ART PRINTMAKING (132)

191 Introduction to Studio Art: Various Media (3) Individual sections for various artistic disciplines. For Non-majors only. Courses may be repeated, medium may not be repeated. Maximum 12 hours.

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

283 Lithography I (3) Stone and aluminum plate lithography applying traditional and contemporary techniques of crayon, tusche, transfer methods, state proofs and photolithography. Prereq: 101.

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

268 Special Topics in Printmaking (3) Some instructor-initiated course offered at convenience of department. Prereq: 101 and determined by department for individual topic. May be repeated. Maximum 12 hours.

291 Papermaking Workshop (3) Papermaking as a medium for two- and three-dimensional art. Includes sheet forming, embedding, laminating, embossing, pulp dyeing, staining, casting, and other related techniques. Emphasis on development of a personal form.

360 Printing Portfolio Review (0) Review of prior work in printmaking. Successful completion required prior to registration for junior and senior courses. Prereq: Art History 172 and 173 with a grade of C or better. Satisfactory/No credit only.

362 Intaglio II (4) Exploration of concepts and techniques in intaglio printing including work from zinc, photo-zinc, and steel. Prereq: 282 and 360 or consent of instructor. May be repeated. Maximum 8 hours.

363 Lithography II (4) Exploration of concepts and techniques in lithography from stones, aluminum plates and photo-plates. Prereq: 282 and 360 or consent of instructor. May be repeated. Maximum 8 hours.

364 Screen Printing II (4) Advanced screen printing techniques including photo screening. Emphasis upon image and personal concept. Prereq: 264 and 360, or consent of instructor. May be repeated. Maximum 8 hours.

462 Intaglio III (3-6) Exploration of individual projects through advanced color printing methods and combinations with other print media. Prereq: 362, or consent of instructor. May be repeated. Maximum 12 hours.

463 Lithography III (3-6) Exploration of individual projects through advanced lithographic methods in combination with other print media. Prereq: 363, or consent of instructor. May be repeated. Maximum 12 hours.

464 Screen Printing III (3-6) Individual development of screen printing problems and techniques. Emphasis upon greater development of image and personal concept. Prereq: 264 and 364, or consent of instructor. May be repeated. Maximum 12 hours.

469 Special Topics in Printmaking (3) Student or instructor-initiated course offered at convenience of department. Prereq: Determined by department for individual topic. May be repeated. Maximum 12 hours.

493 Independent Study (1-15) Prereq: Consent of instructor.

494 Individual Problems (3) Prereq: Consent of instructor. 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. (Does not apply toward art history requirement.) May be repeated. Maximum 8 hours.
ASIAN LANGUAGES (144)

131-132 Elementary Chinese I, II (5,5) Must be taken in sequence. F, Sp

151-152 Elementary Japanese I, II (5,5) Must be taken in sequence. F, Sp

162-162 Elementary Persian (4,4) Taped language program. Must be taken in sequence.

199 Chinese and Japanese Language and World Business (2) Examines the importance of foreign trade at the local, state, and national levels. Interdisciplinary faculty from the Colleges of Business Administration and Arts and Sciences provide an overview of the values of language study and international cultural awareness in the program in Language and World Business. See Director for further information.

231-232 Intermediate Chinese I, II (5,5) Prereq: 151-152 or equivalent or consent of instructor. Must be taken in sequence.

251-252 Intermediate Japanese I, II (5,5) Prereq: 151-152 or consent of instructor. Must be taken in sequence. F, Sp

311-312 Chinese Literature in English Translation (3,3) Classical literature. 312- Vernacular and modern literature. Writing-emphasis course.


332-333 Advanced Chinese I, II (4,4) Prereq: 231-232 or equivalent or consent of instructor. Must be taken in sequence.

351-352 Advanced Japanese I, II (4,4) Includes conversation, drill, and composition practice with native speaker as well as reading and translation. Prereq: 251-252. Must be taken in sequence.

411-412 Readings in Chinese Literature (3,3) Prereq: Mastery of intermediate-level of Chinese or consent of instructor. May be repeated. Maximum 9 hours.

413-414 Readings in Japanese Literature (3,3) Prereq: Mastery of intermediate-level of Japanese or consent of instructor. May be repeated. Maximum 9 hours.

490 Chinese and Japanese Internship (1-15) Career-related experiences in the United States or abroad with permission of the Language and World Business Director. For Language & World Business majors only. Satisfactory/No Grade credit only.

491 Chinese and Japanese Foreign Study (1-15)

ASIAN STUDIES (145)

101-102 Asian Civilization (3,3) Comparative study of development of religion, social institutions, and high culture in India, Japan, and the Islamic world.

101-India and the Islamic World. 102-China and Japan. Writing-emphasis course.

121-122 Elementary Modern Standard Arabic I, II (4,4) Taped language program. Must be taken in sequence. Enrollment by permission of instructor.

141-142 Elementary Modern Hebrew I, II (4,4) Taped language program. Must be taken in sequence. Enrollment by permission of instructor.

161-162 Elementary Persian (4,4) Taped language program. Must be taken in sequence. Enrollment by permission of instructor.

221-222 Intermediate Modern Standard Arabic I, II (4,4) Taped language program. Must be taken in sequence. Enrollment by permission of instructor.

241-242 Intermediate Modern Hebrew I, II (4,4) Taped language program. Prereq: 141-142 or equivalent or consent of instructor. Must be taken in sequence.

261-262 Intermediate Persian (4,4) Taped language program. Prereq: 161-162 or equivalent or consent of instructor. Must be taken in sequence.

322 Classical Islam (3) (Same as Religious Studies 332).

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

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

491 Foreign Study (1-15)

ASTRONOMY (150)

151-152 Introductory Astronomy (4,4) Survey of the composition, structure, and dynamics of the universe which introduces the basic vocabulary of astronomy and scientific method. Prerequisites: 251-252. Must be taken in sequence: Enroll by permission of instructor.

217-218 Honors: Introductory Astronomy (4,4) Introduction to astronomy and astrophysics. Historical perspectives in understanding the celestial universe, with emphasis on the laws of physics as they apply to the changing concepions of the universe: structure of the solar system and celestial motions; evolution and properties of stars; galactic structure and models of the universe; observational techniques and instrumentation. Time may be repeated. Maximum 9 hours.

493 Independent Study (1-15)

494 Aural Habilitation/Rehabilitation of the Hearing Impaired (3) Introduction to psychosocial aspects, amplification components/characteristics, assistive devices, speech acoustics, speech perception, speechreading, parent-infant, preschool school years of children, communication impairments/handicaps/remediation of adults, effects of aging on remediation on the elderly, and case studies. Prereq: 305 and 473, or equivalents or consent of instructor.

499 Senior Seminar in Communication Sciences and Disorders (3) Capstone course exploring the forces shaping the profession of communication disorders in the past, present and future. Prereq: Consent of instructor and senior standing.

500-500 Special Topics in Astronomy (1-3) Topics of current interest in Astronomy and Astrophysics. May be credited with consent of instructor. Maximum 9 hours.

500 AUDIOLGY AND SPEECH PATHOLOGY (160)

125 Speech for Foreign Students (3) Sounds and sound patterns of American English and relation of spelling to sound. Directes students to improve their ability to understand and speak the English language. Prereq: Consent of instructor.

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

302 Acoustics and Perception (3) Basic acoustics. Introduction to psychoacoustics and speech perception.

303 Audiology I (3) Introduction to disorders of hearing. Fundamental mechanisms of auditory anatomy and physiology. Prereq: Consent of instructor.

405 Speech Science I: Phonetics and Acoustics of Speech (3) Basic phonetics including recognition and production of spoken English. Auditory analysis of their formation; acoustic characteristics of speech and speech perception.

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

491 Foreign Study (1-15)

493 Independent Study (1-15)

306 Speech Science II: Anatomy and Physiology (3) Anatomy, physiology and embryological development of the speech production mechanism. Prereq: 305.

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

331 Articulation Disorders (3) Etiology, diagnosis, and treatment of articulatory defects. Prereq: 304, 305, or consent of instructor.

351 Stuttering (3) Nature, appraisal and treatment. Prereq: 304 or consent of instructor.

433 Observation of Clinical Practice (1) Prereq: 304, 305 or consent of instructor.

434 Clinical Practice in Speech-Language Pathology II (1-4) Prereq: 433 and consent of instructor. Enrollment will be limited to 9 semester hours. Only 9 semester hours must have prior departmental approval. May be repeated. Maximum 4 hours.

440 Voice Disorders (3) Etiology, diagnosis, and treatment of functional and organic vocal voice disorders. Prereq: 304, 305, or consent of instructor.

451 Clinical Practice in Audiology (1-4) Prereq: 473 and 494. May be repeated. Maximum 6 hours.

452 Problems in Speech Pathology (1-3) Prereq: Consent of instructor.


473 Audiology II (3) Basic principles of clinical audiology: pure tone, speech, masking and overview of special auditory tests. Prereq. 371.

491 Foreign Study (1-15)

492 Off-Campus Study (1-15)

493 Independent Study (1-15)

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. Credit may not be applied toward BCMB major. Prereq: One year of college chemistry. 4 hours and one lab.

230 Modern Medicine and You (3) New biomedical advances in internal medicine, surgery, obstetrics and gynecology, infectious diseases, cancer treatment, genetic diseases, psychiatry, health promotion, and disease prevention. Team-taught by academic clinicians in their area of specialty. Class meets two hours a week. Each section will include basic biological principles/ processes; scientific advances and current status about new diagnostic and treatment procedures of the particular disease state. Prereq: Biology series or major or non-majors. Satisfactory/No Grade credit. F, Sp

310 Physiological Chemistry (4) Biochemical principles underlying physiological events in animals. Metabolism of carbohydrates, lipids, proteins, and nucleic acids. Role of vitamins and minerals as coenzymes and prosthetic groups. Action of drugs and hormones. Prereq: Chemistry 100-110 or 120-130. Biology 130-40 and Biochem 200. Not available for BCMB 305. Not available for BCMB 405. Not available for BCMB 410 or 411 or 420. Credit cannot be counted toward BCMB concentration. F, Sp (Same as Nutrition 310).
421 Cell and Tissue Structure and Function (4) Study of animal cells and tissues at light and electron micro scope levels. Prereq: Biology 140. 2 hrs and 2 labs.

429 Cell Biology Laboratory (3) A series of open ended, discovery-oriented exercises will be developed to design and test new drugs using modern cell biology and computer technologies. Experimental modules include techniques such as cell isolation, purification, culturing, fluorescent microscopy, receptor binding and signal transduction, apoptosis, cell cycle analysis, protein and steroid dependence, and state-of-the-art electron microscopy. Students will actively participate in experiment design, execution, data analysis and peer evaluation. Prereq: Coreq: 401 or 410. F


452 Independent Research in Biochemistry (1-6) Special experimental problems under direction of a staff member. Limited to undergraduates and by consent of instructor. May be repeated. Maximum 12 hours. Prereq or Coreq: 410. 419.

462 Junior/Senior Seminar (1) Lecture/discussion on the application of biochemical principles and techniques in the research, clinical, diagnostic or therapeutic environment. May not be used toward major. May be repeated. Prereq: 410.

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

471-481 Biophysical Chemistry (3,3) Physicochemical principles and applications to biological systems. 471 Thermodynamics; chemical equilibria; solution chemistry; transport; electrochemistry; kinetics; enzyme catalyzed reactions. 481—Elementary quantum chemistry; interactions of light with biological molecules; optical and magnetic spectroscopy; light scattering; case studies of selected macromolecules. Prereq: Calculus, Organic Chemistry, General Biology or consent of instructor. (Same as Chemistry 471-481). F,Sp

480 Physiology of Exercise (3) (Same as Exercise Science 480.)

492 Off-Campus Study (1-6) No more than two credits of 492 will count toward the Biological Sciences: BCMB major. Satisfactory/No Credit grading.

BIOLOGY (190)

101-102 Humankind in the Biotic World (4,4) Introduction to the principles of biology from the perspective of the impacts of plants, animals, and microbes on human life, and the threats of disease. Intended for students not majoring in the biological or pre-health sciences. 101 surveys life from the cell to human; focuses on the diversity of life on the Earth's biosphere. 102 focuses on the diversity of the Earth's biosphere and the interdependence among communities. Topics include: surveys of biodiversity from bacteria to higher plants and animals, evolutionary processes, population biology, ecology, ecosystems, environmental issues including world population, and global climate change. Each course is 3 hours lecture, 1 hour discussion/laboratory. Laboratory involves a mix of skills-oriented exercises and assignments focused on topics. Although not required, it is strongly recommended that 101-102 be taken in sequence. F,Sp

130 Biodiversity (4) Unifying concepts and principles of biology, illustrated with diversity of life, intended for science majors. Properties of life, molecular basis, origin of life, cells, genetics, introduction to kingdoms, origins of multicellularity, multicellular plants and animals, ideas about the evolution of life on Earth. Emphasis on common themes in living systems (e.g., metabolism, protein and nucleic acid sequence similarities, fertility and sterility, patterns of fossils, and the major plant and animal groups. Writing and analysis of lab activities required. 3 hours lecture, 1 hour lab each week. Credit not available for students with credit for BOTH 101 and 102.

140 Organization and Function of the Cell (4) Topics include: basic organic chemistry and biochemistry, cell structure—membranes, cell walls, mitosis, and molecular biology. Labs will stress basic laboratory skills and procedures such as molecular biology, cell culture, as well as introduce modern methods for analysis of cell components, such as electrophoresis and radioimmunoassay. Prereq: 130, Chemistry 120; coreq: Chemistry 130.

202-203 Inside the Biological Sciences (1,1) Presentations on security and professionalism emphasizing applied biological research. Familiarizes students with diverse nature and current applications of biology. Open to freshmen and sophomores. Satisfactory/No Credit only. May be repeated.

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. Prereq: 130-140 or Bot 110-120; Chemistry 120-130.

250 General Ecology (4) Relations between organisms and their environment, including human-environmental problems. Topics include populations, communities, and ecosystems. 3 hours lecture, 1 hour discussion, field trips or computer simulations. A working knowledge of college algebra is required. Prereq: 130-140 or Bot 110-120; Chemistry 120-130.

307-308 Honors Colloquy in Biological Research (1,1) Presentations by professional biologists emphasizing a variety of careers in different areas of biology. Nationally recognized speakers invited each term. Open to sophomores, juniors and seniors; required of Threshold Biology Scholars. Prereq: 8 hours of 200 or above, or permission of instructor. F,Sp

397 Honors Seminar on Research Skills (3) Technical and cognitive skills necessary for participation in biological research. Lecture/presentations and small team demonstrations and discussion. Required of (but not limited to) Threshold Biology Scholars. Prereq: 8 hours of 200 or above, or permission of instructor. F,Sp

398 Honors Practicum in Biological Research (3-5) Rotation through 3-5 modules of required and elective experience in participating laboratories. Required of (but not limited to) Threshold Biology Scholars. Prereq: 8 hours of 200 or above and 397. Permission of instructor required. F,Sp

410 Senior Thesis (3-12) Required research experience of Threshold Biology Scholars. Students design research projects, complete research data acquisition, engineer thesis documents, and prepare presentations. May be repeated. Maximum of 12 hours. Prereq: 394-395.

BIOSYSTEMS ENGINEERING (196)

103 Introductory Design and Fabrication (1) Experience with fundamental aspects of systems engineering, through capstone projects in biosystems engineering, lab experiences, design competition, and field trips to production facilities. 2 hours lecture, 1 hour lab. F,Sp

104 Design Apprenticeship (1) Exposure to design in biosystems engineering, through apprenticeship with senior design teams in Biosystems Engineering 402. Apprentices will maintain a journal describing their activities in assisting the senior design engineers, and will make an oral presentation summarizing the design project with which they assisted. Grading will be based on journal submissions, the final presentation, and attendance. Prereq: 103. 2 hours lab. F,Sp

201 Career Opportunities (1) Activities and opportunities in the fields of specialization; required training for each area; projected career activities. 1 hour. Sp
315 Soil and Water Conservation (3) Hydrologic, agronomic, and engineering principles applied to soil and water conservation problems to prevent soil erosion, conserve soil, and promote efficient water use. Corequisites: Plant and Soil Sciences 210, 213, or 310; Biochemistry 471. Sp.

311 Processing Food and Biological Materials (3) Application of basic scientific principles to processing and handling of biological materials: physical properties, thermal processes, drying, evaporation, freezing and thawing, membrane processes and extraction. Prereq: 303. Engineering Science 341 or Civil and Environmental Engineering 390. F.


401 Biosystems Engineering Design I (3) First course of a capstone design sequence. Review of fundamental engineering principles, time and project management; ethics, contemporary issues in biosystems engineering. Project portfolio review, and design proposal generation. Design proposals will include extensive preliminaries and preliminary analyses. Corequisites 451 and senior standing or consent of instructor. Corequisites 463 or 465 or 467 or 431. F.

402 Biosystems Engineering Design II (6) Culmination of capstone design sequence. Intensive design experience in project planning and proposal generation in Biosystems Engineering 401. Analysis, construction, testing, evaluation and reporting required. Technical lectures on design software, and technical issues relevant to the chosen design project. Weekly oral and written reports. Submission of design to external engineering firms for competitive display required. Prerequisites: 401, 2 hour lecture, 2 hour recitation (weekly project reports) and 4 hours lab. Sp.

403 Machine and Component Design (3) Nature of design: functional analysis; creativity; geometric and kinematic requirements; plane mechanisms; force, stress, deflection, fatigue, and fatigue life analyses applied to design project components and assemblies. Prereq: 331 or consent of instructor. 1 hour and 2 labs. F.


430 Mobile Hydraulic Power System Design (3) Functional and operational analysis of mobile hydraulic systems including design, performance, and cost. Prereq: 331. Engineering Science 341 or Civil and Environmental Engineering 390. 1 hour and 2 labs. F.

431 Bioprocess System Design and Analysis (3) Design of processing, storage and handling systems for biological materials. Mass and energy balances, product and waste stream calculations, engineering economic analysis, safety and health factors. Corequisites: 1 hour. Credit. Prereq: Coreq 311. 1 hour and 2 labs. F.
400 Research in Chemistry (3) Advanced students work with faculty on research projects requiring knowledge and skills acquired in chemistry curriculum. Prereq: 400. E

401 Advanced Laboratory (3) Directed study in child and family studies. Prereq: 400. Credit/no credit only. May be repeated with different topics. Maximum 12 hours. Satisfactory/No Credit only.

404 Internship in Family Studies (3) Supervised experiences in community-based family life programs. Field experience included. Prereq: 401 and admission to the Early Childhood Education licensure program. Satisfactory/No Credit only.

405 Internship in Community and School-Based Programs (3) Supervised experiences in community-based family life programs. Field experience included. Prereq: 401 and admission to the Early Childhood Education licensure program. Satisfactory/No Credit only.

406 Research in Community and School-Based Programs (3) Advanced study in community and school-based programs that focus on enhancing individual development. Includes observation. Prereq: 401. May be repeated with different topics. Maximum 12 hours. Satisfactory/No Credit only.

410 Introduction to Family Life Programs (2) Community and school-based programs that focus on enhancing individual development. Includes observation. Prereq: 401. May be repeated with different topics. Maximum 12 hours. Satisfactory/No Credit only.

411 Early Childhood Education I: Environments for Children (4) Classroom management, behavior guidance, organization of day care environments, communication, interpersonal skills, interaction with children. Prereq: 401 and admission to the Early Childhood Education licensure program. Laboratory participation included. Prereq: 110 and 211, FSD 210, admission to the major or consent of instructor. Sp

412 Early Childhood Education II: Curriculum and Program Development for Young Children (4) Planning effective early learning programs for young children relating knowledge of children's growth and development. Prereq: 401 and admission to the Early Childhood Education licensure program. Field experience included. Prereq: 401 or completion of Family Studies major or admission to the Early Childhood Education licensure program. Satisfactory/No Credit only.

413 Diversity in Family-Community Relations (3) Techniques for developing community relations including assessment of strengths and challenges from diverse cultures and populations. Includes observation. Prereq: 401 and admission to the Early Childhood Education licensure program. Prereq: 211, FSD 210, admission to the major or consent of instructor. Sp

414 Early Childhood Education III: Assessment and Evaluation (3) Theory and methods for evaluating children's development and learning in the classroom. Prereq: 401 and admission to the Early Childhood Education licensure program. Field experience included. Prereq: 401 or completion of Family Studies major or admission to the Early Childhood Education licensure program. Satisfactory/No Credit only.

415 Early Childhood Education IV: Family and Community Service (3) Family and community service included. Prereq: 401 and admission to the Early Childhood Education licensure program. Satisfactory/No Credit only.

416 Early Childhood Education V: Internship (3) Internship included. Prereq: 401 and admission to the Early Childhood Education licensure program. Satisfactory/No Credit only.

417 Practicum in Child Development (3-12) Supervised experiences in working with children and families in early childhood settings. Prereq: Admission to the Child Development major or the Early Childhood Education licensure program and consent of the instructor. May be repeated. Maximum 12 hours. Satisfactory/No Credit only.

418 Day Care Administration (3) Theory, methods, and materials for administration of day care facilities. Writing can be assigned. Prereq: 401 and admission to the Early Childhood Education licensure program. Satisfactory/No Credit only.

419 Internship in Community and School-Based Programs (3) Supervised experiences in community-based family life programs. Prereq: 401 and admission to the Early Childhood Education licensure program. Satisfactory/No Credit only. Prereq: 401 and admission to the Early Childhood Education licensure program. Satisfactory/No Credit only.
### CHINESE (249)

- 131-132 Elementary Chinese I,II (5,5) (Same as Asian Languages 131-132.)
- 231-232 Intermediate Chinese I,II (5,5) (Same as Asian Languages 231-232.)
- 311-312 Chinese Literature in English Translation (3,3) (Same as Asian Languages 311-312.)
- 331-332 Advanced Chinese I,II (4,4) (Same as Asian Languages 331-332.)
- 431 Readings in Chinese Literature (3) (Same as Asian Languages 431.)

### CINEMA STUDIES (251)

- 222 Classical Greek and Roman Mythology (3) Use of myth in literature, history, religion and philosophy of Greece and Rome from Homer to about 400 B.C. to about 350 A.D. Two foci are the latter half of the fifth century B.C. and the last quarter of the first century B.C. Includes Oriental invasions into Greece and Rome, including early Christianity. Readings include Sophocles, Euripides, Roman poetry, and modern scholarship. Writing-emphasis course.
- 223 Archaeology and Art of Ancient Greece (3) Survey of Greek archaeology from prehistoric times to the Roman period (ca. 3000-100 B.C.). For prehistoric times emphasis on architecture and artifacts used to recreate the culture of the Minoan and Mycenaean civilizations and that of the following Dark Age. For Archi, Classical, and Hellenistic periods emphasis on development of architecture, sculpture, and visual painting. Includes minor arts and the relationship between archaeology and art. Writing-emphasis course.
- 231 Archaeology and Art of Etruria and Rome (3) Study of Etruscan and Roman art and history from the beginning of the Etruscan civilization to the fall of the Roman Republic. Reconstruction of the Etruscan culture from tombs, paintings, and arti-
- 232 German Film (3) (Same as German 232.)
- 233 Latin American Film and Culture (3) (Same as English 233.)
- 235 Introduction to Cinematography as Art (3) (Same as Art 235.)
- 236 Introduction to Film Studies (3) (Same as English 236.)
- 241 Introduction to Film Studies (3) (Same as English 241.)
- 253 Greek and Roman Literature in English Translation (3) Major literature of ancient Greece from Homer to Tactius. Writing-emphasis course.
- 331 Archaeology of the Aegean Bronze Age and Early Greece (3) Includes Troy, the Cycladic Islands, the Greek mainland, Crete, and Cyprus ca. 3000-700 B.C. Rise and fall of the Minoan and Mycenaean civilization and their effect on the Aegean world and Cyprus. Evidence for daily life, religion, trade, and foreign contacts. Architecture, wall paintings, and artifacts. Prereq: One of the following: 231, 232, ancient history (Ancient Near East or Ancient Greece), or consent of instructor. Writing-emphasis course.
- 332 Arabic Literature (3) (Same as Arabic 332.)
- 334 Cities and Sanctuaries of the Greek and Roman World (3) Major cities and sanctuaries in Greece, the Greek Colonies, and the Roman Empire. Approach is archaeological, focusing on physical evidence—landscape, architecture, and sculpture—as well as ascriptions of ancient authors. Cities include Athens, Alexandria, Rome, and others. Prereq: Consent of instructor. Writing-emphasis course.
- 382 Roman Law (3) This course covers the historical development of Roman law in the Classical period (50 B.C.E.-250 A.D.) with particular attention to the analysis of case-law in the areas of contracts, property, and family. Prereq: Consent of instructor. Writing-emphasis course.
- 381 Greek Civilization (3) Major aspects of ancient Greek civilization: religion, fine arts, political life, Pan-Hellenic relations, the prominence of Athens, the role of modern archaeology in interpretation; emphasis on the sixth and fifth centuries B.C. Writing-emphasis course. (Same as Ancient Mediterranean Civilizations 381.)
- 382 Roman Civilization (3) Major aspects of ancient Roman civilization: political institutions, art and archi-
- 400 Greek Poetry (3) Epic, lyric, drama. Authors vary. May be repeated for credit. Maximum 9 hours. Prereq: 261.
- 401 Greek Prose (3) History, philosophy, and oratory. Authors vary. May be repeated for credit. Maximum 9 hours. Prereq: 261.

### Courses of Instruction

- **Courses of Instruction**
  - **441 Special Topics in Classical Civilization (1-3)** Topics in art, literature, religion, and society of Greece and Rome. May be repeated up to three times with consent of department.
  - **461 Studies in Classical Archaeology (3)** Variable content course offering subject matter not taught in an existing course, or concentration on one aspect of the existing course. May be repeated. Maximum 9 hours. Prerequisites according to topic.
  - **491 Foreign Study (1-15)**
  - **492 College Scholars: Off-Campus Study (1-15)** See Director of Special Programs. Primarily for College Scholars students.
  - **493 College Scholars: Independent Study (1-15)** See Director of Special Programs. Primarily for College Scholars students.
  - **498 College Scholars: Special Topics in Comparative Literature (2-12)** Designed for College Scholars working on their senior thesis, project, or performance. May be repeated. Maximum 16 hours.

### COMMUNICATIONS (259)

- **100 Introduction to Mass Communications (3)** Overview of systems of mass communications, with emphasis on American media, their ownership, legal and social controls, and effects. Audience, Broadcasting, Journalism and publishing, and public relations are examined in the context of theories of mass communications.

- **150 Communications in an Information Age (3)** Overview of current and emerging communication systems including print, broadcast, multimedia video, telephony, and the Internet. Particular emphasis given to the development of organizational and public relations.

