign language to English in a variety of physical settings (one-to-one, classroom, assemblies) for students of all ages with varying communication styles. Selecting appropriate register and vocabulary items and interpreting in a manner appropriate to the context. Attention is also given to cross-cultural communication issues.

431 American Sign Language III (3) Sequence (431-432) stresses fluency of expressive and receptive sign communication skills. Using language in context is emphasized. Grammatical structures of ASL and cultural implications of the deaf community.

(RE) Prerequisite(s): 226.

432 American Sign Language IV (3) Sequence (431-432) stresses fluency of expressive and receptive sign communication skills. Using language in context is emphasized. Grammatical structures of ASL and cultural implications of the deaf community.

(RE) Prerequisite(s): 431.

435 Linguistics of American Sign Language (3) Introduction to grammatical and linguistic structures of ASL. Language variations, discourse, bilingualism, and language contact also covered. Conducted in ASL.

(RE) Prerequisite(s): 431.

440 Educational Interpreting Field Work (6) Practical field experience within approved and supervised mainstream settings. Development of specific interpreting skills. Provides a direct service experience in a supportive learning environment.

Grading Restriction: Satisfactory/No Credit grading only.

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.

401 Professional Studies: Applied Educational Psychology (3) Application of concepts, principles, techniques, and models from educational psychology to facilitate student learning and creation of effective classroom environments.

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.)
(RE) Prerequisite(s): 315.
(RE) Corequisite(s): 315.
341 Fields (3) Coulomb’s law, Gauss’ law, Ampere’s law, Maxwell’s equations for electrostatic and magnetostatic cases. Maxwell's equations for dynamic case, dynamic potentials, and uniform plane wave propagation. Transmission lines. 
(RE) Prerequisite(s): 300 and Mathematics 241.
(DE) 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, and spread-spectrum. Includes Level 1 design projects which require laboratory work.
(RE) Prerequisite(s): 206 and 255.
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, and issues in computer security. Includes Level 1 design projects which require laboratory work.
(RE) Prerequisite(s): 300.
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.
(RE) Prerequisite(s): 300.
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) (WC)
(RE) Prerequisite(s): 316 and 342.
(DE) 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.
(RE) Prerequisite(s): 316.
(RE) Prerequisite(s): 316.
421 Electric Energy Systems (3) Structure and operation of the electrical energy grid, load flow, economic loading, planning, control, and reliability. Balanced and unbalanced faults, system protection, and system stability. Includes Level 1 design projects.
(RE) Prerequisite(s): 316 and 325.
(RE) Prerequisite(s): 421.
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, and 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.
(RE) Prerequisite(s): 316 and 336.
(DE) Prerequisite(s): 342.
432 Electronic Amplifiers (3) Feedback amplifier principles, wideband linear amplifier design, low-noise preamplifier design, and audio power amplifier design. Introduction to radio-frequency amplifier design and oscillator principles. Includes laboratory experiments and design projects. Level 2 design projects require laboratory work.
(RE) Prerequisite(s): 431.
433 Introduction to VLSI (3) Investigates the behavior of microelectronic devices in digital circuits and helps the student develop an understanding of the relationship between the device physics and the device static and dynamic characteristics. Includes laboratory assignments which are designed to give advanced undergraduate students a working knowledge of CMOS digital integrated circuit technology, circuit design methodologies, including simulation and physical layout of CMOS digital circuit structures.
(DE) 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, and 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 topics. Includes Level 1 design projects.
(RE) 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.
(RE) Prerequisite(s): 316 and 341.
(DE) Prerequisite(s): 342.
446 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 effects in circuit elements. Radiated and conducted emissions and susceptibility. Crosstalk, shielding, electrostatic discharge, and EMC regulations. Includes Level 1 design projects which require laboratory work.
(RE) Prerequisite(s): 316 and 341.
(DE) Prerequisite(s): 342.
451 Computer Systems Architecture (3) Architecture and design of microcomputer systems with microprocessors or microcontrollers. Instruction set architectures, software interfaces, processor structures, memory hierarchy, and interfacing. Includes Level 1 design projects which require laboratory work.
(RE) 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.
(RE) 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.
(RE) 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.
(RE) 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.
(RE) Prerequisite(s): 316.
481 Power Electronics (3) Principles and characteristics of power semiconductor devices, single-phase and polyphase phase-controlled converters, ac and dc voltage controller. Includes Level 1 design projects and laboratory work.
(RE) Prerequisite(s): 316 and 325.
(DE) 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.
(RE) 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)
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.
(ER) Corequisite(s): 422.
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 integrated learning experiences. Must be taken prior to professional internship.
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.
445 Early Childhood Education: Program Development and Teaching in Kindergarten (3)
Crum 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. Maximum 3 hours.
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, and the development and implementation of logic flow diagrams.
(ER) 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 vectors, kinematics, Newton's laws, forces, work-energy, and impulse-momentum. 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.
(ER) Corequisite(s): 105 and Mathematics 141.
Comment(s): A higher level mathematics 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.
(ER) Prerequisite(s): 151.
(ER) 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.
(ER) Corequisite(s): Mathematics 141.
Comment(s): A higher level mathematics course in the engineering curriculum is an acceptable corequisite.
Registration Restriction(s): Qualification – admission to Chancellor's Honors Program.
158 Honors: Physics for Engineers II (4)
Honors version of 152.
(ER) Corequisite(s): Mathematics 142.
Comment(s): A higher level mathematics 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.
(ER) Prerequisite(s): 152.
301 Engineering Career Planning and Placement (1)
Fundamentals of seeking professional employment, including resume construction, interview preparation, contacting prospects, networking, business etiquette, and the entire job-seeking process. Intended for last-term juniors.
Grading Restriction: Satisfactory/No Credit grading only.
402 Fundamentals of Engineering (1)
Review of topics covered on the general morning session of the Fundamentals of Engineering exam.
Comment(s): Mechanical, aerospace, biomedical engineering majors must enroll for letter grade.
Registration Restriction(s): Majors in the College of Engineering; minimum student level – senior.

