

# COURSE INFORMATION



**T**o see courses listed by semester, meeting time, or instructor, please log on to e-Campus and choose “Class Search.” Registration for classes also takes place through e-Campus.

## Course Numbering

Courses numbered 001–099 are pre-freshman and special undergraduate courses, and do not carry bachelor’s degree credit. Those numbered 100–299 are lower-division undergraduate courses, and those numbered 300–399 are upper-division undergraduate courses. The 400-level courses are generally limited to juniors and seniors majoring in that field, but are open to other advanced undergraduates and graduate students with permission.

The 500-level courses are graduate courses for which a bachelor’s degree is usually a prerequisite, but qualified seniors and honors students are admitted with permission. These courses should make up the majority of course work for students

working toward a master’s degree. Courses at the 600 level are advanced graduate courses. The 900-level courses are special types of graduate courses for which no degree credit is given. They include courses offered to remedy deficiencies as well as workshops, institutes, and courses offered one time only by visiting faculty.

Courses with two numbers—e.g., GER 113, 114—indicate a year’s sequence; generally, the first course is a prerequisite for the second and the two cannot be taken in reverse order without special permission. Parentheses after a course number enclose either the old course number or, in cases of multiple listings, the departments and numbers under which the course is also offered. The number in parentheses after the course name indicates the number of

credits, and the information in parentheses after the course description tells the format and number of hours per week (e.g. “Lec. 3” means three hours of lecture). “Pre:” refers to a prerequisite. “S/U credit” signifies a course in which only grades of satisfactory or unsatisfactory are given. Courses that meet general education requirements are designated with a letter in parentheses indicating the appropriate group, as follows:

- (A) Fine Arts and Literature
- (FC) Foreign Language/  
Cross-Cultural Competence
- (L) Letters
- (EC) English Communication (General)
- (ECw) English Communication (Written)
- (MQ) Mathematical and  
Quantitative Analysis
- (N) Natural Sciences
- (S) Social Sciences

Courses that meet the general education diversity requirement are designated with a [D].

## Course Codes

|     |  |     |  |     |   |
|-----|--|-----|--|-----|---|
| AAF | African and African-American Studies   | FLM | Film Media                             | MUS | Music                                       |
| AVS | Animal and Veterinary Science          | FAL | Fine Arts and Literature               | NRS | Natural Resources Science                   |
| APG | Anthropology                           | FOS | Forensic Science                       | NES | New England Studies                         |
| AMS | Applied Mathematical Sciences          | FRN | French                                 | NVP | Nonviolence and Peace Studies               |
| AFS | Aquaculture and Fisheries Science      | GEG | Geography                              | NUR | Nursing                                     |
| ARB | Arabic                                 | GEO | Geosciences                            | NFS | Nutrition and Food Sciences                 |
| ART | Art                                    | GER | German                                 | OCE | Ocean Engineering                           |
| ARH | Art History                            | GCH | Grand Challenges                       | OCG | Oceanography                                |
| AST | Astronomy                              | GRK | Greek                                  | PHC | Pharmacy                                    |
| BGS | Bachelor of General Studies            | HSA | Health Services Administration         | PHP | Pharmacy Practice                           |
| BIS | Bachelor of Interdisciplinary Studies  | HLT | Health Studies                         | PHL | Philosophy                                  |
| BCH | Biochemistry                           | HBW | Hebrew                                 | PHT | Physical Therapy                            |
| BIO | Biological Sciences                    | HIS | History                                | PHY | Physics                                     |
| BPS | Biomedical and Pharmaceutical Sciences | HPR | Honors Program                         | PLS | Plant Sciences                              |
| BME | Biomedical Engineering                 | HDF | Human Development and Family Studies   | PSC | Political Science                           |
| BUS | Business                               | HSS | Human Science and Services             | POR | Portuguese                                  |
| CHE | Chemical Engineering                   | IME | (see ISE)                              | PLA | Prior Learning Assessment                   |
| CHM | Chemistry                              | ISE | Industrial and Systems Engineering     | PSY | Psychology                                  |
| CHN | Chinese                                | ITR | Internships and Experiential Education | PRS | Public Relations                            |
| CVE | Civil and Environmental Engineering    | ITL | Italian                                | RLS | Religious Studies                           |
| CLA | Classics                               | JPN | Japanese                               | RDE | Resource Development Education              |
| COM | Communication Studies                  | JOR | Journalism                             | RUS | Russian                                     |
| CMD | Communicative Disorders                | KIN | Kinesiology                            | SOC | Sociology                                   |
| CPL | Community Planning                     | LRS | Labor Relations and Human Resources    | SPA | Spanish                                     |
| CSV | Community Service                      | LAR | Landscape Architecture                 | STA | Statistics                                  |
| CLS | Comparative Literature Studies         | LAN | Languages                              | SUS | Sustainability                              |
| CSC | Computer Science                       | LAT | Latin                                  | TMD | Textiles, Fashion Merchandising, and Design |
| CCC | Cross-Cultural Competence              | LAS | Latin American Studies                 | THN | Thanatology                                 |
| ECN | Economics                              | LET | Letters                                | THE | Theatre                                     |
| EDC | Education                              | LIB | Library                                | URI | University of Rhode Island Freshman Seminar |
| EDP | Ph.D. in Education                     | LSC | Library and Information Studies        | WMS | Women's Studies                             |
| EDS | Special Education                      | LIN | Linguistics                            | WRT | Writing                                     |
| ELE | Electrical Engineering                 | MAF | Marine Affairs                         |     |   |
| EGR | Engineering                            | MAC | Master of Science in Accounting        |     |   |
| ENG | English                                | MBA | Master's in Business Administration    |     |   |
| ELS | English Language Studies               | MTH | Mathematics                            |     |   |
| ENT | Entomology                             | MCE | Mechanical Engineering                 |     |   |
| EEC | Environmental Economics                | MLS | Medical Laboratory Science             |     |   |
| EVS | Environmental Sciences                 | MTC | (See MLS)                              |     |   |
|     |  | MIC | Microbiology                           |     |   |
|     |  | MSL | Military Science and Leadership        |     |   |

For an explanation of course codes and other numbers and abbreviations, see "Course Information."

## African and African-American Studies (AAF)

Director: Associate Professor Quainoo

**150 Introduction to Afro-American History**  
See History 150. (L) [D]

**201 Introduction to African-American Studies (3)**  
Interdisciplinary exploration of some of the pivotal themes and issues in the study of peoples of African descent. (Lec. 3) (L) [D]

**202 Introduction to Afro-American Culture (3)**  
Interdisciplinary survey of the social origins of Afro-American culture. (Lec. 3/Online)

**240 Race and Ethnic Relations**  
See Sociology 240.

**247 Introduction to Literature of the African Diaspora**  
See English 247. (A) [D]

**248 African-American Literature from 1900 to the Present**  
See English 248. (A) [D]

**290 African-American Women: Service, Community, and Self (3)**  
Introductory course on African-American women. Focuses on the idea of African-American women's service which has been a constant theme and necessity for the African-American community in North America. (Lec. 3)

**300 Special Topics in African and Afro-American Studies (3)**  
Selected contemporary topics, problems, issues, and individuals from the field of African and Afro-American studies. The topical format allows in-depth analysis of some significant aspect of the African and Afro-American experience. (Lec. 3/Online) Topic: Conditions for Community Service is service learning. Pre: 201 or 202 or permission of instructor. Some topics may be offered online. May be repeated with different topic.

**330 (or ARH 330) African-American Art in Context: A Cultural and Historical Survey I (3)**  
Examines African-American art and artifacts of the 17th, 18th, and 19th centuries, highlighting the dominant attitudes as well as the political and social realities of the times. (Lec. 3)

**331 (or ARH 331) The African-American Artist in Context: A Cultural and Historical Survey II (3)**  
Examines art and artists, the trends, philosophical attitudes, political realities, social influences, and artistic styles of 20th century African-American artists. (Lec. 3)

**333 Oral Interpretation of Black Literature**  
See Communication Studies 333.

**336 Social Inequality**  
See Sociology 336.

**352 (or ENG 352) Black Images in Film (3)**  
Exploration of the cultural, economic, political, and ideological motivations behind the standard representation of people of the African diaspora in cinema in the U.S. and other areas of the world, while examining film as a genre with a vocabulary and idiom of its own. (Lec. 3)

**355 Black Women in the US: Colonial Times to the Present**  
See History 355. (L) [D]

**356 Black Urban History: Late 19th and 20th Centuries**  
See History 356. (L) [D]

**359 History of Slavery in America**  
See History 359.

**360 (or ENG 360) Africana Folk Life (3)**  
Examination of the process of creativity, context, and form in the oral literary tradition of peoples of African descent throughout the world. (Lec. 3) In alternate years. Next offered fall 2011.

**362 African-American Literary Genres other than the Short Story and Novel**  
See English 362.

**363 African-American Fiction**  
See English 363.

**364 Contemporary African Literature**  
See English 364.

**366 Twentieth Century Black Politics and Protest**  
See History 366.

**372 African-Americans and the Legal System (3)**  
Focus on constitutional changes designed to influence the political status of African-Americans in the United States. (Lec. 3)

**380 (or PSC 380) Civil Rights Movement (3)**  
Major transformations in American life brought about by the civil rights movement in law, in social relations, in the role of government. Focus on the period between 1954 and 1968 in an effort to identify and evaluate the changes in government and civil society that occurred during this period. (Lec. 3).

**388 History of Sub-Saharan Africa**  
See History 388.

**390 Directed Study or Research (3)**  
Directed study arranged to meet the needs of individual students who desire independent work and to promote collective research efforts in African and Afro-American Studies. (Independent Study) Pre: permission of director.

**399 Introduction to Multicultural Psychology**  
See Psychology 399.

**408 African Government and Politics**  
See Political Science 408.

**410 (or PSC 410) Issues in African Development (3)**  
A seminar focusing on the dynamics of African development, including political and social change, economic development, education, urbanization, rural development, environmental management, labor and business, industrialization, and technology transfer. (Seminar) Pre: APG 313 or PSC 201 or HIS 388 or permission of instructor.

**415 (or PSC 415) Dynamics of Social Change in the Caribbean (3)**  
Exploration of the slave trade and the origins of Africans and people of African descent in the Caribbean. Emphasis on political and economic relations with the U.S. and the impact of modernization. (Lec. 3) Not for graduate credit.

**428 Institutional Racism**  
See Sociology 428.

**466 Urban Problems**  
See Political Science 466.

**498 Senior Seminar in African and Afro-American Studies (3)**  
Study of a particular issue of the experience of Blacks in the diaspora from an interdisciplinary perspective. Subject or theme will change yearly. Pre: 150, 201, 202, senior standing, or permission of instructor. Not for graduate credit.

## Animal and Veterinary Science (AVS)

Chairperson: Professor Bengtson (Fisheries, Animal and Veterinary Science)

**101 Introduction to Animal Science (3)**  
Animal industry's role in world and national economy; inheritance, growth, physiology, nutrition, and diseases of domestic animals and poultry; geographic distribution and marketing of animal products. (Lec. 3) (N) [D]

**102 Introduction to Animal Science Laboratory (1)**  
Laboratory and demonstrations of principles of the animal industries. (Lab. 2) Pre: credit or concurrent enrollment in 101. Restricted to AVS majors.

**104 Animal Management Techniques (2)**  
Lecture and laboratory in the handling skills needed to maintain animal comfort and productivity. (Lec. 1, Lab. 2) Pre: 101 and 102.

**110 Freshman Seminar in Animal and Veterinary Science (1)**

Overview of the animal and veterinary sciences and the fields they encompass. Student projects, presentations, and field trips. (Seminar) Pre: 101. Open only to freshmen.

**132 Animal Agriculture, Food Policy, and Society**

See Aquaculture and Fisheries Science 132. (S)

**201 Companion Animal Management (3)**

Nutrition, reproduction, behavior, and management of companion animals. (Lec. 3) Pre: 101.

**212 Feeds and Feeding (3)**

Principles and practices of feeding farm animals, nutrient requirements, physiology of digestion, identification and comparative value of feeds, computer calculation of rations for livestock. (Lec. 2, Lab. 2) Pre: 101 and 102.

**301, 302 Seminar in Animal and Veterinary Science (1 each)**

Readings, reports, lectures, and discussions on scientific topics in animal and veterinary science. Subject matter adapted to student and faculty interest. (Seminar) Pre: junior or senior standing.

**323 Animal Management I (3)**

Principles of care and management of domesticated ruminant animals including dairy cattle, beef cattle, sheep, and goats. Emphasis on the production methods of the animal industries. Participation in field trips required. (Lec. 3) Pre: 101.

**324 Animal Management II (3)**

Principles of the care and management of domesticated monogastric animals including swine, horses, and poultry. Emphasis will be given to modern production methods. Participation in field trips required. (Lec. 3) Pre: 101.

**325 Animal Management III (3)**

Principles of the care and management of exotic ruminant and monogastric animals. Emphasis will be on handling, care, feeding, breeding, behavior, and disease prevention. Participation in field trips. Pre: 101 or permission of instructor.

**331 Anatomy and Physiology (3)**

Fundamentals of anatomy and physiology of domesticated animals. (Lec. 3) Pre: BIO 101 or CHM 101 or 103.

**332 Animal Diseases (3)**

Specific diseases of avian and mammalian species; etiology, symptoms, and control. (Lec. 3) Pre: 331.

**333 Anatomy and Physiology Laboratory (1)**

The fundamental anatomy of domestic animals is examined. Demonstrations of physiological principles are performed. Laboratory techniques for screening physiological function in vivo and in vitro are covered. (Lab. 2) Pre: credit or concurrent enrollment in 331.

**340 Veterinary Pharmacology (3)**

See Biomedical and Pharmaceutical Sciences 340.

**343 Behavior of Domestic Animals (3)**

Examination of the basis for, and exhibition and control of, behavioral patterns of domestic animals. (Lec. 3) Pre: 101.

**372 Introductory Endocrinology (3)**

Morphology and physiology of endocrine glands. Roles of hormones in regulation of body processes. Discussion of all endocrine organs and relationship of endocrine and nervous systems. Emphasis on domesticated animals and fowl. (Lec. 3) Pre: BIO 101 or permission of instructor.

**390 Wildlife and Human Disease**

See Entomology 390.

**399 Animal Science Internship (1–6)**

Options in various professional experience programs involving the animal and veterinary sciences. (Practicum) Pre: permission of instructor. May be repeated for a maximum of 6 credits. S/U credit.

**412 Animal Nutrition (3)**

Principles of animal nutrition, metabolism of carbohydrates, proteins, and fats; mineral and vitamin requirements; nutritive requirements for maintenance, growth, reproduction, lactation, and work. (Lec. 3) Pre: junior standing or above.

**420 Animal Breeding and Genetics (3)**

Scientific methods for the genetic improvement of domesticated animals. Genetic variation and expected results of different types of selection and mating systems. (Lec. 3) Pre: junior standing or above. In alternate years.

**440 Seminar on Marine Mammals (3)**

Leading scientists discuss the natural history, anatomy, physiology, husbandry, behavior, and conservation of marine mammals. Current research is emphasized. (Lec. 3). Pre: junior standing, and BIO 101 and 102 and permission of the instructor. Not for graduate credit. Special registration and fee required. Contact Mystic Aquarium, Mystic, CT.