- **300 Mass Communications Research Methods (3)** Social science research methods, especially sample surveys, used by communications media. Applications to both internal decision-making and to external communication in media. Prereq: Journalism 200, or Advertising 350, or Broadcasting 310 or 320, or Speech Communication 390, or consent of instructor. F, Sp

- **400 Mass Communications Law and Ethics (3)** Emphasis on legal issues directly affecting the mass media: libel, privacy, free press-fair trial, judicial controls, government regulations. Also includes ethical standards and practices of the mass media in America. Prereq: Journalism 200, or Advertising 350, or Broadcasting 310 or 320, or Speech Communication 390, or consent of instructor. F, Sp

- **450 On-Line Electronic Publishing (3)** Cross-disciplinary approach to design and production of on-line publications. Emphasis on researching, planning, site content design, and the economic, legal and ethical issues involved in on-line publishing. Prereq: Senior standing and consent of instructor.

### COMPARATIVE LITERATURE (260)

- **202-203 Cross-Cultural Perspectives in World Literature (3,3)** Literary perspectives and values in different time periods and cultures approached from an international context and including an introduction to the theory, methods, and objectives of comparative literature. Variable content. Writing-emphasis course.

- **401-402 Special Topics in Comparative Literature (3,3)** Content varies. May be repeated. Maximum 9 hours.

- **491 Foreign Study (1-15)**
- **492 Off-Campus Study (1-15)**
- **493 Independent Study (1-15)**
100 Introduction to Computers and Computing (3) Basic concepts of computer hardware and software. Microcomputer organizations, installations, networking, and the Internet. The interdisciplinary science of computing. Does not satisfy any requirements for Computer Science majors. Prereq: 2 hours lab required.

102 Introduction to Computer Science (4) Problem solving and algorithm development. Organization and characteristics of modern digital computers with emphasis on developing good programming habits, building abstractions with systems and data, and programming in a modern computer language. Students who have received credit for 140 or 160 may not also receive credit for 102 without instructor permission.

140 Data Structures (4) Advanced problem solving and algorithm development, structured programming, data structures and applications. I/O techniques, lists, queues, trees, basic algorithms, etc. Prereq: 102. 3 hour lab required.

160 Computer Organization (4) Number systems, Boolean algebra, combinational and sequential circuits, registers, processor functional units and control, pipelining, memory and caching, stored program computing, memory management, computer system organization, assembly language programming. Prereq: 102. 3 hour lab required.

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

300 Scripts and Utilities (1) Practical tools available under Unix to enable students to become more efficient in performing lab and research projects. Topics to be covered include: ed, cat, grep,_find, shell scripting, awk, perl, python, make, rsh, gopher, csh. Prereq: 140 or consent of instructor. Satisfactory/No Credit grading only.

302 Fundamental Algorithms (3) Design, analysis, and implementation of fundamental algorithms, such as sorting and searching, and their data structures. Prereq: 140 and 160. 3 hour lab required.


340 Foundations of Software Engineering (3) Principles of analysis and design of information systems. Principles of program design and verification, formal objects, formal specifications. Prereq: 140, 160, 311. 3-hour lab required.

350 Systems Programming (3) Introduction to user-level system programming, security, process control, memory management, system utilities, network programming. Prereq: 302. 3 hour lab required.

365 Programming Languages and Systems (3) Language paradigms (procedural, functional, object-oriented, logic); language design and implementation; issues and language issues related to parallelism. Prereq: 302.

370 Introduction to Scientific Computing (3) The design, analysis, and implementation of numerical algorithms for use in problems in science and engineering. Emphasis on program design, including data structures, computational complexity, scientific computing environments, and high-performance software packages. Prereq: 140, M241, M251. 3 hour lab required.

380 Theory of Computation (3) Countability and diagonalization. Finite automata and regular sets. Pushdown automata and context-free languages. Introduction to Turing machines and undecidability. Prereq: 140, 150, and 311.


420 Advanced Topics in Machine Intelligence (3) Topics such as search, learning, expert systems, neural networks, pattern recognition and natural language processing. Prereq: completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hours. Prereq: Completion of core curriculum or consent of instructor.

430 Advanced Topics in Hardware Systems (3) Topics such as architecture, parallel processors, microprogrammed, networked computer systems. Emphasis on faculty research. May be repeated. Maximum 9 hours. Prereq: completion of core curriculum or consent of instructor.

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. May be repeated. Maximum 9 hours. Prereq: completion of core curriculum or consent of instructor.

470 Advanced Topics in Scientific Computation (3) Topics such as numerical methods,supercomputers and parallel computing, and simulation techniques on physical systems. Emphasis on faculty research. May be repeated. Maximum 9 hours. Prereq: completion of core curriculum or consent of instructor.

471 Numerical Analysis (3) (Same as Mathematics 471.)

472 Numerical Algebra (3) (Same as Mathematics 472.)

480 Advanced Topics in Theoretical Computer Science (3) Topics such as theory of computation, complexity and its applications, emphasis on faculty research. May be repeated. Maximum 9 hours. Prereq: completion of core curriculum or consent of instructor.

499 Independent Study (1-15) Independent investigation of problems in educational and counseling psychology. May be repeated. Maximum credit 15 hours. E

CULTURAL STUDIES IN EDUCATION (271)

290 Human Motor Behavior (3) Theories and principles explaining motor behavior; psychological factors related to and/or affecting motor skill acquisition and performance. Prereq: At least sophomore standing.

291 Sport in American Society (3) For all university undergraduates on the study of sport in American society from a sociological perspective. (Same as Sociology 281.)

302 School and American Society (3) Historical, philosophical, and social perspectives on contemporary educational issues, F, Su

321 History of Sport and Physical Activity in Western Culture (3) Study of sport and physical activity in ancient Greek period to modern times, illustrating historical role in Western culture. Provides background and knowledge of sport in society, and explores how modern sport and physical activity have evolved.

356 Motor Development (3) Evolution of human motor behavior within the context of structural/functional changes, and with the respect to psychological, sociological, and social-psychological factors related to and/or affecting motor performance/learning; analysis of changes in motor performance and underlying attributes across the lifespan with emphasis upon critical developmental periods. Prereq: Progression to major or consent of instructor.

364 Contemporary Issues in African-American Education (3) (Same as African-American Studies 364.)

372 Philosophy of Sport (3) Theories of reality and values as they apply to sport and emphasis on ethical issues. Prereq: Progression to major or consent of instructor.

380 Special Topics (1-3) Study in selected disciplinary or professional areas of Physical Education. May be repeated. Prereq: Progression to major or consent of instructor.

391 Psychology of Coaching (2) Major topics and theories dealing with social-psychological factors affecting and relating to sport performance, with practical implications and applications to teaching and coaching. Prereq: Progression to major or consent of instructor.

405 Sociology of Sport (3) (Same as Sociology 405.)

461 Education in Cultural Perspective (3) Contribution of anthropological concepts to understanding of educational processes; major conceptual frameworks; selected ethnographic research on process of schooling.

466 Motor Development Laboratory (3) Application of selected perceptual-motor development, movement education, and pedagogical concepts to performance assessment and motor task design and presentation to normally developing preschool or primary grade children. Participation in intra- or interdisciplinary research projects. Prereq: Progression to major or consent of instructor.

493 Directed Independent Studies (1-3) Independent study in a specialized area with physical education. May be repeated. Maximum 9 hours. Prereq: Consent of advisor and progression to the major. Satisfactory/No Credit or letter grade.

DANCE (274)

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

201 Practicum: Dance Performance (1-2) Preparation and presentation of university dance company performances. Participation through audition only. May be repeated. Maximum 16 hours.
ELECTIVE COURSES (250)

400 Perspectives in Ecology and Evolutionary Biology (3) Forefront considerations of ecology, behavior, and evolutionary biology. Emphasis on current developments for application, including societal and economic impacts and moral and ethical questions. Writing emphasis course. An oral presentation and a referenced literature research essay are required.

411-412 Mintcourse in Ecology and Evolutionary Biology Selected advanced topics: behavior, and evolutionary biology, concentrated in time and subject matter. Consult departmental listing for topics offered. Prereq: Admittance to program. May be repeated for credit but a maximum of 4 hours may be applied toward the departmental major.

431 Plant Ecology (3) (Same as Botany 431.)

446 Introduction to Oecenography (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 trips to coast required. Prereq: General Biology and Chemistry 120, 130; Biology 250 recommended.

450 Comparative Animal Behavior (3) Principles and methods of ethology on ecology, development, physiological and evolutionary aspects. (Same as Psychology 450.)

459 Comparative Animal Behavior Laboratory (3) Introduction to observational and experimental research in ethology. Coreq: 450. (Same as Psychology 459.)


461 Special Topics in Organismal Biology (3) Evolution, ecology, biogeography, classification, and anatomy of selected animal and plant taxa. Prereq: Biology 250 or consent of instructor.

470 Aquatic Ecology (3) Introduction to the phyto- and zoobenthic nature of inland waters and the role of biotic communities and their interrelationships. Prereq: Chemistry 120 and 130 and Biology 230. 2 hours and 1 lab.

474 Ichthyology (4) Evolution, classification, collection and identification, distribution and biology of fishes with emphasis on freshwater fauna of Eastern North America. Prereq: Biology 230 or consent of instructor. 2 hours and 2 labs.

475 Field Ornithology (2) Intensive one week field course designed to introduce students to the behavior, ecology, and identification of birds. Prereq: Biology 250 and consent of instructor. 2 weeks.

484 Conservation Biology (3) Application of principles and techniques of ecological research to conservation of biological diversity at various levels, population, species, and ecosystem levels. Prereq: Biology 220, 230.

490 Undergraduate Seminar (1) Student oral presentations of topics related to developmental and working concepts of ecology and evolution. All majors are encouraged to enroll. Coreq: Upper division standing in the Biology major. May be repeated for a maximum of 2 hours credit.

493 Independent Study (1-15) Independent study under the direction of a faculty member. Consent of instructor required. May be repeated for up to 15 hours. A maximum of 3 hours may be applied toward major. F, S, Su.
345 Aerospace Engineering Instrumentation and Measurement (3) Fundamentals of measurement systems; standard, dynamic characteristics of instruments; statistical data treatment; transducers; signal conditioning; strain, pressure, temperature and flow measurements. Coreq: ME 363. Prereq: ES 341, EE 301. F, Sp

351 Compressible Flow (3) One-dimensional internal flow with shocks, friction and nonconservative conditions. Two-dimensional external flows. Prereq: ES 341, ME 332. Sp

362 Dynamics/Vibrations (3) Central force motion, transfer orbits, free and forced vibrations of single and multiple degree of freedom systems. Prereq: ES 231. F

363 Structural Analysis of Aerospace Vehicles (3) Fundamentals of structural analysis applied to design of structures common to aerospace vehicles. Prereq: ES 321, Sp


401 Thesis (3) Problem investigation and report. Prereq: Senior standing. F, Sp

422 Aerodynamics (3) Theory and design of aerodynamic bodies for desired characteristics. Potential flow theory, viscous effects, compressibility effects. Subsonic, transonic, and supersonic airflows. Prereq: 351, 370. F

424 Astronautics (3) Orbital mechanics, propulsion, atmospheric reentry of space vehicles including recovery, thermal protection materials, human factors in space flight, the space environment, and current topics. Prereq: 351. Coreq: ME 344. F

425 Propulsion (3) Principles of propulsion devices; turbojet, ram jet and rocket engines. Prereq: 351. F


429 Aerospace System Design (4) Synthesis and design of a complete aerospace system including economic and technical aspects. Participation in team design effort including formal presentations and design report. Prereq: 422, 425, 426, Sp

431 Mechanical Engineering/Aerospace Engineering Seminar (1) Topics related to engineering including ethics. Forum presentations by students on engineering topics. Prereq: 351. F

449 Aerospace Engineering Laboratory (3) Designing, conducting, and reporting results of experimental exercises. Test standards and specifications. Analysis of data and formulation of conclusions. 3 hours lab per week. Prereq: 345, 351, 425. Sp

ENGINEERING BIOMEDICAL (192)

271 Introduction to Biomedical Engineering (3) Application of the skills developed in Engineering Fundamentals for biomedical engineers. The relationship of anatomy, physiology, and biochemistry to the design of artificial organs, orthopedic implants, medical imaging, and other biomedical applications is explored. Prereq: EP 102.

300 Engineering Physiology (3) The study of human physiology, with an emphasis on making engineering design decisions, and the development of computational models. Prereq: BME 271, BIOL 130-140.

301 Biomedical Seminar I (1) Engineering Professionalism and project planning; seminars on current BME topics. Satisfactory/No Credit. Prereq: Junior Standing in BME.

310 Biomechanics (3) The application of mechanics of materials and fluid mechanics to biomedical engineering problems. The special characteristics of living tissues and biological fluids and their effects on computational problems will be introduced. Prereq: ES 231, 341; BME 300.

346 Design of Experiments (3) Study of probability and statistic and design of experiments as applied to biomedical engineering problems. Emphasis on statistical tools to biomedical experimentation, manufacturing methods, and biomedical research planning. Prereq: BME 300, Math 200, 241.


430 Biomedical Engineering Laboratory (3) This course provides experience with the unique problems associated with making measurements and interpreting data in living systems: experiments may include electrical safety, biological fluid flow, mechanical testing of biological materials, and human measurements. Prereq: BME 310, BME 346.

431 Biomedical Seminar II (1) Topics related to engineering including ethics. Formal oral presentation by students on biomedical engineering topics. Prereq: Senior standing.

455 Biomedical Engineering Design I (2) Engineering economics, optimization, design for automation, reliability, patents and product liability; design of biomedical systems. Participation in team design efforts: requires design report. Prereq: BME 310, MSE 474.

469 Biomedical Engineering Design II (4) Design of complete biomedical device: documentation includes complete specifications/ design calculations, preparation of working drawings, and cost analysis. Written and oral reports. Prereq: BME 430, BME 455.

473 Applied Biomechanics (3) Applications of biomechanics to the industrial and orthopedic areas. Design of orthopedic prostheses, orthotics, and joint protection. Prereq: ES 321, MSE 474, BME 310.

ENGINEERING CHEMICAL (226)


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 the principles of statistical mechanics and quantum mechanics. Prereq: CHE 111, CHE 114. F

240 Fluid Flow and Heat Transfer (4) Force, energy and mechanical energy balances; flow in tubes, piping systems, packed bed fluidized beds; pumping and metering, steady and unsteady state heat conduction; heat transfer in tubes and heat exchanger radiation. Prereq: 200, Mathematics 241; Coreq: Mathematics 231.

301 Chemical Engineering Data Analysis (3) Analysis of experimental data, identification of system extremes; statistical properties of samples; empirical modeling of processes; statistical process control; optimization techniques. Prereq: Math 200.

310 Chemical Engineering Laboratory (3) Thermodynamics, fluid flow and heat transfer in chemical engineering. Prereq: 240; Coreq: Chem 473.

330 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. Prereq: CHE 200, CHE 230.

340 Mass Transfer and Separation Processes (3) Stage-wise operation; application of analytical, graphical and computer methods to design of stage-wise separatory equipment. Different types of separation—analytical and computer methods to the design of diffusive processes. Applications include gas absorption, distillation, extraction, and ion exchange and membrane separations. Prereq: 200.

360 Process Dynamics and Control (4) Introduction to process modeling and industrial control system design. Mathematical tools for characterizing dynamic behavior of processes and instruments and designing and controlling such systems. Includes laboratory work. Lab. Prereq: 240, Mathematics 231.

380 Seminar (1) Presentation and discussion of topics in the practice of chemical engineering. Satisfactory/No Credit grading. May be repeated once.


403 Introduction to Optimization (3) Principles and applications of optimization techniques to chemical process design; unconstrained and equality constrained optimizations, linear programming, dynamic programming, and geometric programming. Prereq: Math 241.

407 Honors Seminar (1) Presentations and discussions on topics of importance to chemical engineers. Prereq: Consent of instructor; Satisfactory/No Credit grading. May be repeated once.

408 Honors Seminar (1) Presentations and discussions on topics of importance to chemical engineers. Prereq: Consent of instructor; Satisfactory/No Credit grading. May be repeated once.

410 Chemical Engineering Laboratory II (3) Laboratory investigations of mass transfer and chemical reaction phenomena in chemical engineering. Prereq: 310, 450.

415 Computer Applications in Chemical Engineering (3) Introduction to computer solution of chemical engineering problems. Primary focus on the application of personal computer software—flow sheet simulators, statistics, spreadsheets, graphics and process modeling.


445 Separation Process Technology (3) Multicomponent distillation, theory and computer simulations; humidification; specialized technologies, including membrane separation, crystallization, dialysis, adsorption, ion exchange, etc. Prereq: 340.

447 Honors: Transport Phenomena (3) Overview of momentum, heat and mass transfer processes, the application of advanced differential and integral equations, and applications involving molecular diffusion, including simultaneous mass transfer and chemical reaction. Prereq: 340 and consent of instructor.

450 Chemical Reactor Fundamentals (3) Homogeneous and heterogeneous reactions; equilibrium and homogenous reactor models, both for closed and flow systems; corrections for non-ideal residence time distributions; identification of scaling parameters; catalyst effectiveness factors and corrosion in fixed bed catalytic reactors. Prereq: 240, 340, 360, 301.

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. Prereq: 360 and consent of instructor.

477 Honors: Applied Process Automation Laboratory (3) Interfacing flexible batch continuous processes to automation systems. Top down analysis with bottom up implementation, hierarchical structures and object oriented design. Concepts are used to design automation solutions including human-machine-interfaces. Workstations with modern industrial equipment provide an interactive graphics and visualization environment. Prereq: 360 and consent of instructor.

478 Honors: Applied Process Automation Design Projects (3) Industrial programmable logic controllers (PLCs) and industrial automation and human-machine interfaces (HMIs) are used to develop automation solutions for small teams of students. Advanced control strategies, networking and internet issues. Prereq: 477 and consent of instructor.

485 Hydrocarbon Processing (3) Chemical and physical properties of selected petroleum products and utilization in conversion of raw material into various fuels and selected industrial feedstocks. Prereq: 340, Chem 350.

380 Water and Waste Treatment (3) Principles of unit operations employed in physical, chemical, and biological treatment of water, wastewaters, and solid wastes. Prereq: Junior standing and 390.

390 Hydraulics (4) Basic laws and principles of incompressible fluids. Units and dimensional analysis; drag forces; continuity equations; momentum equations; pipe flow; flow measurement; open channel flow and culverts; pump characteristics, 3 hours, 1 lab. Prereq: 305 or Biosystems Engineering Fundamentals 102; Nuclear Engineering 203.

395 Hydrology (3) Concept of hydrologic cycle; weather patterns; precipitation measurement and distribution, abstraction and storage; storm hydrograph and peak flow analyses, including design floods; reservoir and channel routing; rainfall and streamflow frequency analyses; groundwater flow. Prereq: 390.

400 Senior Design Project (3) Open-ended, comprehensive project emphasizing design approach to design process. Includes problem formulation, site planning, project management, drawings and specifications, cost estimation, and design of civil engineering projects typical of those faced by practicing civil engineers. Prereq: Must be taken during the last 15 hours of curriculum.

401 Review of Engineering Fundamentals (1) Review of selected topics covered in the Fundamentals of Engineering Exam. Emphasis is on those topics relating to Civil and Environmental Engineering. Letter grade only. Prereq: Must be taken during the last 15 hours of the curriculum.

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

412 Portland Cement Concrete Mix Design and Analysis (3) Aggregate properties and tests, tests of portland cement and concrete, mix design methods, admixtures, and nondestructive testing. Two lectures and 1 lab. Prereq: 321.

431 Geological Engineering (3) Influence of geologic origin and history on the engineering characteristics of rocks and soils; applications of geology in the planning, design and construction of civil engineering projects. 2 hours lecture, 1 hour lab. Prereq: 330 or consent of instructor.

435 Foundation Engineering (3) Fundamentals of geotechnics applied to design and analysis of soil-structure systems; subsurface investigations; design of shallow and deep foundations on rock. Prereq: 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. Prereq: Senior standing and 3231.

442 Construction Methods and Equipment (3) Fundamentals of construction and equipment selection and productivity; steel and wood construction; and construction contracts and economics. Prereq: 330.

451 Highway Engineering (3) Design, construction, operation, and maintenance of highway facilities; includes application of various engineering techniques and principles to process of planning, locating and design of highway facilities; covers both geometric and pavement design. Prereq: 210, 251, 352.

452 Traffic Engineering (3) Characteristics of driver vehicle, roadway and their interaction; traffic studies; traffic control; design and operational aspects of a transportation system. Prereq: 210, 251, 252.

453 Airport/Railroad Planning and Design (3) Airport master planning and railroad engineering. Runaway configuration, airfield geometry, design geometry, and terminal layout and design. Railroad capacity, geometric design, and terminal layout and design. Prereq: 210, 251, 252.

454 Transportation Engineering I (3) Introduction to design, construction, and maintenance of various transportation modes, their guideways and terminals, primarily highways and railroads. Prereq: 351.

455 Transportation Engineering II (3) Introduction to design, construction, and maintenance of various transportation modes, their guideways and terminals, primarily highways and railroads. Prereq: 351.

462 Analysis of Framed Structures (3) Vertical and horizontal forces resisting loads due to dead, live, and snow loads; lateral loads due to earthquake and wind; use of computer in structural analysis; building models and computer techniques; building models and computer techniques. Prereq: 351.

471 Introduction to Structural Design (3) Selection of rolled structural steel beams, design of structural steel members for axial tension and compression loads, reinforced concrete beams; use of standard specifications. Prereq: 381.

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. Prereq: 471.

474 Reinforced Concrete Design (3) Design of continuous beams, floor slabs, reinforced concrete members with axial loads and bending, footing; and design for torsion. Prereq: 471.

480 Water and Waste Transport (3) Theory and design of water distribution systems, and wastewater collection systems. Prereq: 390.

485 Principles of Hydrogeology (3) (Same as 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. Prereq: 390, 391. Coreq: Civil Engineering 200 or Agricultural Engineering 243.

490 Water Resources Project Design (3) Development of multipurpose reservoir and dam projects, including data acquisition, spillway and outlet works design, earthwork and dam construction, analysis of water resources development alternatives, multi-objective planning, principles of alternative selection, and dam safety concepts, including dam break analyses. Prereq: 390, 391.

495 Water Resources Development and Management (3) Institutional framework, reservoir location, water law, evaluation procedures for competing and selecting among water resource development alternatives, multi-objective planning, principles of alternative selection, cost allocation methods; environmental impact assessment procedures; decision making using risk-based methods; case studies. Prereq: Senior standing.

ENGINEERING ELECTRICAL AND COMPUTER (319)

201 Circuits I (3) Fundamental laws of circuit analysis. Ohm's Law, Kirchoff's current and voltage laws; the law of conservation of energy; circuits containing independent and dependent sources, and voltage and current sources, resistors, conductance, capacitance, and inductance analyzed using mesh and nodal analysis; superposition, and sources of transformations; and Norton's and Thevenin's Theorems. Static state analysis of DC and AC circuits. Complete solution for transient analysis for circuits containing one and two energy storage elements. Prereq: All course work in Freshman Engineering. Coreq: Math 231; 205 or both CS 102 and Math 251.

202 Circuits II (4) Operational amplifiers, average, complex, imaginary, and real power; effective values of voltage and current; series, parallel, and hybrid parameter circuits. Scaling: magnitude and frequency. Mutual inductance, transformers as circuit elements; linear and ideal transformers. Admittance, impedance and hybrid parameters. Trigonometric and complex Fourier series. Includes laboratory exercises. Prereq: 201 and Math 231.

205 Electrical Engineering Computations (3) Linear algebra; complex analysis and phasor calculus; algorithms for root of equations; Programming in C and use of the application language MATLAB. Includes Level 1 design projects which require laboratory work. Coreq: Math 231.

213 Small Computer Systems (3) Structural assembly language programming, data collection under the control of the personal computer using A/D converters; D/A conversion; conversion to CRT displays; on-line, real time analysis using elementary filters: communications between computers; circuit analysis. Includes Level 1 design projects which require laboratory work. Coreq: 201 or both CS 102 and Math 251.

301 Circuits and Electro Mechanical Components (3) DC and AC Circuits, Transients, Transformers, Motors, Generators. For non-majors only. Prereq: Mathematics 231, Physics 231.

ENGINEERING INDUSTRIAL (556)

202 Work Methods and Measurement (3) Productivity and work design. Techniques of work method design including time and motion studies, predetermined time systems, and work sampling. Prerequisites include character of work, methods of measurement, and knowledge of human factors. 3 hours lecture. 1 lab. Coreq: Engineering Fundamentals 101. F, Sp.

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. Lab component emphasizes the use of teams to collect and analyze data, enhance learning, and develop skills in group dynamics. 2 hours lecture, 1 lab. Prereq: Statistics 251 or Mechanical Engineering 345 or consent of instructor. F, Sp.


304 Introduction to Human Factors Engineering (3) Human capabilities and limitations affecting work, work place, and work environment design. Emphasis on human factors methodology, human input requirements, human output, the design of human-machine interfaces, the analysis of stress on performance, environmental factors such as noise, lighting, and atmospheric conditions. Focus on designing the task to fit the person. Prereq: Junior standing and consent of instructor. F, Sp.

306 Simulation (3) Simulation of complex production processes using current simulation software. Introduction to modeling concepts, flowcharting, random number generation, random number generation, and simulation software and computer utilization. Utilization of statistical tools to analyze inputs and outputs to simulation models. Lab component provides students an opportunity to develop simulation models for relevant industrial engineering case studies. 2 hours lecture, 1 lab. Prereq: 302, 301. F, Sp, Su.


403 Production Facilities Design and Material Handling (3) Design of production facilities including plant layout and analysis and planning for overall movement of material and information, building structures, and the entire job-seeking process. Intended for last-term juniors. Satisfactory/No Credit. Sp.

404 Industrial Engineering Applications (2) To enhance and integrate the industrial engineering education experience with the professional career planning of the engineering students for their transition to professional practice. Prereq: Term of expected graduation or consent of instructor. F, Sp.


421 Information Systems Analysis and Design (3) Systems engineering approach to analysis, design, development, and implementation of information systems. Emphasizes information requirements of industrial engineering systems. Includes utilization of relevant software packages. 2 hours lecture, 1 lab. Prereq: Senior standing or consent of instructor. F.

422 Senior Industrial Engineering Problems Analysis (3) Application of Industrial Engineering to field assignments in local and national companies. May be repeated once. Prereq: Term of graduation or consent of instructor. F, Sp.


440 Process Improvement Through Planned Experimentation (3) Review of fundamentals of continuous improvement, statistical process control, and design of experiments. Lab component utilizes statistical and simulation software to provide hands-on experience. 2 hours lecture, 1 lab. Prereq: 300. Sp.

445 Introduction to Maintenance Engineering (3) (Same as Nuclear Engineering 445) Prereq: 300. Sp.

449 Special Topics in Industrial Engineering (1-3, 1-3) Recent developments in Industrial Engineering including new areas of application, new research techniques and new methodologies. May be repeated once. Prereq: Senior standing and consent of instructor. F, Sp.