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. (WC)
Grading Restriction: A, B, C, No Credit grading.
Comment(s): Students wishing additional help with writing should also register for English 103.
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. (WC)
Grading Restriction: A, B, C, No Credit grading.
(ER) Prerequisite(s): 101.
Comment(s): Students wishing additional help with writing should also register for English 104.
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 of 450/850). Individual instruction in mechanics, paragraph development, and essay structure. (WC)
Grading Restriction: Satisfactory/No Credit grading only.
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.
(ER) Corequisite(s): 101.
104 Writing Workshop II (1)
Self-paced Writing Center tutorial for students wanting additional instruction while enrolled in English 102 or students advised to enroll by their 102 instructors. Individual instruction in critical reading and in developing and documenting the research paper. (WC)
Grading Restriction: Satisfactory/No Credit grading only.
Credit Restriction: To receive credit, students must participate at least two hours per week and must also pass the 102 class in which they are currently enrolled.
(ER) Prerequisite(s): 101.
(ER) Corequisite(s): 102.
118 Honors: English Composition (3)
Grading scale and workload are same as in regular sequence though course proceeds at an accelerated pace. Practice in argumentation, critical reading, literary interpretation, and research methods. May include the study of a long work of literature in addition to readings in nonfiction, short fiction, poetry, and drama.
Grading Restriction: A, B, C, No Credit grading.
Credit Restriction: Students receiving a grade below B in 118 will complete a year’s work in English Composition by taking 102. Students receiving a grade of A or B will complete their freshman English requirements by choosing 102, a sophomore literature course in the English Department, or 355. (Chancellor’s Honors students receiving a grade of A or B may complete their freshman English requirements by choosing one of the University Honors Interdisciplinary Seminars – 257, 267, or 277.)
Comment(s): ACT English and composite scores at or above 28 required.
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. (AH) (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 World Literature I: Ancient through Early Modern (3) Writing-emphasis course. (AH)

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

222 World Literature II: The Eighteenth-Century to the Present (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, law, 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 political organizations. (WC)

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

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

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

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-emphasis course. (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 the Screenplay (3) Introduction to writing screenplays. (Same as Cinema Studies 365.)
(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) Descriptive study of contemporary English with emphasis on phrase, clause, and sentence structure. (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 — folklore, folksong, myth, legend, proverbs, riddles, superstitions, dance, games, and architecture. (Same as American Studies 381.)
(RE) Prerequisite(s): 102 or 118.

389 Literature of the English Bible (3) A literary and historical approach to the Bible, including characteristics of its narrative and poetic art, and analysis of the different types of literature found in it: myth, legend, folklore, law, history, biography, poetry, prophecy, and apocrypha. (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 a selection of literary works from the Old and Middle English period, as well as some continental texts; most will be read in modern English translation, and no previous knowledge of Middle English is required. Writing-emphasis course. (Same as Medieval Studies 401.)
(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 402.)
(RE) Prerequisite(s): 102 or 118.

403 Introduction to Middle English (3) A survey of the language and literature of England from the 12th through the 15th centuries. Reading of prose works and shorter poetry will be done in Middle English with special attention paid to grammar, style, dialect, and language change. The class will explore the culture of medieval England through critical essays, histories, and supplementary texts in translation.

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 great 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, and 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, and Marvell. Prose of Browne, Bacon, and 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. Maximum 6 hours. (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 Brownings; 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 1830 to the end of the Civil War. Includes writers such as Cooper, Emerson, Fuller, Poe, Thoreau, Hawthorne, Melville, Douglass, Jacobs, Whitman, and 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. Includes writers such as Alcott, Twain, Howells, James, Jewett, Harper, Crane, Norris, and Wharton. (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) Traces the development of the American novel from the late 18th to the late 19th centuries. Includes such writers as Rowson, Brown, Cooper, Hawthorne, Melville, Stowe, James, Twain, and Dreiser. (RE) Prerequisite(s): 102 or 118.

436 Modern American Novel (3) Authors such as Faulkner, Steinbeck, and 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 the 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)
Formal, cultural, and thematic movements in 20th-century British and American poetry published before 1950. Includes writers such as Yeats, Frost, Eliot, Pound, Williams, Moore, Stevens, Stein, Hughes, and Auden.

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

### 452 Modern Drama (3)
Survey of British, American, and international drama from 1880 to the end of World War II. Includes such playwrights as Ibsen, Chekhov, Shaw, Synge, O'Neill, Glaspell, Treadwell, Hughes, Pirandello, Brecht, and Wilder. (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. Includes such playwrights as Williams, Miller, Beckett, Dürrenmatt, Stoppard, Churchill, Shepard, Mamet, Shange, Wilson, Friel, Maponya, Highway, and Kushner.

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

### 454 20th-Century American 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 Fiction/Narrative (3)
Formal, literary-historical, and thematic movements in post-World War II British and American fiction and international fiction in translation. Focus on postmodern novels and short stories written after 1945, but readings may include some newly influential narrative forms such as the graphic novel, hypertext and digital fiction and the nonfiction novel.

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

### 459 Contemporary Poetry (3)
Formal, cultural, and thematic movements in poetry published since 1950. Includes such writers as Lowell, Bishop, Brooks, Ginsberg, Plath, Larkin, Ashbery, Heaney, Baraka, and Walcott.

(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 societies. Theoretical and empirical study of language variation in individuals (style-shifting) and among social, cultural, and national/international groups. (Same as Linguistics 471.)

Recommended Background: 371 or 372 or Linguistics 200 or consent of instructor.

### 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, and 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)
Topics vary. Repeatability: May be repeated if topic differs. Maximum 6 hours.

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

### 482 Major Authors (3)
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). Content varies. Repeatability: May be repeated. Maximum 6 hours.

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

### 483 Special Topics in Literature (3)
Topics vary. 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)
Special topics in theoretical and practical approaches to British and American literature. Content varies. Repeatability: May be repeated with consent of department. Maximum 6 hours.

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

### 489 Special Topics in Film (3)
Particular directors, film genres, national cinema movements, or other topics. Content varies. (Same as Cinema Studies 489.) Repeatability: May be repeated with consent of department. Maximum 6 hours.

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

### 490 Language and Law (3)
Language in the Anglo-American legal process. Focus on differences between spoken and written language, lexical and syntactic ambiguity, pragmatics, speech act analysis, and the language rights of linguistic minorities. (Same as Legal Studies 490; Linguistics 490.)

(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)
Nature of legal language and written discourse types (opinions, memoranda, briefs). Introduction to legal research resources and techniques. Issue identification and argumentative techniques. Students will write position papers, memoranda, and briefs. No prior legal knowledge necessary. (Same as Legal Studies 496.)

Recommended Background: 355 or consent of instructor.
Environmental and Soil Sciences (345)

120 Soils and Civilizations (3) Investigation of the close linkage between soil conservation and degradation and the consequences to human 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; and the 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.

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 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.

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.

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 bioremediation. (RE) Prerequisite(s): 210 and Microbiology 210.

434 Environmental Soil Chemistry (3) Composition and chemical properties of soils and processes that govern fate and behavior of chemicals in the soil environment. Topics include – clay mineralogy; soil organic matter; mineral weathering and stability; aqueous speciation; surface chemistry, ion exchange, adsorption, and molecular retention; oxidation-reduction; and soil acidity, alkalinity, and salinity. (RE) Prerequisite(s): Chemistry 110 or Chemistry 350.