**462 Laboratory Animal Techniques (4)**

Management of laboratory animals with emphasis on animal biology, breeding, care, health, research use, and animal welfare. Laboratory animal applications in clinical studies and other selected topics (Lec. 3, Lab. 2) Pre: 331 and 333.

**463 Animal Veterinary Technology (3)**

Theory and application of animal health practices required of paraprofessionals in a veterinary practice. The role of the veterinary assistant in a modern clinical practice will be emphasized. (Lec. 2, Lab. 3) Pre: 331.

**472 Physiology of Reproduction (3)**

Anatomy and physiology of reproduction, with emphasis on domestic animals. (Lec. 3) Pre: BIO 101 and AVS 331 or permission of instructor.

**473 Physiology of Reproduction Laboratory (1)**

Laboratory exercises in mammalian reproductive physiology encompassing whole animal applications and gamete techniques. Current assisted reproductive technologies and management schemes will be discussed. (Lab. 2) Pre: concurrent enrollment in 472.

**491, 492 Special Projects (1–3 each)**

Work that meets the individual needs of students in animal and veterinary science. (Independent Study)

**500 Instructional Methods in Life Sciences (2)**

Organization and development of instructional material and teaching methods for graduate teaching assistants in the life sciences. Emphasis on practice presentation in classroom/lab setting. (Lec. 2) Pre: graduate standing or permission of instructor for senior undergraduate.

**503 Pathobiology**

See Aquaculture and Fisheries Science 503.

**504 Food Systems, Sustainability and Health**

See Nutrition and Food Sciences 504.

**505 Advances in Animal Science (3)**

Critical analysis of recent literature within the field of animal science. Students will gain experience in study design, grant proposal development and oral presentations. Pre: graduate student in good standing or permission of instructors.

**508 Seminar in Biological Literature**

See Biological Sciences 508.

**538 Epidemiology of Infectious Diseases**

See Microbiology 538.

**591, 592 Research Problems (3 each)**

Research problems to meet individual needs of graduate and honors students in the fields of animal breeding, nutrition, or physiology and food science. (Independent Study) Pre: permission of chairperson.

**599 Master's Thesis Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**Anthropology (APG)**

*Chairperson:* Professor Peters (Sociology and Anthropology)

**200 (or LIN 200) Language and Culture (3)**

Cross-cultural survey of the interaction of culture and language. Introduction to various fields of linguistic research emphasizing descriptive and semantic investigations. Linguistic studies used as illustrative material. (Lec. 3) (S) [D]

**201 Human Origins (3)**

The biocultural evolution of humans; review of the fossil record. (Lec. 3) (N) [D]

**202 Introduction to Archaeology (3)**

Archaeological perspectives on the major developments in humanity's past, from the evolution of the earliest humans to the emergence of agriculture and the earliest urban civilizations. (Lec. 3) (S)

**203 Cultural Anthropology (3)**

Anthropological approaches to the study of peoples and cultures around the world. (Lec. 3) (S) [D]

**220 Introduction to the Study of Language**

See Linguistics 220.

**300 Human Fossil Record (3)**

Investigation into the biocultural evolution of hominids over the last 15 million years; course based on evidence from fossil bones, teeth, and paleoecological reconstruction. (Lec. 2, Lab. 2) Pre: 201 or 202 or permission of instructor.

**301 The Anthropology of Nutrition (3)**

Exploration of the cultural and biological relationships of food, diet, and nutrition among human populations. The evolutionary history of food production, distribution, preparation, and selection will be considered. (Lec. 3) Pre: sophomore standing. (S) [D]

**302 Methods of Anthropological Inquiry (3)**

Logic, techniques, and problems in obtaining true information in anthropological inquiry. Problems from anthropological field work and use of cross-cultural data. (Lec. 3) Pre: 203 or permission of instructor. Restricted to juniors and seniors.

**303 New World Prehistory (3)**

Reconstruction of American Indian cultural history from earliest times to the period of European discovery and colonization, using archaeological evidence and perspectives. (Lec. 3)

**309 Anthropology of Religion (3)**

Religious systems of selected peoples around the world; examination of theories concerning the origins, functions, and natures of these religions. (Lec. 3)

**310 Topics in Anthropology (3)**

Analytical study of selected topics in anthropology. Subjects will vary according to the expertise and availability of instructors. (Lec. 3) Pre: one anthropology course or permission of instructor. May be repeated with different topic.

**311 Native North Americans (3)**

Survey of selected North American Indian groups from before European contact to the present. Modern reservation life; influence of the federal government on Indian life. (Lec. 3)

**315 Cultures and Societies of Latin America (3)**

Contemporary cultures and societies; emphasis on adjustment of the people to modern social and economic changes. (Lec. 3) Pre: 203 or permission of instructor.

**319 Cultural Behavior and Environment (3)**

Cultural adaptations made by traditional and industrial societies to natural and human environments using examples from prehistory and ethnography. (Lec. 3)

**320 Sociolinguistics**

See Linguistics 320.

**322 Anthropology of Modernization (3)**

Patterns and processes of contemporary social and cultural change among traditional people. (Lec. 3) Pre: 203 or permission of instructor.

**327 History of Physical Anthropology (3)**

An examination of some classic works in human evolution and physical anthropology. Designed to provide an understanding of the philosophical and historical development of biological anthropology. (Lec. 3) (L)

**328 Gender and Culture (3)**

Analytical study of gender in a cross-cultural context, discussion of the possible origins of gender and subsistence modes, and an examination of societies with flexible or unusual gender systems. (Lec. 3) Pre: one APG course or permission of instructor.

**329 Contemporary Mexican Society**

See Sociology 329.

**350 Human Variation (3)**

Anthropological investigation into the nature and causes of human biological diversity with emphasis on living populations. Students enrolled in this course will serve as a sample for measuring human variation. (Lec. 3) Pre: any 200-level anthropology course or permission of instructor.

**400 Evolution, Culture, and Human Disease (3)**

Investigation of the dynamic interrelationships among culture, human disease, and evolution. Encompasses study of living peoples as well as our fossil and prehistoric ancestors, and includes infectious and chronic diseases. (Lec. 3) Pre: introductory physical anthropology, biology, or zoology, or permission of instructor.

**401 History of Anthropological Theory (3)**

Theory from the sixteenth century to the present; readings from Tylor, Morgan, Boas, Sapir, Kroeber, Benedict, Malinowski, and Radcliffe-Brown. (Seminar) Pre: 203 or permission of instructor.

**405 (or PSY 405) Psychological Anthropology (3)**

Study of human behavior in different cultures employing psychological concepts and theories. (Lec. 3) Pre: 203 or permission of instructor.

**412 Primate Behavior and Organization (3)**

Investigation of the naturalistic behavior and organization of nonhuman primates, and the relationship of primate data to anthropology. (Lec. 3) Pre: 201 or permission of instructor.

**413 (or MAF 413) Peoples of the Sea (3)**

Examination of human sociocultural adaptation to the seas. (Lec. 3) Pre: 203 or MAF 100 or graduate status. Open only to juniors, seniors, and graduate students.

**415 (or SOC 415) Migration in the Americas (3)**

Contemporary trends in migration in the Americas with a focus on migratory flows from Latin America to the United States. Migration theories, unauthorized migration, anti-immigration discourses, intermigration in Latin America, gender dynamics, transnationalism, refugees and the internally displaced, and immigration policies in the Americas. (Lec. 3) Pre: open only to juniors, seniors, and graduate students.

**417 Archaeological Method and Theory (3)**

Problems of collection and interpretation of data, emphasizing nature of archaeological investigation, classification, dating, reconstruction of social contexts. Laboratory demonstrations. (Lec. 3) Pre: permission of instructor.

**427 Unity of Anthropology (3)**

Survey of recent advances in the subfields of anthropology. Designed to help majors appreciate the unity of anthropology in an age of specialization. (Seminar) Pre: junior or senior standing.

**465 Seminar in Cultural Heritage**

See Art History 465.

**470 Problems in Anthropology (3)**

Self-guided study and research, seminar, or individual program. (Independent Study) Pre: permission of chairperson.

**490 Underwater Historical Archaeology**

See History 490.

**565 Seminar In Cultural Heritage**

See Art History 565.

**Applied Mathematical Sciences (AMS)****699 Doctoral Dissertation Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## Aquaculture and Fisheries Science (AFS)

*Chairperson:* Professor Bengtson (Fisheries, Animal and Veterinary Science)

### 101 Freshman Inquiry into Fisheries and Aquaculture (1)

Introduction for freshmen to the opportunities, careers, research activities, applied outreach, and educational programs in fisheries and aquaculture. Interact weekly with faculty. Explore hands-on modules. (Lec. 1) S/U credit.

### 102 Introductory Aquaculture (3)

Aquaculture and its historical development worldwide, its contribution to food supply, non-food species, methods of production, environmental and ecological considerations, culture practices employed for selected species, selective breeding, feeding, disease, processing, and marketing. (Lec. 3)

### 104 Introductory Aquaculture Laboratory (1)

Field trips to local trout hatcheries, shellfish wholesalers, commercial aquaculture operations, aquaculture gear suppliers, and government research aquaculture facilities. Introduction to water quality monitoring. (Lab. 3) For Aquaculture and Fisheries Science majors. Must be taken concurrently with 102.

### 120 Introduction to Fisheries (2)

Introduction to international fishery issues, practices, patterns, and public policy based on readings and discussion in a tutorial setting. Concurrent registration in 121 required. (Lec. 2)

### 121 Introduction to Fisheries Laboratory (1)

Introduction to local fisheries and selected nearshore fishery ecosystems; exposure to use and operation of exemplary fishing and sampling gears in local fresh waters and estuaries. Concurrent registration in 120 required. (Lab. 3)

### 132 (or AVS 132) Animal Agriculture, Food Policy, and Society (3)

The impact of animal agriculture on the natural environment and on human society (arts and literature) is explored, as is the prospect for animal agriculture to alleviate human hunger and poverty here and abroad. (Lec. 3) (S)

### 190 (or BCH, MIC, NRS, PLS 190) Issues in Biotechnology (3)

Introduction to modern biotechnology in medical, pharmaceutical, forensic, agricultural, marine, and environmental applications. Consideration of ethical, environmental, health, and social issues. (Lec. 3) (N)

### 201 Shellfish Aquaculture (3)

Culture of marine and freshwater mollusks. Emphasis on life history, biological requirements, culture practices, and economic importance of major species used for human food or shell products. (Lec. 2, Lab. 3) Pre: 102 and one semester of general chemistry.

### 202 Finfish Aquaculture (3)

Introduction to the culture of finfish, emphasizing general principles and hands-on experience. Topics include water quality, spawning, care and maintenance, and growth of selected freshwater and marine species. (Lec. 1, Lab. 6) Pre: 102 or equivalent.

### 210 Introduction to the Marine Environment (3)

Introduction to estuarine, coastal, and oceanic environments; physical and biological processes affecting basins, bottoms, water properties, marine life, and the atmosphere. (Lec. 3) (N)

### 211 Introduction to the Marine Environment Laboratory (3)

Laboratory exercises on the marine environment. Unit conversions, measuring physical features and times, chart work and positioning problems, measuring and processing physical marine parameters, beach and submerged landscape profiling. (Lab. 2) (N)

### 270 Basic Scuba Diving in Science and Technology (3)

Rigorous introduction to scuba diving including equipment, diving physics, no-decompression and decompression diving, basic skills, and safety. Emphasis on development of basic knowledge and skills appropriate for a diving scientist or technician. Open Water Diver Certification by the National Association of Underwater Instructors is provided. (Lec. 2, Lab. 3) Pre: scuba diving physical examination and demonstration of strong swimming skills.

### 290 Small Boats: Their Equipment and Operation (3)

Principles and practices of vessel operation, from outboard skiffs to small trawlers. Basic nomenclature, navigation, and shiphandling. Rigging and working gear used in marine resource development. (Lec. 2, Lab. 3)

### 300 Aquaculture Health Management (4)

Causes and mechanisms of diseases in cultured marine and freshwater organisms, with emphasis on diagnosis, prevention, and treatment, as well as environmental and regulatory issues. (Lec. 3, Lab. 2)

### 311 Exploration of Marine Bioresources (3)

Explores marine bioresources for pharmaceuticals, nutraceuticals, and novel biomaterials. Distribution and biodiversity of marine organisms important to industrial utilization. Culture and recovery technologies and assessment of bioactivity. (Lec. 3)

### 312 Fish Habitat (3)

An introduction to fish habitat including conservation legislation, identification and mapping, fishing and non-fishing impacts, rehabilitation, and socioeconomic considerations. (Lec. 3) Pre: 120. Offered in spring of even-numbered years.

### 315 Living Aquatic Resources (3)

Survey of major aquatic resource groups; life histories, distribution, and exploitation of representative finfishes, mollusks, and crustacea in major fisheries ecosystems; management practices and patterns of fisheries development. (Lec. 3) Pre: 210 and BIO 113 or 101 or at least one semester of general animal biology.

### 316 Living Aquatic Resources Laboratory (1)

Study of representative organisms of major resource groups; finfish taxonomy, anatomy, and osteology; exemplary mollusks and crustacea; introduction to larval fishes and fish age estimation; character analysis. (Lab. 3) Pre: concurrent registration in 315. Offered in fall of odd-numbered years.

### 321 World Fishing Methods (3)

A survey of fish catching methods of the world and the electronic enhancements to fishing that have increased fishing power. Application of these methods to scientific sampling, commercial harvesting, recreational and subsistence fishing. (Lec. 3) Pre: 120 is recommended. Concurrent enrollment in 322 required. Offered in spring of odd-numbered years.

### 322 Laboratory for World Fishing Methods (1)

An introduction to the basic techniques used in fishing gear construction, maintenance, and operation. (Lab. 3) Pre: 120 is recommended. Concurrent enrollment in 321 required. Offered in spring of odd-numbered years.

### 332 Interactions between Fisheries and Protected Species (3)

An introduction to the issues associated with interactions between fisheries and protected species including legislation, and methods of assessing stock abundance and number of interactions. Case studies of specific interactions will be reviewed. (Lec. 3) Pre: 120. Offered in spring of odd-numbered years.

### 362 Crustacean Aquaculture (3)

Reproductive biology, breeding, culture systems, nutrition, genetics, and ecology of selected species of cultured crustaceans. Representative species of penaeid shrimp, freshwater prawns, crayfish, crabs, lobsters, and brine shrimp will be discussed. (Lec. 3) Pre: 201 and 202. Offered in spring of odd-numbered years.

### 391, 392 Special Problems and Independent Study (1–3 each)

Special work to meet individual needs of students in various fields of fisheries and marine technology. (Independent Study)

### 415 Fishery Science (3)

Biology of aquatic resource animals, fisheries mensuration and assessment, fisheries ecology, fishing methods, aquatic resource management and conservation, fish and shellfish farming. (Lec. 3) Pre: 315 and college mathematics; concurrent registration in 416.