ENGINEERING MATERIALS SCIENCE (638)

201 Introduction to Materials Science and Engineering (3) Correlation of atomic structure, crystal structure and microstructure with mechanical, physical, and chemical properties of engineering significance. Prereq: Chemistry 130. F.

290-291 Materials Seminar U, L(1) Professionalism, ethics, integrity, assumptions, safety, testing, field trips, industrial speakers, materials science in a global/ societal context, teamwork, contemporary issues, literature review. May be repeated once. Only (either 290 or 291) must be taken each semester by MSE majors starting with the second year of residence. Satisfactory/No Credit.

300 Materials Laboratory Procedures (1) Thermometry, sample preparation for microscopic examination, word processing and graphics usage, data analysis, report writing. Prereq: 201.

301 Materials Science and Engineering Data Analysis (3) (Same as Chemical Engineering 301).
472 Fundamental Principles of Composite Materials
(3) Physical principles basic to the design, manufacture and application of fiber reinforced polymers, metals and ceramics. Prereq: 302 or equivalent. (Same as Engineering Science 426)

474 Biomaterials (3) Metals, polymers and ceramics utilized in orthopedic, cardiovascular, and dental surgical implant devices; corrosion and degradation problems; mechanical properties of importance; tissue response to synthetic materials. Prereq: 201. Recommended for engineering science and mechanics majors.

475 Fracture-Safe Design (3) (Same as Engineering Science 423).

484 Introduction to Maintenance Engineering (3) (Same as Nuclear Engineering 484).


496 Special Project Laboratory (1-3) Group or individual investigation of problems related to materials science and engineering. May be repeated to a maximum of 6 credits. Prereq: 201 and consent of instructor.

495 Thesis (3) Research problems in materials science and engineering with prior approval of a professor. May be repeated once. Prereq: Senior standing or consent of professor.

496 Special Topics in Materials Science and Engineering (1-3) Can be repeated for credit. Prereq: Senior standing in major or equivalent material research, developments and/or applications. Prereq: Senior standing or consent of instructor.

ENGINEERING MECHANICAL (650)

331 Thermodynamics I (3) Energy laws and governing energy transformations; thermodynamic properties; thermodynamic classification of processes; applications to engineering problems. Prereq: Chemistry 130, Coreq: Mathematics 241. F, Sp, Su

332 Thermodynamics II (3) Properties of gases and mixtures; chemical potentials; equilibrium and compressible flow; applications to engineering problems. Prereq: 331. F, Sp, Su

344 Heat Transfer (3) Heat transfer by conduction, thermal radiation, free and forced convection. Prereq: 351, 391, ES 491, F, Sp, Su

345 Mechanical Engineering Instrumentation and Measurement (3) Fundamentals of measurement systems: standards; dynamic characteristics of instruments; standard data; transducers; signal conditioning; strain, pressure, temperature and flow measurements. Coreq: 391; Prereq: ES 491, ES 431, F, Sp, Su

363 Mechanical Vibration (3) Free and forced vibrations of damped and undamped lumped parameter systems; energy methods; free vibration of continuous bodies. Prereq: ES 231, Math 231, F, Sp, Su

365 Elements of Machine Design I (3) Motion and forces related to plane and special mechanical linkages. Kinematic and geometric relationships. Motion, size and speed of shafts and pulleys. Mini design experiences. Prereq: ES 231, F, Sp, Su


402 Fundamentals of Engineering (1) The course reviews topics covered on the Fundamentals of Engineering exam. Letter grade only. Prereq: Senior standing in Engineering.

405 Microcomputer-Based Control of Electromechanical Systems (3) Application of microcomputers to control electromechanical devices. Application and theory: dynamics of machine control, assembly language programming, microcontroller architecture, stepping and DC motors, photoelectric devices, AD/DA, interjected circuits. Prereq: EE 391 or EE 393, and consent of instructor.

431 Seminar (1) Topics related to engineering including ethics. Formal oral presentation by students on engineering topics. Prereq: Senior standing.

449 Mechanical Engineering Laboratory (3) Designing, conducting and reporting results of experimental exercises. Test standards and specifications. Analysis of data and interpretation. Prereq: Senior standing. F, Sp, Su

451 Systems and Controls (3) Analytical models of physical systems; comprised of combinations of mechanical, fluid, electrical and thermal components; feedback control systems; transfer functions, responses, stability analysis; nonlinear control of linear systems; sampled data systems, digital filters. Prereq: ME 345, EE 431, F, Sp, Su

455 Introduction to Machine Design (2) Engineering economics, optimization, design for automation, reliability, patents and product liability; design of mechanical engineering systems. Mechanization in team design effort; requires design report. Prereq: ME 363, F

456 Introduction to Thermal Design (2) Engineering economics, optimization, design for automation, reliability, patents and product liability; design of mechanical engineering thermal-fluid systems. Participation in team design effort; requires design report. Prereq: 332, 344, F

466 Elements of Machine Design II (3) Application of strengths and properties of materials, design factors, theory of failure to design of machine elements. Mini design experiences. Prereq: Materials Science 201, ES 321, F, Sp

469 Machine Design (4) Design of complete machine; documentation includes: specifications, design calculations, working drawings, and cost analysis. Written and oral report. Prereq: 366, 455, 466, Sp

471 Refrigeration and Air Conditioning (3) Psychrometric properties; air conditioning cycle; design for comfort and recreation. Prereq: 332, 344.

475 Thermal Engineering (3) Thermal systems with emphasis on turbomachinery, heat exchangers, combustion and system analysis and design including second law and economic analysis. Prereq: 332, 344, F, Sp

479 Thermal Engineering Design (4) Design of a complete thermal-fluid system including economic, technical and optimization aspects. Participation in team design effort including formal presentations and design report. Prereq: 456, 475, Sp

484 Introduction to Maintenance Engineering (3) (Same as Nuclear Engineering 484).

494-495 Selected Topics in Mechanical Engineering (1-1, 4-4) Topics related to developments and practice in mechanical engineering. Prereq: Consent of Instructor. F, Sp, Su

ENGINEERING NUCLEAR (716)

200 Introduction to Nuclear and Radiological Engineering (1) Topics related to nuclear and radiological engineering. Satisfactory/No Credit.

203 Thermodynamics I (3) First law analysis of open and closed systems, basic thermodynamic properties, laws of thermodynamics. Prereq: Physics 232, Math 231.


304 Nuclear and Radiological Engineering Laboratory (3) Radiation detection and counting instrumentation, counting statistics, nuclear data, reactor design, reactor systems. Prereq: 301, 342. Coreq: 470.

305 Energy Transport (3) Development of differential and integral energy conservation; conduction and convection heat transfer including analytical methods; application to nuclear reactor fuel elements, reactor cores, and heat exchangers. Prereq: 203.

342 Thermal Science (3) Fluid statics; conservation equations of mass, momentum, and energy; applications to thermomechanics: heat transfer processes, heat conduction, thermal radiation, free and forced convection. Prereq: NE 203 or ME 331

351 Nuclear System Dynamics and Control (3) System modeling and time-domain response, transfer functions, frequency-domain analysis, stability analysis and design, development and control. Nuclear reactor kinetics, nodal modeling of core heat transfer, reactor control systems and nuclear plant safety issues are discussed. System simulation and control using PC-based software and toolboxes. Coreq: 301

360 Reactor Systems and Safety (3) Safety and operation limiting of nuclear steam supply system components; NRC regulations; accident analysis and mitigation. Prereq: 342.

400 Senior Seminar (1) Current topics related to nuclear and radiological engineering including ethics, contemporary issues, and commitment to life-long learning. Prereq: Senior standing. Satisfactory/No Credit.

403 Nuclear and Radiological Engineering Laboratory (2) Cross section measurements, diffusion properties of neutrons, energy and charge, diagnostics and controls, alpha and beta spectrometry, radiation fields and dosimetry. Prereq: 301

404 Nuclear Fuel Cycle (3) Topics related to nuclear fuel cycle including mining, extraction and concentration, fabrication, in-core management, reprocessing, waste disposal, radiation health issues and requirements. Prereq: 470 or equivalent.

420 Introduction to Nuclear Criticality Safety (3) Fundamentals of nuclear criticality to safe reactor core design, multiplication accidents, safety standards, overview of experiments, computational methods, and applications. Prereq: 301.

421 Radiation Protection (3) External and Internal dosimetry, biological effects of radiation, detection, radiation risk assessment. Prereq: 301.

432 Radiation Risk Analysis (3) Radiation risk estimates for external and internal radiation, dose-response models, dose rate effects, prediction of radiation risks, radiation safety standards. Prereq: 431.

433 Introduction to Fusion Energy I (3) (Same as Electrical Engineering 463.)

434 Introduction to Fusion Energy II (3) (Same as Electrical Engineering 464.)

470 Nuclear Reactor Theory I (3) Fundamentals of reactor physics relative to cross sections, reaction rates, reactor systems and nuclear data. Analytical and numerical methods applicable to general criticality problems, eigenvalue searches, perturbation theory, and the multigroup diffusion equations. Prereq: 301.

471 Nuclear Reactor Theory II (3) (Same as Electrical Engineering 464.)

479 Nuclear Reactor Theory (3) Fundamentals of reactor physics relative to cross sections, reaction rates, reactor systems and nuclear data. Analytical and numerical methods applicable to general criticality problems, eigenvalue searches, perturbation theory, and the multigroup diffusion equations. Prereq: 301.

488 Introduction to Reliability Engineering (3) Probabilistic failure models, parameter estimation (maximum likelihood, Bayes techniques). Model identification and comparison, accelerated life tests, failure prediction, system reliability, preventive maintenance and warranty. Prereq: Senior standing or consent of instructor.

484 Introduction to Maintenance Engineering (3) Principles of maintenance and reliability engineering, and maintenance management. Topics include information extraction from maintenance requirements, rotating machinery diagnostics, nondestructive testing, life prediction, failure models, lubrication oil analysis, establishing a predictive maintenance program, and computerized maintenance management. Prereq: Senior standing in engineering and consent of instructor. (Same as Materials Science and Engineering 464, Industrial Engineering 484 and Mechanical Engineering 484.)
494 Special Topics in Nuclear Engineering (3) Prereq: Senior standing, consent of instructor. May be repeated.
495 Special Topics in Radiological Engineering (3) Prereq: Senior standing, consent of instructor. May be repeated. Prereq: Senior standing on consent of instructor.
498 Research (1-3) Research related to recent developments in nuclear and radiological engineering. May be repeated. Prereq: Senior standing, consent of instructor.

ENGINEERING SCIENCE (335)
471 Clinical Engineering and Bioinstrumentation (3) Function and characteristics of health care delivery systems including operation and health care economics; development and management principles for a hospital-based clinical engineering program. Biomedical instrumentation, system operational characteristics, performance of the system as a whole, conditional data, readout and storage devices; evaluation of commercially available systems, selection and procurement methods, custom systems, equipment maintenance and control programs for hospitals. Ethical issues and professionalism in clinical engineering. Prereq: 271, EE 330.
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; consideration of current available devices; federal regulation and ethical considerations. Prereq: 341, Mathematics 231.
494-495 Special Engineering Science Topics (1-3, 1-3) Problems related to recent developments and practice. May be repeated once for credit. Prereq: junior or senior standing, consent of instructor.

ENGLISH (339)
410 English Composition I (3) Strategies for written argumentation, critical reading, and discussion; emphasis on audience analysis, the invention and arrangement of ideas, and revision for style and mechanics; typical assignments include written research essays, journals, quizzes and collaborative projects; two individual conferences required. Prereq: English placement score of 103 or higher. A, B, C, NC grading.
410 English Composition II (3) Critical strategies for reading and writing about literature; emphasis on the documented essay, literary history, and a continuation of the study of style and voice; typical assignments include written research essays, journals, quizzes and collaborative projects in addition to help with writing. Prereq: English placement score of 103 or higher. A, B, C, NC grading.
410 Three Writing Workshop (1) Self-paced Writing Center workshop for students who wish to sharpen their writing skills and receive feedback on their work. Prereq: English placement score of 103 or higher.
410 Writing Workshop II (1) Self-paced Writing Center workshop for students who wish to sharpen their writing skills and receive feedback on their work. Prereq: English placement score of 103 or higher.
410 Honors English Composition I (3) For students whose ACT English and composite scores are at or above 26 (or SAT verbal/composite scores at or above 660/1250). Grading scale and course credits are the same as for regular sequence though course proceeds at an accelerated pace. Practice in argumentation, critical reading, literary interpretation, and literary research methods. May include the study of a long work of literature in addition to readings in nonfiction, short fiction, poetry, and drama. Prereq: Admission to Honors College by the spring of the junior year. A, B, C, NC grading.
410 Honors English Composition II (3) For students whose ACT English and composite scores are at or above 26 (or SAT verbal/composite scores at or above 660/1250). Grading scale and course credits are the same as for regular sequence though course proceeds at an accelerated pace. Practice in argumentation, critical reading, literary interpretation, and literary research methods. May include the study of a long work of literature in addition to readings in nonfiction, short fiction, poetry, and drama. Prereq: Admission to Honors College by the spring of the junior year. A, B, C, NC grading.
410 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. Required for all English speaking students who demonstrate on the English Placement Examination a need for work in English structures, reading, or writing. Admission to this course is by the English Placement Examination only. Meets four hours a week. A, B, C, F grading.
410 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 required. Admission to this course is by the English Placement Examination only. A, B, C, F grading.
410 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. Admission to this course is by the English Placement Examination only. A, B, C, NC grading.
410 British Literature I: Beowulf through Johnson (3) Major literary works from three periods: Middle Ages, Renaissance, and Restoration and Eighteenth Century. Writing-emphasis course.
410 British Literature I: Wordsworth to the Present (3) Major literary works from three periods: Romantic, Victorian, and Twentieth Century. Writing-emphasis course.
410 Honors British Literature I (3) Enriched section of 201 designed for students with a 3.25 or higher GPA.
410 Honors British Literature II (3) Enriched section of 202 designed for students with a 3.25 or higher GPA.
410 Literature of the Western World I: Ancient, Medieval, and Renaissance (3) Writing-emphasis course.
410 Literature of the Western World II: Enlightenment, Romantic, and Modern (3) Writing-emphasis course.
410 American Literature I: Colonial Era to the Civil War (3) Development of American literature from its beginnings to the Civil War. Writing-emphasis course.
410 American Literature II: Civil War to the Present (3) Development of American literature from its beginnings to the Civil War. Writing-emphasis course.
410 Major Black Writers (3) Black American literature as a literary tradition. Writing-emphasis course.
410 Honors American Literature I: Colonial Era to the Civil War (3) Enriched section of 211 designed for students with a 3.25 or higher GPA.
410 Honors American Literature II: Civil War to the Present (3) Enriched section of 212 designed for students with a 3.25 or higher GPA.
410 Introduction to Poetry (3) Poetry as a distinct mode of artistic expression. Critical tools for perceptive reading of poems. Writing-emphasis course.
410 Introduction to Drama (3) Critical tools for perceptive reading of play texts. Writing-emphasis course.
410 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.
410 Themes in Literature (3) Study of important themes in English, American, and World literature. Some simple themes (eg, love, loyalty, revenge, etc) will be treated. An introduction to the process of literary analysis. Writing-emphasis course. See Timetable for topic.
410 Introduction to Creative Writing (3) Practice in writing poetry and fiction, combined with study of models and techniques. Writing-emphasis course.
410 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 interpretation. Writing assignments. (Same as Cinema Studies 281.)
410 Business and Technical Writing (3) Principles of written communication in science and business.
410 British Culture to 1600 (3) English literature in the context of parallel developments in art, architecture, music, and social and intellectual history. Writing-emphasis course.
421 Investment Analysis (3) Principles and concepts of asset valuation, portfolio and efficient financial markets. Basic analytical tools are presented and used to study valuation of different types of securities. Major writing requirement. Prereq: 301.

422 Portfolio Analysis and Management (3) Portfolio theory and evidence of behavior of security returns with a view to determining rational investment policies. Includes statistical analysis for risk and return of portfolios, portfolio revision, capital market theory, and extension of portfolio analysis. Prereq: 301, 421 and Management 303.

430 Financial Markets (3) Role of short and long term financial markets in the process of capital formation and allocation. Theories and mathematics of interest rates in money and capital markets. Prereq: 301.


460 Advanced Topics in Financial Management (3) Contemporary issues in financial management: risk, liquidity, and current asset management, corporate growth and control, international financial management, and pension fund management. Prereq: 301, 450.

470 Risk Management and Insurance (3) Identification, measurement and decision making with regard to insurance-type risks facing the firm. Emphasizes handling these risks in the most cost-efficient manner. Prereq: 301.

471 Estate and Financial Planning (3) Process of estate accumulation, safekeeping, and distribution, with particular emphasis on impact of insurance and taxation. Prereq: 301.

481 Real Estate Finance and Investment Analysis (3) Principles of financing and investing in real property. Utilizes discounted cash flow models and ratio analysis. Current federal tax law applicable to real property. Limited partnerships and other joint ventures. (Same as Urban Studies 481.) Prereq: 301.

482 Urban Development and Finance (3) Economic analysis of determination of urban land value and use, and discussion of current urban problems in the United States. Present mortgage markets and economic analysis of the effects of these markets on urban development. (Same as Urban Studies 482.) Prereq: 301.

492 Off-Campus Study (1-6) Letter grade only. Prerequisite: Consent of Instructor and Department Head.

493 Independent Study (1-6) Letter grade only. Prereq: Consent of Instructor and Department Head.

FIRST YEAR STUDIES (355)

101 Approaches to the University (2) Integration into the academic life of the campus, including the nature and purpose of a college education, career planning, the organization of university disciplines, and assessment of special needs in areas such as time management, study skills, interpersonal relations, and communication and listening techniques, mentoring and advising skills. Prereq: Consent of instructor.

401 Peer Mentor Techniques (1) Training of upperclass students as mentors and advisors for freshmen. Includes cognitive and developmental theories of the college-age student, teaching and learning styles, group-communication and listening techniques, mentoring and advising skills. Prereq: Consent of instructor.

402 Peer Mentor Practicum (1) Peer mentoring of first-year students. Coreq: 401 and consent of instructor. S/NC only. May be repeated. Maximum 3 hours.

FOOD SCIENCE AND TECHNOLOGY (390)

140 The Food Industry (3) Introduction to the food industry and the production of an adequate, safe food supply for national and international markets.

240 Field Observations in Food Processing (2) Introduction to observation and familiarization with processing, packaging, quality control and distribution of different types of foods. Prereq: 140; non-majors must obtain permission of instructor. 1 hour and 1 lab.

250 Evaluation and Grading of Dairy Products (2) Evaluation and scoring of milk, ice cream, cheddar cheese, cottage cheese, and yogurt. Prereq: 140 or consent of instructor. 2.75 minute-lecture/labs.

269 Meat Evaluation and Grading (2) Grading standards for quality and yield; principles for evaluating beef, pork and lamb, and application of standards for institutional meat cuts. Practice grading, judging carcasses and cuts, and application of purchase specifications. F

310 Food Chemistry (4) Reactions of water, proteins, lipids, carbohydrates, minerals, enzymes, vitamins, and additives in foods. Prereq: Chemistry 110 or equivalent. Coreq: Biochemistry 310. 3 hours lecture and 1 lab.

320 Food Microbiology (2) Physical, chemical and environmental factors affecting growth and survival of foodborne microorganisms; pathogenic and spoilage microorganisms, effects of quality of foods and their control. Prereq: Microbiology 210. Coreq: 429. F


340 Food Preservation (3) Principles and methods used for preservation of foods. Prereq: 140 and 240 or consent of instructor; 2 hours lecture and 1 lab.

401 Food Technology and Science Seminar (1) Individual reports and group discussion on current topics. May be repeated; maximum 3 credit hours. Prereq: Senior standing or consent of instructor.

430 Sensory Evaluation of Food (3) Principles and methods of sensory evaluation of foods. Basic statistics. 2 hours and 1 lab. F

442 Special Topics in Food Science and Technology (1-4) Topics of current concern to the food industry. May be repeated. Maximum 9 hours. Prereq: Consent of instructor. Letter grade or Satisfactory/No Credit grading. S

452 Science of Dairy Foods (3) Science and technology of the processing of milk and its products. Prereq: 290, 310, 320-29, and 340 or consent of instructor. 2 hours lecture and 1 lab.

460 Meat Products Technology (3) Carass characteristics of meat animals, muscle structure and composition, cut identification, curing, freezing and cookery. Prereq: 140 or consent of instructor.

489 Meat Science Lab (1) Slaughter and processing methods for beef, pork, lamb and poultry. Coreq: 460. 1 lab.

470 Food Crop Products (3) Food products from plants emphasizing types, processing manufacture, quality attributes and utility. Prereq: 340, and 3 hours biological science or consent of instructor; 2 hours and 1 lab. A, Sp

480 Cereal Science and Bakery Products (3) Chemistry and technology of processing cereal grains; interactions of ingredients during production and storage of baked products. Prereq: 290, 310 and 340 or consent of instructor. 2 hours and 1 lab. A, Sp

490 Food Laws and Regulations (3) A comprehensive examination of the regulations 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 key issues and their effects on laws and regulations. Core courses in Food Science and Technology will serve as an essential basis for understanding of material covered in this course. Prereq: 140; non-majors must obtain consent of instructor.

498 Independent Study (1-12) Specialized research in areas of interest under faculty direction. Field experience in supervised laboratories or field. May be repeated; maximum 12 hours. Prereq: Consent of instructor. E

FOREIGN LANGUAGE/ESL EDUCATION (394)


306 Forest Protection (3) (Same as Entomology and Plant Pathology 306.) Sp

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. Prereq: English 102 and Speech 210 or 240 or consent of instructor. F


323 People and Forest Practices (2) 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 required. Letter grade only. Coreq: 305, 306, 322, 323, 326, 329, 330. Sp

339 Farm Resource Analysis (3) Growth and yield prediction; harvest determination; goal setting under multiple use concepts; approaches to regulation; financial aspects of forestry with computer simulation. Prereq: Agriculture and Natural Resources 290 and Economics 201. Coreq: 305, 306, 322, 323, 326, 329, 330. Sp


399 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. Prereq: Botany 110 or consent of instructor. Coreq: 331 for Forestry majors. Sp

399 Wood Identification (1) Cell structure and arrangement as a tool for species identification; microscopic and hand lens identification of important commercial hardwoods, hardwoods and foreign woods; laboratory procedures for macroscopic and microscopic examination; student use of reference collection of wood samples; day field trip may be required. Prereq: Forestry, Wildlife and Fisheries 311 or consent of instructor. Coreq: 331 for Forestry majors. Sp

FOOD PROCESSING SYSTEM ANALYSIS AND EVALUATION (3) Design and evaluation of a food processing operation to produce a safe and acceptable quality end product. Prereq: 310, 320, and 340 or consent of instructor.
Courses of instruction

421 Phonetics (3) Foundation in the science of phonetics. Practical exercise and individual performance. Laboratory course. Credit no credit. Prereq: foreign language proficiency. This course for graduate credit. Graduate credit is not offered to students enrolled in the Department of Romance Languages. Prereq: French 335 or equivalent.

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. Includes lecture and 3 hours lab per week. Prereq: French 335 or 345.

423-424 Advanced Conversation (1, 1) Informal conversation with native speakers on contemporary topics. Stress in class contact rather than outside preparation. Meets two hours a week for one semester credit. Prereq: French 334 or 345.

425 Introduction to Descriptive Linguistics (3) Initiation into the theory and practices of techniques of linguistic analysis in the subfields of 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 techniques. Prereq: 200 strongly recommended. (Same as German 425, Linguistics 425, Russian 425, and Spanish 425.)

426 Methods of Historical Linguistics (3) (Same as Russian 426, German 426, Spanish 426 and Linguistics 426.)

428 Romance Linguistics (3) Development of Classical Latin through Vulgar Latin into major Romance languages. (Same as Spanish 428 and Linguistics 428.)

431 Theoretical French (4) Comprehensive introduction to the theoretical production and performance of French. Students collect and analyze a personal staging of a French play and they actively participate in its public performance. Prereq: 300-level literature course. May apply toward major.

431 Highlights of French Civilization (3) Survey of French civilization from the Gauls to World War II. Historical events, daily life, all forms of art. Prereq: a 300-level literature course. Writing-emphasis course.

431 Contemporary French Culture (3) French contemporary civilization and culture since World War II. Problems, trends and organization of French society today. Prereq: a 300 level literature course.

433 Literary Portraits of French Women (3) This course is designed to acquaint students with a variety of French literary masterpieces dealing with women of different social backgrounds and of complex personalities. Not for major or minor credit in French. (Same as Women’s Studies 433.)

434 Literature of Quebec (3) Survey of literature of Quebec as well as French literature written in the North America. Reading include explorer and missionary works, such as the Voyages of Champlain and the Journals of the Jesuit missions as well as the literature of contemporary Quebec. Prereq: a 300 level literature course.

440 Capstone Experience in French (3) Synthesizing a senior colloquium and a tutorial in which students reflect on the raison d’être of the discipline from a multidisciplinary point of view. Writing-emphasis course. Prereq: a 400 level literature course.

445 Advanced French for Business (3) Study of advanced contemporary French language and culture as they relate to business transactions. A comparative approach is used to explore differences and similarities between foreign business cultures and those of North America and Japan. Students build upon their knowledge of business terminology while being sensitized to cultural differences and the dangers of simplistic stereotypes. Prereq: 345 or consent of the instructor.

490 Internship (1-15) Career-related experiences in the United States or abroad with permission of the Language & World Business Director. For Language & World Business majors only. Satisfactory/No Credit only.

491 Foreign Study (1-15)

492 Off-Campus Study (1-15)

493 Independent Study (1-15)

GEOGRAPHY (415)

101-102 World Geography (3, 3) Selected topics and world regions, especially cases with problems of situations of contemporary interest, to illustrate geographical points of view, concepts, and techniques. Must be taken in sequence. Prereq: French 335 or equivalent.

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. Open to students who have received an "A" in Geography 101. Students may not receive credit for both 102 and 108.

131-132 Geography of the Natural Environment (4, 4) Characteristics and processes of the earth's surface and lower atmosphere with a view to creation of a world pattern of distinctive environments significant to humanity. Must be taken in sequence. 3 hours lecture and 2 hours lab per week. Prereq: 131 or 132 strongly preferred.

131-132 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. 2 hours lecture and 2 hours lab per week.

320 Cultural Geography: Core Concepts (3) Back-ground 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.

323 Behavioral Geography (3) Types of human behavior, such as hunting, territoriality, commuting, residential mobility, and internal consciousness as they relate to distance, national environment, and culture. (Same as Urban Studies 323.)

334 Meteorology (3) Dynamic atmosphere and resulting weather events. Nature of individual weather elements, their measurement and analysis over time and space.


345 Population and Environment (3) Global and local patterns of population distribution and change as they relate to culture, economic development, technology, and the environment. Prereq: 101-102 or consent of instructor. Writing-emphasis course.