442 Soil Genesis and Classification (3) Soil genesis and formation; observing and describing morphology of agricultural and forest soils; chemical and physical properties; and classification. Includes 3 weekend field trips. Contact Hour Distribution: 2 hours and 1 lab. (RE) Prerequisite(s): 210.

444 Environmental Soil Physics (3) Basic understanding of soil physical properties and processes: influence of soil physical properties on water and chemical movement in soil; and 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.


COURSES OF INSTRUCTION

50 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.

500 Senior Seminar (3) Intensive study of an author, period, genre, or of 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, and study skills as they relate to content area subjects. Grading Restriction: Satisfactory/No Credit grading only.

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.

Entomology and Plant Pathology (341)

201 Impact of Insects and Plant Diseases on Human Societies (3) Insects and plant diseases have had a significant influence on human history, culture, and lifestyles. The science of entomology and plant pathology helps humankind understand the impact of insects and plant pathogens on these dimensions of human existence. The development of strategies to capitalize on the beneficial aspects of these organisms will also be explored. (NS)

313 Plant Pathology (3) Introduction to the microorganisms and environmental conditions causing disease in plants. Biology of pathogens, host-pathogen interactions, and disease development and principles of control. Contact Hour Distribution: 2 hours and 1 lab.

321 Economic Entomology (3) Structure, life history, habits, and principles of control of important insect pests of farm, garden, orchard, and household. Contact Hour Distribution: 2 hours and 1 lab.

325 Veterinary Entomology (3) Identification, biology, and control of arthropods that attack major livestock species. Introduction to entomology, methods of insect control, major pest species groups, and problems associated with specific host production operations. Contact Hour Distribution: 2 hours and 1 lab.

405 Mycology (3) Survey of the fungal kingdom and traditional allies in the context of phyla and classes. Systematics, biology, reproduction, structure-function, physiology, and ecology are illustrated with material and cultural techniques in laboratories. Contact Hour Distribution: 2 hours lecture and one 2-hour lab. Credit Restriction: Students cannot 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 greenhouses, nurseries, 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.

448 Taxonomy of Adult Insects (3) Classification, phylogeny, and distribution of insects and related arthropods. Lectures on theory and practice of systematics and major features of insect structure and evolution. Laboratory practice on methods of collection, preservation, and study of insects with emphasis on order and family identification of adults. Insect collection and one or more field trips required. Credit Restriction: Students receiving credit for 448 cannot receive credit for 548.

451 Plant Tissue Culture (3) Methods for the culture of cells, tissues, and organs including media preparation and maintenance of cultures. (Same as Plant Sciences 451.) Contact Hour Distribution: Lecture and lab. Registration Permission: Consent of instructor.

493 Independent Study in Entomology or Plant Pathology (1-4) Laboratory, field, or library research in entomology, plant pathology, or integrated pest management under the guidance of a faculty member. Repeatability: May be repeated. Maximum 6 hours.
492 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.

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.

(RED) Prerequisite(s): 100.


(RED) Prerequisite(s): 322.
Registration Restriction(s): Exercise science major.


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.

370 Aging and Physical Activity (3) Examines the biological, social, and behavioral aspects of exercise and physical activity in older adults in order to develop programs for older adults to improve and/or maintain functional status. Methods of measuring physical activity and assessing functional status for older adults are also considered and practiced. The course provides a foundation for working with older adults in programs and sites for exercise and/or physical activity.

380 Special Topics (1-3) Study in selected disciplinary or professional areas of exercise science.

Repeatability: May be repeated. Maximum 6 hours.

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.

(RED) Prerequisite(s): Biochemistry and Cellular and Molecular Biology 230.
Registration Restriction(s): Exercise science major.


(RED) Prerequisite(s): 332 and Physics 221.
Registration Restriction(s): Exercise science major.

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 6 hours.
Registration Restriction(s): Exercise Science major; 2.50 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.

(RED) Prerequisite(s): 332 and Biochemistry and Cellular and Molecular Biology 230.
(RED) Prerequisite(s): Physical Education 252.
Registration Restriction(s): Exercise science major; 2.50 GPA.

480 Physiology of Exercise (3) Lecture and laboratory class dealing with functions 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.

(RED) Prerequisite(s): Biochemistry and Cellular and Molecular Biology 230 or Biochemistry and Cellular and Molecular Biology 440.
Registration Restriction(s): Exercise science major; 2.50 GPA.

490 Exercise Physiology/Fitness Internship (12-15) Full-time practicum in exercise/fitness at approved agency.

Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: Not repeatable for credit. May be taken once for 12-15 hours.
(RED) Prerequisite(s): 414 and 422.
(RED) Prerequisite(s): 426 and 480.
Registration Restriction(s): Exercise science major; 2.50 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; 2.50 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.

Repeatability: Not repeatable for credit. May be taken once for 3-6 hours.
Registration Restriction(s): Exercise science major; minimum student level – senior.

Finance (349)

301 Financial Management (3) Principles of financial management. Investment, financing, and asset management functions of the firm.

(RED) Prerequisite(s): Business Administration 201.


(RED) Prerequisite(s): Business Administration 207.
Comment(s): Admission to the College of Business Administration's Global Leadership Scholars Program is required.

402 Special Topics in Finance (3) Junior- and senior-level finance seminar.
Repeatability: May be repeated if topic differs. Maximum 6 hours.
(RED) Prerequisite(s): 301 and Accounting 301.
Registration Restriction(s): Majors in the College of Business Administration.
Comment(s): Grade of C or better in Finance 301 is required.

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.

(RED) Prerequisite(s): 301 and Accounting 301.
Comment(s): Grade of C or better in Finance 301 is required.
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.

(RED) Prerequisite(s): 301 and Accounting 301.
Comment(s): Grade of C or better in Finance 301 is required.
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.

(RED) 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; insurance; and financial, estate, and retirement planning.

(RED) Prerequisite(s): 301 and Accounting 301.
Comment(s): Grade of C or better in Finance 301 is required.
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.

(RED) Prerequisite(s): 301 and Accounting 301.
Comment(s): Grade of C or better in Finance 301 is required.
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. Contact Hour Distribution: 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): 3.00 in all upper-division business courses is required. Grade of C or better in Finance 301 is 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.

129 Freshman Seminar (1) Small, academic seminars that encourage the exchange of ideas between professors and students. For a current list of course topics consult http://www.utk.edu/freshmanseminar. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 2 hours. Registration Restriction(s): Freshmen only.

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, and 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. Repeatability: May be repeated. Maximum 3 hours. (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 their impact on the globalization of the food supply. Contact Hour Distribution: 3 hours lecture.