**416 Fishery Science Laboratory (1)**

Practices and techniques of fisheries science. Field exercises in local model estuary and lake ecosystems; sampling methods; enumerating and documenting collections; measuring and reporting environmental attributes; estimating population parameters. (Lab. 2) Pre: concurrent registration in 415.

**421 Design of Fish Capture Systems (3)**

Detailed study of the design considerations and methods of construction of specific representative commercial and scientific sampling fish capture gear. Full-scale and model nets are designed, constructed, and tested. (Lec. 2, Lab. 3) Pre: 321 or permission of instructor.

**425 Aquaculture and the Environment (3)**

Impacts of aquaculture practices on the environment, including habitat alteration, release of drugs and chemicals, and interaction of cultured and wild organisms. Methods to reduce or eliminate those impacts: modeling, siting, and monitoring of aquaculture facilities; use of polyculture and water reuse systems. (Lec. 3) Pre: 102.

**426 Ecological Aquaculture (3)**

Study of the natural and social ecology of aquaculture ecosystems by applying principles of the systems ecology to the management of the world's aquaculture ecosystems. (Lec. 3) Pre: 102. Not for graduate credit.

**432 Marine Finfish Aquaculture (2)**

Culture of non-salmonid marine fish worldwide, with emphasis on the hatchery phase. Broodstock, larval rearing, live and formulated feeds, grow-out systems, stock enhancement. Requires student project on facility design. Pre: 102.

**433 Research Diving Methods (3)**

Underwater methods used to assess biological, physical, chemical, and geological characteristics of estuarine and coastal environments are presented and used to investigate seasonal changes in these parameters in the Narragansett Bay environment. (Lec. 2, Lab. 3) Pre: scuba certification and permission of instructor.

**434 Aquatic Food Quality and Processing (4)**

See Nutrition and Food Sciences 434.

**435 Aquatic Food Product Development (3)**

Concept of product developments, physicochemical principles and process technology for aquatic food and marine bioproduct development, survey of aquatic and marine products and manufacturing processes, and lab exercises on key products. (Lec. 2, Lab. 2) Pre: 434 or equivalent.

**481 Shellfish Aquaculture Laboratory (2)**

Detailed study of hatchery, nursery, and grow-out techniques for the production of bivalve mollusks. Culture of phytoplankton, conditioning of brood-

stock, spawning, larviculture, settlement, metamorphosis, nursery and grow-out methods. (Lab. 6) Pre: 201 or permission of instructor. Offered in fall of odd-numbered years.

**483 Salmonid Aquaculture (3)**

Principles of salmonid aquaculture, including culturing, spawning, incubation, feed formulation and feeding, disease control, genetics, systems management, harvesting, and transport. (Lec. 2, Lab. 2) Pre: 102 or equivalent.

**486 Physiology of Fish (3)**

Study of how fish function in the changing aquatic environment from the molecular to the organismal level. The major organ systems, regulation of physiological and biochemical functions, and interactions. (Lec. 3) Pre: BIO 341 or equivalent.

**491, 492 Special Projects (1–3 each)**

Work that meets the individual needs of students in aquaculture. (Independent Study)

**500 Diseases of Aquatic Organisms (3)**

Nature, causes, diagnosis, and spread of diseases limiting piscine freshwater and marine aquaculture projects. Emphasis on prevention, control, and treatment of more common diseases affecting hatchery management. (Lec. 3) Pre: 102; BIO 201 or AVS 331.

**501, 502 Seminar (1 each)**

Preparation and presentation of scientific papers on selected subjects in animal pathology and virology. (Seminar)

**503 (or AVS 503) Pathobiology (3)**

Mechanisms and causes of disease in homeothermic and poikilothermic vertebrates. Cell death, inflammation, infection, metabolic disorders, and neoplasia in relation to fish, reptiles, birds, and mammals. Effects of disease at the cellular, tissue, organ, and organismal levels with a medical orientation. (Lec. 3) Pre: BIO 201 or AVS 331.

**508 Seminar in Biological Literature**

See Biological Sciences 508.

**516 Early Life History of Aquatic Resource Animals (3)**

Biology and ecology of juvenile and planktonic commercially important species; dynamics of reproduction, fecundity, growth, distribution, and behavior as modulated by the physical environment; identification, enumeration, and sampling. (Lec. 2, Lab. 3) Pre: 415 and STA 308.

**521 Evaluation of Fish Capture System (3)**

Evaluation of fish capture system behavior and performance using empirical, theoretical, model scaling, and statistical analysis techniques. Field and laboratory measurement procedures. (Lec. 2, Lab. 3) Pre: 421 or permission of instructor.

**531 Fisheries Stock Assessment (3)**

A quantitative approach to describing the processes of fish growth and mortality, the estimation of stock size, the prediction of stock yield, and management practices. Spreadsheets and other microcomputer applications will be used for analysis and modeling. (Lec. 2, Lab. 3) Pre: 415, STA 409 or permission of instructor.

**532 Experimental Design**

See Statistics 532.

**534 (or MIC 534) Animal Virology (3)**

Basic properties, classification, and evolution of animal viruses. Individual agents are studied in detail. (Lec. 3) Pre: MIC 432, 533, or permission of chairperson.

**536 (or MIC 536) Virology Laboratory (2)**

Methods employed in diagnosis and for the investigation of the biological, physical, and chemical properties of animal viruses. (Lab. 6) Pre: credit or concurrent enrollment in 534.

**576 Seminar in Genetics of Aquatic Organisms (3)**

Modes of inheritance found in fish including chromosome number, polyploidy, sex determination, and hybridization. Heritabilities, methods of selection, and mating systems used in the development of fish suited for intensive culture. (Seminar) Pre: BIO 352.

**581 Current Topics in Molluscan Aquaculture (3)**

Review and critical analysis of recent literature within the field of molluscan biology with emphasis on application to mariculture techniques. Student presentation of selected topics and field trips to state-of-the-art mariculture facilities. (Lec. 3) Pre: graduate standing or senior standing with permission of instructor.

**584 Advanced Aquaculture Systems (3)**

Development of design criteria, operational analysis, and management of selected species in water reuse systems. (Lec. 2, Lab. 2) In alternate years.

**586 Fish Nutrition (3)**

Digestion and metabolism of carbohydrate, protein, and lipids by fish. Role of vitamins and minerals in metabolism and associative nutritional diseases resulting from deficiencies. Inadvertent toxic factors in fish feeds. (Lec. 3) Pre: CHM 228 or equivalent. In alternate years.

**591, 592 Special Projects (1–3 each)**

Research projects in animal pathology, virology, and aquaculture. (Independent Study) Pre: graduate standing or permission of chairperson.

**599 Master's Thesis Research**

Number of credits is determined each semester in consultation with the major professor or program committee (Independent Study) S/U credit.

## Arabic (ARB)

*Chairperson:* Professor Hedderich (Languages)

### 101 Beginning Arabic I (3)

Fundamentals of grammar and pronunciation of Arabic; exercises in reading, writing, and conversation. (Lec. 3) Students enrolling in this course should have had no more than one year of previous Arabic study. (FC) [D]

### 102 Beginning Arabic II (3)

Continuation of 101. (Lec. 3) Students enrolling in this course should have taken 101 or its equivalent. (FC) [D]

### 103 Intermediate Arabic I (3)

Development of facility in reading; exercises in grammar, writing, and conversation. (Lec. 3). Students enrolling in this course should have taken 102 or equivalent. (FC) [D]

### 104 Intermediate Arabic II (3)

Continuation of 103. (Lec. 3) Students enrolling in this course should have taken 103 or its equivalent. (FC) [D]

## Art (ART)

*Chairperson:* Professor Dilworth (Art and Art History)

### 002 Sophomore Review (0)

Presentation by majors of a broad selection of their previous college-level work for review by faculty. (Studio) Pre: 101, 103, 207.

### 101 Two-Dimensional Studio (3)

Exploration of principles of visual organization relating primarily to formulations on the two-dimensional surface by means of fundamental studies and assignments in studio techniques. (Studio 6) (A)

### 103 Three-Dimensional Studio (3)

Introduction to problems in three-dimensional organization. Observations from objects with discussion and application to simple mold and casting techniques. Introduction to the use of basic materials, clay, plaster, and wood. (Studio 6)

### 203 Color (3)

Visual perception of color and manipulation of light as they pertain to two- or three-dimensional formulations. (Studio 6)

### 204 Digital Art and Design I (3)

Introduction to various digital technologies used in the production of fine art and applied design. Students gain the basic technical skills and theoretical knowledge of digital still imaging, animation, and interactivity information design. (Studio 6)

### 207 Drawing I (3)

Visual perception and observation, using nature structures, drawing from models, still life, and landscape; exercises in basic drawing techniques and principles. (Studio 6) (A)

### 208 Drawing II (3)

Advanced practice in graphic conceptions; exercises in spatial problems, organizing relationships of abstract forms and structures; advanced drawing media. (Studio 6) Pre: 207.

### 213 Photography I: B/W Photography (3)

Introduction to basic black and white photography and exploration of relate techniques using light-sensitive materials. Emphasis on photography as an artistic media. Required projects and readings. (Studio 6)

### 215 Video and Filmmaking I (3)

Introduction to basic filmmaking and video techniques and theories of moving images. Emphasis on film and video as artistic media. Required projects and readings. (Studio 6) May be repeated for a maximum of 6 credits with permission of instructor.

### 221 Painting I (3)

Techniques of painting, utilizing as reference the natural and human-made environments. Traditional and contemporary materials. (Studio 6) Pre: 101 and 207.

### 231 Printmaking I (3)

Introduction to the intaglio process and monotype, with an emphasis on image development and workshop procedures (Studio 6) Pre: 101 or 207 or permission of instructor.

### 233 Relief Printing and Typography I (3)

Introduction to basic elements of graphic design; letter forms, their relationship to the page and to the image. Various traditional and modern reproduction techniques, workshop practice in typesetting and layout. (Studio 6) Pre: 101 or permission of chairperson.

### 243 Sculpture I (3)

Formation of three-dimensional forms employing basic sculptural materials and techniques. Basic media, emphasis on form, material, and structural means in studio practice. (Studio 6) Pre: 103 or permission of instructor.

### 300 Art Gallery Internship (3)

Curatorial responsibilities taught through hands-on experience in exhibition programs including exhibition research, production of interpretive texts and lectures, art object preparation, registration, and installation. (Practicum) Pre: junior standing and permission of instructor and chairperson. S/U only.

### 301 Projects in Studio (3)

Studio projects under guidance of instructor selected by student. (Independent Study) Pre: permission of chairperson and instructor.

### 303 Topics in Studio (3)

Selected topics based on particular materials, techniques, or thematic premises. Topics and semesters to be announced. (Studio 6) Pre: art major status,

or permission of instructor or chairperson. May be repeated for credit with permission of instructor and chairperson.

### 304 Digital Art and Design II (3)

Continuation of 204 with an emphasis on the development of professional quality resources, content, and output. Assignments cover the fundamental elements of graphic design in the digital environment and the cross influences among fine art, mass media, and new media. (Studio 6) May be repeated once for credit with permission of instructor. Pre: 204.

### 305 Photographic Alternatives (3)

Topics emphasize possibilities in photographic themes and techniques, including alternative processes, collotype, and studio practice. (Studio 6) Pre: 213 and permission of instructor. May be repeated with permission of instructor and chairperson.

### 306 Digital Art and Design III (3)

Continuation of 304 with an emphasis on contemporary issues related to art, information technology, and social influence. Students are required to develop Web-based projects. (Studio 6) May be repeated once for credit with permission of instructor. Pre: 304.

### 307 Art Studio Internship (3 or 6)

Work in an institution, agency, or organization supervised by an art professional and a studio faculty member. Activities, expectations, performance assessments, hours, and credits determined through prior consultation. (Practicum) Limit of 6 credits toward graduation. Pre: junior standing in the B.A. or B.F.A. studio program and permission of chairperson. S/U only.

### 309 Drawing III (3)

Further problems in drawing with emphasis on independent work. (Studio 6) Pre: 208 or permission of instructor.

### 314 Photography II: B/W Darkroom (3)

Continuation of 213 with emphasis on expanding skills in creative photographic expression, technique and communication. Discussions/papers on contemporary photography. (Studio 6) Pre: 213 May be repeated once for credit with permission of instructor.

### 315 Photography II: The Digital Darkroom (3)

Introduction to the digital darkroom with an emphasis on digital workflow, printing and the use of digital as a form of artistic expression. Required projects and readings. (Studio 6) May be repeated once for credit with permission of instructor. Pre: 213 and 204 or permission of instructor.

### 316 Video and Filmmaking II (3)

Continuation of 215 with added emphasis on sound. Required projects and reading. (Studio 6) Pre: 215. May be repeated once for credit with permission of instructor.

**322 Painting II (3)**

Continuation of 221. (Studio 6) Pre: 221. May be repeated for credit with permission of instructor.

**324 Figure Drawing and Painting (3)**

Introduction, exploration, and integration of materials, principles, and techniques related to the human figure. Emphasis on conceptual and observational approach to structure and development of form. May be repeated once for credit with permission of instructor. Pre: 207 and 208 and 221 or permission of instructor.

**332 Printmaking II (3)**

Introduction to lithography including stone, plate, and photographic processes. Contemporary viewpoints and their relationship to traditional printmaking, with emphasis on individual image development. (Studio 6) Pre: 231.

**334 Relief Printing and Typography II (3)**

Continuation of 233. Applications of previous studies to experimental workshop assignments leading to production of book pages, folders, posters, and other visual material incorporating type and print in a contemporary idiom. (Studio 6) Pre: 233 or permission of chairperson. May be repeated for credit with permission of instructor.

**337 Printmaking III (3)**

Continuation of 332 with semi-independent work in various printmaking media. Introduction of aluminum plate and photo-lithography. (Studio 6) Pre: 332.

**344 Sculpture II (3)**

Continuation of 243. (Studio 6) Pre: 243 or permission of instructor. May be repeated for a maximum of 6 credits with permission of instructor.

**404 Digital Art and Design IV (3)**

Independent work in digital art and design under the supervision of instructor. Students present project proposals and are guided in the development of a professional multimedia portfolio. (Studio 6) Pre: 306 and permission of instructor and department chair. May be repeated once with permission of the instructor and department chairperson.

**405, 406 Studio Seminar (3 each)**

Intensive self-directed work under guidance of instructor. Periodic critiques and discussion of work of all participants. (Studio 6) Pre: limited to senior B.A. and B.F.A. studio art majors with 3.00 or above as studio course average and permission of instructor.

**410 Drawing IV (3)**

Independent work in drawing under the supervision of instructor. (Studio 6) Pre: 309 and permission of instructor. May be repeated for credit with permission of instructor and department chair.

**415 Photography III (3)**

Independent work in various photographic media under the supervision of the instructor. Students guided in the development of a portfolio. May be repeated once for credit with permission of instructor. (Studio 6) Pre: 314 and 315 or permission of instructor.

**417 Video and Filmmaking III (3)**

Independent work in video and filmmaking under the supervision of instructor. (Studio 6) Pre: 316 and permission of instructor. May be repeated for credit with permission of instructor and department chair.