361 Regional Geography of the United States and Canada (3) Physical, economic, and social distributions shown in the four contiguous 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, economic, and social distributions shown in the four southern states. Origin, development, and contemporary economic and cultural traits of the area. Writing-emphasis course.

365 Geography of Appalachia (3) Interrelation of physical, economic, and social patterns that give distinctive character to the region and its parts, especially in southern Appalachian, Appalachia in perspective in the current American scene. 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.

372 Geography of Middle America (3) Physical, cultural, and economic characteristics of Mexico, Central America, and the West Indies. (Same as Latin American Studies 372.) Writing-emphasis course.

373 Geography of South America (3) Physical, cultural, and economic characteristics of the countries of South America. (Same as Latin American Studies 373.) Writing-emphasis course.

375 Geography of Russia and the Commonwealth of Independent States (3) Geographical appraisal of Russia and the other successor states to the Soviet Union. Focus on how geographical factors influence the region's patterns, and human resources influence the region's future. Writing-emphasis course. (Same as Russian and East European Studies 375.)

379 Geography of Africa (3) Physical, cultural, and economic characteristics of Africa. Emphasis on particular emphasis on the area to the south of the Sahara. (Same as African-American Studies 379.) Writing-emphasis course.

410 Global Positioning Systems and Geographic Data (3) Theory and field application of Global Positioning Systems for capturing digital geographic data; management of geographic data, including coordinate systems, datum selection, digitizing, map standards, and uncertainty in Geographic Information Systems. 2 hours lecture and 2 hours lab per week.

411 Computer Mapping and Geographic Information Systems (3) Concepts, management, and presentation of digital data for spatial analysis, with emphasis on cartographic data structures. 2 hours lecture and 2 hours lab per week. Prereq: 310 and knowledge of a computer language or consent of instructor.

412 Advanced Cartographic Techniques (3) Cartographic design and display techniques for reference and thematic maps. Basic principles and methods of data reproduction. Prereq: 310 or consent of instructor. 2 hours lecture and 2 hours lab per week.

413 Remote Sensing: Types and Applications (3) Principles and use of remote sensing imagery, digital data, and spectral data, with particular emphasis on geosciences and environmental mapping techniques. Prereq: 310 or consent of instructor.

415 Quantitative Methods in Geography (3) Geographical application of statistical techniques, pattern analysis, and analysis of areal units. Prereq: Mathematics 115 or two semesters of calculus or consent of instructor.

419 Practicum in Cartography/Remote Sensing (2-6) Supervised practice in design and production of maps and other graphic materials in the Cartographic Services Laboratory or a similar organization. Prereq: Written consent of department prior to registration. S/N or letter grade.

421 Geography of Folk Societies (3) Geographical study of folk culture, emphasizing material culture and rural settlement, with examples drawn from eastern North America and selected foreign areas. Prereq: 101-102 or 320 or consent of instructor.

423 Geography of American Popular Culture (3) Geographical study of regional variation in popular cultures, especially focused on youth cultures in the United States. Prereq: Geography 320 or consent of instructor. Writing-emphasis course. Same as American Studies 423. Primary department is Geography.

425 Historical Geography of the United States (3) Survey of the changing human geography of the United States from the four centuries of development. Emphasis on changing population patterns, development of agricultural regions, and patterns of urban-industrial development. Prereq: 320 or consent of instructor. Writing-emphasis course.

433 The Land-Surface System (3) Characteristics of surface form, water, vegetation, and surface materials, and their regional interrelationships. People as evaluators and agents of change. Prereq: 131-132 or consent of instructor.

434 Climatology (3) General circulation system leading to world pattern of climates. Climatic change and modification, and interrelationships of climate and human activity. Prereq: 131-132 or 334 or consent of instructor. Prereq: 131 or consent of instructor.

438 Biogeography (3) Study of the changing distribution of plants and animals on a variety of spatial and temporal scales. The effects of continental drift, Pleistocen climatic change, and human activity on world biogeography. Prereq: 131-132 or consent of instructor.

438 Water Resources (3) Global water resources and hydrologic processes, including water availability, flooding, and water quality issues examined from physical and environmental geographic perspectives. Prereq: 131-132 or consent of instructor.

439 Plant Geography of North America (3) Characteristics and distribution of major plant communities of North America, especially those in the boreal forest region. Prereq: 131-132 or course work in botany or consent of instructor.
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. 3 lecture hours, 1-2 hour lab, 2 field trips. Prerequisite: Grade of B or better in Geology 107, grade of A in Geology 101, or permission of the instructor. Students may not receive credit for both Geology 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. 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. No prerequisite. May not be applied toward the Geology major.

303 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. 3 lecture hours, plus 1-2 hour lab. May not be applied toward the Geology major.

310 Mineralogy (4) Introduction to crystallography, crystal chemistry, x-ray diffraction, optical mineralogy, and the structures of rock-forming minerals. Laboratory includes hand sample identification, x-ray diffraction techniques, and microscopic identification of minerals. Prerequisite: 101, Chemistry 120-130 or equivalent. 3 lecture hours and 1 lab.

320 Paleobiology (3) Fossils and their uses in functional morphology, paleoecology, biogeography, biostratigraphy, and evolution. Prerequisite: 102 or consent of instructor. 2 lecture hours and one 2-hour lab or field period.

330 Igneous and Metamorphic Petrology (3) Classification and properties of igneous and metamorphic rocks, the processes that produce them, and the tectonic environments in which they form. Prerequisite: 310, 2 lecture hours and one 2-hour lab.

340 Stratigraphy and Sedimentation (3) Stratigraphic principles and practices; physical sedimentary processes and interpretation of depositional environments. Prerequisite: 101, 102, and 310. 2 lecture hours and one 2-hour lab or field work.

345 Geology of East Tennessee (1) Geology of the Southern Appalachians in Tennessee. Prerequisite: Completion of major or consent of instructor. 1 lecture hour plus field trips.

370 Structural Geology (4) Common geologic structures (folds, faults, cleavage) and their genesis. Laboratory includes map interpretation, cross-sections, projections, structural analysis, and the use of hand and remote sensing. Prerequisite: 120, 141-142; and Physics 135. Coreq: 310. 3 lecture hours and one 2-hour lab.


401 Quantitative Methods in Geology (2) Application of calculus and differential equations to problems in the earth sciences. Examples of the diffusion equation in hydrogeology, the wave equation in geophysics, mechanical modeling and boundary conditions in structural geology and tectonics. Prerequisite: 101-102 or 107-108. Mathematics 141-142. 3 lecture hours.

410 Mineral Science (3) Crystal chemistry of the rock-forming minerals, interaction of electron magnetic radiation, magnetite and quartz crystal structures. Optical properties of minerals, visible and infrared spectroscopy, and x-ray diffraction. Laboratory exercises emphasize thin section and x-ray diffraction methods of mineralogy. Prerequisite: 310, 2 lectures, one 2-hour lab.

411 Optical Mineralogy (2) Laboratory course on the principles of optical mineralogy. Use of petrographic microscopes to identify minerals with applications to petrology and environmental mineralogy. Prerequisite: 310.

412 Elements of X-ray Diffraction (2) Laboratory course on principles and applications of X-ray diffraction. Phase identification, quantitative determination of mineral and non-mineral inclusions, and crystal structure determination. Prerequisite: 310.

420 Paleoclimatology (4) Principles of paleoclimatology as applied to fossils and fossil assemblages with emphasis on data collection and interpretation. Laboratory experiences are based on field and laboratory analysis. Writing emphasis course. 3 lecture hours and one 2-hour lab.

421 Invertebrate Paleontology (4) Survey of invertebrate phyla, with emphasis on skeletal structure and preservation, functional morphology, and stratigraphic distribution. Prerequisite: 310 or consent of instructor. 2 hours and two 2-hour labs.

431 Geological Engineering (3) (Same as Civil Engineering 431.)

439 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 and practiced; and applied to the solution of geological problems. Prerequisite: Geology core courses (310, 320, 330, 340, 370) and consent of instructor.

450 Process Geomorphology (3) Integrative approach to examination of the surface of the Earth based upon case histories, major reference texts, laboratory work, and field periods. Prerequisite: 6 hours of geology courses numbered above 300, Physics 221-222. 3 lecture hours.

471 Fieldwork in Geophysics (2) Summer field course for advanced undergraduates or graduate students. Taught off-campus, and requires the full-time of the student for 2 or more weeks. Geophysical investigations applied to the solution of a problem in tectonics, hydrogeology, or the environment. Prerequisite: 470 or consent of instructor.

475 Physical and Chemical Systems of the Earth (3) Development of the physical earth from the solar nebula to the present. Formation, composition, and evolution of the atmosphere, hydrosphere, crust, mantle, and core. Interdependence of geology, volcanism, plate tectonics, geochemistry, and atmospheric processes. Prerequisite: 101-102 or equivalent. Recommended: 480. 3 lecture hours and one 2-hour lab.

485 Principles of Hydrogeology (3) Physical principles of flow, flow equations, geologic controls, aquifer analysis, water well design, and hydrogeologic transport processes. Prerequisite: 101, Math 141 and 142, Physics 135 or equivalent, or consent of instructor. (Same as Civil Engineering 485.)

486 Hydrogeology Laboratory (1) Application and demonstration of hydrogeological principles in the field and laboratory. Prerequisite: Coreq: Geology 485, or Environmental Engineering 335, or consent of instructor.

490 Special Problems in Geology (1-3) Directed study on special topics. Prerequisite: consent of instructor. May be repeated. Maximum 6 hours.
Courses of Instruction

481 Professional Experience in Hotel/Tourism Management II (9) Supervised professional experience in selected hotel operations. Prerequisite: Supervised first professional experience. Pre-req: HRA 421, 424, HE 410. Coreq: HRA 486.

485 Managerial Issues in Restaurant and Food Service Management I (9) Managerial problems involving staffing and retention of personnel, conflict resolution, financial analysis, and crisis management. Coreq: HRA 480 or 490, Pre-req: HRA 410, 420, HE 410.


490 Management Experience in Restaurant and Food Service Management (9) Supervised management experience in selected restaurants and food service operations. Pre-req: HRA 410, 420; HE 410. Coreq: HRA 485.

491 Professional Experience in Hotel/Tourism Management (3) Supervised educational experiences in selected hotel and restaurant operations. Pre-req: Progression into the program and HRA 325 and 390.

421 Professional Experience in Hotel/Tourism Management (3) Supervised educational experiences in selected hotel/tourism operations. Pre-req: Progression into the program and HRA 325 and 390.

24 Strategic Hotel/Tourism Planning (3) Hotel Management from a strategic planning perspective; development and implementation of plans for strategic and tactical decisions for hotel operations. Coreq: HRA 311 or RSC 311 (Same as RSC 425).


420 Professional Experience in Restaurant and Food Service Management I (6) Supervised educational experiences in selected restaurant and food service operations. Pre-req: Progression into the program and HRA 325 and 390.

421 Professional Experience in Hotel/Tourism Management II (6) Supervised educational experiences in selected hotel/tourism operations. Pre-req: Progression into the program and HRA 325 and 390.

352 Practicum in Industrial Education (1-25) Updating and upgrading experiences in nontraditional settings for technical teachers. May be repeated. Maximum 25 hours. Satisfactory/No Credit only. Prereq: Junior standing and departmental approval.

350 Related and Applied Theory in Occupations (1-15) Undergraduate course in the understanding of the principles, applications, and techniques of an occupation. May be repeated. Maximum 15 hours. Satisfactory/No Credit only. Prereq: Junior standing and departmental approval.

345 Advanced Food Production and Service Management (3) Application of management concepts in menu design, cost control and production and service of food. 2 hours and lab. Pre-req: HRA 210.

353 Administrative Management (3) This course is designed to allow students to interpret operational problems pertaining to food service, to design case studies and to resolve those problems. Pre-req: HRA 211, 325, 425, Mkt. 301.

325 Practicum in Industrial Education (1-3) Updating and upgrading experiences in nontraditional settings for technical teachers. May be repeated. Maximum 6 hours. Satisfactory/No Credit only. Prereq: Junior standing and departmental approval.

325 Development of Instructional Resources (3) The course is designed to prepare instructors for the learning environment. It includes the design and development of instructional materials, the preparation of teaching aids, and sequencing instruction based on the Instructional Systems Development (ISD) model. Each student will develop a training module. Pre-req: HRD 320, E.

330 Instructional Strategies and Techniques (3) The course is designed to prepare instructors for the learning environment. It includes the design and development of instructional materials, the preparation of teaching aids, and sequencing instruction based on the Instructional Systems Development (ISD) model. Each student will develop a training module. Pre-req: HRD 320, E.

329 Hospitality Computer Applications (3) This course has been designed to provide students with a broad exposure to software program applications specifically for the hospitality industry. The course covers computer usage for guest room accounting, reservations, payables, receivables, managing inventory, in- ventory control, payment, and others. Pre-req: HRA 325, 390.

328 Legal Issues in Service Management (3) Legal rights and responsibilities for service industry managers, their staff and clientele. Pre-req: HRA 311/RCS 311 (Same as RCS 425).

305 Construction Systems (3) Introduction to construction technology, preparing for the construction project, designing and planning the project, managing construction activities, building the facility, installing the systems, finishing the project, and closing the contract.

304 Manufacturing Systems (3) Introduction to manufacturing, engineering materials, primary manufacturing processes, secondary manufacturing processes, establishing a manufacturing enterprise, designing and engineering projects, manufacturing the product, marketing the product, and performing financial activities.

303 Program Planning for Training, Development, and Education (3) An on-line course that provides a four-course sequence, providing skills and knowledge in analyzing, designing, developing, implementing, and evaluating educational programs. The course will plan an educational program. Pre-req: HRD 210 or permission of the instructor.

302 Development of Instructional Resources (3) The course is designed to prepare instructors for the learning environment. It includes the design and development of instructional materials, the preparation of teaching aids, and sequencing instruction based on the Instructional Systems Development (ISD) model. Each student will develop a training module. Pre-req: HRD 320 and 325.

301 Field Experience in Teaching (1-3) Field experience in public school Business/Marketing, Family and Consumer Sciences, or Technology Education programs. May be repeated. Maximum of 3 hours. S/NC credit only.

300 Related and Applied Theory in Occupations (1-15) Undergraduate course in the understanding of the principles, applications, and techniques of an occupation. May be repeated. Maximum 15 hours. Satisfactory/No Credit only. Prereq: Junior standing and departmental approval.

300 Field Experience in Teaching (1-3) Field experience in public school Business/Marketing, Family and Consumer Sciences, or Technology Education programs. May be repeated for a maximum of 3 hours. S/NC credit only.

309 Special Topics in Human Ecology (1-3) Topics variable. Prereq: Consent of the instructor. Satisfactory/No Credit only. May be repeated. Maximum 3 credits.


201 Field Experience in Teaching (1-3) Field experience in public school Business/Marketing, Family and Consumer Sciences, or Technology Education programs. May be repeated for a maximum of 3 hours. S/NC credit only.

200 Special Topics in Human Ecology (1-3) Topics variable. Prereq: Consent of the instructor. Satisfactory/No Credit only. May be repeated. Maximum 3 credits.

100 Special Topics in Human Ecology (1-3) Topics variable. Prereq: Consent of the instructor. Satisfactory/No Credit only. May be repeated. Maximum 3 credits.

361 Graphic Reproduction Processes (3) Principles of printing, duplicating, photography, and other forms of communication. Includes laborator experience in SLR camera applications, camera copy preparation, line and halftone photography, layout, stripping, plate making, and offset press work.

360 Special Topics in Human Ecology (1-3) Topics variable. Prereq: Consent of the instructor. Satisfactory/No Credit only. May be repeated. Maximum 3 credits.

Integrating Organizational and Career Development (3) This online course examines methods of organizational development, issues and problems associated with employee empowerment, involvement, and recognition. Effective communication strategies are developed, and improvement in interfunctional relationships and leadership. Prerequisite: HRD 210 or equivalent.

Sp 473

INTEGRATING ORGANIZATIONAL AND CAREER DEVELOPMENT (3) This online course examines methods of organizational development, issues and problems associated with employee empowerment, involvement, and recognition. Effective communication strategies are developed, and improvement in interfunctional relationships and leadership. Prerequisite: HRD 210 or equivalent.

Sp 473

INFORMATION SCIENCES (560)

101 Information Foundations (3) Nature of information, sources, value, creation, organizing principles, transfer, uses in society, issues: social, economic, legal, copyright, preservation, national information policy, equity of access. Undergraduate credit only. F

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. Undergraduate credit only. Sp

310 Information Seeking: Resources and Strategies (3) Information as critical resource for research and decision making; emphasis on planning, executing, and evaluating information searches. Focus on topic of student's major. Undergraduate credit only. E

330 Books and Related Materials for Children (3) Materials for children in leisure time or classroom activities; criteria for selecting books, magazines, recordings, films and related materials; storytelling and other devices for encouraging reading. Undergraduate credit only. F

350 Information Consumer (3) Information in society, information economy, knowledge society; publishing and information providers: hosts, bulletin boards, nets, information overload/avoidance, science fraud, gatekeeping concepts, updating systems, environmental scanning, information consumption techniques. Undergraduate credit only. Sp

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

450 Writing About Science, Technology and Medicine (3) Same as Journalism 450. F

465 Introduction to Electronic Communications and Information Resources on the Internet (3) Exploration of worldwide information and communications resources including e-mail, newsgroups, and the World Wide Web. Discussion of information issues including copyright, censorship, privacy, and access. F

486 Advanced Electronic Communications and Information Resources on the Internet (3) Exploration of advanced information and communications issues, resources and tools including forms, scripting and search engines. Prereq: IS 485 or consent of instructor. E

490 Information Environment (3) Generation, production, management, dissemination, and use of information. Roles of information in society, information seeking and user behavior, information industry, economics of information products and services, and technologies of computerized information. Prerequisite: Information overload/avoidance. Information Sciences Foundation. Undergraduate credit only. E, Su-A

TECHNOLOGY, CURRICULUM, AND EVALUATION (577)

203 Field Study in Education (1-3) Problems of persons in active service in the field, includes methods of teaching, curriculum materials, school-community relationships, and school organizations. May be repeated. Maximum 6 hours. F

204 Microcomputers and Instructional Design (3) Introduction to basic operations and application of the microcomputer as resource in curriculum development and instructional design. Prereq: Admission to the Teacher Education Program.
251 Materials and Resources for Interiors (2) The development and application of materials and resources used in interior architectural space. Prereq: 171 or Arch 172 or consent of instructor. Sp

271 Fundamentals of Interior Design I (6) Principles of spatial organization; creative problem-solving and communication techniques for micro-environmental environments; perspective drawing, model building, experimental interaction with both body and white media. Five hour studio. Prereq: 141, 171. Art History 172 or consent of instructor. Sp

272 Fundamentals of Interior Design II (6) Problem solving, spatial organization of micro environments, increasingly larger scales; communication of total design solution graphic, audio and photographic techniques; emphasis on the use of color. Five hour studio. Prereq: 271. Sp

311 History of Interior Architecture (4) Interior architecture, decoration and decorative arts within cultural context, concept through 20th century. Emphasis on Italy, France, England, and American. Prereq: Art History 172 and 173 or consent of instructor. F

312 History of the Contemporary Interior Architecture (3) Architecture, furniture, design philosophy, nineteenth century roots for twentieth century developments, Europe and America. Design influenced by movements in the fine arts, technological advances, cultural context. Prereq: 311 or consent of instructor. Sp


371 Intermediate Interior Design I (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. Five hour studio. Prereq: 272 and Third year standing in interior design. F

372 Intermediate Interior Design II (6) Studio problems of intermediate complexity with emphasis on programming and schematic design; in-depth analysis of current programming methods; integrates and extends previous knowledge of spatial organization and planning of micro and macro environments. Five hour studio. Prereq: 231, 371. Sp

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. Two hour studio. Prereq: 200, 231, Coreq: 471 or consent of instructor. Fr

411 History of American Interior Architecture (3) Historical developments in interior architecture and decorative arts within cultural context, colonial era through nineteenth century. Prereq: 311 or consent of instructor. Fr

417 Honors: Interior Design (1-4) Advanced research in interior design problems for juniors or seniors. May be repeated. Maximum 8 hours. Consent of Interior Design faculty. Sp

420 Practicum for Interior Design (3) Supervised experience in a professional design firm; business practices, professional management and design philosophy. Prereq: 360, 372 and consent of instructor. Fr


460 Lighting for Interior Designers (3) Application of elements and principles of lighting and wiring to design of visual environment. Prereq: fourth year standing. Sp

464 Environmental Factors in Design (3) Human factors and associated research techniques and design methodologies to enhance the built environment. Prereq: Advanced Interior Design I. Coreq: 460. Sp

471 Advanced Interior Design I (6) Non-residential studio problems of advanced complexity; integrates and extends previous experiences utilizing systematic design methodologies. Four hour studio. Prereq: 372, 420. Coreq: 400, or consent of the instructor. F

472 Advanced Interior Design II (6) Comprehensive studio problems of advanced complexity; integrates and extends previous experiences utilizing systematic design methodologies. Six hour studio. Prereq: 471 or consent of instructor. Sp

480 Furniture Design (4) Human factors data applied to design of body support, task support, storage and systems. Furniture designers' role in advanced millwork design; materials and manufacturing processes. Two hour lecture and two hour studio. Prereq: 471 or Arch 372 or consent of instructor. Sp

484 Needs Assessment and Design Programming (3) Systematic methodology and interdisciplinary research methods as a part of design problem solving experience. Appropriate for evaluating various environments: commercial, corporate, hospitality, institutional, and retail. Seminar. May be repeated for maximum 3 hours credit. Prereq: Fourth year standing or graduate student in architecture and/or planning or consent of instructor.

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. Prereq: Consent of all interior design faculty.

493 Directed Studies in Interior Design (1-4) Student or staff initiated research or studio investigation of special topic. Elective credit only. May be repeated for a maximum of 8 hours. Prereq: Consent of instructor. Fr

494 Directed Studies in Environmental Design (1-3) Independent research in environmental design analysis. Prereq: Consent of instructor.

ITALIAN (584)

111-112 Elementary Italian (3,3) Introduction to Italian. Must be taken in sequence. Language Laboratory required. F, Sp.

119 Italian Language and World Business (2) This course will examine the importance of foreign trade at the national, regional, and international levels. An interdisciplinary team of faculty from the colleges of Business and Arts and Sciences will provide an overview of the value of language study and international cultural awareness in world business. Restricted to students majoring in Language and World Business. See the Director for further information.

211-212 Intermediate Italian (3,3) Sequence stresses reading, writing, listening and speaking Italian to prepare for upper division courses in the language. Must be taken in sequence. Language Laboratory required. F, Sp.

311-312 History of Italian Literature (3,3) Chronological survey of Italian literature in relation to the specific historical developments that have influenced it. Prereq: 212 or equivalent. F

314 Highlights of Italian Civilization (3) Survey of Italian civilization with special attention to major social, political and cultural achievements. Prereq: 212 or consent of instructor.

314-342 Intermediate Grammar, Composition, and Conversation (3,3) Grammatical analysis of Italian. Prereq: review of grammatical principles and their application in translation from English to Italian, both written and oral, exercises in free composition. Prereq: 212 or equivalent.

401 Dante and Medieval Culture (3) Introduction to the significance of this great Italian writer. Prereq: 212 or consent of instructor. (Same as Medieval Studies 401.)

402 Petrarca and Boccaccio (3) Prereq: 212 or consent of instructor. (Same as Medieval Studies 402.)

403 Literature of the Renaissance (3) From Puccio to Tasso, the bucolic, the satiric and the Cinquecento. Prereq: 212 or consent of instructor.

405 Modern Italian Poetry (3) Prereq: 212 or consent of instructor.

406 The Modern Italian Novel (3) Prereq: 212 or consent of instructor.

409 Directed Readings (3)

410 Italian Theatre (3) Survey of Italian theatre from Renaissance to present. Prereq: 212 or consent of instructor.
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.

421 Topics in Italian Literature and Cinema (3) Examination of related literature and cinema from 1930 to the present focusing on literary works translated into English and adapted into film. Objectives of the course are to investigate the relationship between literature and cinema and to achieve a greater understanding of Italian culture since 1930. Films will be shown in Italian with English subtitles. May be repeated. Maximum of 6 hours. (Same as Cinema Studies 421.)


433 Advanced Editing (3) Focus primarily on sensitivity to language and editing skills, including headline writing, layout and production. Prereq: 300.

441 Environmental Reporting (3) Writing for news media on such environmental issues as strip-mining, water pollution, nuclear power, fossil fuel power, and solid wastes. Students hear presentations from and interview experts in environmental science and conservation. Exemplary popular literature in environmental reporting is reviewed. Prereq: 300 for majors; consent of instructor for non-majors.

450 Writing about Science, Technology, and Medicine (3) Writing workshop to analyze examples of successful science writing and write series of articles for general publication based on scientific journals, news conferences, technical meetings and interviews. Prereq: Consent of instructor. (Same as Information Sciences 450.)

451 Environmental Reporting (3) Writing for news media on such environmental issues as strip-mining, water pollution, nuclear power, fossil fuel power, and solid wastes. Students hear presentations from and interview experts in environmental science and conservation. Exemplary popular literature in environmental reporting is reviewed. Prereq: 300 for majors; consent of instructor for non-majors.

455 Issues in Science Communications (3) May be repeated. Topics vary. Prereq: Consent of instructor.

456 Science Writing as Literature (3) Survey of important science writing including public policy, the spectrum of science, engineering, and medicine. Works by authors such as Arthur C. Clarke, Stephen J. Gould, and Richard Dawkins will be analyzed by literary qualities in a quest to understand why some science writing succeeds. Prereq: Consent of Instructor.

460 Mass Communications History (3) Development of the press and the role of mass communications in American history. Newspapers, radio, television and magazines. F.

465 Women and Mass Media (3) Media effects on women. Media coverage and portrayal of women. Historical and current status of women in mass communications industries.


491 Foreign Study (1-15) Advance approval of hours and topics by advisor required for registration. May be repeated for maximum of 7 credit hours.

492 Field Experience (1-3) Approved internships and other supervised practice in journalism. May be repeated for a maximum of 4 credit hours. Prereq: 390, senior standing, and consent of instructor. Satisfactory/No Credit grading only. E.

493 Independent Study (3) May be repeated for maximum of 6 hours. Prereq: Consent of instructor.

JUDAIC STUDIES (595)

311 Ancient Hebraic Religious Traditions (3) Writing emphasis course. (Same as Religious Studies 311.)

LATIN (257)

111-112 Beginning Latin (3,3) Must be taken in sequence. Not available to students eligible for Latin 150.

150 Latin Transition (3) This course is designed to prepare students for enrollment in Latin 251. Prereq: Two years of high school Latin and a score on the Latin placement exam below that required for admission to Latin 251. 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 six hours of elementary language credit awarded through placement examination.

251 Intermediate Latin: Grammar and Readings (3) Prereq: 112 or 150 or placement through the Latin placement examination.