240 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: 1 hour discussion and one 4-hour lab. Registration Restriction(s): Food science and technology major.


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.

340 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 lecture and 2-hour lab. (RE) Prerequisite(s): Chemistry 110 or 350.


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, and dehydration. Contact Hour Distribution: 2 hours and one 2-hour lab. Credit Restriction: Students cannot receive credit for both 441 and 541. (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.

469 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.

493 Practical Experience in Food Science and Technology (1-12) Specialized research in areas 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)

455 Teaching of Foreign Language, Grades 7-12 (3) Instructional methods, lesson planning, and peer-teaching. Materials for teaching foreign language and culture. Evaluation techniques. 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 functioning. (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; and site quality. Perturbations and growth, survival and forest composition; forest succession; and 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 economics. Microeconomic applications in forestry and non-market valuation and analysis. Financial analyses of private and public forest resource management decisions. (RE) Prerequisite(s): Economics 201.

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 (3) Application of silvicultural techniques and tree improvement. Use of herbicides and 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 and road layout and construction 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.

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, development, 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.

Forestry, Wildlife and Fisheries (398)

212 Dendrology and Silvics of North American Trees (3) Identification, classification, and nomenclature of important North American trees and woody 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.


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.
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 wildlife 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 (3) 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.
Credit Restriction: Students cannot earn credit for both 420 and 520.

French (405)

111 Elementary French I (3) Introduction to French.
Credit Restriction: Not available to students eligible for 150.

112 Elementary French II (3) Introduction to French.
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 I (3) (CC)
(IE) Prerequisite(s): 150 or 112 or departmental placement exam.
Comment(s): Students who place in 200-level courses from high school will receive 6 hours of elementary French credit.

212 Intermediate French II (3) (CC)
(RE) Prerequisite(s): 211.
Comment(s): Students who place in 200-level courses from high school will receive 6 hours of elementary French credit.

217 Honors: Intermediate French I (3) For students of superior ability in French. Students follow enriched program with emphasis on speaking ability and reading, including literary selections (CC)
Comment(s): Incoming freshmen admitted on basis of diagnostic test, high school average, and performance on ACT.

218 Honors: Intermediate French II (3) For students of superior ability in French. Students follow enriched program with emphasis on speaking ability and reading, including literary selections. (CC)
(RE) Prerequisite(s): 217.
Comment(s): Incoming freshmen are admitted on the basis of diagnostic test, high school average, and performance on ACT. Students with a grade of A in 218 may enter 219 with permission of instructor. Credit for 300 is given to students receiving a grade of A or B in 218.

300 Transitional Grammar Review and Reading (3) For students who have completed the intermediate-level sequence and who need additional preparation in reading comprehension, vocabulary acquisition, and key areas of grammar.
Credit Restriction(s): May not be applied toward the major or minor.
(RE) Prerequisite(s): 212 or 218.

301 Elements of French for Upper-Division and Graduate Students (3) Elements of language, elementary and 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.

302 Elements of French for Upper-Division and Graduate Students (3) Elements of language, elementary and 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.

333 Intermediate Composition and Grammar (3) Emphasizes writing skills. Review of major grammatical points in French.
(RE) Prerequisite(s): 212 or 218.

(RE) Prerequisite(s): 333.

345 French for Business (3) Contemporary French language as it applies to business transactions. Understanding and composing business letters. Oral communication and elements of French culture related to good business practices.
Credit Restriction: Either 334 or 345 may be applied toward the major, but not both.
(RE) Prerequisite(s): 333.

351 History of French Literature I (3) Chronological overview of French literature and culture from the Middle Ages to 1800.
(RE) Prerequisite(s): 333.

352 History of French Literature II (3) Chronological overview of French literature and culture from 1800 to the present.
(RE) Prerequisite(s): 333.
Comment(s): May be taken before 351.

400 Consecutive and Simultaneous French-English and English-French Translation (3) Consecutive translation to and from English. Introduction to simultaneous translation to English.
(RE) Prerequisite(s): 333.

410 Medieval French Literature (3) 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.

411 French Literature of the 16th Century (3) Highlights of 16th-century French literature. Excerpts from Rabelais and Montaigne. Readings of poems from the writers from Lyon and members of the Pléiade. Writing-emphasis course.
(RE) Prerequisite(s): 351 or 352.

(RE) Prerequisite(s): 351 or 352.

413 French Literature of the 18th Century (3) Major works of the Enlightenment. Writing-emphasis course.
(RE) Prerequisite(s): 351 or 352.

(RE) Prerequisite(s): 351 or 352.

(RE) Prerequisite(s): 351 or 352.

420 French Cinema (3) The French cinema from its earliest days through 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.

421 Phonetics (3) Foundation in the science of phonetics. Practical exercises and individual performance.
(RE) Prerequisite(s): 333.

422 Advanced Grammar (3) Improving one’s written French by studying basic and more refined structures of the French language. Writing creative free-style compositions. Writing-emphasis course.
(RE) Prerequisite(s): 333.

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.

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.

425 Introduction to Descriptive Linguistics (3) Initiation into the theory and practice of techniques of linguistic analysis in the subfields of phonetics, phonology, morphology, syntax, semantics, pragmatics, and historical linguistics. Discussion of their relevance to the learning and teaching of foreign languages and to the study of literary texts. Writing-emphasis course. (Same as German 425; Linguistics 425; Russian 425; Spanish 425.)
Recommended Background: Linguistics 200.
426 Methods of Historical Linguistics (3) (See German 426.)

429 Romance Linguistics (3) Development of Classical Latin through Vulgar Latin into major Romance Languages. Writing-emphasis course. (Same as Linguistics 429; Spanish 429.)

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 actively participate in its public performance. May be applied toward the major as a literature course. Writing-emphasis course.

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.

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.

433 French and Francophone Women Writers (3) Works by women writing in French considered in cultural context. In English with readings in French for majors. May be applied toward the French major. Writing-emphasis course. (Same as Women's Studies 433.)

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.

450 Special Topics (3) Selected topics in French studies. Repeatability: May be repeated if topic differs. 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): French 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 program chair.

Geography (415)

101 World Geography (3) Selected topics and world regions, especially those of contemporary interest. Illustrates 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 of contemporary interest. Illustrates 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 of 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, 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 relate 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) Interalation 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 current 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.)

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): 132.
Geography Standards.

Course organization and content based largely on that of the National
Research and Development Center for Career and Technical Education.

466 Teaching and Learning Geography (3)
Preparation of prescriptive teachers in the content, skills, strategies, and understandings needed for the effective teaching and assessment of geography in 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 3.20 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.