**423 Painting III (3)**

Independent work in painting under the supervision of the instructor. (Studio 6) Pre: 322 and permission of instructor. May be repeated for credit with permission of instructor and department chair.

**435 Relief Printing and Typography III (3)**

Independent work in relief printing and typography under the supervision of instructor. (Studio 6) Pre: 334 and permission of instructor. May be repeated for credit with permission of instructor and department chair.

**438 Printmaking IV (3)**

Independent work in printmaking media under supervision of instructor. (Studio 6) Pre: 337 and permission of instructor. May be repeated for credit with permission of instructor and department chair.

**445 Sculpture III (3)**

Independent work in sculpture under the supervision of instructor. (Studio 6) Pre: 344 and permission of instructor. May be repeated for credit with permission of instructor and department chair.

**501 Graduate Studio Seminar (3)**

Intensive independent studio work under guidance of instructors. Periodic critiques and discussions related to work of all participants in the course. (Studio 6) Pre: 48 credits in studio.

**Art History (ARH)**

*Chairperson:* Professor Dilworth (Art and Art History)

**120 Introduction to Art (3)**

Fundamental principles of the visual arts, evolution of styles and conceptions through the ages in different forms of creative expression. (Lec. 3) (A) [D]

**251 Introduction to Art History: Ancient-Medieval (3)**

The development of architecture, sculpture, and painting from prehistory through the Middle Ages. (Lec. 3) (A) [D]

**252 Introduction to Art History: Renaissance-Modern (3)**

The development of architecture, sculpture, and painting from the early Renaissance to the present. (Lec. 3) (A) [D]

**284 Introductory Topics in Architectural History (3)**

Consideration of the history of architecture and city planning through surveys of selected periods and themes. (Lec. 3) May be repeated for a maximum of 6 credits with permission of instructor.

**300 Art History Internship (3–6)**

Internship in an approved professional organization (such as museum, gallery, preservation society, auction house). Specific details determined in consultation with faculty supervisor and off-campus liaison, and approved by chairperson. (Practicum) May be taken in one semester or repeated for a maximum of 6 credits. S/U only.

**330 African-American Art in Context: A Cultural and Historical Survey I**

See African and African-American Studies 330. Next offered spring 2013.

**331 The African-American Artist in Context: A Cultural and Historical Survey II**

See African and African American Studies 331.

**354 Art of the Ancient Mediterranean (3)**

Developments in architecture, painting, and sculpture in Greece and Rome from 800 B.C. to 400 A.D. Brief analysis of the art of the Aegean from 2500 to 1500 B.C. (Lec. 3) Pre: 251 or 252 or permission of instructor. May be repeated once with permission of instructor.

**356 Medieval Art (3)**

Painting, sculpture, architecture, and minor arts of the Middle Ages from 500 to 1400 in Western Europe. (Lec. 3) Pre: 251 or permission of chairperson.

**359 Baroque Art (3)**

Developments in painting, sculpture, and architecture in Italy and northern Europe from 1600 to 1750. (Lec. 3) Pre: 251 or 252 or permission of instructor.

**361 Nineteenth-Century Art (3)**

Investigates major movements of European and American painting, sculpture, photography, and architecture from 1780–1900. (Lec. 3) Pre: 251, or 252, or permission of instructor.

**362 Twentieth-Century Art (3)**

Investigates major movements of European and American painting, sculpture, photography, and architecture from 1900–2000. (Lec. 3) Pre: 251, or 252, or permission of instructor.

**363 Modern Art: 19th and 20th Centuries (3)**

A survey of trends in the visual arts over the last two centuries with emphasis on defining a “modern” aesthetic. Painting, sculpture, performance, conceptual, and related arts will be discussed. (Lec. 3) Pre: 251 or 252 or permission of instructor.

**364 American Art (3)**

Painting, sculpture, and architecture from their origins in the 17th century to the present; emphasis on the 19th century. (Lec. 3) Pre: 251 or 252.

**365 Renaissance Art (3)**

Painting, sculpture, and architecture of Italy and northern Europe from 1400 to 1600. (Lec. 3) Pre: 251 or 252 or permission of instructor.

**371, 372 Projects in Art History I, II (3 each)**

Directed study in art history under guidance of instructor selected by student. The student may select a different instructor for 371 and 372. (Independent Study) Pre: permission of chairperson and instructor.

**374 Topics in Film (3)**

Explores the social, historical, and aesthetic development of the cinema from 1895 to the present. Lectures (3 hours) and required film screenings. (Lec. 3) May be repeated for a maximum of 6 credits with permission of instructor.

**375 Topics in the History of Photography (3)**

Explores the social, historical, and aesthetic development of photography from 1826 to the present. (Lec. 3) May be repeated for a maximum of 6 credits with permission of instructor.

**376 History of Animation (3)**

Traces the development of animation from the pre-history of animation to the present. (Lec. 3) Pre: 251, 252, or permission of instructor.

**377 The History of Experimental Film (3)**

Traces the development of experimental cinema in the context of modern art. (Lec. 3) Pre: 251, 252, or permission of instructor. Next offered fall 2012.

**380 Topics in Art and Architectural History (3)**

Selected topics, themes, and issues in the history of the visual arts. (Lec. 3) Pre: 251 or 252 or permission of instructor. May be repeated with a different topic for maximum of 6 credits.

**385 Women in Art (3)**

Examination of women artists and their work in the history of western art; analysis of representations of women and gender in works of art and art historical texts. Pre: 252 or WMS 150 or permission of instructor.

**461 Topics in Methods, Theory, and Criticism (3)**

Art history methods or selected topics in the theory and criticism of art. (Lec. 3) Pre: permission of chairperson. May be repeated for credit with permission of instructor.

**462 Contemporary Art Seminar (3)**

Analysis of contemporary work and its relation to earlier movements. (Seminar) Pre: 363. May be repeated for a maximum of 6 credits with permission of instructor. Next offered fall 2012.

**465 (or APG 465) Seminar in Cultural Heritage (3)**

Investigates how global development, commercialization, and conflicts affect humankind's cultural heritage. Examines some ethical issues and legal strategies for protecting cultural sites, artifacts, and traditional folkways. (Lec. 3) Pre: at least 3 credits at the 300-level in anthropology, art history, or history; or permission of the instructor.

**469, 470 Art History: Senior Projects (3–6 each)**

Intensive, independent work on a project determined by consultation with the student's project advisor. (469, Independent Study; 470, Tutorial) Pre: senior standing, art history major, permission of chairperson.

**475 Classical Archaeology: Critical Approaches to the Greek and Roman Past (3)**

Study of material remains of ancient Greek and Roman (and related) cultures. Critical analysis of art, artifacts, and architecture with attention to changing approaches to interpreting antiquity. (Seminar) Pre: at least 3 credits at the 300-level in art history, history, or anthropology; or permission of instructor.

**480 Advanced Topics in European and American Art (3)**

Consideration of the history of European and American art through analysis of selected periods or themes. (Seminar) Pre: permission of instructor. May be repeated for credit with a different topic.

**565 (or APG 565) Seminar in Cultural Heritage (3)**

Investigates how global development, commercialization, and conflicts affect humankind's cultural heritage. Examines some ethical issues and legal strategies for protecting cultural sites, artifacts, and traditional folkways. (Lec.) Pre: 300-level coursework in anthropology, art history, or history; or permission of instructor.

**575 Classical Archaeology: Critical Approaches to the Greek and Roman Past (3)**

Study of material remains of ancient Greek and Roman (and related) cultures. Critical analysis of art, artifacts, and architecture with attention to changing approaches to interpreting antiquity. (Seminar) Pre: coursework at the 300-level in art history, history, or anthropology, or permission of instructor.

**Astronomy (AST)**

*Chairperson:* Professor Northby (Physics)

**108 Introductory Astronomy: Stars and Galaxies (3)**

Celestial sphere, constellations. Constitution of sun, stars, nebulae, and galaxies. Planetarium used freely for lectures and demonstrations. (Lec. 3) (N)

**118 Introductory Astronomy: The Solar System (3)**

Celestial sphere, Earth, formation of and motions and characteristics of objects in solar system, the Sun, exoplanets, and search for extraterrestrial life. Planetarium used for lectures and demonstrations. (Lec. 3) (N)

**334 Optics**

See Physics 334.

**483, 484 Laboratory and Research Problems in Physics**

See Physics 483, 484.

**491, 492 Special Problems**

See Physics 491, 492.

**Bachelor of Interdisciplinary Studies (BIS)**

*Coordinator:* Assistant Professor Hubbard

**100 (BGS) Pro-Seminar (3)**

Introduction to critical approaches to learning with emphasis on reading and rhetorical skills appropriate to college students. Must be taken concurrently with URI 101. S/U credit. (ECW)

**350 (BGS) Directed Study or Research (1–6)**

Directed research or study designed to meet the particular needs of individual students. (Independent Study) Pre: permission of the academic department chairperson and the B.I.S. coordinator. May be repeated for a maximum of 6 credits.

**390 (BGS) Social Science Seminar (6)**

Exploration of the social sciences for B.I.S. students who have completed the Pro-Seminar, started their major, and have the consent of their advisor. (Seminar) Required of B.I.S. students. Offered every third semester. Next offered spring 2012. (S) [D]

**391 (BGS) Natural Science Seminar (6)**

Exploration of the natural sciences for B.I.S. students who have completed the Pro-Seminar, started their major, and have the consent of their advisor. (Seminar) Required of B.I.S. students. Offered every third semester. Next offered fall 2012. (N)

**392 (BGS) Humanities Seminar (6)**

Exploration of the humanities for B.I.S. students who have completed their Pro-Seminar, started their major, and have the consent of their advisor. (Seminar) Required of B.I.S. students. Offered every third semester. Next offered fall 2011. (L) [D]

**397 (BGS) Human Studies Major Seminar (3)**

Capstone course of human studies major. Review and assessment of students' major education through intensive exploration of issues central to human studies. (Seminar/Online) Pre: completion of 30 credits of major. Required of B.I.S. human studies majors.

**398 (BGS) Applied Communication Major Seminar (3)**

Capstone course of applied communications major. Review and assessment of students' major education through intensive exploration of issues central to professional communications. (Seminar) Pre: completion of 30 credits of major courses. Required of all applied communication majors.

**399 (BGS) Supervised Senior Project (3)**

A project chosen by the student with faculty guidance on a topic relevant to the student's major, resulting in a paper or other demonstration of academic achievement. (Independent Study) Pre: senior standing in B.I.S. program and approval of advisor and B.I.S. coordinator. Required of B.I.S. students.

**Biochemistry (BCH)**

*Chairperson:* Professor Sperry (Cell and Molecular Biology)

**190 Issues in Biotechnology (3)**

See Aquaculture and Fisheries Science 190. (N)

**211 Biochemical Aspects of Nutrition and Physiology (3)**

Chemistry of biological transformations in the cell. Chemistry of carbohydrates, fats, proteins, enzymes, vitamins and hormones integrated into a general discussion of energy-yielding and biosynthetic reactions in the cell. (Lec. 3) Pre: one year college biology and one year of chemistry including CHM 124.

**242 Human Genetics and Human Affairs (3)**

Basic principles of genetics including patterns of inheritance, mitosis and meiosis, sex determination and sex linkage. Genetic diseases, their cause and cures. Recombinant DNA and genetic engineering. Human diversity and evolution. (Lec. 3)

**311 Introductory Biochemistry (3)**

Chemistry of biological transformations in the cell. Chemistry of carbohydrates, fats, proteins, nucleic acids, enzymes, vitamins, and hormones integrated into a general discussion of the energy-yielding and biosynthetic reactions in the cell. (Lec. 3) Pre: CHM 124 or equivalent.

**312 Introductory Biochemistry Laboratory (2)**

Laboratory exercises illustrate chemical and physical properties of biomolecules, separation techniques, enzyme catalysis, symptoms of nutritional deficiency, quantification of metabolic end-products, and drug detoxification. (Lab. 4) Pre: credit or concurrent enrollment in 311.

**352 General Genetics**

See Biological Sciences 352.

**353 (or BIO 353) Genetics Laboratory (1)**

Basic principles and concepts of genetics demonstrated with microorganisms, plants and animals. (Lab. 2) Pre: credit or concurrent enrollment in 352.

**412 Biochemistry Laboratory (3)**

Same as 312 plus an individual supervised laboratory project selected in consultation with the student. Projects may include enzyme action, enzyme induction, drug action, use of radioisotopes, and plant metabolism. (Lab. 6) Pre: credit or concurrent enrollment in 311.

**435 (or MIC 435) Introduction to the Biology and Genetics of Cancer (3)**

Comprehensive instruction in the biology, genetics and biochemistry of cellular transformation and cancer. Pre: 311 and 352, or permission of instructor.

**437 Fundamentals of Molecular Biology**

See Biological Sciences 437.

**451 (or MIC 451) Laboratory in Cell Biology (1)**

Analysis of subcellular processes, structures, and molecules using techniques including gel electrophoresis, spectrophotometry ultracentrifugation, and protein purification. Topics range from analysis of gene expression to subcellular localization of enzymatic activity. (Lab. 2) Pre: concurrent enrollment in 453 (or MIC 453) or permission of instructor.

**452 (or BIO 452) Advanced Topics in Genetics (3)**

More detailed treatment of topics introduced in the general genetics course (352) including aspects of transmission genetics, molecular genetics, cytogenetics, biotechnology, developmental genetics, and the impact of genetics on society. (Lec. 3) Pre: BIO 352.

**453 Cell Biology**

See Biological Sciences 453.

**464 Biochemistry of Metabolic Disease (3)**

A study of the primary and secondary molecular changes in human metabolic diseases. Topics include aging, alcoholism, arteriosclerosis, diabetes, depression, and genetic diseases. (Lec. 3) Pre: 311 or 481.

**484 Physical Methods in Biochemistry (3)**

Experimental methods including spectroscopy, spectrofluorimetry, optical rotation, chromatography, and electrophoresis are applied to biochemical compounds and reactions. Physical principles and the calculation of important properties are stressed. (Lec. 1, Lab. 4) Pre: 435, 481, and permission of chairperson.

**491, 492 Research in Biochemistry (1–6 each)**

Special problems. Student outlines the problem, carries on experimental work, presents the conclusions in a report. (Independent Study) Pre: permission of instructor. Not for graduate credit in biochemistry.

**495, 496 Biochemistry Seminar (1 each)**

Discussion and presentation of research papers on selected subjects in biochemistry. (Lec. 1) Pre: 311, 482, or 582.

**500 Principles and Techniques in Molecular Cloning (II, 2)**

Current techniques and strategies in gene cloning, characterization, construction, and expression in prokaryotes and eukaryotes. Comprehensive knowledge and understanding necessary for gene cloning and vector construction emphasized (Lec. 2). Pre: 437 or permission of instructor.

**502 Techniques of Molecular Biology**

See Microbiology 502.

**508 Seminar in Biological Literature**

See Biological Sciences 508.