252 Intermediate Latin: Vergil's Aeneid (3) Prereq: 150 or 251 or consent of instructor.

310 Cicero and Sallust (3) Prereq: 252 or equivalent.

312 Women and Religion (3) (Same as Religious Studies 312.)

315 Latin-American Studies (3) (Same as Religious Studies 315.)

322 Medieval Philosophy (3) (Same as Religious Studies 322.)

330 Israeli Jewish Topics in Literature and Culture (3) May be repeated. Maximum 6 hours. (Same as German 330.)

369 History of the Middle East (3) Writing emphasis course. (Same as History 369.)

370 History of the Middle East (3) Writing emphasis course. (Same as History 370.)

381 Introduction to Judaism (3) Writing emphasis course. (Same as Religious Studies 381.)

385 Contemporary Jewish Thinkers (3) Writing emphasis course. (Same as Religious Studies 385.)

386 Voices of the Holocaust (3) (Same as Religious Studies 386.)

395 The Crusades and the Medieval Christian-Muslim Relations (3) (Same as History 395)

405 Modern Jewish Thought (3) Writing emphasis course. (Same as Religious Studies 405.)

425 Early Christian and Byzantine Art, to 1350 (3) Writing emphasis course. (Same as Art History 425 and Medieval Studies 371.)

431 Medieval Art of the West, 800-1400 (3) Writing emphasis course. (Same as Art History 431 and Medieval Studies 381.)

LATIN-AMERICAN STUDIES (600)

251-252 Introduction to Latin American Studies (3,3) (Same as History 250-256.)

311 Aspects of Luso Brazilian Literature (3) (Same as Portuguese 311.)

313 Peoples and Cultures of Mesoamerica (3) (Same as Anthropology 313.)

320 Women and Religion (3) (Same as Religious Studies 320 and Women's Studies 320.)

322 Medieval Philosophy (3) (Same as Religious Studies 322 and Medieval Studies 322.)

350 German-Jewish Topics in Literature and Culture (3) May be repeated. Maximum 6 hours. (Same as German 350.)
Courses of Instruction

319 Caribbean Cultures and Societies (3) Same as Anthropology 319 and African and African-American Studies 319.

336 Aspects of Spanish American Literature (3) (Same as Spanish 336.)

355 Latin American Government and Politics I (3) (Same as Political Science 355.)

360 History of Latin America (3) (Same as History 360.)

425 Introduction to Descriptive Linguistics (3) (Same as French 425, German 425, Russian 425, and Spanish 425.)

426 Methods of Historical Linguistics (3) (Same as French 426, German 426, Russian 426, and Spanish 426.)

429 Romance Linguistics (3) (Same as French 429 and Spanish 429.)

433 Structure of the German Language (3) (Same as German 433.)

436 History of the German Language (3) (Same as German 436.)

471 Sociolinguistics (3) (Same as English 471 and Sociology 471.)

472 American English (3) (Same as English 472.)

474 Teaching English as a Second or Foreign Language I (3) (Same as English 474.)

475 Teaching English as a Second or Foreign Language II (3) (Same as English 475.)

476 Second Language Acquisition (3) (Same as English 476.)

486 Special Topics in Language (3) (Same as English 486.)

490 Language and Law (3) (Same as English 490.)

491 Foreign Study (1-15)

492 Off-Campus Study (1-15)

493 Independent Study (1-15)

LEADERSHIP STUDIES (615)

200 Student Leadership Development (3) Designed to enhance the communication and skill of emerging student leaders and includes theoretical and experiential content related to leadership role, skill, and effectiveness. Satisfactory/No Credit grading only.

LINGUISTICS (623)

200 Language, Linguistics and Society (3) Introduction to linguistics with focus on language development and use of language by individuals and groups. Prereq: Completion of Freshman English or equivalent.

371 Foundations of the English Language (3) (Same as English 371.)

372 The Structure of Modern English (3) (Same as English 372.)

400 Topics in Linguistics (3) Content varies. May be repeated. Maximum 6 hours.

411 Linguistic Anthropology (3) (Same as Anthropology 411.)

423 The Development of Diachronic and Synchronic Linguistics (3) Development of Western linguistic thought from the Hebrews and Greeks through modern times. Readings from Boas, Sapir, Bloomfield, and others. Prereq: 9 hours of courses required for the Linguistics major (300-level or above) or consent of instructor.

425 Introduction to Descriptive Linguistics (3) (Same as French 425, German 425, Russian 425, and Spanish 425.)

426 Methods of Historical Linguistics (3) (Same as French 426, German 426, Russian 426, and Spanish 426.)

429 Romance Linguistics (3) (Same as French 429 and Spanish 429.)

433 Structure of the German Language (3) (Same as German 433.)

436 History of the German Language (3) (Same as German 436.)

471 Sociolinguistics (3) (Same as English 471 and Sociology 471.)

472 American English (3) (Same as English 472.)

474 Teaching English as a Second or Foreign Language I (3) (Same as English 474.)

475 Teaching English as a Second or Foreign Language II (3) (Same as English 475.)

476 Second Language Acquisition (3) (Same as English 476.)

486 Special Topics in Language (3) (Same as English 486.)

490 Language and Law (3) (Same as English 490.)

491 Foreign Study (1-15)

492 Off-Campus Study (1-15)

493 Independent Study (1-15)

LOGISTICS AND TRANSPORTATION (624)

301 Introduction to Logistics (3) Business logistics as a strategic area within the firm. Role of materials management and physical distribution, activities such as customer service, order processing and information flow, transportation, warehousing, purchasing, inventory, systems design and organization. Overview of supply chain operation.

302 Introduction to Transportation (3) Transportation and distribution as a vital part of the nation's economic and social structure; U.S. transportation system; society's demands for mobility and policies of public and private sectors to meet those demands. Prereq: Economics 201.

303 Special Topics in Logistics and Transportation (3-6) Seminar in current problem area in logistics and transportation. Topic announced prior to offering. May be repeated once for additional credit provided topic is different. Maximum 6 hours. Prereq: Consent of instructor.

411 Logistics and Transportation Analytical Methods (3) Introduction to the principle analytical tools and models used in logistics and transportation; applications of analytical tools to logistics and transportation problems; using analytical methods to support negotiations. Prereq: 301, 302.

441 Global Logistics and Transportation (3) Multinational logistics strategy, import-export process, global sea, surface and air operations comparative transport systems analysis. Prereq: 301, 302.

450 Logistics Information Infrastructure Strategy and Design (3) An introduction to information strategy involving both structured and unstructured systems, using internal and internet networks. Emphasis will be on designing a structured system using upper CASE tools, and an unstructured system using groupware that will be internet accessible with success control.

460 Seminar in Logistics and Transportation Strategy (3) Senior seminar in development of strategy for logistics and transportation in a supply chain perspective. Prereq: 411, Statistics 305, Senior Standing.

493 Independent Study (1-6) Directed research on subject of mutual interest to student and staff member. May be repeated. Maximum 6 credit hours. Prereq: Consent of instructor.

497 Honors: Executive-in-Residence in Transportation and Logistics (3) Student interaction with top-level logistics and transportation executives. Focus on the strategic decision-making process. Prereq: Consent of instructor.

MANAGEMENT (625)

303 Principles of General and Operations Management (3) Basic functions of general management and the concepts and techniques used in operations management. Includes lectures and discussion/problem solving sessions. Prereq: Statistics 201.

311 Labor Relations and Collective Bargaining (3) American labor history, structure, and philosophy of contemporary unions, nature of collective bargaining, and dispute settlement.

321 Organizational Structure and Behavior (3) Behavioral processes in organizations; motivation, leadership, decision making, communication, conflict, group dynamics, organizational structure, conflict, politics, change and development. Prereq: 301, F, S.

341 Operations Management I (3) Design of operating systems. Process and methods, analysis and measurement, location and layout, project management, operational forecasting. Prereq: 301, Statistics 201, F, S.

401 Business Strategy/Policy (3) Strategy and policy which affect the success and survival of the total enterprise. Capstone course which integrates all functional areas in the formulation and implementation of strategy which will enable the organization to achieve objectives. Major writing requirement. Prereq: Completion of business core courses and senior standing. Must be admitted to a business major. E.

421 Total Quality Management (3) TQM is characterized by three main principles: customer focus, continuous improvement, and teamwork. Course focuses on the managerial perspective and is necessary to successfully implement and sustain a TQM philosophy, while briefly introducing its underlying statistical concepts. Preq: Statistics 201, Management 301, F, S.

431 Personnel Management (3) Theory, methods and issues pertaining to successful personnel management. Prereq: 301, senior standing. F, S.

432 Implementation and Evaluation of Personnel Programs (3) Methods of identifying, developing, implementing and evaluating various personnel programs. Prereq: 431, senior standing. S.

440 Organizational Psychology (3) (Same as Psychology 440.)

441 Operations Management II (3) Planning and control of operations systems. Aggregate planning, scheduling systems, materials planning, and control. Prereq: 301, F, S.

471 International Management (3) Factors significant to the manager in international business activities.

492 Management Off-Campus Study (1-6) Satisfactory, No Credit grading only. Prereq: Consent of Instructor.

493 Independent Study (3) Readings, research, and special projects. Prereq: Consent of Instructor. May be repeated one time for credit.

MANAGEMENT SCIENCE (627)

310 Management Science and Managerial Decision Support Systems (3) Introduction to quantitative decision models and their integration into microcomputer based decision support systems. Topics include linear, dynamic, and network programming, as well as decision analysis, Markov, inventory and queuing models. Preq: Mathematics 125, 125 and Statistics 201.

MARKETING (632)

301 Principles of Marketing (3) Practical applications-oriented review of what every manager needs to know about marketing to be able to effectively provide value to customers of the organization. Prereq: Accounting 201, Economics 201, Junior standing.
MATHEMATICS (641)

100 Intermediate Algebra (3) First degree equations and inequalities, polynomials, rational expressions, exponents, radicals, quadratic equations and inequalities, systems of equations, introduction to logarithmic and exponential functions. A, B, C, N grading.

109 Algebra Workshop (1) Self-paced tutorial center for students taking Math 119, 130, or 141 who need additional help. May be taken for credit by placement examinations, assessment exams, or classroom performance. Indivi-ual and computerized instruction on various pertinent algebraic topics. To receive credit, a student must pass the Math 119, Math 130, or Math 141 class in which he/she is currently enrolled. May be taken for credit three times. S/N grading.

110 Algebraic Reasoning (3) A course in the applications of elementary mathematics to life in the modern world. Includes topics in financial mathematics, consumer mathematics, and other areas. Students preparing to take 123-125 should take 119 instead of 110. Prereq: Two years of algebra and one year of geometry in high school and satisfactory placement test scores or Math 100. This course should not be taken to remove an entrance requirement.

115 Statistical Reasoning (3) An introduction to probability and statistics. Not available for credit to students in the College of Business Administration. Prereq: Two years of algebra and one year of geometry and either satisfactory placement test scores or Math 100.

119 College Algebra (3) A review of algebraic functions, equations, and inequalities for students who satisfy the course prerequisites for 123 or 125 but whose placement test scores indicate additional preparation is necessary. Students who receive a grade of C or better in any course number 123 or higher (except for 261 or 262) may not subsequently receive credit for 119. Prereq: Two years of algebra and one year of geometry and either satisfactory placement test scores or Math 100. This course should not be taken to remove an entrance requirement.

123 Finite Mathematics (3) For students not planning to major in the physical sciences, engineering, mathematics, or computer science. Exponential and logarithmic functions, financial mathematics, graph theory, and matrices, optimization. Prereq: Two years of algebra and one year of geometry in high school plus satisfactory placement test scores, or 119 or 130.

125 Basic Calculus (3) For students not planning to major in the physical sciences, engineering, mathematics, or computer science. Calculus of algebraic, exponential, and logarithmic functions, with applications. No students will receive credit for Math 141 or 152 with a grade of C or better. Prereq: Two years of algebra and one year of geometry in high school and satisfactory placement test score, or 119 or 130.

130 Precalculus I (4) Review of algebraic, logarithmic, exponential, and trigonometric functions for students who satisfy the course prerequisites for 141 or 151, but whose placement test scores indicate additional preparation is necessary. Students who have earned a grade of C or better in 141 or 151 may not subsequently receive credit for 130. Prereq: Two years of algebra, one year of geometry, and satisfactory placement test score, or 119 or 130.

140 Precalculus II (4) Review of calculus, including limits, derivatives, and integrals for students who satisfy the course prerequisites for 241 or 247. Prereq: Math 141 or 152.

141-142 Calculus I, II (4, 4) Standard first-year course in single variable calculus, especially for students of science, engineering, mathematics, and computer science. Differential and integral calculus with applications. Prereq: Two years of algebra, a year of geometry, and half a year of trigonometry in high school. Students who did not study trigonometry in high school must receive credit in trigonometry simultaneously with 140. Prereq: Math 141 or 152.

151-152 Mathematics for the Life Sciences I, II (3, 3) For students majoring in the Life Sciences. Differentiable and integral calculus with applications. Prereq: Two years of algebra, a year of geometry, and half a year of trigonometry in high school. Prereq: Math 141 or 152.

160-161 Calculus for Business Students I, II (3, 3) Calculus of algebraic, exponential, and logarithmic functions for business majors. Prereq: Math 119 or 125.

171 Computer Literacy for Mathematics (3) Introduction to computers, the internet, mathematical packages and programming for prospective mathematics majors. Prereq: Math 141. S/N only.

200 Matrix Computations (1) Introduction to matrix calculations, including determination of eigenvalues and eigenvectors. Prereq: Math 141 or 152. Credit may not be received for both 200 and 250.

201 Matrix Computations (3) Introduction to matrix calculations, including determination of eigenvalues and eigenvectors. Prereq: Math 141 or 152. Credit may not be received for both 200 and 250.

211 Structure of the Number System (3) Problem solving, sets, relations, number systems, integers, elementary number theory, the set of integers and decimals. Prereq: Two years of algebra and one year of geometry in high school and satisfactory placement test score.

221 Differentiable Equations I (3) First course, emphasi-ses solution techniques. Includes first-order equations and applications, theory of linear equations, equa-tions with constant coefficients, Laplace transforms, and series solutions. Prereq: 141 or 142.

241 Calculus III (4) Calculus of functions in two or more dimensions. Includes solid analytic geometry, partial differen-tial equations, complex variables, and selected topics in vector calculus. Prereq: 141 or 142.

247 Honors: Calculus III (4) Prereq: 147-148 or invita-tion of the department.

251 Matrix Algebra I (3) First course in the algebra of simultaneous linear equations and matrices. Includes Gaussian elimination, determinants, vector spaces, linear transformations, eigenvalues, and eigenvectors. Prereq: 141-142.

257 Honors: Matrix Algebra I (3) Prereq: 148 or invitation of the department.

300 Introduction to Abstract Mathematics (3) Alge-bra, sets, functions, relations, mathematical induction, algebraic structure of the real number system, order properties, and completeness. Prereq: Math 142.

323 Probability and Statistics (3) Discrete and con-tinuous random variables; conditional probability, expectation, moment generating functions; laws of large numbers, central limit theorem. Elements of statistical inference, estimation, and hypothesis testing. Prereq: Math 241 or 247.

341 Analysis I (3) Introduction to the theory of the real number system, limit concepts, and the foundations of a real variable. Prereq: 241 (or 247) and 300.

351 Algebra I (3) Introduction to abstract algebra, emphasizing integers and polynomial rings. Prereq: (or 257) and 300.

371 Numerical Algorithms (3) Development and applica-tion of fundamental algorithms for finding roots of equations, solving systems of linear equations, interpola-tion, fitting data using least-squares, differentiation, integration, and solving ordinary differential equations. Prereq: A high-level programming language (e.g., 171 or Computer Science 100), 231 (or 247), and basic matrix algebra (e.g., 200 or 251).

399 Studies in Mathematics (3) May be repeated. Maximum 9 hours. Prereq: Consent of instructor.

400 History of Mathematics (3) Development of major ideas in mathematics from ancient to modern times and the influence of these ideas in science, technology, philosophy, art, and other areas. Prereq: Math 241 (or 257) and 300. Writing emphasis course: at least one in-class essay examination and 3000 words of writing outside the classroom.

401 Mathematics and Microcomputers (3) Primarily for students seeking certification as mathematics teachers at the secondary level. The use of microcomputers to teach mathematics, and the digital computers to teach the theories of Gauss and Stokes. Prereq: 241 or 247.
405 Models in Biology (3) Difference and differential equation models of biological systems. Prereq: 142 or 148 or 152.

411 Mathematical Modeling (3) Construction and analysis of mathematical models used in science and industry. Projects emphasized. Prereq: 231, 241, and 251 or 257. Writing-emphasis course. May be repeated.

421 Combinatorics (3) Introduction to problems of construction and enumeration for discrete structures such as sequences, partitions, graphs, finite fields and geometries, and experimental designs. Prereq: 303 or consent of instructor.

423 Probability (1) (2) Axiomatic probability, multivariate distributions, conditional probability and expectations, methods of representation of random functions. Laws of large numbers and the central limit theorem. Prereq: 300-level probability or consent of instructor.

424 Probability (1) (2) Elements of stochastic processes; random walk, Markov chains and Poisson processes. Other topics as selected by the instructor. Prereq: 453.

425 Statistics (3) Derivation of standard statistical distributions including f, F and X2; independence of sample mean and variance; basic limit theorems; point and interval estimation, Bayesian estimates; statistical hypotheses, Neyman-Pearson theorem; likelihood ratio and other parametric and nonparametric tests; sufficient statistics. Prereq: 423 or consent of instructor.


443 Complex Variables (3) Introduction to the theory of functions of a complex variable, including residue theory and contour integrals. Prereq: 241 or 247.

445-446 Advanced Calculus I, II (3,3) Introduction to the theory of sequences, series, differentiation, and Riemann integration of functions of one or more variables. Prereq: 241 or 247 (and 231) or consent of instructor.

447-448 Honors: Advanced Calculus I, II (3,3) Honors version of 445-446. Prereq: 241 or 247 and 300, or consent of instructor.

450 Clinical Serology and Immunology (2) Performance and interpretation of broad range of clinical serological and immunological procedures with emphasis on principles standard to efficient blood bank. Coreq: 310. F

453 Matrix Algebra I (1) Matrix algebra, including vector spaces, linear transformations, matrices, determinants, eigenvalues and eigenvectors, and diagonalization. Prereq: 251 or 257.

454-456 Abstract Algebra I, II, III (3,3,3) Introduction to the theory of groups, rings, fields, vector spaces and linear transformations. Prereq: 251 or 257, and 300, or consent of instructor.

457-458 Honors: Abstract Algebra I, II, III (3,3,3) Honors version of 454-456. Prereq: 251 or 257 and 300, or consent of instructor.

460 Geometry (3) Axiomatic and historical development of Euclidean, hyperbolic geometry and the geometry of the sphere. Prereq: Math 322 or consent of instructor.

461 Topology (3) Inclusion of topology of line and plane, separation properties, compactness, connectedness, continuous functions, homeomorphisms, continua, and topological invariants. Prereq: 241 or 247 (and 231) or consent of instructor.

465-466 Advanced Calculus I, II (3,3) Introduction to the theory of sequences, series, differentiation, and Riemann integration of functions of one or more variables. Prereq: 241 or 247 (and 231) or consent of instructor.

467-468 Honors: Advanced Calculus I, II (3,3) Honors version of 465-466. Prereq: 241 or 247 and 300, or consent of instructor.

469 Mathematical Methods in the Physical Sciences (3) Introduction to the mathematical methods of physics and engineering. Prereq: Math 453 or Math 251 or 257, and 231.

470 Introduction to Mathematical Computing (3) Introduction to mathematical computing using a computer algebra system. Prereq: Math 251 or 257. F

471 Numerical Analysis (3) Introduction to computation, instability, and rounding. Interpolation and approximation by polynomials and piecewise polynomials. Quadrature and numerical solution of initial and boundary value problems of ordinary and partial differential equations, including stiff systems. Prereq: 231 or consent of instructor. (Same as Computer Science 471.)

472 Numerical Analysis (3) Direct and iterative methods for systems of linear equations. Solution of a single nonlinear equation and nonlinear systems. Orthogonal decomposition methods, including the algebraic eigenvalue problem. Prereq: 371 or consent of instructor. Recommended: 473. (Same as Computer Science 472.)

475 Industrial Mathematics (3) Modeling, analysis, and computation of mathematical models in industrial problems. Prereq: 231 and familiarity with an operating system and a programming language (e.g., Fortran, COBOL). F

480 Readings in Mathematics (1-3) Open to superior students with consent of department head. Independent study with faculty guidance. May be repeated. Maximum 9 hours. Prereq: Agreement of faculty mentor to supervise independent work.

485 Seminar in Actuarial Mathematics (1-3) Introduction to principles and problem solving techniques in actuarial sciences with emphasis on the mathematical topics included in the initial Actuarial Exams. Prereq: 241, 251, and 323.

489 Seminar in Mathematics (1-3) Topics will vary. Will require out-of-class projects and class presentations by students. Students must register for the number of credit hours announced for a particular seminar. May be repeated. Maximum 9 hours. Prereq: Consent of instructor.

490 Readings in Mathematics (1-3) Open to superior students with consent of department head. Independent study with faculty guidance. May be repeated. Maximum 9 hours. Prereq: Agreement of faculty mentor to supervise independent work.

492 Off-Campus Study (1-15) F

493 Independent Study (1-15) F

494 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.

MEDIEVAL STUDIES (674)

201-202 Medieval Civilization (3,3) Introduction to basic themes in the medieval experience, approached from interdisciplinary points of view and including philosophy, religion, and art and architecture, language and literature, social and political history, Writing-emphasis course.

261 Medieval Culture: Readings from the Early Middle Ages, 500-1000 (3) Critical analysis and interpretation of selected works from the early medieval period. Focuses on major types of literature produced during the period 500-1000 A.D., e.g., cultural, religious, rhetorical, lyric, epic, biographical. Includes Augustine’s Confessions, Boethius’ Consolation, St. Gregory’s Life of St. Benedict, The Life of Charlemagne, etc. Writing-emphasis course.

262 Medieval Culture: Readings from the Later Middle Ages, 1000-1500 (3) Critical analysis and interpretation of selected works from the later medieval period. Focuses on romantic, allegorical and mystical writings from the high and later Middle Ages, e.g., the Song of the Nibelungen, the Romance of the Rose, St. Bernard’s Commentary on the Song of Songs, Peter Abelard’s History of My Calamities. Should be taken in sequence with 261. Writing-emphasis course.

312-313 Medieval History (3,3) (Same as History 312-313)

321 Medieval Philosophy (3) (Same as Philosophy 322 and Judiac Studies 322)

372 Northern European Painting, 1530-1600 (3) (Same as Art History 441.)

381 Medieval Art of the West, 800-1400 (3) (Same as Art History 441.)

382 The Art of Italy, 1250-1450 (3) (Same as Art History 441.)

401 Dante and Medieval Culture (3) (Same as Italian 401.)

402 Petrarch and Boccaccio (3) (Same as Italian 402.)

403 Seminar in Medieval Studies (3) Interdisciplinary treatment of selected topics. Content varies. May be repeated. Writing-emphasis course.

405 Medieval Literature (3) (Same as English 401.)

406 Chaucer (3) (Same as English 402.)

410 Medieval French Literature (3) (Same as French 410.)

415 Medieval Architecture (3) (Same as Architecture 415.)

475 Ancient and Medieval Political Thought (3) (Same as Political Science 475.)

491 Foreign Study (1-15)

492 Off-Campus Study (1-15)

500 Medieval Studies (3) (Same as History 500.)

MICROBIOLOGY (684)

210 General Microbiology (3) General properties of bacteria and viruses including physiology, metabolism, genetics, applied bacteriology, pathogenesis, and immunity. May not be used as part of the major in microbiology. 2 hours and 2 labs. E

310 Introduction to Microbiology (3) Introduction to bacteria and viruses including physiology, metabolism, genetics, and replication and expression of viruses; bacterial and viral pathogenicity; mechanisms of resistance to disease. Prereq: Biology 140. Coreq: Biology 240. F, Su

319 Introductory Microbiology Laboratory (2) Basic techniques for the examination, cultivation, and identification of microorganisms. Coreq: 310. F

320 Advanced Microbiology (3) Cell and molecular biology of microorganisms, principles and applications in modern technological society. Intended for Microbiology majors. Prereq: 310. Sp
100 Basic Military Science I (2) Formation and functioning of the American defense establishment and its relationship with American society, customs and traditions of the army, aspects of military physical fitness training; selected topics dealing with current world affairs; challenges facing the military in the future. Adventure training skills lab introduces mountaineering, rifle marksmanship, field training exercises. Preq: United States citizen; freshman or sophomore standing. Students with higher standing require consent of instructor. Letter grade only. F, Sp

200 Basic Military Studies - Practicum (4) 240 contact hours of instruction at Fort Knox, Kentucky over a five week period during the summer. Preq: United States citizen; physically qualified; at least 3 years and 6 months remaining to complete degree. Letter grade only. Su

210 Basic Officer Skills I (2) The study of American Military History from 1775 to the present. Study includes the record of military and armed forces in peace and war and focuses on the history of military art, memoirs, battle history, technical studies, and the relationship between political and armed forces with society. Labs teach rappelling, physical training, drill and ceremony, and historical field trips. Preq: U.S. citizen, freshman or sophomore standing; 3 years remaining to complete degree. Letter grade only.

220 Basic Officer Skills II (2) Practical application of small unit operating techniques to include first aid, marksmanship, and weapons familiarization, map reading and land navigation, drill and ceremony, processing of enemy prisoners of war (EPW), execution of individual/unit movement techniques, and the exercise of leadership. Preq: 210 or consent of the Professor of Military Science. Letter grade only.

310 Advance Military Studies I (4) Discussion and practical exercise of leadership including operation of the military team, land navigation, small unit patrolling, and physical fitness. Tactical/operational and leadership roles as the military are developed in the classroom and applied during leadership labs and field training. Preq: United States citizen; must have at least 2 years remaining to complete degree (undergraduate or graduate); physically qualified; cumulative GPA 2.00 or above; legally qualified. 3 or 4 years of ROTC (or 110, 120, 210, 220) completion (or 200 completion (or) basic training completion). Letter grade only. 3 hours and 1 hour lab.

320 Advanced Military Studies II (4) Preparation of the future officer leader of the Army to excel at MS 400 Advanced Camp Practice, instruction builds on lessons learned in the 310 and refines small unit leadership skills, map reading, technical and written communication skills, and physical fitness. Includes three field exercises and a leadership laboratory. Preq: 310. Letter grade only. 3 hours and 1 hour lab.

400 Advanced Camp-Practicum (4) 240 contact hours of instruction and evaluation of leadership skills, group dynamics, communication skills, decision-making skills during the period between the Junior and Senior year. Preq: 310, 320. Letter grade only.