Geography (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 applied to interpretation of the stratigraphic record — weathering and soil formation, the hydrologic cycle, physical sediment transport, biological and chemical sedimentation, and sediment diagenesis.
Contact Hour Distribution: 3 hours lecture and one 2-hour lab.
Recommended Background: Two 100-level geology courses or consent of instructor.

Contact Hour Distribution: 3 hours lecture and one 2-hour lab.
(Re) Prerequisite(s): Mathematics 142.
Recommended Background: 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, and planetary exploration.
Contact Hour Distribution: 3 hours lecture and one 2-hour lab.
(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.

425 Data Analysis for Geoscientists (3) An overview of sampling schemes, data analysis, and statistical methods as applicable to earth sciences.
Recommended Background: Introductionary geology and introductory calculus.

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 environment.
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.

473 Principles of Near-Surface Geophysics (3) Basics of several standard near-surface geophysics techniques (for example, seismic reflection, seismic refraction, surface wave and GPR, electrical resistivity, magnetism, and EM), using state-of-the-art field equipment to develop the skills necessary to process and interpret data. Includes a significant field component.
Recommended Background: Introductory calculus.

485 Principles of Hydrogeology (3) Physical principles of flow, flow equations, geologic controls, aquifer analysis, water well design/testing, and introduction to transport processes. (Same as Civil Engineering 485.)
Recommended Background: Introductory calculus, physics, and geology.

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 I (3) Introduction to German.
Credit Restriction: Not available to students eligible for 150.
Comment(s): If at least two years of German were taken in high school, a placement exam is required.

102 Elementary German II (3) Introduction to German.
Credit Restriction: Not available to students eligible for 150.
(Re) Prerequisite(s): 101.

150 Elementary German Transition (3) This course is designed to prepare students for enrollment in German 101.
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.
Comment(s): If at least two years of German were taken in high school, a placement exam is required.
201 Intermediate German I (3) (CC)
(DE) Prerequisite(s): 102 or 150 or placement exam.

202 Intermediate German II (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.
Credit Restriction: No credit for students who have completed 101-102.
Repeatability: May be repeated. Maximum 6 hours.
(Re) Prerequisite(s): 302 or 301. (DE) Prerequisite(s): 302 or 311.
Comment(s): Open to graduate students (for undergraduate credit) preparing for language examinations and upper-division students desiring reading knowledge of the language.

333 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 18th 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.

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, and 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 precariously 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 Judaic Studies 350.)

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): 331 or 301.
(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, and 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.
(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 concentrations.

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.)
(De) 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.
Covers alcohol, drugs, tobacco, and other substances.
Grading Restriction: Satisfactory/No Credit grading only.
305 Health of Adolescents (3) Profiles 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 organizing and presenting health content, health materials, 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 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.)
404 Alcoholism and Alcohol Education (3) Factors which make alcoholism a serious health and safety problem. Various types of instruction/educational and intervention programs.
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.)

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.
475 Directed Independent Studies (1-3) Individual identification and study of a health/wellness or health promotion problem/issue.
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of instructor.
483 Field Practice (12) Off-campus health internship or field practice in an educational or other agency with qualified professional. Usually taken in final semester.
Grading Restriction: Satisfactory/No Credit grading only.
Comment(s): Approval of internship is required.

Hebrew (458)
141 Elementary Modern Hebrew I (4) (See Asian Studies 141.)
142 Elementary Modern Hebrew II (4) (See Asian Studies 142.)
241 Intermediate Modern Hebrew I (4) (See Asian Studies 241.) (CC)
242 Intermediate Modern Hebrew II (4) (See Asian Studies 242.) (CC)

Higher Education Administration (461)
200 Student Leadership Development (3) Designed to enhance the knowledge and skill of emerging student leaders and includes theoretical and experiential content related to leadership role, skill, and effectiveness.
Grading Restriction: Satisfactory/No Credit grading only.
455 Seminar in Student Leadership (1) Topics to be assigned. Designed to develop knowledge and skills in leadership roles for resident assistants, student government leaders, student activities, and other student organizations.
Repeatability: May be repeated. Maximum 3 hours.

History (462)
221 History of the United States (3) Settlement to 1877. Writing-emphasis course.
222 History of the United States (3) 1877 to present. Writing-emphasis course.
227 Honors: History of the United States (3) Students will attend the appropriate 221 lectures and the designated honors discussion section.
Registration Permission: Consent of department.
228 Honors: History of the United States (3) Students will attend the appropriate 222 lectures and the designated honors discussion section.
Registration Permission: Consent of department.
241 Development of Western Civilization (3) Historical survey of the civilization of the western world – ancient world to 1715. Writing-emphasis course. (CC)
242 Development of Western Civilization (3) Historical survey of the civilization of the western world – 1715 to present. Writing-emphasis course. (CC)
247 Honors: Development of Western Civilization (3) Students will attend the appropriate 241 lectures and the designated honors discussion section. Writing-emphasis course. (CC)
248 Honors: Development of Western Civilization (3) Students will attend the appropriate 242 lectures and the designated honors discussion section. Writing-emphasis course. (CC)
255 Introduction to Latin American Studies (3) Societies of Latin America with special emphasis on dominant culture patterns, social changes, and impact of nationalism. Pre-colonial and colonial periods through independence era. Writing-emphasis course. (Same as Latin American Studies 251.) (CC)
256 Introduction to Latin American Studies (3) Societies of Latin America with special emphasis on dominant culture patterns, social changes, and impact of nationalism. Latter 19th century and the modern period. Writing-emphasis course. (Same as Latin American Studies 252.) (CC)

261 A History of World Civilization (3) Historical survey of world civilization – origins to 1500. Writing-emphasis course. (CC)

262 A History of World Civilization (3) Historical survey of world civilization – 1500 to present. Writing-emphasis course. (CC)

301 History of Early Greece (3) (See Classics 301.)

302 History of Classical Greece (3) (See Classics 302.)

331 History of England (3) (Same as Medieval Studies 331.)

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, and the Severans. Writing-emphasis course. (Same as Classics 303.)

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, the fall of the western empire, from Roman to Byzantine in the east. Writing-emphasis course. (Same as Classics 305.)

306 History of Hellenistic Greece (3) (See Classics 306.)


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 upon 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 consequences: 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 and civil policies and institutions designed to uncover and combat heretics, homosexuals, Jews, and witches. Writing-emphasis course.


331 History of England (3) To 1689 to the present. Seventeenth-century revolutions – commercial, agricultural and industrial. Class conflict, empire, the welfare state, world wars, and economic crisis.

333 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 Metternich’s Confederation, 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.

341 History of Russia (3) From the middle of the 19th century.

342 History of Nazi Germany (3) The coming to power of the Nazi party in Germany, origins of ideology, and the 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. Writing-emphasis course.

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. Writing-emphasis course.