**521 Physical Biochemistry (3)**

The use of calorimetry, centrifugation, electrophoresis, (SDS-PAGE, agarose gels, sequencing gels, immunoelectrophoresis, capillary electrophoresis, and isoelectric focusing), chromatography (GFC, SPX, IEX, normal and reversed-phase HPLC, and micro-HPLC), mass spectrometry (ion-labeling, MALDI, FAB, electrospray, and MS/MS), radioactive labels, and X-ray crystallography to characterize biologically important macromolecules such as proteins, DNA/RNA, carbohydrates, and lipids. (Lec. 3) Pre: 311, concurrent registration in 581, or permission of instructor. In alternate years. Next offered fall 2012.

**522 Bioinformatics I**

See Biomedical and Pharmaceutical Sciences 542.

**523, 524 Special Topics in Biochemistry (1–3 each)**

Advanced work arranged to suit the individual needs of the student. Lecture and/or laboratory according to the nature of the problem. (Independent Study) Pre: permission of chairperson. May be repeated for a maximum of 12 credits. S/U credit for 524.

**551 (or MLS 551) Topics in Biochemistry for the Clinical Scientist (3)**

Description of the major components of biochemistry as it relates to the medical sciences. Major concepts include molecular genetics, regulatory biochemistry, and medically related applied biochemistry. (Lec. 3) Offered every third year.

**552 Microbial Genetics**

See Microbiology 552.

**579 Advanced Genetics Seminar**

See Biological Sciences 579.

**581 General Biochemistry I (3)**

First semester of a two-semester course on the principles of biochemistry. Topics include bioenergetics, protein structure, enzymology, glycolysis, the tricarboxylic acid cycle, and oxidative phosphorylation. (Lec. 3) Pre: CHM 228 and 229.

**582 General Biochemistry II (3)**

Second semester of a two-semester course on the principles of biochemistry. Topics include photosynthesis, membranes, hormones, metabolism, the

biosynthesis of DNA, RNA, and proteins. (Lec. 3) Pre: 581 or permission of instructor.

#### 585 Recent Advances in Receptor Research (1)

Discussion of current research literature about receptors for hormones, pheromones, neurotransmitters, and other biological signals. Consequences of receptor activation will also be discussed. (Lec. 1) Pre: 311 and permission of instructor. May be repeated.

#### 599 Master's Thesis Research

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

#### 642 Biochemical Toxicology

See Biomedical and Pharmaceutical Sciences 642.

#### 651, 652 Research in Biochemistry (3 each)

Students are required to outline a research problem, conduct necessary literature survey and experimental work, and present the observations and conclusions in a substantial written report. (Independent Study) Pre: graduate standing.

#### 695, 696 Graduate Seminar

See Microbiology 695, 696.

#### 699 Doctoral Dissertation Research

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## Biological Sciences (BIO)

*Chairperson:* Professor Goldsmith

#### 101 Principles of Biology I (4)

Chemistry, structure, metabolism, and reproduction of cells. Principles of genetics. Structure, development, and physiology of animals. Survey of the animal kingdom. (Lec. 3, Lab. 2) (N)

#### 102 Principles of Biology II (4)

Structure, physiology, and reproduction of plants. Diversity of plants, fungi, and algae. Principles of ecology and evolution. (Lec. 3, Lab. 2) Pre: 101. (N)

#### 105 Biology for Daily Life with Laboratory (3)

Basic biological principles needed to understand contemporary issues in biology, for example, forensic biology, cloning, genetic engineering, reproductive technologies, "alternative" medicine, biodiversity, habitat alteration, and endangered species. Designed for nonmajors. (Lec. 2, Lab. 2) (N)

#### 106 Biology for Daily Life with Recitation (3)

Basic biological principles needed to understand contemporary issues in biology, for example, forensic biology, cloning, genetic engineering, reproductive technologies, "alternative" medicine, biodiversity, habitat alteration, and endangered species. Designed for nonmajors. (Lec. 2, Rec. 1) (N)

#### 121 Human Anatomy (4)

Elementary anatomy of the organ systems, studies with the aid of charts, models, and predissected specimens. (Lec. 3, Lab. 3) Open to B.A. biology, B.S. biological sciences, physical education, nursing, pharmacy, pre-physical therapy, medical laboratory science, nutrition, dietetics, and biomedical engineering majors only.

#### 130 Topics in Marine Biology (1)

Current and classical issues considered in small classes. Designed for students interested in marine biology. (Seminar) Pre: limited to marine biology majors. Required of all freshman marine biology majors and students entering the major with fewer than 24 credits. May not be repeated.

#### 201 General Animal Physiology (3)

Basic principles of physiology with emphasis on cellular and membrane mechanisms. Topics include bioenergetics and metabolism, enzymes, respiratory functions of blood cells, osmoregulation, bioelectricity and motility, cellular responses to humoral stimuli. (Lec. 2, Lab. 3) Pre: two semesters of biological sciences and one semester of chemistry recommended.

#### 242 Introductory Human Physiology (3)

Functions of the organ systems of the human body and their coordination in the whole human organism. Attention is given to the needs of students preparing for health-related professions. (Lec. 3) Pre: 121.

#### 244 Introductory Human Physiology Laboratory (1)

Mechanisms of physiological processes are illustrated by experiments on vertebrate animals. (Lab. 3) Pre: credit or concurrent enrollment in 242.

#### 262 Introductory Ecology (4)

Structure and function of ecosystems, limiting factors, population dynamics, population interactions, and community relationships. Selected habitats and general ecological effects of humans. (Lec. 3, Rec. 1) Pre: 101, 102 or equivalent.

#### 272 (or GEO 272) Introduction to Evolution (4)

Introduction to evolution as the unifying thread in the biosphere. Processes and patterns discussed, including microevolution and macroevolution. Social impact of evolution discussed from a biological perspective. Pre: GEO 102 or one semester of biological sciences, or permission of instructors.

#### 286 (or ENT 286) Humans, Insects, and Disease (3)

Role of insects, ticks, and mites as vectors and as direct agents of diseases in humans; factors affecting the spread of these diseases and their role in our cultural development. (Lec. 3) Not for major credit for B.S. in biological sciences. (N)

#### 302 Animal Development (4)

Survey of the patterns and mechanisms of animal development, including the molecular genetic control of development, medical developmental biology, and evolution of development. (Lec. 3, Lab. 3) Pre: 101, 102, and two additional semesters of biological sciences; genetics recommended.

#### 304 Comparative Vertebrate Anatomy (4)

Anatomy of chordates emphasizing functional and evolutionary diversity. Lecture focuses on morphological variation and evolution. Laboratory focuses on comparative anatomy through dissections and models. (Lec. 3, Lab. 3) Pre: 101 and 102 or equivalent.

#### 311 Plant Structure and Development (4)

Structure of vascular plant cells, tissues, and organs; cellular and molecular mechanisms controlling developmental processes including cell division, leaf initiation, epidermal patterning, and vascular differentiation. (Lec. 3, Lab. 3) Pre: 102 or permission of instructor.

#### 321 Plant Diversity (4)

Representative forms of prokaryotes, algae, fungi, bryophytes, and vascular plants with emphasis on evolution, ecology, and life cycle. (Lec. 3, Lab. 3) Pre: 102 or permission of instructor.

#### 323 Field Botany and Taxonomy (4)

Collection, identification, and study of vascular flora of Rhode Island, including use of manuals and herbarium specimens. Field trips throughout Rhode Island. Discussion of principles, methods, and data used in classification. (Lec. 2, Lab. 4) Pre: 102.

#### 327 Vertebrate Histology (3)

A study of the normal microscopic organization of the cells and tissues that compose the organ systems of vertebrates. An introduction to histochemical and cytochemical methods is included. (Lec. 3) Pre: one year of biological sciences and one semester of organic chemistry.

#### 329 Vertebrate Histology Laboratory (1)

A detailed study in the laboratory of prepared microscope slides of cells and tissues of vertebrates. (Lab. 3) Pre: credit or concurrent enrollment in 327.

#### 332 (or PLS 332) Plant Pathology (4)

Nature, cause, and control of plant diseases. Use of basic techniques for identification of major types of plant diseases and their causal agents. (Lec. 4) Pre: 102 or permission of instructor.

#### 334 Physiology of Exercise

See Kinesiology 334.

#### 335 Physiology of Exercise Laboratory

See Kinesiology 335.

**341 Principles of Cell Biology (3)**

An introduction to the structure and organization of eukaryotic cells. Topics include membranes and organelles, gene expression, protein synthesis and secretion, energy utilization, the cytoskeleton, and signal transduction. (Lec. 3) Pre: one semester of biological sciences and one semester of organic chemistry.

**345 Marine Environmental Physiology (3)**

The physiological basis of adaptation to the marine environment. Physiological methods adapted to marine plants and animals. (Lec. 2, Lab. 3) Pre: two semesters of biological sciences.

**346 Plant Physiology (3)**

Development and function of vascular plants, including energy and nutrient assimilation, growth, reproduction, and interactions with other organisms and the physical environment. (Lec. 3) Pre: 102, one semester of chemistry, or permission of instructor.

**348 Plant Physiology Laboratory (1)**

Laboratory methods in plant physiology, including experimental design and reporting. Techniques include water potential measurement, chromatography, spectrophotometry, enzyme assay, tissue culture, bioassay, protein extraction, and gel electrophoresis. (Lab. 3) Pre: 346, may be taken concurrently.

**352 (or BCH 352) General Genetics (4)**

Introduction to basic genetic principles and concepts leading to an understanding of genes, heredity, and the nature of inherited variation. Applications and implications for animals, plants, fungi, and bacteria. (Lec. 3, Rec. 1) Pre: 101 and 102.

**353 Genetics Laboratory**

See Biochemistry 353.

**354 Invertebrate Zoology (4)**

Study of the origin and evolutionary relationship of the invertebrate animals. Emphasis on marine forms. Laboratory sessions include comparative study of selected examples and field trips to local environments. (Lec. 2, Lab. 4) Pre: 101 and 102.

**355 Marine Invertebrates of Southern New England (3)**

Collection and identification of marine invertebrates of southern New England. Emphasis on field and laboratory studies. Student collection will incorporate video photography. (Lab. 6) Pre: 101 and 102 or permission of instructor.

**360 Marine Biology (4)**

The nature of plants and animals of the sea. Diversity of species and adaptations to habitats from the sea surface to the depths of the ocean. (Lec. 3, Lab. 3) Pre: 101, 102.

**365 Biology of Algae (4)**

Taxonomy, morphology, and evolution of all major algal divisions. Laboratory/field component focuses

upon taxonomic identification of both live and preserved microscopic and macroscopic algal species. (Lec. 3, Lab. 3) Pre: 102.

**366 Vertebrate Biology (3)**

Life histories, adaptations, ecology, classifications, and distribution of vertebrate animals. Laboratory and extensive field work on local vertebrates. (Lec. 2, Lab. 3) Pre: 262 recommended.

**385 Introductory Entomology**

See Entomology 385.

**386 Introductory Entomology Lab**

See Entomology 386.

**396 Biology and Society (2)**

A seminar course dealing with the impact of biological discoveries on societal questions and with the social influences that affect biological discovery. Discussion of original papers, magazines, newspaper articles, and books about various discoveries. (Seminar) Pre: three courses in biology (including current enrollment) or permission of instructor.

**397, 398 Colloquium in Biological Sciences (0 each)**

Introduction to modern scholarly work in biology. Lectures by visiting and resident scholars, with questions from the audience. Expected of students enrolled in the biology honors program. (Lec.) Pre: open to biological sciences majors only. S/U only.

**412 Evolution and Diversity of Fishes (4)**

Origin, evolution and diversification of fishes, their phylogenetic relationships, and morphological, physiological, ecological and behavioral adaptations in marine and freshwater habitats. (Lec. 3, Lab. 3) Pre 101 or 102 and 366 or permission of instructor. Not for graduate credit.

**418 Ecology of Marine Plants (4)**

Ecology, development, and physiology of marine algae and higher plants. Topics include competition, herbivory, nutrient uptake, photosynthesis, and growth. (Lec. 3, Lab. 3). Pre: 102, 262 or permission of instructor. In alternate years.

**437 (or BCH 437) Fundamentals of Molecular Biology (3)**

Biochemical basis of heredity as seen through the structure and function of nucleic acids. Includes DNA replication, transcription, translation, gene regulation, and gene organization in prokaryotes and eukaryotes. Current methods emphasized. (Lec. 3) Pre: MIC 211, BIO 352, and BCH 311, or permission of instructor.

**441 Environmental Physiology of Animals (3)**

The dynamics of the interaction of animal functions with the environment. Emphasis on quantitative study of physiological adaptations to environmental fluctuations. (Lec. 3) Pre: 201 or equivalent.

**445 Endocrinology I (3)**

Hormones and their regulation of early development, growth, metabolism, salt and water balance, adaptation to stress, reproduction, and behavior. (Lec. 3) Pre: 341 or 345 or equivalent; BCH 311 recommended. Not for graduate credit. In alternate years.

**452 Advanced Topics in Genetics**

See Biochemistry 452.

**453 (or BCH 453 or MIC 453) Cell Biology (3)**

Structure, replication, and function of eukaryotic cells at subcellular level. Topics considered include cell membranes, cytoplasmic organelles and nuclei, cell division, cellular differentiation, and methods. Emphasis on recent publications. (Lec. 3) Pre: two semesters of biological sciences, BCH 311, junior standing, or permission of instructor.

**455 Marine Ecology (3)**

Investigation of the structure and dynamics of various marine ecosystems. Includes mineral cycling, energy flow, community and population organization, and behavioral ecology in selected marine environments. (Lec. 3) Pre: 262 or permission of instructor.

**457 Marine Ecology Laboratory (1)**

Field and laboratory work on community relationships of dominant organisms in Rhode Island marine environments. (Lab. 3) Pre: concurrent enrollment in 455. Limited to 15 students.

**467 Animal Behavior (3)**

Roles of natural selection, individual learning, and cultural transmission in shaping animal behavior. (Lec. 3) Pre: two semesters of biology.

**469 Tropical Marine Invertebrates (5)**

Systematic survey of tropical invertebrates. Emphasis on examples from Bermuda's marine environment. Laboratory includes field collections, identification and preparatory techniques for taxonomic studies. (Practicum, Lab. 8) Taught in Bermuda. Pre: 101 and 102, junior standing, snorkeling experience.

**472 (or GEO 472) Advanced Evolutionary Biology (4)**

A survey of modern evolutionary biology, including macroevolution, evolution and development, mass extinction, and genomic evolution. (Lec. 3, Rec. 1) Pre: 272 or permission of instructor.

**475 Coral Reef Ecology (5)**

Structure and function of coral reef ecosystems with emphasis on the biology of corals. Laboratory sessions focus on field surveys and research techniques. (Practicum, Lab. 8) Taught in Bermuda. Pre: 262 and junior standing; SCUBA certification required.

**480 Community Ecology (3)**

Exploration of community ecology, with an emphasis on interspecific interactions (competition, predation, mutualism), species diversity, succession, niche theory, and island biogeography. Format includes lecture,

case studies, and discussion. (Lec. 3) Pre: 262 or permission of instructor. Not for graduate credit.

#### 491, 492, Independent Biological Research (1–3 each)

Individualized laboratory, field, or literature research projects. May be repeated for a total of 6 credits. Pre: open only to undergraduates on arrangement with staff. S/U only.