410 Command and Staff Functions (4) Command and staff duties and relationships including logistical, personal systems, efficiency reports, correspondence, training, command presentations, counseling, strategic force positioning, and noncombatant relationships. Preq: 310 and 320, 400 or consent of instructor. Letter grade only. 3 hours and 1 hour lab. F

420 Military Ethics and Law (4) Military profession, ethical reasoning, staff operations, military briefings, recruitment, leadership, military justice system, individual leadership, Law of War, Wartime. Preq: 310, 320, 400, 410 or consent of instructor. Letter grade only. 3 hours and 1 hour lab.

430 U.S. Military History, 1754 to the Present (3) (Same as History 451.)

483 Military Leadership Topics (1) Topics on principles and styles of military leadership. May be repeated for additional credit. 4 max credit hours. 4 maximum hours. Letter grade only. 3 hours and 1 hour lab. F

500 U.S. Military History, 1754 to the Present (3) (Same as History 451.)

543 Military Leadership Topics (1) Topics on principles and styles of military leadership. May be repeated for additional credit. 4 max credit hours. 4 maximum hours. Letter grade only. 3 hours and 1 hour lab.

620 Basic Military Science II (2) Introduction of basic leadership theory, principles and skills, with emphasis on effective oral communication. Students present a military skills subject briefing. Topics include rifle marksmanship, small unit communications, and land navigation. Leadership lab focuses on adventure training which includes rappelling, tactical formation, drill and ceremony, field exercises. Preq: U.S. citizen, freshman or sophomore standing. Letter grade only. F, Sp

130 Army Conditioning Program (1) Challenging instruction that concentrates on student's individual weaknesses and directly applies exercises designed to increase flexibility, endurance, strength, and cardiorespiratory endurance. Student also develops the ability to design and lead a fitness program. May be repeated.
320 Conducting II (2) Developing advanced band techniques. MULTIPLE RHYTHMS, MODERN BEAT PATTERNS AND THEIR VARIATIONS. STUDYING, ANALYZING AND INTERPRETATION OF THE FULL RANGE OF HUMAN EXPRESSION. THE LEADERSHIP OF THE ORCHESTRAL SECTIONS IN THE FULL RANGE OF HUMAN EXPRESSION. PREREQ: CONDUCTING I OR CONSENT OF INSTRUCTOR.

330 Music Methods for the Elementary School (3) Methods and materials for teaching music in the elementary grades. Primarily intended for music education majors. PREREQ: Consent of instructor and admission to Teacher Education Program. Letter grade only. F

340 General Vocal Music Methods (3) Methods and materials for teaching music in the elementary, middle and high schools. Intended for the instrumental music education major. Letter grade only.

350 Field Experience in Music Education (1) PREREQ: Consent of instructor and admission to Teacher Education Program. May be repeated. Maximum 3 hours. Satisfaction/No Credit only. E

400 Student Teaching in Music (12) Full-time teaching practicum in an approved public school. PREREQ: Admission to the teacher education program and completion of all Music Education courses required for the Bachelor of Music degree (four-year alternative) in Music Education. Coreq: Music Education 400.

401 Senior Seminar (0) Issues related to the music teaching profession as experienced in Student Teaching. Coreq: Music Education 400.

420 Music Methods for the Junior High School and Middle School (3) Methods and materials for teaching vocal, instrumental, and general music at the junior high school or middle school level. PREREQ: Admission to Teacher Education Program and consent of instructor. Letter grade only.

430 Music Methods for High School (3) Methods and materials for vocal and instrumental music at the high school level, including choral for the marching band. PREREQ: Admission to Teacher Education Program and consent of instructor. Letter grade only. F

440 Marching Band Techniques (2) Functions, organization, and direction of a school marching band. Letter grade only.

441 String Orchestra Pedagogy and Rehearsal Techniques (2) Function, organization and direction of a school orchestra program. Letter grade only.

482 Internship II: Grades K-12 (3-6) Demonstration of professional competence in planning, instruction and classroom management. Internship is completed in local public schools. PREREQ: Admission to Teacher Education Program. Satisfaction/No Credit only. Sp

490 Special Topics in Music Education (1-3) PREREQ: Consent of instructor, May be repeated. Maximum 9 hours. Letter grade only. E

493 Independent Study in Music Education (1-6) PREREQ: Consent of the department head. May be repeated. Maximum 9 hours. Letter grade only. E

MUSIC ENSEMBLE (708)

301-301 Woodwind Choir (1,1) May be repeated. Maximum 12 hours.

303-303 Small Jazz Ensemble (1,1) May be repeated. Maximum 12 hours.

304-304 Jazz Ensemble (1,1) May be repeated.

305-305 Studio Orchestra (1,1) May be repeated. Maximum 12 hours.

306-306 Trombone Choir (1,1) May be repeated.

309-309 Tubas Ensemble (1,1) May be repeated.

310-310 Percussion Ensemble (1,1) May be repeated.

311-311 Marimba Choir (1,1) May be repeated.

312-312 Baroque Ensemble (1,1) May be repeated.

314-314 Brass Choir (1,1) May be repeated.

315-315 Chamber Music Ensemble (1,1) May be repeated. Maximum 12 hours.

316-316 Steel Band (1,1) May be repeated.

320-320 U.T. Singers (1,1) May be repeated.

330-330 Chamber Singers (1,1) May be repeated.
MUSIC JAZZ (711)

110 Jazz Theory I (3) Development of jazz theory, including chord structure, chord progression, and melodic development. Prereq: Music Theory 110.

120 Analysis of Jazz Styles I (3) Individual improvisation and group analysis of jazz improvisation. Prereq: Consent of instructor.

130-140 Jazz Piano I, II (1.1) Development of piano skills in jazz improvisation, including识曲, chord progressions, and fundamental melody and rhythm principles. Prereq: Consent of instructor.

150-160 Jazz Pedagogy I, II (1.1) Development of skills and pedagogical methods for teaching of jazz improvisation. Prereq: Consent of instructor.

170-180 Jazz Pedagogy III, IV (1.1) Advanced study of jazz improvisation and pedagogical methods. Prereq: Consent of instructor.

190-200 Jazz Pedagogy V, VI (1.1) Advanced study of jazz improvisation and pedagogical methods. Prereq: Consent of instructor.

210-220 Jazz Improvisation I, II (2) Study and application of principles of improvisation, including识曲, chord progressions, and melodic development. Prereq: Consent of instructor.

MUSIC KEYBOARD (712)

110-120 Class Piano I, II (1.1) Development of keyboard skills in reading, technique, repertoire, harmony, and transposition. Must be taken in sequence. Prereq: Successful completion of music audition and theory placement exam. Intended for music majors and minors.

210-220 Class Piano III, IV (1.1) Continuation of 110-120. Prereq: Consent of instructor.

310 Fundamentals of Acting for Singers I (1) Development of basic skills in voice, stage movement, and character development. Prereq: Consent of instructor.

320-330 Composition I, II (3,3) Advanced study of composition and analysis. Prereq: Consent of instructor.

MUSIC TECHNOLOGY (713)

290 Sound Recording Techniques (3) Theory and applications of recording and reproduction of music. Topics include recording techniques, audio measurements, and digital audio. Prereq: Consent of instructor.

340 Introduction to Computer Music Transcription (3) Study of computer music transcription and computer music systems. Prereq: Consent of instructor.

390 Sound Synthesis Techniques (3) Advanced study of computer music systems. Prereq: Consent of instructor.

400 Ear Training Review (1) Review of basic skills in identification of musical elements. Prereq: Consent of instructor.

490 Improvisation (1-2) May be repeated. Prereq: Consent of instructor.

MUSIC THEORY (714)

100 Fundamentals of Music (3) Theory and practice of basic elements of music. Prereq: Consent of instructor.

110-120 Theory I, II (3,3) Comprehensive study of music theory and practice. Prereq: Consent of instructor.

130 Realization and transposition of music. Prereq: Consent of instructor.

140-150 Advanced Theory IV, V (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

160-170 Advanced Theory VI, VII (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

180-190 Advanced Theory VIII, IX (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.


230-240 Advanced Theory XII, XIII (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.


270-280 Advanced Theory XVI, XVII (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

290-300 Advanced Theory XVIII, XIX (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

310-320 Advanced Theory XX, XXI (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.


350-360 Advanced Theory XXIV, XXV (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

370-380 Advanced Theory XXVI, XXVII (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

390-400 Advanced Theory XXVIII, XXIX (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

410-420 Advanced Theory XXX, XXXI (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

430-440 Advanced Theory XXXII, XXXIII (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

450-460 Advanced Theory XXXIV, XXXV (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

470-480 Advanced Theory XXXVI, XXXVII (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

490-500 Advanced Theory XXXVIII, XXXIX (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

510-520 Advanced Theory XL, XLI (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

530-540 Advanced Theory XLII, XLIII (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

550-560 Advanced Theory XLIV, XLV (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

570-580 Advanced Theory XLVI, XLVII (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

590-600 Advanced Theory XLVIII, XLIX (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

610-620 Advanced Theory L, LI (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

630-640 Advanced Theory LII, LIII (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

650-660 Advanced Theory LIV, LV (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.


690-700 Advanced Theory LIX, LX (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

710-720 Advanced Theory LXI, LXII (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

730-740 Advanced Theory LXIII, LXIV (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

750-760 Advanced Theory LXV, LXVI (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

770-780 Advanced Theory LXVII, LXVIII (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

790-800 Advanced Theory LXIX, LXX (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

810-820 Advanced Theory LXXI, LXXII (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

830-840 Advanced Theory LXXIII, LXXIV (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

850-860 Advanced Theory LXXV, LXXVI (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

870-880 Advanced Theory LXXVII, LXXVIII (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

890-900 Advanced Theory LXXIX, LXXX (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

910-920 Advanced Theory LXXXI, LXXXII (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

930-940 Advanced Theory LXXXIII, LXXXIV (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

950-960 Advanced Theory LXXXV, LXXXVI (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

970-980 Advanced Theory LXXXVII, LXXXVIII (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

990-1000 Advanced Theory LXXXIX, CXX (3,3) Advanced study of music theory and practice. Prereq: Consent of instructor.

Courses of Instruction
NUCLEAR MEDICINE TECHNOLOGY (718)

Courses in this concentration are open only to qualified students who have completed the first three years of the Nuclear Medical Technology Curriculum, described in the College of Technology curricula section of this catalog, and who have been admitted to the Nuclear Medical Technology Program at UTMC.

410 Physics for Nuclear Medicine I (3) Nuclear physics, mathematics, and statistics. Survey of historic and current concepts of nuclear structure and reactions, and relationships between matter and energy, nuclear reactions, nuclear stability, production of radionuclides, radionuclide generators, decay schemes, and charts used in nuclear identification and behavior prediction. Mathematics and statistics topics include basic arithmetic theories, mathematics manipulations, and applied technical mathematics for use in radio active decay equations, dose calculations and concentration, and shielding calculations. Radiation protection, and other physical and chemical applications of mathematics to nuclear medicine are included. May not be substituted for Physics 471 or 472.

411 Nuclear Instrumentation (3) Course consists of: imaging, imaging, and instrument quality assurance. Non-imaging topics include basic radiation detection, their applications, functions, and limitations with overview of basic electronics, gas-filled detectors, statistics and counting, solid and liquid scintillation detection systems, semiconductor and instrument identification, and quality control. Imaging topics are instrumentation of imaging devices, including basic function, application, and quality control. Equipment familiarization in radiation detection and quality control data.

412 Radiopharmacy (2) Emphasis on basic chemistry and radiochemistry in nuclear radiopharmacy. Topics include radiopharmaceutical preparation and quality assurance, radionuclide production, and basic photographic film chemistry. Kinetics, biodistribution, and mechanisms of localization are also included, plus guidelines and rules of practice in a supervising radiopharmacy management and operation.

415 Physics for Nuclear Medicine II (2) Continuation of 410 with focus on radiobiology and radiation safety. Radiobiology topics include: introduction to radiation biology, the effects of ionization, and the cellular, systemic, and genetic responses to radiation, early and late somatic and genetic effects, biological effects of ionizing radiation, cellular and organ dose calculations, and benefit versus risk factor. Radiation safety topics include exposure terminology, dose limit recommendations, ALARA philosophy, federal and state regulations, radiation monitoring equipment, and methods and techniques for safe practice of nuclear medicine.

420-430-440 Clinical Nuclear Medicine I, II, III (4,4,4) Courses provide an in-depth exploration of nuclear medicine: I—Patient care, central nervous system, endocrine system, respiratory system and digestive system; II—neuroendocrine and hemodynamic system, cardiovascular system, musculoskeletal system, oncology/nuclear medicine, medical imaging, positron emission tomography, clinical quality assurance, pediatric nuclear medicine, radionuclide therapy, and overview and administration of nuclear medicine programs.

425 Computer Applications in Nuclear Medicine (3) Computer systems, applications, and components in quantitation in nuclear medicine. Topics include acquisition modes and limitations, image processing modes and limitations, and image quantitation with some attention to machine and language architecture and numbering systems.

450-460-470 Clinical Practicum I, II, III (4,4,4) Clinical instruction and radiation procedures conducted at UTMC and other clinical sites. Clinical instruction activities in imaging, instrumentation, radiotherapy, distance administration, radiation safety and protection, non-imaging procedures, patient care and preparation, computer applications, radionuclide therapy, and basic administrative and management procedures.

475 Nuclear Medicine Registry Review (2) Preparation for Nuclear Medicine Registry certification with emphasis on film interpretation and reporting in technical critique sessions.

NURSING (720)

All upper division nursing courses except 301, 314, and 340 are restricted to students who have progressed into the major. See Progression Policies and Procedures.

202 Health and Culture (3) An exploration of the beliefs and practices of various cultural groups within the United States in relation to health, illness and the healthcare delivery system. (Prerequisites: 1 lecture, 1 semester hour of anatomy and physiology.) F, Sp

301 Clinical Pharmacology I (3) Biochemical and pharmacological effects on the human body; positive and negative reactions to drugs and interaction effects between and among drugs. Prerequisite: Chemistry 101-106 and 6 semester hours of anatomy and physiology. F

302 Foundations of Professional Nursing (5) History, philosophy, and scope of nursing practice with emphasis on communication, therapeutic interventions, and coordination of care. Nursing care is defined by the nursing process. Clinical laboratory experiences provide the opportunity for the application of these processes in the care of adult clients in selected health care settings. 2 lectures, 3 labs. Coreq. or Prereq: 301, 304, 306, F

304 Nursing Assessment and Wellness Promotion (4) Developmental, psychosocial, cultural, environmental, spiritual, family, and physical dimensions of health assessment. Collection and analysis of data, and application of assessment data in formulation of wellness-oriented nursing diagnoses and use of the nursing process in planning and implementing the plan of care. Emphasis is placed on the role of the profession in wellness promotion and education. Laboratory sessions for development of nursing assessment skills. Corequisites are: 301, 304, 411, 431, and 433. 3 lectures, 1 lab. F

305 Transition to Professional Nursing (3) Current status of professional nursing utilizing the nursing process in a changing health care delivery system. Philosophy and conceptual framework of the baccalaureate nursing program and selected physiological and behavioral deviations demonstrated by clients whose health problems require inpatient services. Prerequisite: all 300 level nursing courses or the equivalent. 3 lectures, 1 lab. F

316 Health Deviation Concepts II (4) Continuation of 315. With emphasis on clinical application to patients with physiologic and behavioral deviations un-derlying or associated with complex and critical illnesses. Prerequisite: 301, 306. F, Sp

330 Nursing of Adults (6) Didactic and clinical laboratory experiences related to assessment of patients in early, middle and late adulthood with various health needs. Emphasis on the planning of nursing care, prioritization, and delivery of care. Corequisites: 2 lectures, 4 labs. Corequisites: 301, 302, 304, 306 or RN status. F, Sp

332 Community Health Nursing: Aggregates (3) Introduction to the history, philosophy, and scope of community health nursing. Aggregates associated at risk for illness, disability, or death. Application of the nursing process to the care of these aggregates with emphasis on health education for health promotion and disease prevention. 1 lecture, 1 seminar, 1 lab. Prerequisites: 301, 302, 304, 306 or RN status. Coreqs: 316, 330 or consent of instructor.

401 Family Health Nursing (5) Nursing needs of families in health and crisis. Provision of comprehensive care to families in the childbearing and childrearing phases of family development. Application of theories of human growth and development, family dynamics, and crisis intervention to provision of nursing care to families experiencing normal pregnancy and child birth and to those experiencing such health problems as complications during pregnancy, congenital anomalies, high risk birth, disturbed parent-child relationships, or gynecologic disturbances. 3 lectures, 3 lab. Prerequisites: All 300 level clinical nursing courses or RN status. F, Sp

405 Professional Nursing Seminar (2) Critical examination of legislative, legal, ethical, social, and educational issues and trends that have immediate or long-range implications for professional nursing practice. Prerequisite: All 300 level clinical nursing courses or RN status.

411 Psychosocial Long-Term Nursing (5) Nursing care needs of those whose long-term illness is developmental, behavioral, or long-term nature. Equal emphasis on prevention, wellness promotion, and rehabilitation. Nursing care needs of individuals with a psychiatric and chronic illness emphasis in a variety of acute, extended care, and rehabilitation facilities. 3 lectures, 3 lab. Prerequisite: All 300 level clinical nursing courses or RN status.

414 Community Mental Health Nursing (5) Nursing needs of clients and groups with psychosocial and/or long-term health problems. Clinical experiences provide opportunities for students to work with groups in the delivery of healthcare service to clients and groups in a variety of acute, extended care, and community settings. 3 lectures, 3 lab. Prerequisites: All 300 level nursing courses. For non-nurse MSN students only. Su

415 Family/Community Health Nursing (5) Application of the nursing process to individuals, families, and groups in the childbearing/rearing stages of development and in the experiences of family members and/or patients in the hospital and community settings. 3 lectures, 3 lab. Prerequisites: All 300 level nursing courses or the equivalent or RN status. F, F

416 Nursing of Adults (6) Didactic and clinical laboratory experiences related to the nursing care of infants, children, and adolescents. Emphasis on application of physiological, sociocultural, behavioral, and developmental concepts for the provision of nursing care in various settings. 2 lectures, 2 lab. Prerequisites: All 300 level nursing courses. For non-nurse MSN students only. Su

431 Nursing of Children (4) Theoretical component and clinical laboratory experiences related to the nursing care of infants, children, and adolescents. Emphasis on application of physiological, sociocultural, behavioral, and developmental concepts for the provision of nursing care in various settings. 2 lectures, 2 lab. Prerequisites: All 300 level nursing courses or the equivalent or RN status. F, Sp

433 Community Health Nursing: Individuals and Families (3) Exploration of political, social, economic, environmental, ethical issues, related to community health nursing. Applications of nursing and epidemiologic processes to the care of individuals and families within the home and community. Emphasis on health promotion, prevention, and control of communicable diseases. 1 lecture, 1 seminar, 1 lab. Prerequisites: All 300 level nursing courses or RN status.

440 Leadership and Management in Nursing (3) Introduction to leadership concepts related to leadership and management in the delivery of nursing care services. Prerequisites: All required 300 level courses.

441 Introduction to Clinical Research (3) Application of research concepts related to patient care in clinical research settings. 1 lecture, 1 seminar, 1 lab. Prerequisites: All 300 level nursing courses.

442 Advanced Clinical Research (3) Application of research concepts related to patient care in clinical research settings. 1 lecture, 1 seminar, 1 lab. Prerequisites: All 300 level nursing courses.

443 Community Health Nursing: Individuals and Families (3) Exploration of political, social, economic, environmental, ethical issues, related to community health nursing. Applications of nursing and epidemiologic processes to the care of individuals and families within the home and community. Emphasis on health promotion, prevention, and control of communicable diseases. 1 lecture, 1 seminar, 1 lab. Prerequisites: All 300 level nursing courses or RN status. F, Sp

444 Management and Leadership in Nursing (3) Development of the nurse leader and manager who is able to make decisions and effectively manage in the delivery of nursing care services. Prerequisite: All required 300 level courses.
381 Professional Leadership Issues (3) Survey of legislative, legal, ethical, social issues and implications for professional nursing. Prereq: 201, 311, 341 or RN status. Sp

371 Nursing Theory and Research (3) Theoretical foundations for nursing practice and research. Language of research, design, and statistical analysis. Prereq: 201, 311, 341, or consent of instructor. Sp

361 Health Maintenance and Restoration Across the Life Span (5) Focus on use of the nursing process to support and care for individuals experiencing health challenges with acute, chronic, or life-threatening illness. Prereq: 211, 311, 333, 341, or RN status. F, Sp

351 Pharmacology (2) Biochemical and pharmacological effects of drugs on the nervous system. Prerequisites: 100, 310, or consent of instructor. Prereq: 201, 311, 341, or consent of instructor. F

350 Nutrition (3) Food and nutritional principles and practices. Nutrition for health maintenance. Prereq: 100, 310, 341, or consent of instructor. Prereq: 201, 311, 341, or consent of instructor. F

341 Health Promotion and Maintenance in Community (2) Focus on the use of the nursing process to support and care for individuals experiencing health challenges with acute, chronic, or life-threatening illness. Prereq: 201, 311, 341, or consent of instructor. F

333 Health Assessment (2) Theory and laboratory practice in the performance of health assessments. Prerequisites: 100, 310, 341, or consent of instructor. Prereq: 201, 311, 341, or consent of instructor. F


302 Life Span Nutrition (3) Physiological development and psychosocial factors that influence nutrient needs and selection of foods across the life span. Prereq: 100, 201, 310, or consent of instructor. F

301 Basic Landscape Plants (3) Identification, classification, adaptation, culture and landscape design uses of basic ornamental plants. Prereq: 100, 310, 341, or consent of instructor. F

300 Nutritional Horticulture and Landscape Design (4) Holistic approach to landscape design using principles of nutrition and horticulture. Prereq: 100, 201, 310, 341, or consent of instructor. F
PHYSICAL EDUCATION ACTIVITY PROGRAM (764)

200 Special Topics (1-2) Selected topics in various activities not covered in the regular program. When content varies, may be repeated. Maximum 6 hours.

202 Badminton (1) Fundamental badminton technique, game strategy, and rules for singles and doubles play.

206 Bowling (1) Introduction to ball selection, approach, spot bowing, rules, scoring, etiquette, and basic terminology necessary for enjoyable recreational bowling.

211 Golf (1) Introduction to chipping, putting, full swing, rules, etiquette, and scoring necessary for enjoyable recreational play.

213 Ice Skating (1) Beginning skills and etiquette in ice skating. Satisfactory/No credit grading only.

216 Martial Arts (Special Topics) (2) Special Topics. Selected topics in various forms of martial arts, including but not limited to kickboxing, karate, and tai chi. When content varies, may be repeated. Maximum 6 hours.

222 Paddleball (1) Introduction to forehand, backhand, drop, drive and volleys, and court work. Satisfactory/No credit grading only.

223 Personal Safety and Self-Defense (1) Develop and enhance the options of self defense so they may become viable considerations for personal safety. Satisfactory/No Credit grading only.

224 Physical Fitness: Conditioning (1) Program of flexibility, strength, and cardiovascular endurance through exposure to various exercise forms. Satisfactory/No Credit grading only.

226 Physical Fitness: Exercise to Music (1) Total workout to music with lecture emphasis on basic fitness components of flexibility, strength, and cardiovascular fitness.

226 Exercise and Weight Control (1) Fitness activities and basic fundamentals of nutrition for students interested in losing weight: includes body composition assessment and instruction on achieving a goal weight.

229 Physical Fitness: Jogging (1) General factors on physical fitness with emphasis on the importance of cardiovascular fitness through jogging.

230 Physical Fitness: Swimming (1) Introductory course outlining basic principles of fitness, evaluation, and workout design in the aquatic environment.

231 Physical Fitness: Walking (1) Course for those wishing to begin a fitness program: includes measurement and interpretation of fitness components, including body composition, cardiorespiratory fitness, low back function and nutrition.

232 Racquetball (1) Pass, kill, ceiling shots, and basic serves. Singles and doubles strategy, necessary for recreational play.

232 Racquetball II (1) Stroke refinement. Forehand and backhand kill shots, advanced strategy, and introduction to competitive play.

234 Soccer (1) Introduction to individual and team fundamentals, rules, and strategy.

235 Social Dance (2) Popular ballroom dance forms such as the swing (shag), foxtrot, cha cha, tango and rumba.

236 Softball (1) Introduction to individual and team fundamentals, rules and strategy.

239 Beginning Swimming (1) Includes skills in the American Red Cross basic swimming course for the non-swimmer.

240 Intermediate Swimming (1) Crawl stroke, elementary backstroke, side stroke, back crawl, breast stroke, entry and turn.

244 Tennis I (2) Introduction to forehand, backhand, serve, volley, rules, scoring, and simple strategy.

245 Tennis II (1) Development of accuracy and improved technique of ground strokes and serve; introduction to smash, spin serve, and advanced strategy.

248 Table Tennis (1) Beginning table tennis skills including forward and backward rolls, twisting, balance, agility, and combinations.

250 Tumbling II (1) Front and back handstands, front and back somersaults, and combinations.

251 Volleyball (1) Introduction to individual and team fundamentals, rules, and strategy.

252 Weight Training (1) Introduction to the principles of strength development for large muscle groups through the use of free weights and machines.

254 Yoga and Relaxation (1) Introduction to yoga and various forms of relaxation, with the majority of class time spent learning and refining the postures.

255 Water Safety Instructor (2) Prepares individuals to teach American Red Cross basic swimming and personal safety courses. Satisfactory/No Credit grading only.

259 Snow Sking (1) Development of skills necessary to balance, walk, and slide on skis. Learn ski etiquette and "Skier's Responsibility Code." Satisfactory/No Credit grading only.

260 Western Dance (1) Popular western dance forms including line dances, western social dances, mixers and couples.
401 A Survey of Physics (3) A survey of physics from earliest times to the present, emphasizing the unifying philosophical and mathematical principles. Classical theories: gravitation, electromagnetism, and various forms of quantum mechanics, quantum electro-dynamics, and general relativity. Recent topics: particle physics, and their impact on modern society and the practice of physics from a value-oriented perspective. Written reports on important original research involving problems combining different fields of classical physics, and a final oral and written report on some independent study. Prereq: Senior standing or consent of instructor.

410 A Survey of Physics (3) Modern principles of quantum mechanics and methods of calculation. Solution of the Schrödinger equation for simple systems. Application to atomic, molecular, nuclear, and condensed matter physics. Must be taken in sequence. Prereq: 301 or 302 and consent of instructor. 3 hours lecture and 1 hour lab.

413 Electricity and Magnetism (3,3) Electrostatics, magnetostatics, coupled electric and magnetic fields, Maxwell's Equations, electromagnetic waves and radiation. Prereq: 136 or 138 or 232 and consent of instructor. 3 hours lecture and 1 hour lab.

414-420 Team Research Project (3,3) Student teams will carry out major experimental or computational projects. The teams in consultation with the instructor will choose the topics and develop a plan for the project. Each team will conduct several oral presentations in an independent manner and produce a final written report. Must be taken in sequence. Prereq: 361, 461.