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 by people of color, 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 interregional 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, and the 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 his-
torical perspective.
  Contact Hour Distribution: Lecture-discussion.
  Repeatability: May be repeated. Maximum 9 hours.
  Comments: Especially suitable for non-majors. Also open to major.

375 Revolutions in Historical Perspective (3) Comparative history of
major revolutions which transformed political, social, and economic struc-
tures and values both in France, Russia, China, Mexico, and
Iran. Contrasts and common patterns in their causes, phases and out-
comes. Relationships between leaders and masses. Major theories of rev-
olution. Writing-emphasis course.

381 History of South Africa (3) South African history from the pre-colo-
nial period through the apartheid and post-apartheid eras. Topics include
African formation and resistance to European colonization, the
impact of industrialization, the evolution of modern resistance move-
ments, and the first democratic elections in 1994. Writing-emphasis
course. (Same as Africana Studies 381.)

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 and the
Haskala. The Reform movement and Zionism, the Holocaust, and the
foundation of the State of Israel. 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 and intellectual and literary traditions, and cross-cultural
exchanges. Writing-emphasis course.

390 History of China (3) China since 1600. Highlights China’s transfor-
mation 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 transfor-
mation of Chinese cultural values, the social and political roles of intellec-
tuals, 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-empha-
sis 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 reli-
gious, 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 con-
ceptual 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 con-
texts. Writing-emphasis course.

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. Relationships
between family structure, sexual attitudes, and the economic and politi-
cal roles of women with an emphasis on autobiographical writings by
women. Writing-emphasis course. (Same as Women’s Studies 432.)

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 feder-
al 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
resistance, and campaigns, and present-day relationship. Writing-emphasis
course.

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, econom-
ic, and social development of the colonies. Slave culture, adaptation, and
resistance. Freed black people. 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.)

448 History of Tennessee (3) Tennessee’s history from the 18th century
to the present.

450 History of United States Foreign Relations to World War II (3)
Examines the ideology and practice of U.S. international relations from
independence to entry into World War II.

451 United States Military History, 1754 to the Present (3) The
nation’s broad strategic aims and means used to attain them. Shifting
strategy, tactics, and weaponry involved in wars. The relationship
between American society and its armed forces. Writing-emphasis

452 The American Experience in World War II (3) Diplomacy and war-
fare 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
time 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 moderniza-
tion, the new national government, the first political party system. Foreign
relations, the changing status of women, and the growth of cities.
Changing ideas about deference, class, and community. Writing-empha-
sis 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

461 Cuban Revolution in Historical Perspective (3) Cuban history with
major emphasis on Cuban Revolution and Cuban-U.S. relations. Writing-

462 History of Mexico (3) Pre-Columbian, colonial, national, and mod-
ern Mexican history, emphasizing the 20th century’s first true social rev-
olution, the Mexican Revolution, and contemporary social and economic
problems. Writing-emphasis course. (Same as Latin American Studies 462.)

470 Studies in British History (3) Selected themes and issues in British
history. Variable content.
  Repeatability: May be repeated. Maximum 9 hours.

471 Studies in Western European History (3) Particular aspects of
western European history such as witchcraft, revolutions, or nationalism.
Variable content. Writing-emphasis course.
  Repeatability: May be repeated. Maximum 9 hours.

472 Studies in Central European History (3) Variable content. Writing-

473 Studies in Eastern European History (3) Selected aspects of east-
ern European history, especially on Russian and Polish history. Variable
content. Writing-emphasis course.
  Repeatability: May be repeated. Maximum 9 hours.

474 Studies in Medieval and Early Modern European History (3)
Particular aspects of medieval and early modern Europe. Variable con-
tent.
  Repeatability: May be repeated. Maximum 9 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.

**212 Conventions, Meetings, and Events (3)** Understanding the concepts and models of conventions/meetings, roles of meeting planners, identifying decision makers, site selection, negotiating, budgeting, and marketing commitment.

**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 – recruitment and selection, training and development, and employee relations. *(Same as Retail and Consumer Sciences 311.)*  
(RE) Prerequisite(s): 210 or Retail and Consumer Sciences 210.  
(DE) Prerequisite(s): 211, 212, or 224.

**326 Food and Lodging Cost Control (1-3)** Budget, cost analysis, computer, financial statement use in decision-making in lodging and foodservice systems.  
Repeatability: Not repeatable for credit. May be taken once for 1-3 hours.  
(RE) Prerequisite(s): 210 and Accounting 200.  
(DE) Prerequisite(s): 211, 212, or 224.

**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, and motivational and negotiating skills. *(Same as Retail and Consumer Sciences 390.)* *(WC)*  
(RE) Prerequisite(s): 311.  
(DE) 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 (3)** 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 (4)** Hospitality management from a strategic planning perspective. Introduces model, methods, and techniques that can be used to identify strategic issues, and generate future-oriented action plans. Explores the manager’s role as a strategic thinker. Includes a lab in which students will be presented with real world business problems and asked to generate solutions.  
Contact Hours Distribution: 3 hours and 1 hour lab.  
(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.  
(DE) Corequisite(s): 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 Meeting Planning, Special Events, and Convention Management (3)** Management techniques used in the execution of meetings, marketing, conventions, and special events. Emphasis on integration of management principles and strategic planning.  
(DE) Prerequisite(s): 210 or 212.  
Registration Permission: Consent of instructor.

**440 Special Topics: Hotel, Restaurant, and Tourism (1-3)** Developments, issues, and problems in hotel, 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): 210.
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 (6) 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.

Repeatability: May be repeated. Maximum 6 hours.

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

Registration Permission: Consent of instructor.

Human Resource Management (530)


(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. Developing 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.

360 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, and decision making.

(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 and procedures. 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.

Recommended Background: Completion of freshman engineering courses.

Comment(s): Available to other majors who have completed an introductory course in probability and statistics.

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: 3 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 (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, workplace, 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, and 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 multi-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 hours lecture and 1 lab.

(Re) Prerequisite(s): 202 and 300.

Recommended Background: Completion of an introductory course in probability and statistics.
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. Principles of written communication 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, and other 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.

404 Industrial Engineering Applications (1) Enhances and integrates 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) Prerequisite(s): 12, 322.
Recommended Background: Completion of one semester of industrial engineering senior-level courses.
Registration Permission: Consent of instructor.


Registration Restriction: 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.
(Re) 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 – 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.

(Re) Prerequisite(s): 402.
Recommended Background: Completion of an introductory course in probability and statistics.
Registration Restriction(s): Industrial engineering major; minimum student level – junior.

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, terminology, and tools of lean enterprise and Six Sigma. Activities will include case studies, industry based projects, and the preparation of written engineering reports.