#### 495 Tropical Marine Biology Research (6)

Independent marine research in Bermuda. Topics may include marine ecology, physiology, systematics, etc. Proposal, oral report, and project paper required. (Practicum Lab. 12). Taught in Bermuda. Pre: junior standing, 475, 469.

#### 508 (or BCH/MIC/AFS/AVS/NRS/PLS 508) Seminar in Biological Literature (1)

Survey of biological literature including traditional methods of bibliographic control, contemporary information retrieval services, and the development of a personalized information system. (Lec. 1) Pre: graduate standing or permission of the instructor.

#### 511 Special Readings in Developmental Plant Anatomy (3)

Intensive tutorial work, research, and reading on ontogeny of plant structures and morphogenetic mechanisms. (Independent Study) Pre: graduate standing and permission of instructor. Concurrent audit of 311 required. Offered on demand.

#### 512 Evolution and Diversity of Fishes (4)

Origin, evolution and diversification of fishes, their phylogenetic relationships, and morphological, physiological, ecological and behavioral adaptations in marine and freshwater habitats. (Lec. 3, Lab. 3) Pre: BIO 101, 102, and 366, or permission of instructor.

#### 513 Functional Morphology (3)

Advanced study of the evolution and biological role of organismal structure including critical evaluation of recent research in functional morphology with an emphasis on vertebrates. (Lec. 3) Pre: graduate standing; 304 or 366 recommended.

#### 515 Light Microscopy Research Methods (4)

Introduction to optical techniques and biological specimen preparation for light microscopy with emphasis on application of these methods in biological research. Topics include optics, embedding and sectioning, fluorescence and immunocytochemistry, and computer image analysis. (Lec. 1, Lab. 6) Pre: graduate standing or permission of instructor.

#### 521 Recent Advances in Cell and Molecular Biology

See Microbiology 521.

#### 524 Methods in Plant Ecology (3)

Methods in analysis of vegetation and microenvironments. Emphasis on quantitative techniques in analysis of vegetation, soil, and microclimate; techniques in physiological ecology. (Lec. 2, Lab. 3) Pre: 102

and 262 or equivalent; STA 412 recommended. In alternate years.

#### 536 Seminar in Plant Stress Physiology (1–2)

Readings, discussion, and analysis of current literature with emphasis on biochemical and genetic aspects of responses. Students electing 2 credits will write review papers. (Seminar) Pre: one course in plant physiology and one course in biochemistry. In alternate years.

#### 541 Comparative Physiology of Marine Animals (3)

Comparison of physiological mechanisms by which animals maintain life with emphasis on marine invertebrates. Responses to external environment mediated by receptors, nervous systems, effectors. Living control systems for muscular activity and circulation. (Lec. 3) Pre: one physiology course. In alternate years.

#### 544 Insect Ecology

See Entomology 544.

#### 545 Endocrinology II (3)

Integration of cellular processes with whole animal challenges of early development, growth, metabolism, salt and water balance, adaptation to stress, reproduction, and behavior. (Lec. 3) Pre: graduate standing.

#### 546 Introduction to Neurobiology (3)

Fundamental processes in neurobiology with emphasis on cellular and membrane mechanisms of nerve functioning. (Lec. 3) Pre: 201 and MTH 141 or permission of instructor. In alternate years.

#### 550 Advanced Topics in Neurobiology (3)

Published papers in selected aspects of neurobiology will be discussed. Representative topics include role of Ca<sup>++</sup>, c-AMP in the nervous system, gating currents learning at the cellular level, cellular rhythmicity. (Seminar) In alternate years.

#### 551 (or NRS 551) Seminar in Marine Ecology (1)

Readings and discussion on current research involving ecological interactions of marine species. (Seminar) Pre: permission of instructor. May be repeated.

#### 560 Seminar in Plant Ecology (2)

Recent topics and investigations pertinent to plant ecology. Library research, oral presentation of reports, and group discussions. (Seminar) Pre: 262 or equivalent or permission of instructor. May be repeated.

#### 563 (or NRS 563) Biology and Ecology of Fishes (4)

Exploration of the functional biology and ecology of marine and freshwater fishes through lecture and discussion of primary literature. Laboratory involves specimen study, field trips, and a research project. (Lec. 3, Lab. 3) Pre: BIO 366 or equivalent, or permission of instructor.

#### 564 Elasmobranch Biology (3)

Sharks, skates, rays, and chimeras of the world. Their structure, evolution, classification, ecology, and physiology. (Lec. 3) Pre: 366; graduate standing or permission of instructor.

#### 571 Natural Selection (3)

Ideas and controversies concerning the action of natural selection. Maintenance of genetic variability, neutral mutation, levels of selection, recombination and sexual reproduction, and rates of evolution. (Lec. 2, Lab. 3) Pre: 262 and 352 or 472 or graduate standing.

#### 572 (or ENT 586) Medical and Veterinary Entomology (3)

Life history, classification, habits, and control of insects and other arthropods affecting human and animal health. Topics will include public health significance, vector-parasite interactions, and survey and research methodologies. (Lec. 1, Lab. 4) Pre: 385 or equivalent. In alternate years.

#### 579 (or BCH 579) Advanced Genetics Seminar (1)

Current topics in genetics, including cytological, ecological, molecular, physiological, population, quantitative, and radiation genetics. (Seminar) Pre: 352 and permission of instructor.

#### 580 Community Ecology (3)

Explores community ecology, with an emphasis on interspecific interactions (competition, predation, mutualism), species diversity, succession, niche theory, and island biogeography. Format includes lecture, case studies, and discussion. Pre: 262 or permission of instructor.

#### 581, 582 Biological Sciences Colloquium (1 each)

Invited talks on selected research topics in selected areas related to biology. Required of graduate students majoring in biological sciences. (Seminar). Pre: graduate standing in the department of Biological Sciences. S/U credit.

#### 587 Seminar in Neurobiology (1)

Current literature in the neurosciences will be surveyed. Topics include molecular and behavioral electrophysiology, ultrastructure of excitable cells, receptor and pharmacological neurobiology of invertebrates and vertebrates. (Seminar) Pre: graduate standing or one advanced neuroscience course.

#### 591, 592 Independent Biological Research (1–6)

Individualized laboratory, field, or literature research projects. May be repeated for a total of 6 credits. Pre: graduate standing, permission of instructor. S/U credit.

#### 593, 594 Special Topics in Biological Sciences (1–6)

Selected areas pertinent to needs of individuals or small groups. Class, seminar or tutorial. Topics may include the following: biomechanics, cell biology, ecological morphology, functional morphology,

ichthyology, molecular biology, morphology and mechanics, physiology, plant cell development, and zoology. May be repeated for a total of 6 credits.

#### 599 Master's Thesis Research

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

#### 642 Seminar in Physiology (1–3)

Reports and discussions on topics of current research in physiology. Subject matter adapted to meet interests of students. (Seminar) Pre: permission of instructor.

#### 654 Seminar in Ichthyology (2)

Reading, library research, reports, and class discussion on problems of current research interest in the biology of fishes. (Seminar) Pre: 563 or permission of instructor. In alternate years.

#### 675 Advanced Ecology Seminars (2 each)

Specialized and advanced areas of ecological research and theory, including biogeography, Pleistocene ecology, population dynamics, energy flow in ecosystems, and radiation ecology. (Seminar) Pre: permission of instructor.

#### 691 Biological Problems (1–6)

Special work to meet the needs of individual students who are prepared to undertake special problems. (Independent Study) Pre: permission of chairperson. Open only to doctoral students.

#### 695 Graduate Seminar (1)

Students to give seminar reports on their thesis research. Topics may also include professional development subjects, such as grant writing, presentation techniques, résumé writing, etc. (Seminar) Pre: graduate standing. S/U credit. May be repeated for credit, but only 2 credits may be applied to the program of study.

#### 699 Doctoral Dissertation Research

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## Biomedical and Pharmaceutical Sciences (BPS)

*Chairperson:* Professor Chichester

#### 201 How Drugs Work (3)

Drug actions, uses, and adverse effects of prescription and non-prescription medications, recreational drugs, and nutritional supplements. General audience: (Lec. 3) Open to all students except health science and related majors. (N)

#### 202 Maintaining Health in the Age of Chemicals (2)

Introduction for the general student to the potential hazards posed by drugs, food additives, and pollutants to the maintenance of health. (Lec. 2) Not for program credit for nursing or pharmacy majors in the third year or beyond.

#### 203 Herbal Medicines and Functional Food (3)

Study of traditional herbal medicines, commonly used medicinal plants, and modern plant-derived drugs. Medicinal foods, herbal supplements, and plant extracts (nutraceuticals) for health benefits beyond basic nutrition. (Lec. 3) Intended for freshmen and sophomores. (N)

#### 301 Dosage Forms I: Regulation of Drug Products and Biopharmaceutics (2)

Introduction to the regulation of drug products. Application of kinetics to stability, dissolution, absorption, and other biopharmaceutical process. Bioavailability and generic equivalence. (Lec. 2) Open to BSPS students third year standing and CHE students in pharmaceutical track

#### 303 Dosage Forms II: Solid and Solution Dosage Forms and Pharmaceutical Calculations (2)

Physicochemical properties of drug molecules and their effect on formulation, manufacturing, and administration of solid and solution products. Introduction to pharmaceutical calculations. (Lec. 2) Open to BSPS students third year standing and CHE students in pharmaceutical track.

#### 305 Dosage Forms III: Disperse System, Sterile and Specialty Dosage Forms (2)

Physicochemical properties of drug molecules and their effect on formulation, manufacturing, and administration of Disperse System, Sterile and Specialty Dosage Forms. (Lec. 2) Open to BSPS students third year standing and CHE students in pharmaceutical track.

#### 310 Foundations

See Pharmacy Practice 310.

#### 311 (or PHP 311) Foundations of Human Disease I: Immunoinflammatory Disease (2)

The pathogenesis, etiology, epidemiology, symptomatology, and diagnosis of immunoinflammatory and musculo-skeletal diseases. The pharmacology and medicinal chemistry of anti-inflammatory medications, immunosuppressives, and anti-rheumatic drugs. (Lec. 2) Pre: third-year standing or permission of instructor. Open to BSPS students. Offered every fall.

#### 313 Principles of Medicinal Chemistry (2)

Physico-chemical properties of drug molecules; and principles needed to understand chemical basis of pharmacology and therapeutics, pharmacophores for drugs used to treat disease, and structure-activity relationships of drug-target interactions. Open to BSPS students.

#### 318 Pharmacy Technology Laboratory (1)

Prescription processing and compounding techniques for pharmaceutical dosage forms. (Lab. 3) Pre: third-year standing or permission of instructor.

#### 321 Principles of Pharmacology and Autonomic Pharmacology (2)

Fundamental principles of drug action with emphasis on drug/receptor interactions. Mechanisms of action and medicinal chemistry of drugs that affect the autonomic nervous system. (Lec. 2) Pre: third-year standing or permission of instructor. Open to BSPS students. Offered every fall.

#### 322 Pharmacology and Medicinal Chemistry of Drugs Acting on the Central Nervous System (2)

Neurologic agents in the brain; antidepressants, antipsychotics, sedative hypnotics, analgesics, anti-seizure medications, anti-dementia therapy, and anti-anxiety medications. (Lec. 2) Pre: third-year standing or permission of instructor. Offered every spring.

#### 325 Drug Metabolism and Bioanalysis (2)

Chemical, biochemical, genetic and clinical aspects of drug metabolism. Examples of modern bioanalysis and clinical chemistry and its importance to screening, diagnosis and evaluation of patients (Lec. 2) Pre: third-year standing or permission of instructor. Offered every spring.

#### 326 Pharmacology and Medicinal Chemistry Laboratory I (1)

Effects of drugs on physiological functions. Identification and quantification of drugs and their actions. (Lab. 3) Pre: third-year standing or permission of instructor. Offered every spring.

#### 333 Nursing Pharmacology (3)

Comprehensive course in nursing pharmacology that forms the basis for therapeutics. (Lec. 3) Pre: NUR 213 and 234, or RN student status or permission of instructor.

#### 334 Pharmacology and Medicinal Chemistry of Cardiovascular and Renal Drugs (2)

Mechanism of action, adverse effects, and therapeutic applications of drugs affecting cardiovascular and renal function. (Lec. 2) Pre: doctor of pharmacy professional student in good standing; or permission of instructor.

#### 340 (or AVS 340) Veterinary Pharmacology (3)

Principles of pharmacology including pharmacokinetics and pharmacodynamics, drug indications, usages and side effects, practical applications of drugs including drug handling, dosing calculation and administration methods. (Lec. 3) Pre for AVS students: AVS 331 and 333 or permission of instructor; Pre for BSPS and Pharm.D students: 2nd or 3rd year standing.

#### 352 Personal Cosmetics (3)

Formulation and manufacture of various types of personal cosmetics and toilet preparations. Examples

of types studied are prepared in laboratory. (Lec. 2, Lab. 3) Pre: third year standing.

#### 403 Pharmacokinetics I (3)

Pharmacokinetics of drug distribution, metabolism, and elimination. Compartmental models, pharmacokinetic modeling, development of dosage regimens. (Lec. 3) Pre: fourth-year standing or permission of instructor.

#### 405 Physical Pharmacy (3)

Provides an understanding of the basic principles behind the formulation, manufacturing, storage stability and bio-availability of drug products (Lec. 3) Pre: PHY 111, 185. Not for graduate credit.

#### 409 (or PHP 409) Foundations of Human Disease III: Infectious and Pulmonary Processes (2)

The etiology, pathogenesis, epidemiology, symptomatology, and diagnosis of infections and pulmonary diseases. (Lec. 2) Pre: fourth-year standing or permission of instructor. Offered every fall.

#### 410 Foundations for Human Disease V: GI, Endocrine (2)

See Pharmacy Practice 410.

#### 411 Biostatistics II

See Statistics 411.

#### 412 Foundations of Human Diseases: CNS

See Pharmacy Practice 412.

#### 416 Pharmacology and Medicinal Chemistry Laboratory II (1)

Pharmacologic principles relating to the modification of drug activity and toxicity. Clinical assays relevant to assessing drug effects. (Lab. 3) Pre: fourth-year standing or permission of instructor. Offered every fall.

#### 420 (or PHP 420) Biotechnology Products in Pharmacy (2)

Clinical, pharmaceutical, and economic impact of biotechnology products in pharmacy, including monoclonal antibodies, interleukins, human growth factors, antigens oligonucleotides, DNase, and interferons. (Lec. 2)

#### 421 Pharmacology and Medicinal Chemistry of Anti-infective and Respiratory Agents (2)

Chemistry, mechanism of action, sensitivity, resistance, and toxicity of anti-infections drugs, and an overview of antibacterial, antifungal, antiviral, anti-protozoal, respiratory drugs, and vaccines in current use. (Lec. 2) Pre: fourth-year standing or permission of instructor. Offered every fall.

#### 422 Endocrine, Gastrointestinal, and Biotechnological Drugs (2)

Mechanisms of action of drugs used to treat endocrine and gastrointestinal disorders. Biological and biotechnological sources, isolation, design, and medicinal chemistry of biopolymer drugs. (Lec. 2)

Pre: fourth-year standing or permission of instructor. Offered every spring.