461-462 Modern Physics Laboratory (3,3) 461 Introduction to fundamental and modern techniques in experimental physics, and to the theory of measurement and data analysis. Selected experiments in nuclear, atomic, molecular and solid state physics, and modern optics. Prereq: 301 and either 461 or 411, 462. 461-Advanced experiments and experimental techniques in modern physics; experimental teamwork. 462. Through continuous experimental verification of theoretical predictions, students will write and present the results of the experiments. Prereq: 351. 4 hours lecture per week.

490 Senior Seminar (1,3) Topics of current interest. May be repeated with consent of department. Maximum 6 hours.

491 Foreign Study (3-15)

492 Off-Campus Study (3-15)

493 Research and Independent Study (1-3) Research and study in a field of the student's choice. Consent of department required. Maximum 6 hours.

PLANT AND SOIL SCIENCES (792)

200 Current Topics in Environmental Science (1) Lecture or seminar presentations on current environmental issues and events in Environmental Science.

210 Introduction to Soil Science (3) Differences in soils; soil genesis, physical, chemical, and biological properties of soils; soil profile, of soil to land use and pollution; soil management relative to tillage, erosion, moisture, temperature, aeration, fertility and plant nutrition. Prereq: One semester chemistry. 2 hours lecture and one 2-hour lab. F, Sp.

230 Introduction to Crop Science and World Crops (3) Introduction to world crop systems. Emphasis on production technology, origin and development, environmental interactions, plants and human nutrition, ecological processes of sustainability, current technology, and practices of crop production. Prereq: One year biological science. 2 hours lecture and one 2-hour lab.

292 Soil Morphology (1) Intensive course involving describing, classifying and interpreting soils in preparation for regional and national soil judging contests. Prereq: Consent of instructor. May be repeated. Maximum 4 hours. 1 hour lecture and 1 hour lab.

310 Soil Science (3) In-depth examination of fundamental properties of soils and their applications to agricultural and environmental soil science. Topics include soil biotechnology, and physical, chemical, biological properties; soil genesis and classification, management of soil resources. This course is primarily for PSS majors. 2 hours lecture and one 3-hour lab. A 3-day, weekend field trip is required. Prereq: and Chemistry 130 or equivalent. Sp.


315 Soil and Water Conservation (3) Hydrologic, agronomic, and engineering principles applied to resource management problems including flood and erosion control, drainage, and water quality. Prereq: 210. 2 hours lecture and 1 lab. (Same as Biosystems Engineering 315.) Sp.

330 Crop Science (3) Principles of crop science for Plant and Soil Sciences majors. Principles of production and management of crops, fruit, vegetable, and specialty crops. Emphasis on environmental factors as they affect basic plant physiology related to important cultural resource-related aspects of crop and their environments. Prereq: Botany 120, Coreq. 210. 2 hours lecture and one 2-hour lab. Sp.

334 Weed Management (3) Principles of weed interference, integrated management, and environmental behavior, specific recommendations for various crop and non-crop situations. Prereq: 210. 2 hours and 1 lab. F.

350 Biodiversity, Germplasm Conservation and Plant Improvement (3) Basic considerations of biodiversity and germplasm resources and germplasm conservation efforts. Includes germplasm resources and effects of plant reproduction systems on improvement for utilization in plant breeding systems as well as germplasm conservation efforts. Prereq: Botany 120 or equivalent. 2 hours lecture and one 2-hour lab. F.

422 Conservation of Soil and Water (3) Principles of soil and water conservation. Prereq: computer programming skill. 3 hours and 2 hours lab. F.

424 Soil Genesis and Classification (3) Soil genesis and formation; observing and describing morphology of agricultural and forest soils; chemical and physical properties, classification, 2-weekend field trips. Prereq: 310. 2 hours and 1 lab. F.

431 Environmental Soil Chemistry (3) Composition and structural properties of soils and processes that govern fate and behavior of chemicals in soil. Emphasis on environmental soil chemistry. Topics include: clay mineralogy; soil organic matter; soil degradation and stability; aqueous speciation; surface chemistry; ion exchange, adsorption, and desorption; metal adsorption; and soil acidity, alkalinity, and salinity. Prereq: 310 and Chemistry 110 or 112, or consent of instructor.

434 Soil, Land Use and the Environment (3) Soil as an environmental component and soil properties affecting land use. Soil as a resource in development planning including planning aspects of site selection for land use, soil survey and resource data in land use planning, land use recognition and prevention of soil erosion. Prereq: 310 or consent of instructor. Sp-A.

453 Physiological and Ecological Agroecosystems (3) Plant physiology and ecology applied to crop production and management. Emphasis on plant physiology and ecology principles as they relate to crop production practices from seed to harvest and harvesting and branding. Interactions of crops with their environment and agroecosystem. Prereq: 330. 2 hours lecture and one 2-hour lab. F.

462 Bioclimatology (3) Solar energy budget; interactions between global, regional and local climates and biological systems; interactions of macro- and microclimate, and their modification; automated weather station data collection and interpretation; biological responses to climatic stresses; climate variation and change and their effects on biological systems. Prereq: One year of physical or biological science, junior standing. 3 hours. F-A.

493 Principles of Plant Breeding (3) Genomic principles and methods used in the development of crop varieties. The design of breeding programs and the use of genetic improvement in crop improvement. Prereq: 210. 3 hours lecture and one 2-hour lab. F.

471 Statistics for Biological Research (3) Notation, descriptive statistics, probability distributions, confidence intervals, student's t and chi-square tests, analysis of variance, mean separation procedures, linear regression and correaltion. Prereq: Math 125 or equivalent. 3 hours and 1 rec. F.

475 Principles of Plant Breeding (3) Principles of plant breeding and genetic improvement as applied to crop improvement. Prereq: 210. 1 hour lecture and one 2-hour lab. F.

480 Political Science (801)

101 United States Government and Politics (3) Introduction to fundamental institutions and processes of American National Politics including the Constitution, voting, the Presidency, the Congress and the courts.

102 Introduction to Political Science (3) Introduction to politics and political systems.
Courses of Instruction

437 Honors Seminar (1) Classic works in psychology: professional and ethical issues in psychology; presentations of faculty scholarship and honors students' projects. Meets weekly (May be repeated) (maximum 8 hours). Prereq: Consent of instructor.

360 Social Psychology (3) Theories, methods, and findings of research concerning individual behavior in a social context. Prereq: 110. E

367 Psychology Honors Project (3) Independent study in哪个学科 leads to the honors thesis. Students must have plans of study approved by their mentor prior to enrollment. S/NC only. May be repeated (maximum 15 hours). Prereq: Consent of Instructor.

370 Ethology and Sociobiology (3) (Same as Ecology and Evolutionary Biology 370). S, Sp

382 Contemporary Topics in Psychology (3) Current issue or problem, such as architectural psychology, impact of technology, artificial intelligence, or stereotypes. Different and development of language. Prereq: 110 and upper division standing (30 or more semester hours). Maximum of 6 hours may be applied toward major. May be repeated.

385-395 Statistics in Psychology (3) Descriptive statistics; logic of hypothesis testing; basic parametric and nonparametric tests. Not open to students with credit in Math 115 or Statistics 201. E

395 Methods of Research in Psychology (3) Fundamentals in the design and conduct of research, including systematic observation, experimentation, quasi-experiments, and program evaluations. Focus on both laboratory and natural settings. Prereq: 110 and Math 250 or Math 115 or Statistics 201 or Junior standing (60 semester hours). F, Sp

399 Supervised Research and Field Work (1-3) Field experience in community-based research and service settings. Prereq: Consent of instructor. Note: Any combination of 6 hours of 399, 499, 491, 492, 493 may be used in major. An additional 6 hours may be used as elective. May be repeated. E

400 Cognitive Psychology: Language and Symbolic Processes (3) Theory of knowledge, explaining, and understanding. Directed and associative thinking, memory, problem-solving, and concept-formation. Nature, use, and development of language. Prereq: 110 and Junior standing (60 semester hours) or consent of instructor. F

409 Group Facilitation (3) Study of theory and techniques through supervised experience in small groups. Prereq: 110 and Junior standing (60 semester hours) or consent of instructor. May be repeated. Maximum 6 hours.

410 Sensory Processes and Perception (3) Phylogeny and phylogenetic development. Perception. Emphasis on audition and vision. Prereq: 110 and Junior standing (60 semester hours) or consent of instructor. Prereq: Psych 355 or Math 115 or Statistics 201 or Junior standing. Sp

415 Psychology of Religion (3) History of the psychology of religion with an examination of various philosophical and empirical orientations. Exploration of the psychological function of religion for individuals and society. Prereq: 110 and Junior standing (60 semester hours) or consent of instructor. (Same as Religious Studies 415.)

420 History and Systems of Psychology (3) History of psychological thought: classical approaches and recent developments. Prereq: 110 and Junior standing (60 semester hours) or consent of instructor or Graduate standing. Sp

424 Psychology and the Law (3) Psychological aspects of legal systems. Prereq: 110 and Junior standing (60 semester hours) or consent of instructor.

430 Health Psychology (3) Psychological factors related to health and illness, including stress, personality, and environmental factors. Emphasis on prevention and interventions to physical illness. Prereq: 110 and Junior standing (60 semester hours) or consent of instructor.

434 Psychology of Gender (3) Biological, psychological, and social factors in gender. Importance of gender roles and stereotypes for behavior and experience. Prereq: 110 and Junior standing (60 semester hours) or consent of instructor. (Same as Women's Studies 434.)

440 Organizational Psychology (3) Social-psychological analysis of organizations, emphasizing role theory and systems theory. Prereq: 110 and 360 and Junior standing (60 semester hours) or consent of instructor. (Same as Management 440.)

445 Measurement and Testing (3) Theory of test construction and psychological measurement. Statistical methods in measurement. Survey of testing existents. Prereq: 110, Psychology 135, or Math 115 and Statistics 201 or Junior standing (60 semester hours) or consent of instructor.


450 Comparative Animal Behavior (3) (Same as EEB 450). F

459 Comparative Animal Behavior Laboratory (3) Coreq: 450. (Same as EEB 459). F

461 Physiological Psychology (3) Nervous system and psychological correlates of behavior. Biological basis of emotion, learning, memory and stress. Prereq: 110 and Junior standing (60 semester hours) or consent of instructor.

470 Theories of Personality (3) Major theories of human personality and their development. Prereq: 110 and Junior standing (60 semester hours) or consent of instructor. F, Sp

475 Adolescent Development (3) Theoretical perspectives and empirical research findings pertinent to adolescent development. Prereq: 110 and Junior standing (60 semester hours) or consent of instructor.

480 Theories of Learning (3) Classical and current approaches to learning and cognition. Prereq: 110 and Junior standing (60 semester hours) or consent of instructor.

482 Topics in Psychology (3) Intensive analysis of special topics, such as African-American Psychology or evaluation of positionality. Prereq: 110 and Junior standing (60 semester hours) or consent of instructor. Prereq: No more than 6 hours of Psych 382 and Psych 482 may count toward the major. An additional 6 hours of Psych 382 and 482 may count toward major. May be repeated. Prereq: Consent of instructor.

489 Supervised Research (1-9) Prereq: Junior standing (60 semester hours) and consent of instructor. Note: Any combination of 6 hours of 399, 499, 491, 492, 493 may be used in major. An additional 6 hours may be used as electives. May be repeated. E

491 Foreign Study (1-15) Prereq: Junior standing (60 semester hours) and consent of instructor. Note: Any combination of 6 hours of 399, 499, 491, 492, 493 may be used in major. An additional 6 hours may be used as electives. May be repeated. E

492 Off-Campus Study (1-15) Prereq: Junior standing (60 semester hours) and consent of instructor. Maximum 12 hours in 399, 499, 491, 492, and 493 may be applied toward major. Note: Any combination of 6 hours of 399, 499, 491, 492, 493 may be used in major. An additional 6 hours of Psych 382 and 482 may be used as electives. May be repeated. E

493 Independent Study (1-15) Prereq: Junior standing (60 semester hours) and consent of instructor. Note: Any combination of 6 hours of 399, 499, 491, 492, 493 may be used in major. An additional 6 hours of Psych 382 and 482 may be used as electives. May be repeated. E

496 Senior Seminar: Great Ideas in Psychology (3) Key ideas that have shaped conceptions of humankind. Exploration of historical development, scientific evolution, and larger-scale context. Prereq: Senior standing (90 semester hours). Writing emphasis course. F, Sp

310 Environmental Health and Control (3) Contempory principles of environmental protection and producing agents in our environment. Emphasizes concepts for effective application of control principles to vocational endeavors and leisure time activities. Includes: Drinking water quality (chemical, physical and biological), waste management (liquids, solid and hazardous), vector control, safe food management, recreational sanitation, and safety to include pool management, shelter hygiene (homes, child care, schools, hospitals, etc.), occupational health and safety. F, Sp

400 Consumer Health (3) (Same as Health 400.)

410 Worksite Health Promotion (3) Foundation of health promotion programs delivered in the workplace that involve around issues related to employee health and management. Emphasis on theory, program design, implementation, and evaluation of the health promotion specialist. Prereq: H300. F, Sp

493 Directed Independent Study (1-3) Individual study of selected issues. Prereq: Consent of instructor. May be repeated. Maximum 6 hours. E

PUBLIC RELATIONS (841)

270 Public Relations Principles (3) Theories and principles of public relations. Overview of public relations management of business, government, institutions and organizations. Brief case studies and public relations projects. F, Sp

320 Public Relations Communications (3) Mechanisms and procedures for various media to achieve organizational goals. Overview of the area of public communication and persuasion theories. Focus on implementation of research-based and planned and techniques in a lab setting. Prereq: 270 or ADV 260, and Journalism 200, or consent of instructor. E

370 Public Relations Cases (3) Oral and written analysis of current and classic case studies in public relations. Emphasis on research, the arts, professional organizations, public policy, and forms of public relations. Methods of communication and persuasion. Prereq: 270. F

412 Opinion Writing (3) (Same as Journalism 412.)

416 Issues in Public Relations (3) Topics vary. May be repeated. Maximum credit 6 hours. Prereq: Consent of instructor.

470 Public Relations Campaigns (3) Research, planning, and evaluation of public relations campaigns. Oral and written presentation of a public relations project from inception to completion. Emphasis on out-of-class work. Prereq: 270 and 370 or consent of instructor. E

491 Foreign Study (1-15) Advance approval of hours and topics by advisor required for registration. May be repeated for maximum of 15 hours credit.

492 Field Experience (1-2) Approved internships and other practised practice in journalism and public relations. May be repeated for a maximum of 6 credit hours. Prereq: 320, senior standing, and consent of instructor. Satisfaction/No Credit grading only. E

493 Independent Study (3) May be repeated for a maximum of 6 hours. Prereq: Consent of instructor.

READING EDUCATION (847)

329 Teaching Developmental Reading in the Elementary and Middle Schools (3) Methods and background on how to teach reading skills, comprehensions, study skills, and how to use materials such as units on phonics, evaluation, and basal readers. For BS Education majors only. Prereq: Admission to Teacher Education Program. F, Sp

430 Elementary and Middle School Developmental Reading Instruction (3) Word recognition (including phonics), comprehension, evaluation, and materials. Open to students who have had recent course in reading methods. Prereq: Admission to Teacher Education Program. F, Sp

434 Topics in Reading Education (1-6) May be repeated. Maximum 6 hours. Prereq: Admission to Teacher Education Program as an inside in Reading Education. E
RECREATION AND TOURISM MANAGEMENT (554)

201 Recreation and Tourism Foundations and Leadership (4) Introduction to theories and principles of recreation and tourism focusing on understanding concepts, philosophy, and professional practices in the leisure service industry. Prerequisites: Theories and practices of recreation leadership. F, Sp

202 Practicum in Recreation and Tourism Management (2-3) Supervised practice in approved agencies offering programs in recreation and tourism. Each hour of credit requires 40 clock hours of work. For majors only. Prerequisites: Permission of instructor. SNC only. E

310 Development and Evaluation of Recreation and Tourism Programs (3) Essential elements and principles of various types of recreation and tourism programs. Emphasis on development of program objectives. Practical and comprehensive program designs and evaluation for popular leisure facilities with students' areas of interest. Prerequisites: RTM 110, Junior standing, GPA required for admission to major. A-F, Sp Su

320 Theoretical Recreational and Special Populations (3) Principles, concepts, historical development of recreation, therapeutic recreation, and leisure services for special populations. Examination of legislation, attitudes, behaviors, and services of the mainstreaming, advocacy, as related to leisure fulfillment. Prerequisites: Consent of instructor. F

325 Therapeutic Recreation and Lifestyle Planning (3) Emphasis on how therapeutic recreation specialists can use therapeutic lifestyle planning and delivery of therapeutic recreation service for individuals with disabilities. Prerequisites: Consent of instructor. F

390 Practicum in Recreation and Tourism Management (2-3) Supervised practice in approved agencies offering career-related, experiential, and supervised practice in recreation and tourism. Each hour of credit requires 40 clock hours of work. Only for majors in Recreation and Tourism Management. Prerequisites: RTM 231 and permission of instructors. SNC only. E

410 Management Concepts of Recreation, Tourism, and Sport Programs (3) Principles for operationalizing, recreational, tourism, and sport related programs. Units address utilizing research as a management tool, assessing program costs, facility utilization, and contemporary management concepts. Prerequisites: RTM 110, 310, or consent of instructor. A-F, F

415 Development and Maintenance of Recreation, Tourism, and Sport Programs (3) Principles of design, planning, operating, and administrative maintenance of various facilities. Elements of risk management and safety are incorporated into the design process. Prerequisites: RTM 310, or consent of instructor. F

420 Principles of Therapeutic Recreation (3) Principles and practices in therapeutic recreation, including activity analysis, activity and program selection, individual and group program assessment, treatment plans, documentation, and professional issues. Prerequisites: 320 or consent of instructor. F

425 Therapeutic Recreation Programming (3) Principles and practices of therapeutic recreation programming for individuals with disabilities. Focus is on the social, interpersonal, and behavioral aspects of working with individuals in inclusive therapeutic recreation programs. Includes lab. Prerequisites: 320 and/or consent of instructor. F, Sp

430 Organization and Administration of Leisure and Tourism Services (3) Principles of administration applied to professions in leisure service offered by public, private, and/or commercial enterprises. Organization structures, personnel management, evaluation, legal aspects, and professional ethics. Introduction to budgeting and fiscal procedures. Permission of instructor. F

440 Dimensions of Commercial Recreation and Tourism Enterprises (3) Organizational structures, design, delivery systems, financing, private enterprises and operating selected program in a variety of settings. Special attention is given to market positioning, program planning, and economic impact. Prerequisites: RTM 110, Junior Standing or consent of instructor. A-F, Sp

450 Special Topics in Leisure Education and Tourism (1-4) Development of special topics in Recreation/ Therapeutic Recreation and Tourism. A-F, May be repeated.

470 Tourism and Leisure Industries (3) An examination of the relationship between tourism and various sectors of the economy, both natural and developed, and the economic impacts of these ventures. Sociocultural impacts upon the environment and how the various segments of the local population. Sp

490 Internship in Recreation and Tourism Management (12) Full time practice in approved recreation, sport or tourism management agency. Emphasis on supervised and professional experiences. Prerequisite: RTM 290, at least 300 level RTM courses, Senior Standing, GPA required for major. SNC, E

492 Directed Independent Studies in Recreation and Tourism Management (1-3) May be repeated.

REHABILITATION AND DEAFNESS (855)

223 American Sign Language I (3) Expressive and receptive skill development in sign communication. Video text and demonstration used. Class conducted totally in sign. This course is a prerequisite for 224.

224 American Sign Language II (3) Expressive and receptive skill development in sign communication. Video text and interactive training used. Class conducted totally in sign. May be taken in sequence. Prerequisite: 223.


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) for students of all ages with varying communication styles. Selecting appropriate to the context. Attention is also given to cross-cultural communication.

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

415 Development of Deaf/Hard of Hearing (10) Language problems of hearing impaired contrasted with scope and sequence of normal language development. Formal linguistic systems used to describe language development problems. F


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

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

425 Introduction to the Psychology of Deafness and the Deaf (1-3) For students 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.

431-432 American Sign Language III and IV (3,3) Sequence stresses fluency of expressive and receptive sign communication skills. Using language in context is emphasized. Grammar, structure of ASL, and cultural implications of the deaf community. Must be taken in sequence. Prerequisite: 431 or consent of instructor. Prerequisite: 432 for 431. Co-requisite of instructor.

435 Directed Independent Study (1-3) and specialized area. Prerequisites: Consent of instructor. May be repeated. Maximum 6 hours. SNC or letter grade.

RELIGIOUS STUDIES (863)

101 World Religions in History (3) Introduction to religion in culture and society, including examination of religious traditions from China, India, and the Mediterranean world. Writing-emphasis course.

102 The Comparison of World Religions (3) Introduction to religion in culture and society, focusing on cross-cultural interpretation and the treatment of common problems and themes within religious traditions. Writing-emphasis course.

232 Varieities of Religious Community (3) How different forms of religious communities (sects, tribes, sects, monasteries, families, etc.) have sought to reject, transform, or dominate their culture and society. (Same as Sociology 232.)

300 Ways of Understanding Religion (3) Sources and methods used in the study of religion and religions; analysis of problems for the study of religion. Writing-emphasis course.

301 Religious Myth, Symbol, and Ritual (3) Distinctive modes of religious expression and analysis of theoretical approaches appropriate to their particular social and cultural functions in religions.

302 Anthropology of Religion (3) Religions of selected non-literate peoples. Role of religion in their social and cultural systems. (Same as Anthropology 302.)

305 Modern Religious Thought (3) Major themes, thinkers, and trends of nineteenth and twentieth century religion. Variable content. May be repeated. Maximum 6 hours.

309-310 Elementary Classical Hebrew (3,3) Basic elements of Hebrew phonology, script, morphology and syntax. Introduction to basic elements of text, form, and literary criticism.

311 Ancient Hebraic Religious Traditions (3) Development of ancient Israelite and early Jewish traditions with emphasis on those concerning the Exodus, Devidc kingship, and Zion in the interpretive and apologetical context. Writing-emphasis course. (Same as Judaic Studies 311.)

312 Religious Aspects of Biblical and Classical Literature (3) Analysis of how oratory modes of literary study enhance appreciation of biblical and classical material. Ways in which the western literary tradition has appropriated and reconstituted the biblical and classical heritage. Writing-emphasis course. (Same as Judaic Studies 312.)

313 Religious Aspects of Modern Literature (3) Issues raised for religious inquiry in contemporary literature. Relation of religious and moral considerations to problems of literary analysis; relation between religious language and forms of human expression (symbol, metaphor, myth, image) identified in study of literature. Writing-emphasis course.

315 Reformations Europe, 1500-1650 (3) (Same as History 315.)

319 Sociology of Religion (3) (Same as Sociology 319.)

320 Women and Religion (3) Concepts of gender in religious traditions, religious, social and psychological dimensions of gender, feminisms (e.g., the God-ness, God the Father) that shape men's and women's experiences; contemporary feminist discussions of ways in which religion has liberated and opprimed women. (Same as Women's Studies 320 and 320.)

321 New Testament Origins (3) Influence of pre-Christian Judaism and Greek culture and philosophy on early Christianity. Motivations and guiding concepts which underlie the formalization, canonization, and the spread of the Christian Church over the forces of persecution and the Constantinian settlement (311 A.D.). Writing-emphasis course. (Same as History 321.)

Courses of Instruction 193
Courses of Instruction

492 Management Experience in Retailing (3) Supervised managerial training with sponsoring retail operations. Prereq: RSC 410, 422, HE 410. Coreq: RSC 485.

493 Directed Study (1-3) Individual problems for junior and senior students with special interest in retail and consumer sciences. Prereq: Junior or Senior standing and consent of the instructor.

495 Special Topics (3) Topics in retail and consumer sciences. May be repeated. Maximum 9 hours. Prereq: Junior or Senior standing and consent of the instructor.

497-498 Honors: Retail and Consumer Sciences (3) Individual problems for Junior and Senior students showing special ability and interest in retail and consumer sciences. Prereq: Recommendation of Department Head.

RURAL SOCIOLOGY (880)

380 Rural Sociology (3) Topics include the analysis of U.S. land tenure systems, agricultural regions, rural minorities, Amish farmer organizations, rural institutions, community decision making, local government, rural policy issues, rural industrialization, food policy, and cross-cultural analysis. Prereq: Sophomore standing. F. (Same as Sociology 380.)

480 Technological and Community Change (3) Analysis of community change. Emphasis on how new technology spreads within a farm population and analysis of social institutions related to change in rural communities. Prereq: 380 or consent of instructor. (Same as Sociology 480.) Sp.

RUSSIAN (886)

101-102 Elementary Russian (4,4) Must be taken in sequence.

199 Russian Language and World Business (2) This course will examine the importance of foreign trade at the local, state, and national levels. An interdisciplinary team of faculty from the colleges of Business and Arts and Sciences will provide an overview of the value of language and international cultural awareness in world business. Restricted to students in the Language and World Business program. See the Director for further information. F

201-202 Intermediate Russian (4,4) Must be taken in sequence.

221 Rebels, Dreamers and Fools: The Outcast in 19th Century Russian Literature (3) Texts in English translation. No foreign language credit. Writing-emphasis course.

223 Russian Literature (3) Focus on Russian literature in English translation. No foreign language credit. Writing-emphasis course.


311-312 Russian Composition and Conversation (3,3) Practice in writing and speaking: grammar review and vocabulary building. Prereq: Completion of 202.

325 Russian Film (3) A study of Russian cinema from the earliest days to the present. Writing-emphasis course. (Same as Cinema Studies 325.)

371 Martyrs, Mobs, and Madmen in Russian Culture: 988-1861 (3) Explores various aspects of Russian culture, emphasizing violent cultural clashes that produced extreme artistic reactions. Prereq: Senior standing or consent of instructor. F, Su.

372 Eros, Death and Resurrection in Modern Russian Culture (3) Examines the obsession with death underlying the intellectual and cultural ferment of 20th-Century Russian music, art, and literature. Texts in English translation. Writing-emphasis course.

401-402 Advanced Grammar, Conversation, and Composition (3,3) Prereq: 312 or equivalent. (Same as Russian and East European Studies 401-402.)

SOCIAL SCIENCE EDUCATION (900)

454 Teaching Strategies and Issues in Social Studies Education (3) Goals, objectives, techniques, materials, and evaluation; directed observation in public schools. Prereq: Admission to Teacher Education Program. F

SOCIAL WORK (905)

200 Introduction to Social Work (3) Emergence of the social work profession; professional mission; knowledge, skills, and values; practice settings; client groups; helping services; career patterns; practice methods. Designed to assist students to consider their ability for careers in social work.


310 Social Work Research (3) Scientific method and research strategies to evaluate the organization and administration of social work programs. Prereq: Mathematics 115 or Psychology 385. Coreq: RSC 380.