(Re) Prerequisite(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. Transform problems into programming paradigms, and encode 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.

(Re) 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.

(Re) 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.

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.

(Re) Prerequisite(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.

(Re) 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. (RE) 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 spreadsheet sheets 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. (RE) 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.

301 Introduction to Web Technologies (3) Introduction to the Internet and World Wide Web technologies and practices. Topics include the history and development of the World Wide Web and the Internet; standards-compliant markup and tools for creation of markup (e.g., XHTML and style sheets); introductory Web page and Web site design.

310 Information Seeking: Resources and Strategies (3) Information as a critical resource for research and decision-making. Emphasis on planning, executing, and evaluating information searches. Focus on topic of student’s major.


351 Race, Gender and Information Technology (3) Examines how expression of gender and race affect, and are affected by, information technologies. Course considers how information technologies interact with race and gender in various contexts: high-technology workplaces; classification and information organization; cultures of computing; and library and information-centered environments. The course is framed by two broad, interrelated concepts — the expression of identity (individual and group) in cyberspace and the “digital divide,” and reviews theoretical background in the social studies of gender, race, technology, and knowledge.

410 History of the Book (3) History of writing and various methods of bookmaking.

450 Writing About Science and Medicine (3) (See Journalism and Electronic Media 450.) (WC)

451 Information Management in Organizations (3) Introduces concepts and techniques for the interdisciplinary study of information, organizations, technology, and individuals, sometimes referred to as knowledge management. Topics include characteristics of data, information and knowledge; introduction to knowledge management; sensemaking in organizations; organizational learning; intellectual capital; communities of practice; ecological approaches; knowledge acquisition, representation, and sharing; uses of information technology for information and knowledge management; and roles of professionals in managing information management initiatives. (RE) Prerequisite(s): 310. Comment(s): Prior knowledge may satisfy prerequisite, with consent of instructor.

460 Internet Applications and Technologies (3) Introduces World Wide Web and related Internet technologies (e.g., XHTML, XML, CSS) and how they are used to solve organizational, individual, discipline-specific and social problems. Topics include the history of and the role of Internet standards in the design of information systems; metadata; principles and practices of standards-compliant, accessible Web design; informatics. (RE) Prerequisite(s): 301. Comment(s): Prior knowledge may satisfy prerequisite, with consent of instructor.

461 Information Architecture and the User Experience (3) Introduction to the design of the representational systems and interaction paradigms required of effective information systems. Topics include taxonomy creation; interface design; and techniques for design testing and validation. (RE) Prerequisite(s): 301. Comment(s): Prior knowledge may satisfy prerequisite, with consent of instructor.

470 Advanced Internet Applications and Technologies (3) Principles and practices of applying advanced techniques and standards to organizational, individual, discipline-specific, and social information problems; applications in discipline-specific branches of informatics. Topics include semantic Web technologies; server- and client-side scripting; and the use of databases in Web-based information systems. (RE) Prerequisite(s): 460. Comment(s): Prior knowledge may satisfy prerequisite, with consent of instructor.

495 Special Topics (3) Detailed study of a specialized area of information studies or information technology. Topics vary by semester.

Instructional Technology (569)

486 Introduction to Instructional Computing (3) Classroom uses of computers, applications for teachers, overview of computer operation and software for teachers of all grades. Registration Restriction(s): Qualification – admission to teacher education.

Instructional Technology and Cultural Studies (572)

495 Special Topics (1-3) Topics to be assigned. Repeatability: May be repeated. Maximum 12 hours.

Interdisciplinary Programs (581)

100 Selected Topics (1-3) Repeatability: May be repeated. Maximum 6 hours.

400 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.

491 Foreign Study (1-15) Repeatability: May be repeated. Maximum 15 hours. Registration Permission: Consent of Director of Interdisciplinary Studies.

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.

Interior Design (582)

141 Introduction to Interior Design (2) Orientation to the profession, relationship to allied fields, contemporary development, and philosophical approaches. Registration Restriction(s): Interior design major or architecture major. Registration Permission: Consent of instructor.

171 Visual Studies (3) Classification and properties of two and three-dimensional visual organization. Design principles and visual and spatial elements within simple and complex visual systems. The role of movement in experiencing scale and volumetric space. Contact Hour Distribution: 3-hour studio. (RE) Corequisite(s): Architecture 121 and Architecture 171. Registration Restriction(s): Interior design major.

172 Introduction to Microenvironments (3) Human perceptions in micro-scale environments (residential, commercial, and public spaces). Introduction to basic analytic and behavioral programming techniques. Contact Hour Distribution: 3-hour studio. (RE) Prerequisite(s): 171 and Architecture 171.

177 Honors: Introduction to Microenvironments (3) Student will attend Interior Design 172 studio classes with supplementary assignments required, including an individual research project. (RE) Prerequisite(s): 171 and Architecture 171. Registration Permission: Consent of interior design program.

221 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.

261 Materials and Resources for Interiors (2) The development and application of materials and resources used in interior architectural space.

(Re) Prerequisite(s): 172.


Contact Hour Distribution: 6-hour studio.

(Re) Prerequisite(s): 172 and Architecture 171.

(De) Prerequisite(s): 141 and Mathematics 123.

272 Interior Design Studio II (6) Problem-solving, spatial organization of microenvironments, increasingly larger scale. Emphasis on digital communication; computer-aided design and drafting, desktop publishing, graphic imaging, and reproduction.

Contact Hour Distribution: 6-hour studio.

(Re) Prerequisite(s): 271.

(Re) Corequisite(s): 221.

311 History of Interior Architecture (4) Interior architecture, decoration and decorative arts within cultural context, ancient through 19th centuries with emphasis on Italy, France, England, and America.

(Re) Prerequisite(s): Art History 172 and Art History 173.

(De) Prerequisite(s): 272.

312 History of Contemporary Interior Architecture (2) Interior architecture, furniture, design philosophies, 19th-century roots for 20th-century developments, Europe and America. Design as influenced by movements in the fine arts, technological advances, and cultural context.

(Re) Prerequisite(s): 311.

331 Drawing and Construction Documentation (2) Building on previous computing skills, this course focuses on interior construction documentation through computer-aided design applications. The vehicle for this course will involve a small-scale design problem and will emphasize technical graphic conventions, codes and regulations affecting the health, safety, and welfare of public.

Contact Hour Distribution: 6-hour studio.

(Re) Prerequisite(s): 272 and Architecture 231.

360 Business Principles and Practices (3) Interprofessional relationships and business practices, responsibilities, and liabilities.

(Re) Prerequisite(s): 272.

371 Intermediate Interior Design I (6) Studio problems of intermediate complexity with emphasis on programming and schematic design phases. In-depth analysis of current programming methods. Integrates and extends previous knowledge of spatial organization and planning of micro and macro environments.