#### 425 GMPs in the Manufacture of Pharmaceutical Products (3)

Application of current Good Manufacturing Practices to the manufacture and quality control of various pharmaceutical products. (Lec. 3) Pre: fourth year standing or permission of instructor. Open to CHE students in pharmaceutical track. Not for graduate credit.

#### 432 (322) CNS Drug Pharmacology and Medicinal Chemistry (2)

The pharmacologic and biochemical action and side effects of drugs used to treat neurologic, psychiatric, and skeletal muscle system diseases. (Lec. 2) Pre: Doctor of Pharmacy student in good standing or permission of the instructor. Not for graduate credit. Offered every spring.

#### 436 (or PSY 436) Psychotropic Drugs and Therapy (3)

Interaction of drug and nondrug therapy and of physiological and psychological origins of psychopathology. Intended for advanced undergraduate and graduate students interested in clinical psychology. (Lec. 3) Pre: any one of the following—BIO 101, 104B, 113, 121, PSY 381, or permission of instructor. Not for graduate credit.

#### 442 Pharmacogenetics and Pharmacogenomics (3)

Principles of how genetic and genomic factors contribute to individual variation in drug response and how these principles can be used to produce effective and safe drugs. (Lec. 3) Pre: BCH 311 and BPS 321.

#### 443 Formulation and Manufacturing Laboratory (2)

Provides general principles and hands-on experience in the preformulation, formulation, manufacturing, and quality control fields that are necessary in design, formulation, compounding and manufacturing of drug dosage forms. (Lab. 4) Pre: 301 or 303 or 305.

#### 445 Natural Products and Biotechnological Drugs (3)

Natural drug products of biological or biotechnological origin. Sources, process of isolation or production, and general fundamental properties. (Lec. 3) Pre: CHM 228; MIC 201 or equivalent.

#### 450 Practical Tools for Molecular Sequence Analysis

See Medical Laboratory Science 450.

#### 451 Techniques in Medicinal Chemistry and Molecular Biology (4)

Provides students with an understanding of medicinal chemistry, molecular biology, and drug analysis techniques commonly used in pharmaceutical indus-

try. The course combines laboratory exercises with easy-to-understand lectures. (Lec. 3, Lab. 4) Pre: BCH 311 and BPS 313 and 321.

#### 455 Protein Molecular Modeling for Biomedical Sciences (3)

Use of cutting edge computer software to explore the 3D-structure of proteins of biomedical interest. Independent application of course topics will be required: either a case study to teach existing knowledge or a research project to create new knowledge. (Lec. 1, Lab 6) Pre: BCH 311 or equivalent with grade of B- or better, and CHM 227 (or 124) with grade of B- or better. Not for graduate credit.

#### 497, 498 Special Problems (1–5 each)

Methods of carrying out a specific research project. Literature search, planning, laboratory work, writing an acceptable report. (Independent Study) Pre: permission of chairperson. Not for graduate credit.

#### 503 Pharmacokinetics and Pharmacodynamics for Scientists (3)

Presents the principles of pharmacokinetics and pharmacodynamics with specific emphasis on their application in pharmaceutical science. Pre: MTH 131.

#### 504 Pharmacokinetics II (3)

Applied pharmacokinetics, principles of clinical pharmacology, therapeutic drug monitoring, and dose individualization. (Lec. 3) Pre: 403, fifth year standing or permission of instructor. Offered every fall semester.

#### 515 (or PHP 515) Pharmacy Practice Laboratory I (1)

Simulated practice sessions designed to develop the delivery of pharmaceutical care, including prescription processing, use of patient profiles, communication with patients and health care professionals, pharmaco-epidemiology, and physical assessment. (Lab. 3) Pre: fifth-year standing or permission of instructor.

#### 516 (or PHP 516) Pharmacy Practice Laboratory II (1)

Simulated practice sessions designed to develop the delivery of pharmaceutical care, including prescription processing, use of patient profiles, communication with patients and health care professionals, pharmaco-epidemiology, and physical assessment. (Lab. 3) Pre: fifth-year standing or permission of instructor.

#### 519 Self-Care II

See Pharmacy Practice 519.

#### 521 Cancer Chemotherapy and Toxicology (3)

Pharmacology and medicinal chemistry of oncology drugs. Principles of toxicology. (Lec. 3) Pre: fifth-year standing or permission of instructor. Offered every fall.

**525 Experimental Techniques in Biomedical Sciences (4)**

Provides experience with a variety of techniques used in biomedical science research, including HPLC, NMR, polarimetry, biotransformations, solid-phase synthesis, cell fractionation, and isolation and purification of proteins. (Lab. 4)

**526 Foundations of Human Disease VI: Hematology-Oncology**

See Pharmacy Practice 526.

**530 Drug Metabolism (3)**

Mechanisms of Phase 1 (oxidation, reduction, hydrolysis) and Phase 2 (conjugations and synthesis) of drug metabolism. (Lec. 3) Pre: BCH 581 or permission of instructor. Offered every spring.

**533 Medicinal Plants (3)**

Problems in drug plant chemotaxonomy with field work in the drug plant gardens. Emphasis is placed on certain alkaloid, glycoside and oil-yielding plants, weedicides and insecticides as related to measures for control. (Lec. 2, Lab. 3) Pre: 446 or equivalent.

**535 Pharmaceutical Biotechnology (3)**

Introduction to pharmaceutical biotechnology, including drug design, DNA sequencing, cloning, recombinant proteins, monoclonal antibodies, and drug-screening techniques. (Lec. 3) Pre: BCH 581 or permission of instructor.

**536 Biotechnology Product Evaluation and Development**

See Medical Laboratory Science 571.

**542 (or CSC 522 or MIC 522 or STA 522) Bioinformatics I**

Integrates computing, statistical, and biological sciences, algorithms, and data analysis/management. Multidisciplinary student research teams. Modeling dynamic biological processes. Extra project work for 4 credits. (Lec. 3, Project 3) Pre: major in a computing, statistical, or biological science or permission of instructor.

**544 Forensic Toxicology (3)**

Theoretical and practical aspects of poisoning including the isolation and identification of toxic materials from pharmaceuticals, body fluids, and tissues. Isolation and identification of physiological fluids from stains, hairs, and tissue with application to forensic medicine. (Lec. 2, Lab. 3) Pre: permission of instructor.

**545 Applied Toxicology (2)**

A two-credit lecture course dealing with cases of common toxic syndromes caused by drug overdose or exposure to environmental agents. Antidotes/patient decontamination measures will be surveyed. Patient case studies will be discussed. (Lec. 2) Pre: 322, 455, 521 or permission of instructor.

**546 Advanced Toxicology (3)**

Toxic effects of selected drugs and other xenobiotics on physiological and biochemical processes. (Lec. 3) Pre: permission of instructor. Offered every third year. Next offered spring 2012.

**550 Practical Tools for Molecular Sequence Analysis (3)**

See Microbiology 550.

**551 Chemistry of Natural Products (3)**

Introduction to chemistry of certain groups of natural products especially in relation to their chemotaxonomic position in plant classification. Topics limited to secondary metabolites; e.g., terpenoids, phenolic compounds, aromatic compounds, phytosterols, alkaloids. (Lec. 3) Pre: CHM 228 and 230. In alternate years. Next offered fall 2012.

**552 Advanced Medicinal Chemistry (3)**

Covers didactic topics of medicinal chemistry: Drug Discovery, Design, and Development; Drug-Receptor Interactions; Mechanisms of Enzyme Catalysis and Cofactors; Enzyme Inhibition and Inactivation; DNA Interactive Agents; Drug Metabolism; Prodrugs and Drug Delivery Systems. Pre: Introductory Organic Chemistry and permission of instructor.

**560 Fundamentals of Cosmetic Science (3)**

Study of the fundamentals of the function and behavior of skin, hair, and nails and their reactivity to cosmetic raw materials. Properties of cosmetic ingredients will also be addressed. (Lec. 3) Pre: permission of instructor.

**561 Basic Research in Cosmetic Science (2)**

Laboratory exercises in the form of individual projects designed to provide an understanding of the basic properties and behavior of skin, hair, and nails. Assessment of cosmetic product performance and the basic properties of cosmetic ingredients. (Lab.) Pre: permission of instructor.

**562 Cosmetic Product Formulation (2)**

Provides a basic understanding of cosmetic products, technology, and quality control; improves formulation skills with a particular emphasis on the application of new technological developments in cosmetic preparation. (Lab.) Pre: permission of instructor.

**565 Pharmacokinetics (3)**

The principles and application of clinical pharmacokinetics for advanced pharmacy students. Developing, modifying, and evaluating dosage regimens. (Lec. 3)

**572 Neural Bases of Drug Action (3)**

Review of neuroanatomy, neurochemistry, and neurophysiology as they relate to drug action. (Lec. 3) Pre: 322 or equivalent or permission of instructor. Offered every third year. Next offered spring 2012.

**587 General Pharmacology (3)**

An introduction to principles of pharmacology and major drug categories, for graduate students and

advanced undergraduate students in biological sciences. (Lec. 3) Pre: permission of instructor.

**597, 598 Special Problems (1–3 each)**

Special graduate student project assignments in research under the supervision of faculty. (Independent Study) Pre: graduate standing. May be repeated for a maximum of 6 credits.

**621 Manufacturing Pharmacy I (2)**

Theory and practice in the manufacture of pharmaceuticals and the principles of operation of the equipment used for their production. (Lec. 2) In alternate years.

**622 Manufacturing Pharmacy II (3)**

Theories applied to the manufacture of pharmaceuticals with an emphasis on formulation considerations and principles of operation of equipment used for their production. (Lec. 3) Pre: 621. In alternate years.

**623 Manufacturing Pharmacy Laboratory (2)**

Practical application of the principles of all aspects of dose-form manufacture, including an emphasis on good manufacturing practices. (Lab.) Pre: credit or concurrent enrollment in 622.

**625 Advanced Physical Pharmacy (4)**

Theory and application of physical chemical principles to problems in pharmaceutical research, with emphasis on methods by which properties of new medicinal agents are determined. (Lec. 4) Pre: permission of instructor.

**626 Advanced Physical Pharmacy Laboratory (1)**

Laboratory exercises dealing with the physical-chemical principles used in the evaluation of pharmaceutical substances. (Lab. 4) Pre: permission of instructor.

**633 Biosynthesis (3)**

Biogenesis of medicinally active principles of biological origin. Emphasis given to organic acids, polysaccharides, glycosides, steroids, and certain nitrogenous compounds. (Lec. 3) In alternate years. Next offered spring 2013.

**635, 636 Pharmacognosy Techniques (3–4 each)**

Physical and chemical factors influencing growth and development of active principles of drug plants. Certain biological analyses of results are performed. (Lec. 1, Lab. 6–9)

**641 Biochemical Pharmacology (3)**

Theory and application of pharmacological studies at the cellular and subcellular levels and their significance to drug action in the intact organism. (Lec. 2, Lab. 3) Pre: permission of instructor. Offered every third year. Next offered fall 2011.

**642 (or BCH 642) Biochemical Toxicology (3)**

Biochemical and molecular aspects of chemically induced cell injury and chemical carcinogenesis. (Lec. 3) Pre: permission of instructor. Offered every third year. Next offered fall 2012.

**644 Cardiovascular Pharmacology (3)**

Cellular mechanisms of drug action as a basis for understanding therapeutic effects. Emphasis on current developments in antihypertensive, antiarrhythmic, antianginal, and cardiotonic drug research. (Lec. 3) Pre: permission of instructor. Offered every third year. Next offered spring 2012.

**660 Industrial Project (Pharmaceutics) (3)**

A research project directed by the major professor on a topic in industrial pharmacy. A report must be submitted to the department faculty. The project will normally be conducted off campus. (Lab.) Pre: graduate standing in pharmaceutics.

**670 Advanced Pharmacokinetics (3)**

Application of classical compartmental and noncompartmental analyses to pharmacokinetics and pharmacodynamics emphasizing the use of PKPD analysis employed in the pharmaceutical industry. Pre: 403 or permission of instructor. Graduate standing or in good standing in the P2–P4 years of the Pharm. D. curriculum.

**691 Selected Topics in Medicinal Science (3)**

Covers the following special research topics of interest: (a) heterocyclic chemistry, (b) nucleoside antibiotics, (c) prodrugs and isosteres, (d) nucleosides and nucleotides—synthesis and biological function, and (e) nucleic acid targeted drug design. (Lec. 3) Pre: permission of instructor. May be repeated for a maximum of 9 credits.

**697, 698 Research in Biomedical and Pharmaceutical Sciences (1–3 each)**

Literature survey, laboratory work, and a detailed research report on one or more assigned topics. (Independent Study)

**Biomedical Engineering (BME)**

*Chairperson:* Professor Fischer (Electrical, Computer, and Biomedical Engineering)

**181 Biomedical Engineering Seminar I (1)**

Seminar series given by instructor, invited experts, and students with focus on biomedical electronics, medical devices, rehabilitation engineering, medical instrumentation, and biomedical ethics. Pre: (credit or concurrent enrollment in MTH 141) or permission of instructor.

**207 Introduction to Biomechanics (3)**

Engineering analysis of the human body in equilibrium, hard and soft tissue mechanics (stress and strain), elementary beam theory (bending and torsion) applied to bones, biocompatibility of fracture repair. (Lec. 3) Pre: (MTH 142 and PHY 204 and (credit or concurrent enrollment in BIO 121)) or permission of instructor.

**281 Biomedical Engineering Seminar II (1)**

Seminar series given by instructor, invited experts, and students with focus on physiological system modeling, biomechanics, biomaterials, tissue engineering, artificial organs, biosensors, and technologies for health care. Pre: 181 or permission of instructor.

**307 Bioelectricity (3)**

Quantitative analysis of electrical phenomena in biological cells, tissues, and organs. Action potentials and propagation in neurons, cardiac and skeletal muscle. (Lec. 3) Pre: ((ELE 212 or 220) and (MTH 243 or 362)) or permission of instructor.

**360 Biomeasurement (3)**

Principles of biomeasurement, patient safety, embedded system design with microcontrollers, programming with assembly and C++ languages, interrupts, timer, real-time digital filters, electrocardiogram (ECG) instrumentation, QRS detection, heart rate meter. (Lec. 3) Pre: (concurrent enrollment in 361 and ELE 212) or permission of instructor.

**361 Biomeasurement Laboratory (1)**

Constructing and experimenting with embedded systems using microcontrollers, implementing real-time digital filters with assembly and C++ languages, constructing an electrocardiogram (ECG) amplifier, implementing QRS detection and heart rate meter. Concurrent enrollment in 360 required.

**391 Special Problems (1–4)**

Independent study of special engineering problems. Topic and number of credits determined in consultation with the instructor. (Independent Study)

**461 (or ELE 461) Physiological Modeling and Control (3)**

Principles of physiological modeling and control of linear and nonlinear systems, stability analysis, root locus, Bode plots, linearization. (Lec. 3) Pre: ELE 314 or permission of instructor. Not for graduate credit.