312 Social Work Practice I (3) Knowledge, values, and skills for entry level generalist practice in a variety of settings. The social work problem solving process, decision making under uncertainty, professional ethics, and values. Prereq: Full progression. Coreq: 310.


314 Human Behavior and the Social Environment (3) Theories of human behavior and social environments. Prereq: Senior standing or consent of instructor.

460 Integrative Seminar (2) Social work content for entry-level professional practice and current issues influencing the profession. Includes development of a reflective portfolio focusing on BSW competencies. Prereq: Full progression. Coreq: 481.


SOCIOMETRY (915)

110 Social Problems and Social Change (3) Increasing crime and intergroup conflict as a result of alcoholism, violence, crime, inequality, lifestyle preferences, and environmental abuse within the context of social change. Assessment of control strategies.

120 General Sociology (3) Major concepts and theoretical approaches of sociology with emphasis on culture, socialization, social organization, and social stratification.

200 Sociological Analysis (3) Selected set of contemporary issues emphasizing theoretical and logical structuring of the issues and development of data needed to enter into informed debate on the issues. Students are expected to develop their own analytical arguments. Prereq: English 102 and other Sociology 110 or 120 or consent of instructor.

220 Interpersonal Communication (3) (Same as Speech Communication 220.)

232 Varieties of Religious Community (3) (Same as Religious Studies 232.)
291 Sport in American Society (3) (Same as Cultural Studies in Education 291.)

310 American Society (3) Institutional organization of contemporary American society with particular attention to major social values. Writing-emphasis course.

311 Family (3) Theoretical frameworks and methodological approaches to the application in the sociological study of past and present family forms.

318 Sociology of Religion (3) Interrelationship of society, culture, and religion. (Same as Religious Studies 318.)

320 Interpersonal Communication Processes (3) (Same as Speech Communication 320.)

321 Sociological Theory (3) Survey of contemporary issues and problems in sociological theory with an emphasis on research methodology and their importance for the field. Students are required to take critical appraisals of the topics addressed. Prereq: 200 or consent of instructor.

320 Computers and Society (3) History of computing and computer systems, capabilities of computer applications in various fields; social, cultural, and economic impacts.

331 Sociological Research (3) Selected issues in philosophy of social science, research design, sampling, methods of data collection, and interpretation. Requires written research report. Prereq: 200 or consent of instructor.


343 Race and Ethnicity (3) Social sources of racial and ethnic cleavages and social, economic, and political consequences. Emphasis on race and ethnicity in the United States. (Same as African-American Studies 343 and American Studies 343.) Writing-emphasis course.

344 Power and Society (3) Sociological analysis of the formation and application of nation state politics. Examination of who gets what, who, and how. Emphasis on contrasted explanations of the control of the state and the relative autonomy of the state.

345 Collective Behavior and Social Movements (3) Collective phenomena leading to social change. Emphasis on disaster, popular crazes, and social protests and development, organization, and function of social movements. Emphasis on American cases. (Same as American Studies 345.)

346 Sociology of Occupations (3) Occupations and professions as interest groups in work settings and the wider community.

350 Criminology (3) Systematic inquiry into alternative definitions of crime, statistical distribution of different types of crime causation, and responses to crime, particularly by the police.

351 Juvenile Delinquency (3) Critical assessment of historical and contemporary nature of the delinquency types of crime causation, and responses to crime, primarily by the police.

350 Criminology (3) Systemic inquiry into alternative definitions of crime, statistical distribution of different types of crime causation, and responses to crime, primarily by the police.

355 Sociology and Law (3) How laws and legal procedures are affected by social change, the social impact of legal sanctions, relations between law and social justice. Writing-emphasis course.

359 Organizational and Corporate Crime (3) Crime and deviance committed by organizations. Case studies of corporate and organizational crime, the organizational dynamics of crime, theories of corporate crime, and organized responses to this type of crime by governmental regulatory agencies.

362 Population (3) Demographic factors and social structure; trends in fertility, mortality, population growth, migration, distribution, and composition; population policy.

442 Comparative Poverty and Development (3) A critical examination of poverty and inequality in developing areas of the world, along with an overview of major sociological theories which attempt to explain differences in development. Writing-emphasis course. (Same as Asian-American Studies 442.)

446 The Modern World System (3) Critical examination of the capitalist world-system as a social system, its coherence, boundaries, regions, member groups, cleavages, and patterns of conflict. Analysis of who gets what, who, and how in the global economic political writing-emphasis course.

451 Criminal Justice (3) A critical assessment of the criminal justice apparatus and its components. Brief examination of the problems with most of the emphasis on the criminal courts and institutions and programs such as the prison, probation, and parole. Analysis of their operation and impact. Prereq: 200 or consent of instructor.

455 Society and Law (3) How laws and legal procedures are affected by social change, the social impact of legal sanctions, relations between law and social justice. Writing-emphasis course.

459 Organizational and Corporate Crime (3) Crime and deviance committed by organizations. Case studies of corporate and organizational crime, the organizational dynamics of crime, theories of corporate crime, and organized responses to this type of crime by governmental regulatory agencies.

462 Urban Ecology (3) The relation of humans to their urban environment with emphasis on conservation and the use of appropriate technology. (Same as Urban Studies 462.)

465 Social Values and the Environment (3) Human dimensions of ecosystem management and public policy. An applied focus on how social values are activated within specific biophysical settings. Prereq: 110 or 120 or consent of instructor.

471 Sociolinguistics (3) (Same as English 471 and Linguistics 471.)

480 Diffusion of Agricultural Technology (3) (Same as Rural Sociology 480.)

491 Foreign Study (1-15) Prereq: 200 or Departmental Approval of number of hours and topics. May be repeated. Maximum 15 hours.

450 Independent Study (1-15) Prereq: Departmental approval of number of hours and topics. May be repeated. Maximum 15 hours.

450 Independent Study (1-15) Prereq: Departmental approval of number of hours and topics. May be repeated. Maximum 15 hours.

SPANISH (924)

111-112 Elementary Spanish (3,3) Language laboratory required. Must be taken in sequence. Not available to students eligible for SPAN 211.

150 Intermediate Spanish (3) This course is designed to prepare students for enrollment in Spanis, 211. Prereq: Two years of high school Spanish a placement score below the level required for admittance to Spanish 211. This class will not count toward the College of Arts and Sciences intermediate-level foreign language requirement. Since 150 is a review of elementary Spanish, students who receive credit in this course may not also receive credit for any other 100 level Spanish course and therefore also for the six hours of elementary language credit awarded through placement examination. For elective credit only. F, S
Special Education Principles (3) Introduction to the field of special education, including the nature and causes of disabling conditions, family systems, a history of the field and current policies. Prereq: Admission to Teacher Education Program. Sp

Special Education Strategies (3) Introduction to basic special education procedures, including forms of assessment, planning, implementation of individual education plans, applied behavioral analysis, appropriate medical procedures, and effective instructional strategies. Prereq: 310, admission to Teacher Education Program.

Psychology and Education of Students with Mild Disabilities (6) Nature and characteristics of persons with mild handicaps and the educational strategies appropriate for those persons. Prereq: 310, 320 and Admission to Teacher Education Program. Coreq: 420. F

Field Experience in Modified Programs (3) Practicum in teaching in modified programs: planning, developing, implementing, and evaluating instruction. Prereq: 310, 320, and Admission to Teacher Education Program. Coreq: 420. S/NC only. F

Experience in Comprehensive Programs (3) On-site teaching experience with moderately and severely handicapped children and youth. Prereq: 310, 320, and Admission to Teacher Education Program. Sp

Education of the Gifted and Talented Children (3) Psychometric and behavioral studies of giftedness. Analysis of past and present school programs in reference to curriculum and program implementation. Prereq: Admission to Teacher Education Program.

Speech and Language Basis of Learning Disabilities in the Classroom (3) Normal communication development; understanding of speech and language impairments in school-age students; integration of oral/written communication skills into existing curriculum, especially for high incidence special education students. Sp

Psychology of the Exceptional Child (3) General characteristics and educational needs of exceptional children. Implications of developmental variations for functioning as adults. Enrollment limited to non-education majors.

SPEECH COMMUNICATION (943)

Introduction to Speech Communication (3)Fundamental theories and practices with particular reference to interpersonal, group, organizational, and public communication.

Honors: Introduction to Speech Communication (3) Analysis and exploration of the fundamental theories and principles of public communication. Admission by consent of the department.

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.

Interpersonal Communication (3)Process by which thoughts, feelings, and actions affect and are affected by the face-to-face communication situation. (Same as Sociology 202.)

Listening (3)Study of the principles and techniques of listening. Focuses on theoretical and practical listening skills.

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.

Advanced Public Speaking (3)Theory and practice of informative and persuasive speaking. Prereq: 210 or 240.

Communication and Society (3)Study of communication strategies and public opinion with emphasis on communication media: posters, films, songs, demonstrations, drama, and public address.

Argumentation and Debate (3)Reasoned decision-making with emphasis on acceptability of evidence, reasoning, constructing, and refuting arguments.
SPORT MANAGEMENT (957)

100 Orientation to Sport Management (1) Overview of the professional and disciplinary areas in Sport Management with special emphasis on introductory field experiences. Taken the first semester as pre-major. F, Sp

250 Foundations of Sport Management (3) An introduction to the scope of the sport enterprise including why business is involved in sport and an overall evaluation of sport management as a profession. Prereq: Sport Management 100 or Recreation/Leisure Studies 110 F, Sp

290 Practicum I (3) Supervised part-time experience at approved site in sport management. Requires 120 clock hours per semester. S/N only. Prereq: Admission to major, minimum GPA 2.5, Sport Management 100 or Recreation/Leisure Studies 110 F, Sp

Proseminar in Speech Communication (1-3)

310 Theatre History I (3) History and literature of theatre. Drama in performance with particular emphasis on major trends and movements from Antiquity to the present. Satisfactory/No credit. May be repeated. Maximum 9 hours. Prereq: Consent of instructor. E

311 Coaching Football (1) Theoretical and practical application of various coaching techniques in football for the prospective secondary/college coach. Includes analysis and selection of game plans, specific conditioning and training programs, practice organization, player evaluation, scouting, individual and team offensive and defensive. Prereq: Consent of instructor.

312 Coaching of Basketball (1) Individual and team fundamentals for the high school coach: conditioning, schedule making, and other business arrangements. Prereq: Consent of instructor.

313 Coaching of Track and Field (1) Coaching methods and techniques in track and field events, including experience observing and working at meets and practices. Prereq: Consent of instructor.

314 Coaching of Baseball/Softball (1) Theoretical and practical application of various coaching techniques in baseball/softball for the secondary/college coach. Topics include analysis and selection of appropriate game plans, specific conditioning and training programs, practice organization, player evaluation, scouting, individual and team offensive and defensive strategies. Prereq: Consent of instructor.

315 Coaching of Sport Management (3) Overview of management theory and principles associated with the perspectives of sport enterprise. Prereq: Prerequisite (admission) to major, minimum GPA 2.5, Sport Management 250 and 290, or consent of instructor. F, Sp

410 Sport Marketing (3) Application of fundamental marketing concepts to the sport industry. Marketing research, promotions, and fund raising, advertising, and assessment of marketing programs specific to sport will be covered. The historical development of sport marketing will be included. Prereq: Marketing 301 and admission to Sport Management major. Admission by consent of instructor.

415 Development and Maintenance of Leisure, Sport, and Tourism Services (3) (Same as Recreation and Tourism Management 415.)

440 Sport Marketing II (3) Supervised part-time experience at approved site offering sport management opportunities. Requires 120 clock hours per semester. S/N only. Prereq: Sport Management majors, minimum GPA 2.5, Sport Management 350, or consent of instructor. E

450 Legal Aspects of Sport (3) Identification and application of various areas of law to sport industry, including contracts, torts, trusts, anti-trust law, and tort law. Sport management decision-making. Special emphasis placed on discrimination in sport (e.g., race, gender, sexuality). Prereq: Progression (admission) to major, minimum 2.5 GPA, Sport Management 350, or consent of instructor.

490 Sport Management Internship (6, 12) Supervised work experience at approved site. Emphasis on managerial tasks and administrative procedures. S/N only. Prereq: Progression (admission) to major, minimum 2.5 GPA, completion of all 200 level Sport Management course requirements, senior standing, enrollment two semesters (6 hours each) or full-time (12 hours). Total 12 hours required.

493 Directed Independent Studies (1-3) Independent study in a specialized area of sport management. May be repeated. Maximum of 9 hours. Prereq: Progression to Sport Management major. E

STATISTICS (962)


251 Probability and Statistics for Scientists and Engineers (3) Data collection; descriptive statistics; Concepts of probability and probability distributions. Discrete and continuous distributions. Estimation of means, confidence intervals, hypothesis tests for single mean and proportion; regression and correlation. Process improvement and statistical process control. Two-level experiments. Use of statistical computing software. Prereq: Math 142 F, Sp

320 Regression and Correlation Methods (3) Simple linear regression and correlation analysis, time series analysis, multiple regression, variable selection, regression diagnostics, polynomial and fractional factorial experiments, sequential experimentation, blocking and run order restrictions, Taguchi's strategies to reduce variation. Use of statistical computing software. Applied course appropriate for a general audience. Prereq: 201 or 251 E

330 Experimental Methods (3) Strategies of experimentation; fractional factorial and fractional experimental designs, sequential experimentation, blocking and run order restrictions, Taguchi's strategies to reduce variation. Use of statistical computing software. Applied course for a general audience. Prereq: 201 or 251 Sp


473 Experimental Design Analysis (3) Design and analysis of factorial and fractional factorial experiments, sequential experimentation, blocking and run order restrictions, Taguchi's strategies to reduce variation. Use of standard computer packages. Major writing requirement. Prereq: 320 Sp


483 Special Topics in Statistics (1-3) Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

485 Principles of Statistical Process Management (3) Control charts and other statistical techniques applied to management of business processes. Prereq: Consent of department head. E

492 Internship (1-6) Supervised off-campus experience in application of statistical principles and methods in business, industry, or government, culminating in a written internship report. Prereq: Progression to major, admission by consent of the Chairperson of the Statistics Department Undergraduate Affairs Committee. Satisfactory/No credit only. May be repeated. Maximum 6 hours.

493 Independent Study (2-6) Faculty directed reading and investigation of specified topic in probability or statistics culminating in a written report. Prereq: Two courses in statistics and permission of the Chairperson of the Statistics Department Undergraduate Affairs Committee. Letter grade or Satisfactory/No credit. May be repeated. Maximum 6 hours.

TEXTILE SCIENCE (970)

220 Selection and Use of Soft Goods Literature (3) Study of textile products for apparel and interior furnishings; emphasis on the selection of fibers, yarns, fabrics, finishes and construction details to optimize properties needed for particular use.

THEATRE (976)

100 Introduction to Theatre (3) Understanding theatre: thought, philosophy, aesthetics, and production practices of the performing arts. A writing-emphasis course.

220-221 Acting (3,3) 220-Basic Acting techniques. 221-Further exploration and development of acting techniques through exercises and beginning scene work. Prereq: 220. Writing-emphasis courses. Prereq to 221: 220.

245 Basic Stage Costuming (3) Costume design and construction; basic theory and technique. Production participation required.

250 Introduction to Scenery Technology (3) Techniques of scenery and stage properties construction. Production participation required.

260 Fundamentals of Lighting and Sound Production (3) Survey of practical information on electricity, physics, psychology, and instrument engineering as it relates to stage lighting and sound production. Emphasis on hands-on skills in technical design and application. Prereq to 261: 260.

310 Theatre History I (3) History and literature of theatre. Drama in performance with particular emphasis on major trends and movements from Antiquity to the Restoration.

311 Theatre History II (3) History and literature of Theatre. Drama in performance with particular emphasis on major trends and movements from the Restoration to the present.
Courses of Instruction

313 American Theatre (3) Development of theatre from origins to 20th century with emphasis on the evolution of plays, playwrights and theatre innovators.


322 Stage Movement (3) Introduction to movement/kinesiology as an art form and its application to performance. Prereq: 220 or permission of instructor.

324 Theatre Dance I (2) Dance techniques incorporating elements of musical theatre. Prereq: 323 or consent of instructor.

326 Advanced Voice and Speech (3) Breath-centered voice production with emphasis on vocal flexibility and control of shaping sound; IPA; text work; preparation for speaking for the stage.

340 Introduction to Costume Design (3) Development of research and rendering skills. Prereq: 245 or consent of instructor.

341 Introduction to Scenic Design (3) Introduction to art and craft of scenic design.

342 Lighting Design (3) Mechanics and control of stage lighting; problems in basic lighting practice. Prereq: 250.

401 Principles of Theatrical Design (3) Fundamental principles of design; visual and structural relationships. Projects will be assigned to develop understanding and perception.

409 Stage Make-Up (3) Study and problems in makeup design and application with emphasis on character analysis. Prereq: 100.

410 Special Studies in History, Literature and Criticism (3) Content varies. Concentrated study in a given period or area of Theatrical History, Literature or Criticism. May be repeated.

420 Special Studies in Acting (3) Content varies. Exercises in selected areas such as style, techniques, approach, e.g., Shakespeare, movement, humor. Prereq: 320 and consent of instructor. May be repeated. Maximum 9 hours.

421 Theatre Projects in International Theatre (3-5) Study and performance of foreign works. Content varies. Language skills required. Prereq: Foreign language 320 and permission of instructor(s). May be repeated for a total of nine (9) hours.

423 Period Movement and Dance (2) Movement styles and dances from the Renaissance to the 20th Century. Prereq: 320 or consent of instructor.

424 Theatre Dance II (2) Advanced dance techniques incorporating elements of musical theatre. Prereq: 324 or consent of instructor. May be repeated. Maximum 6 hours.

425 Selected Musical Theatre Techniques (2) Study and practice of musical theatre material including both dance and vocal work. Prereq: 324 or consent of instructor. May be repeated. Maximum 4 hours.

426 Applied Phonetics (3) Development of skills in transcription and reproduction of the principal varieties of the English Language in North America and Great Britain and selected foreign dialects in North America. Prereq: Consent of instructor.


440-441 Advanced Theatre Costume Design (3.3) Costume as an expressive element in dramatic production. Prereq: 340.

446 Costume Patternmaking (3) Draping patterns for period costumes. Includes corsetry and the study of historic patterns 1500-1900.

450 Advanced Scenery Technology I (3) Study and practice of theatre woodworking, production of production participation will be required. Prereq: 250. Graduate credit available to theatre M.F.A. students only.

451 Advanced Scenery Technology II (3) Study and practice of theatre woodworking and plastics for theatrical productions. Production participation will be required. Prereq: 250. Graduate credit to theatre M.F.A. students only.

452 Advanced Scenery Technology III (3) Study and practice of stage rigging for theatrical productions; production participation will be required. Prereq: 250. Graduate credit available to theatre M.F.A. students only.

454 Scenery Painting (2) Introduction to materials, techniques, and principles of stage craft. Emphasis on gaining skill and understanding through studio experience. Prereq: Consent of instructor.


456 Rendering (3) Techniques in monochrome and full color illustration of space and form. Some acquaintance with basic mechanical perspective and freehand sketching is assumed.

462 Advanced Lighting Design (3) Advanced problems in lighting design and theory including areas such as lighting musical theatre, opera, and dance. Prereq: 392 or consent of instructor.

464 Computer Assisted Design for Theatre (3) Advanced techniques in computer assisted design for theatre. Work with CAD, Computer Drawing, Graphics, and 3D Modeling software for preparation of theatrical designs. Specific content varies with semester. Admission by consent of instructor only. May be repeated. Maximum 9 hours.

470-471 Playwriting (3,3) Advanced study in the writing of plays. Prereq: Consent of instructor.

481 Applied Theatre: Costumes (2) Laboratory in costume design for departmental productions. Credit available to Theatre majors only or with consent of instructor. 90 hours of work required.

482 Applied Theatre: Scenery (2) Laboratory in scenic design for departmental productions. Credit available to Theatre majors only or with consent of instructor. 90 hours of work required.

483 Applied Theatre: Lighting (2) Laboratory in lighting for departmental productions. Credit available to Theatre majors only or with consent of instructor. 90 hours of work required.

484 Applied Theatre: Performance (2) Laboratory in performance for departmental productions. Credit available to Theatre majors only or with consent of instructor. 90 hours of work required.

491 Foreign Study (1-15) Open to any undergraduate. Prerequisites must be approved in advance. See the Director of University Honors for further information.

492 Honors: Off-Campus Study (3-15) Open to any undergraduate. Prerequisites must be approved in advance. See the Director of University Honors for further information.

493 Honors: Independent Study (1-15) Open to any undergraduate. Prerequisites must be approved in advance. See the Director of University Honors for further information. Letter grade only.

THEORY AND PRACTICE IN TEACHER EDUCATION (978)

203 Field Study in Education (1-3) Problems of persons in active service in the field. Includes methods of teaching, curriculum materials, school-community relationships and school organizations. May be repeated. Maximum 6 hours.

492 Directed Independent Study (1-13) Tutorial and specialized area. Prereq: consent of instructor. May be repeated. Maximum 12 hours. Satisfactory/No Credit grading only.

493 Independent Study (1-3) Topics to be assigned. May be repeated. Maximum 12 hours.

494 Supervised Readings (1-13) Topics to be assigned. May be repeated. Maximum 12 hours.

495 Special Topics (1-13) Topics to be assigned. May be repeated. Maximum 12 hours.

UNIVERSITY HONORS (983)

117-127 Honors Freshman Seminar (1,1) Sequence required for all freshmen honors students. 117 concentrates on computer skills, contemporary issues, and writing. 127 concentrates on critical thinking, contemporary issues, and international studies. Satisfactory/No Credit grading only.

337 Honors: Concentration in the Humanities (3) Small group studies of selected topics, issues or problems with a concentration in the humanities disciplines. Open to all students with a GPA of 3.25 or greater. Topics vary. May be repeated.

338-348 University Scholars Seminar (1,1) Selected topics. Enrollment limited to students in the University Honors Program, or with permission of the Director of University Honors. May be repeated. Maximum 6 hours.

347 Honors: Concentration in the Social Sciences (3) Small group studies of selected topics, issues or problems with a concentration in the social sciences. Open to all students with a GPA of 3.25 or greater. Topics vary. May be repeated.

357 Honors: Concentration in the Natural and Applied Sciences (3) Small group studies of selected topics, issues or problems with a concentration in the natural and applied sciences. Open to all students with a GPA of 3.25 or greater. Topics vary. May be repeated.

456 Rendering (3) Techniques in monochrome and full color illustration of space and form. Some acquaintance with basic mechanical perspective and freehand sketching is assumed.

462 Advanced Lighting Design (3) Advanced problems in lighting design and theory including areas such as lighting musical theatre, opera, and dance. Prereq: 392 or consent of instructor.

464 Computer Assisted Design for Theatre (3) Advanced techniques in computer assisted design for theatre. Work with CAD, Computer Drawing, Graphics, and 3D Modeling software for preparation of theatrical designs. Specific content varies with semester. Admission by consent of instructor only. May be repeated. Maximum 9 hours.

470-471 Playwriting (3,3) Advanced study in the writing of plays. Prereq: Consent of instructor.

481 Applied Theatre: Costumes (2) Laboratory in costume design for departmental productions. Credit available to Theatre majors only or with consent of instructor. 90 hours of work required.

482 Applied Theatre: Scenery (2) Laboratory in scenic design for departmental productions. Credit available to Theatre majors only or with consent of instructor. 90 hours of work required.

483 Applied Theatre: Lighting (2) Laboratory in lighting for departmental productions. Credit available to Theatre majors only or with consent of instructor. 90 hours of work required.

484 Applied Theatre: Performance (2) Laboratory in performance for departmental productions. Credit available to Theatre majors only or with consent of instructor. 90 hours of work required.

491 Foreign Study (1-15) Open to any undergraduate. Prerequisites must be approved in advance. See the Director of University Honors for further information.

492 Honors: Off-Campus Study (3-15) Open to any undergraduate. Prerequisites must be approved in advance. See the Director of University Honors for further information.

493 Honors: Independent Study (1-15) Open to any undergraduate. Prerequisites must be approved in advance. See the Director of University Honors for further information. Letter grade only.

UNIVERSITY STUDIES (984)

101 Lives and Times (3) Study of biography, autobiogra phy, and biographical theory including factors that shape individual lives. Writing emphasis. Intended for entering students.

210-220 Special Topics in University Studies (1-9, 1-9) Interdisciplinary approaches to selected topics for lower division students. Small group discussion of various topics that transcend the boundaries of a single discipline. Writing intensive and team taught. May be repeated maximum 9 hours. Permission of instructor required. Variable credit.

310-320 Special Topics in University Studies (3,3) Interdisciplinary approaches to issues transcending the boundaries of a single discipline. Topics may be initiated by faculty or students through arrangements with the University Studies Program. Taught by faculty from throughout the University (often team-taught). Discussion based and writing intensive. May be repeated. Maximum: 9 hours.

311 AIDS and Society (3) Speakers from across the state speak about scientific, social, medical, emotional and financial aspects of acquired immunodeficiency syndrome. Students are required to participate in some AIDS related community activity and to describe that activity in writing.

321 Aging and Society (3) Multidisciplinary examination of the process of aging and of the medical and community resources for coping with its stresses and challenges.

322 Technology, Society and the Common Good (3) Explores philosophical and religious systems with a commitment to stewardship of the planet and those with an antagonistic or neutral perception of the natural world. Systems are presented in conjunction with cultural and species extinctions caused by or related to their behaviors and values.

410-420 Advanced Topics in University Studies (3,3) Interdisciplinary research approaches to major issues transcending the boundaries of a single discipline. Topics may be initiated by faculty or students through arrangements with the University Studies Program. Taught by faculty from throughout the University (often team-taught). Discussion based and writing intensive. May be repeated. Maximum: 9 hours.
442 Fisheries Techniques (2) Active and passive sampling techniques for fish and aquatic organisms; population estimation methods; fish handling and transport; food habits analysis; marking and tagging techniques; age determination and incremental growth analysis; stream assessment; equipment and instrumentation usage and maintenance; and sampling methods. Weekend field trip may be required. Prereq: FWF 317 or consent of instructor. 2 hours and 1 lab. Sp

443 Fisheries Science (3) Quantification and management of freshwater fisheries including population estimation, age, growth, biological assessment, and stocking. Prereq: FWF 317 or consent of instructor. 2 hours and 1 lab. Sp

444 Ecology and Management of Wild Mammals (3) Biological and ecological characteristics of game mammals and endangered mammals. Current principles and practices of wildlife management. Prereq: FWF 317 or consent of instructor. 2 hours and 1 lab. One weekend field trip required. Sp

454 Ecology and Management of Wild Birds (3) Biological and ecological characteristics of game birds, endangered birds, and birds pests. Current principles and practices of wildlife management. Prereq: FWF 317 or consent of instructor. 2 hours and 1 lab. One weekend field trip required. Sp

493 Independent Study (1-15) Special research or individual problem in wildlife and fisheries science. Letter grade or Satisfactory/No Credit. E

(1-15)