Contact Hour Distribution: 6-hour studio.

(Re) Prerequisite(s): 272 and 261.

(De) Prerequisite(s): 221.

372 Intermediate Interior Design II (6) Studio problems of intermediate complexity. Integrates and extends previous knowledge of working drawings, materials and sources, design methods, spatial organization, and planning of micro and macro environments.

Contact Hour Distribution: 6-hour studio.

(Re) Prerequisite(s): 371 and 331.

400 Proxemics (2) Analysis of space and behavior within a cultural context. Application to design and the design process. Examination of theoretical foundations and concepts from environment and behavior. Simulation techniques and methods for identifying behavioral design requirements.

Contact Hour Distribution: 2-hour studio.

(Re) Prerequisite(s): 200 and Architecture 231.

(De) Prerequisite(s): 471.

420 Practicum for Interior Design (3) Supervised experience in a professional design firm. Business practices, project management, and design philosophy.

(Re) Prerequisite(s): 360 and 372.

433 Digital Graphics for Interior Design (3) Theory and techniques of visual problem solving as applied to application of interior design.

Contact Hour Distribution: 3-hour studio.

(Re) Prerequisite(s): 272 and Architecture 231.

Registration Restriction(s): 3.00 GPA.

460 Lighting for Interior Design (3) Lecture presentation of design principles in lighting, acoustics and mechanical systems. Course will emphasize fundamentals of lighting design practices and techniques.

(Qu) Prerequisite(s): 271 and Physics 161.

(Re) Corequisite(s): 372.

471 Advanced Interior Design I (6) Non-residential studio problems of advanced complexity. Integrates and extends previous experiences utilizing systematic design methodologies.

Contact Hour Distribution: 6-hour studio.

(Re) Prerequisite(s): 372 and 420.

(De) Prerequisite(s): 460.

(Re) Corequisite(s): 400.

472 Advanced Interior Design II (6) Comprehensive studio problems of advanced complexity. Integrates and extends previous experiences utilizing systematic design methodologies.

Contact Hour Distribution: 6-hour studio.

(Re) Prerequisite(s): 471.

477 Honors: Advanced Interior Design II (6) Student will attend Interior Design 472 comprehensive design studio classes with supplementary design assignments required.

(Re) Prerequisite(s): 471.

Registration Permission: Consent of interior design program.

480 Furniture Design (3) Human factors data applied to design of body support, task support, storage and systems, construction drawings, and scale models. Advanced millwork design and materials and manufacturing processes.

Contact Hour Distribution: 2-hour lecture and 2-hour studio.

(Re) Prerequisite(s): 372 or Architecture 372.

491 International Study (1-15) 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.

493 Directed Studies in Interior Design (1-4) Student- or staff-initiated research or studio investigation of special topic.

Repeatability: May be repeated. Maximum 8 hours.

Credit Restriction: Elective credit only.

International Business (583)

409 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): Business Administration 361.

Comment(s): Students must be admitted to an international business collateral or dual concentration.

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

419 International Environment and Management (3) Critical knowledge about how changing international environments create new complex challenges for international managers. Analysis of international environments at global, regional, and individual-country levels. Exposure to practical problems arising from specific cultural, political, economic, and technological diversity at various units of analysis in organizations.

(Re) Prerequisite(s): Business Administration 361.

Comment(s): Students must be admitted to an international business collateral or dual concentration.

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


Credit Restriction: Students may not receive credit for both International Business 429 and Economics 322.

(Re) Prerequisite(s): Business Administration 361.

Comment(s): Students must be admitted to an international business collateral or dual concentration.

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

439 Global Supply Chain Management (3) Explores the complexities of managing supply chains in a global context. Addresses issues relating to the drivers of globalization and managing the supply and demand fulfillment processes across an extended and global organization. Topics include discussions of cultural differences, regional trading blocs, global procurement, offshoreing, global infrastructure, security and risk, sustainability, market entry, service quality, gray markets, customer lifetime value, demand/supply integration.

(Re) Prerequisite(s): Business Administration 331 and Business Administration 361.

Comment(s): Students must be admitted to an international business collateral or dual concentration.

Registration Restriction(s): Majors in the College of Business Administration.
449 International Accounting and Finance (3) An analysis of accounting and finance topics that are relevant to international business decision making, including international accounting standards and reporting requirements, exchange rate analysis, financial strategy, hedged cost of funds, economic exposure and management, capital budgeting, financial and corporate strategy, evaluation of international risks and returns. (RE) Prerequisite(s): Business Administration 361 and Finance 301. Comment(s): A grade of C or better in the prerequisites is required. Registration Restriction(s): Majors in the College of Business Administration.

489 Study Abroad (0) Study abroad program approved by the College of Business Administration Undergraduate Programs Office. Grading Restriction: Satisfactory/No Credit grading only. Registration Restriction(s): Admission to the College of Business Administration. 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.

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.

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.)

402 Petrarch and Boccaccio (3) Writing-emphasis course. (Same as Medieval Studies 402.)

403 Literature of the Rinascimento (3) From Pucci to Tasso, the Quattrocento and the Cinquecento.

409 Directed Readings (3)

410 Italian Theatre (3) Survey of Italian theatre from Renaissance to present.

411 Aspects of Modern Literature and Culture (3) Representative works of modern literature and culture.

412 Advanced Literary Reading and Conversation (3) Representative works of contemporary literature and culture.

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.

422 Topics in Italian Cinema (3) Examination of Italian cinema from 1930 to the present focusing on feature films, documentaries and, depending on the topic of the course, on literary works in light of political, cultural, and social contexts. Films are shown in Italian with English subtitles. Writing-emphasis course. (Same as Cinema Studies 422.)

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

Japanese (589)

151 Elementary Japanese I (5) (See Asian Languages 151.)

152 Elementary Japanese II (5) (See Asian Languages 152.)

251 Intermediate Japanese I (5) (See Asian Languages 251.) (CC)

252 Intermediate Japanese II (5) (See Asian Languages 252.) (CC)

313 Japanese Literature in English Translation (3) (See Asian Languages 313.)

314 Japanese Literature in English Translation (3) (See Asian Languages 314.)

321 Japanese Graphic Novels and Animation (3) (See Asian Languages 321.)

351 Advanced Japanese I (4) (See Asian Languages 351.)

352 Advanced Japanese II (4) (See Asian Languages 352.)

413 Topics in Japanese Literature (3) (See Asian Languages 413.)

451 Readings in Pre-Modern Japanese Literature (3) (See Asian Languages 451.)

452 Readings in Modern Japanese Literature (3) (See Asian Languages 452.)

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.


236 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 productions. 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 the 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.