**462 Biomedical Instrumentation Design (3)**

Fundamentals of biomedical instrumentation, biocompatibility, medical device materials; safety, noise rejection, biomedical signal processing; measuring, recording, monitoring, and therapeutic devices. Pre: (207 and 360 and ELE 313 and 314) or permission of instructor. Not for graduate credit. Not open to students who have credit in ELE 562.

**463 Biomedical Instrumentation Laboratory (1)**

Development of a portable heart function monitor that measures the electrocardiogram and photoplethysmogram; embedded system design using instrumentation amplifier, op-amp, graphic LCD module, and PIC microprocessor with C programming. Pre: (ELE (205 or 208) and 313 and 341) or permission of instructor. Not for graduate credit. Not open to students who have credit in ELE 562.

**464 Medical Imaging (3)**

Engineering and clinical applications of medical imaging systems including X-ray, computed tomography, radioisotope imaging, ultrasound, magnetic resonance imaging; picture archiving and communication system and medical image processing. (Lec. 3) Pre: (207 and 360 and ELE 313 and 314) or permission of instructor. Not for graduate credit. Not open to students who have credit in ELE 564.

**465 Medical Image Processing Laboratory (1)**

Development of medical imaging processing algorithms with graphical user interface in C++ under the Windows operating system; smoothing and sharpening filters, morphological filters, area measurement and edge tracer. (Lab. 1) Pre: credit or concurrent enrollment in 464. Not for graduate credit. Not open to students who have credit in ELE 564.

**468 Neural Engineering (3)**

Principles and technologies of neuroengineering and clinical applications; brain stimulator, spinal cord stimulation, functional electrical stimulation (FES), neural-machine interface for motor prosthesis control, artificial visual/auditory devices for augmented sensory perception. (Lec. 3) Pre: 360 or permission of instructor. Not for graduate credit.

**482 Biomedical Engineering Seminar III (1)**

Seminar series given by instructor, invited experts, and students with focus on biomedical signals and systems, computers in medicine, technologies for health care, and biomedical ethics. (Seminar) Pre: ((207 or ELE 205 or 208) and ELE 313 and 342) or permission of instructor.

**484 Biomedical Engineering Capstone Design I (2)**

Applications of engineering skills; team projects in biomedical areas such as neuroengineering, assistive technology, cardiopulmonary measurements, medical imaging, and modeling of physiological systems. First of a two-course sequence. (Lec. 1, Lab. 3) Pre: (207 and 360) or permission of instructor. Not for graduate credit.

**485 Biomedical Engineering Capstone Design II (2)**

Applications of engineering skills; team projects in biomedical areas such as neuroengineering, assistive technology, cardiopulmonary measurements, medical imaging, and modeling of physiological systems. (Lec. 1, Lab. 3) Second of a two-course sequence. Pre: 484 or permission of instructor. Not for graduate credit.

**491 Special Problems (1–4)**

Independent study of special engineering problems. Topic and number of credits determined in consultation with the instructor. (Independent Study) Not for graduate credit.

## Business (BUS)

Dean: Professor Higgins

### 110 Business Computing Applications (3)

Applications, concepts, and skills relevant to information technology in the context of the modern business environment. Topics include word processing, spreadsheet, presentation, and internet software. Pre: open to students with a BU code or permission of the CBA dean's office.

### 111 Introduction to Business Analysis and Applications (3)

Selected mathematical tools and techniques for analysis of business and economic problems and as aids in decision-making. Topics from finite and modern mathematics and applied calculus. (Lec. 3) Pre: open to students with BU code or permission of instructor. Algebra proficiency test required. (MQ)

### 140 Introduction to Business (3)

Nature, philosophy, objectives, and scope of the American business system. Emphasis on the interrelations of the functional areas. (Lec. 3) Not open to juniors and seniors in the College of Business Administration.

### 201 Financial Accounting (3)

Basic concepts and systems used in financial accounting for business organizations. (Lec. 3) Open to students with more than 24 credits or permission of dean's office.

### 202 Managerial Accounting (3)

Basic techniques and systems used by management accountants in budgeting, cost accounting, cost analysis, and control. (Lec. 3) Pre: 201 or 201H or permission of instructor.

### 210 Managerial Statistics I (3)

General statistical methods used in the collection, presentation, analysis, and interpretation of statistical data. Includes frequency distribution, measures of central tendency and dispersion, probability theory, sampling distribution, central limit theorem, law of large numbers, estimation, and tests of hypothesis. Pre: 111 or MTH 131 OR MTH 141.

### 211 Managerial Decision Support Systems (3)

Methodologies and information technologies that support decision-making. Emphasis on the use of PC-based analytical software for solving managerial problems; case studies and group problem solving. (Lec. 3) Pre: 110 and 210.

### 212 Managerial Statistics II (3)

Additional data analysis techniques, including tests of independence and goodness of fit, regression, correlation, analysis of variance, time series, and index numbers. (Lec. 3) Pre: 210 or STA 308.

### 301 Intermediate Accounting I (3)

Theoretical aspects of accounting principles and their application to preparation and analysis of corporate

financial statements. Valuation, recognition and disclosure relative to current and long-term assets and liabilities (Lec. 3) Pre: 201 or 201H or permission of instructor.

### 302 Intermediate Accounting II (3)

Continuation of corporate financial reporting. Topics include stockholders' equity, earnings per share, revenue recognition, income taxes, pensions, leases, accounting changes, and statement of cash flows. (Lec. 3) Pre: 301 and junior standing in a degree-granting college or permission of instructor.

### 303 Cost Accounting (3)

Cost and managerial accounting systems and concepts including cost allocation, actual and standard cost systems, cost and profit planning, and control systems. (Lec. 3) Pre: 202 and junior standing in a degree-granting college or permission of instructor.

### 310 Applications of Microcomputer Software in Business (3)

In-depth study of microcomputer software used in business applications. Emphasis on spreadsheets, data management, presentation graphics, and communication software. Student projects and microcomputer lab assignments required. (Lec. 3) Pre: 110.

### 315 Legal and Ethical Environment of Business I (3)

An introduction to the origins, framework, and concepts of the legal and ethical environment of business with emphasis on contractual relations. (Lec. 3) Pre: junior standing in a degree-granting college.

### 316 Legal and Ethical Environment of Business II (3)

Operations of the U.S. system of jurisprudence and ethics as it affects the law of contracts, sales, debtor-creditor rights, and business organizations. (Lec. 3) Pre: 315 and junior standing in a degree-granting college.

### 317 (or COM 354) International Business Communications Exchange (3)

Examination of effective international business communication. Use of worldwide email network to exchange views on business topics with counterparts abroad. (Lec. 3/Online) Pre: junior or senior standing or permission of instructor.

### 318 Business Law (3)

An Introduction to the origins, framework, and concepts of the legal environment of business. A. Emphasis on accounting topics; B. Finance and international business issues. (Lec. 3) Pre: junior standing in a degree-granting college.

### 320 Financial Management (3)

Study of the basic principles of finance and the applications of these principles. Topics include time value of money, risk and return, valuation, capital budgeting and other corporate financial decisions. (Lec. 3)

Pre: ECN 201 or EEC 105, BUS 202, 210 or STA 308 and junior standing in a degree-granting college.

### 321 Security Analysis (3)

Exploration of investments in equity securities. Emphasis on the structure and functioning of securities markets, current investment theories, fundamental analysis, portfolio risk/return, and performance measurement. (Lec. 3) Pre: 320 or 320H.

### 322 Financial Institutions and Markets (3)

Comprehensive analysis of financial products and financial institutions as well as the markets in which they operate. Emphasis on the operational details of the institutions. (Lec. 3) Pre: ECN 201 or EEC 105, BUS 202, 210 or STA 308 and junior standing in a degree-granting college.

### 323 Fundamentals of Real Estate (3)

Analysis of real estate principles. An examination of land utilization, valuation, financing techniques, urban development, property rights, markets, and government regulation. (Lec. 3) Pre: ECN 201 or EEC 105, and junior standing in a degree-granting college.

### 335 Fundamentals of Risk Management and Insurance (3)

Basic course on risk management for corporations and individuals. Emphasis on risk identification, measurement, and management; homeowner insurance, basic life policies, commercial insurance and employee benefits. (Lec. 3) Pre: 202 and 210 or STA 308.

### 336 Commercial Property and Liability Insurance (3)

Analysis of commercial property and liability risk exposures and their related coverages. Coverage includes general property and liability insurance and specialized topics for marine, fidelity, surety, and professional liability exposure. (Lec. 3) Pre: 320 and junior standing in a degree-granting college.

### 337 Life Insurance (3)

Analysis of the many types of life insurance and health insurance contracts, computation of premiums and reserves, and contract interpretation. Included is an analysis of the uses of life insurance contracts. (Lec. 3) Note: This course is preparation for the Rhode Island state licensing examination in life and accident and health insurance and for Part I of the charter life underwriter examination. Pre: 320 and junior standing in a degree-granting college.

### 338 Social Insurance (3)

Analysis of the network of state and federal economic security programs including the OASDHI system, unemployment compensation, temporary disability programs, and the workers' compensation system. (Lec. 3) Pre: ECN 201 or EEC 105 and BUS 202, 320 or 320H and junior standing in a degree-granting college or permission of instructor.

**340 Organization and Management Theory I (3)**

Management processes, organizational theory and behavior, organizational structure, international business, ethics, and environmental analysis. Emphasis on developing conceptual and analytical skills. (Lec. 3) Pre: junior standing in a degree-granting college.

**341 Organizational Behavior (3)**

Introduction to organizational behavior; theory of human relations in industry; individual and group dynamics as well as motivational theories applied to current business issues, international business, and technological changes. (Lec. 3) Pre: junior standing in a degree-granting college.

**342 Human Resources Management (3)**

Role of the personnel department in an organization. Employer-employee problems at various internal levels and their impact on the organization and its environment. Covers such areas as manpower planning, the recruitment process, training, employee relations, pension planning, and occupational safety in the public and private sectors. Cases and lectures. (Lec. 3) Pre: junior standing in a degree-granting college.

**343 Skills Development in Organizational Behavior (3)**

Developing the managerial skills and competencies of leadership, motivation, conflict resolution, and interpersonal relations through dynamic cases, experiential exercises, and personal development sessions. (Lec. 3) Pre: junior standing in a degree-granting college.

**344 Labor Problems (3)**

Historical development of labor unions, changing composition of the labor force. Factors determining wage levels and employment in the firm and market. Analysis of mobility and occupational and regional wage differentials; the power of unions to raise wages; the role of investments in the human agent as a factor in economic growth. (Lec. 3) Pre: ECN 201 or EEC 105, or permission of instructor.

**345 Business in Society (3)**

Examination of the contemporary social, political, cultural, legal and ethical forces that shape the business environment. Consideration of stakeholder relations and corporate social responsibility. Pre: junior standing in a degree-granting college.

**346 Women in Business and Management (3)**

Analysis of sex-role behavior in the workplace. The history, current status, and future prospects of women and men in business and the organizational response to the changing work force. (Lec. 3) Pre: 340 recommended. Not for graduate credit.

**355 Operations and Supply Chain Management (3)**

Operations management problems in global and domestic environments. Operations strategy, service,

and manufacturing; forecasting; inventory management; production and material requirements planning; scheduling; just-in-time; and quality management. (Lec. 3) Pre: 110 or CSC 101, BUS 210 or STA 308, and junior standing in a degree-granting college or permission of instructor.

**356 Business Applications Programming (3)**

Techniques for the development of business software applications using appropriate hardware platforms and software environments. Emphasis on creation and manipulation of data structures used in business systems. (Lec. 3) Pre: 110; junior standing in a degree-granting college.

**357 Information Technology in Business Organizations (3)**

An overview of existing and developing information technologies used in business organizations. Topics include computer hardware and software, business information systems, operating systems, data communications, and local- and wide-area networks. (Lec. 3) Pre: junior standing in a degree-granting college.

**358 Business Data Communications and Networking (3)**

Introduction to data communications and computer networks within the context of modern business organizations. Emphasis on current technologies and their impact on management information systems. (Lec. 3) Pre: junior standing in a degree-granting college.

**359 Management Systems Analysis (3)**

Analysis, concepts, methods, and techniques used in the evaluation of business processes leading to the design strategies for developing management information systems. (Lec. 3) Pre: junior standing in a degree-granting college.

**360 Introduction to Logistics (3)**

Provides the background to understanding the strategic possibilities and goals of logistics. Specifically addressing the design, operation, and control of logistics systems for firms. (Lec. 3) Pre: junior standing in a degree-granting college.

**361 International Transportation (3)**

Background for understanding all critical issues in domestic and international transportation. Addresses regulations, key financial indicators, modes, carrier selection, transportation system management and design. (Lec. 3) Pre: junior standing in a degree-granting college and BUS 355.

**362 Principles of Transportation (3)**

Principles of transportation covering the role of transportation systems; modal components; managerial and economic aspects of the various modes, and analytical techniques to manage the transportation value chain. (Lec. 3) Pre: 355.

**365 Marketing Principles (3)**

An introduction to marketing from a managerial viewpoint. Examines social, economic, technological, legal, ethical, and other environmental factors and their impact on product, price, promotion, and distribution decisions in a worldwide market. (Lec. 3) Pre: junior standing in a degree-granting college. Proficiency test available if course was taken at a non-AACSB program prior to transfer to the University.

**366 Consumer Behavior (3)**

A review of the consumer decision-making process and factors that influence consumers, including ethical issues. Implications for cross-cultural marketing are examined. (Lec. 3) Pre: 365 or concurrent enrollment.

**367 Marketing Research (3)**

Describes the nature and scope of marketing research activities. Reviews research designs, sampling, measurement, analysis, and other issues with focus on providing marketing information to management. (Lec. 3) Pre: 210 or STA 308, BUS 211 and 365 or 365H.

**390 Junior Career Passport Program (1)**

Exploration of career options. Develop personal and professional goals, and personal job searching tools. (Online) Pre: junior standing in the College of Business Administration.

**401 Accounting Computer Systems (3)**

Accounting information systems and use of the computer for decision making; emphasis on sources of information and employment of analytical tools in solving accounting problems. (Lec. 3) Pre: 301 or concurrent enrollment in 301 and junior standing in a degree-granting college or permission of instructor.

**402 Advanced Accounting (3)**

Accounting principles and policies for governmental and nonprofit organizations, multinational and multidivisional organizations, partnerships, and other complex organizational structures. (Lec. 3) Pre: 302 or permission of instructor.

**403 Federal Tax Accounting (3)**

Federal laws, regulations, and other authorities affecting taxation of individuals. (Lec. 3) Pre: 202 and junior standing in a degree-granting college or permission of instructor.

**404 Auditing (3)**

Auditing standards, procedures, programs, working papers, and internal control. (Lec. 3) Pre: 302 or concurrent enrollment in 302 and senior standing in a degree-granting college, or permission of instructor.

**420 Advanced Financial Management (3)**

Intensive research on selected current topics relating to the financial management of the firm. Extensive

use of the case method. (Lec. 3) Pre: 211, 320 or 320H or permission of instructor. Not for M.B.A. credit.

#### **421 Derivative Securities and Risk Management (3)**

Advanced treatment of options, futures and other derivatives securities. Includes theoretical and normative valuation methods with applications to investment portfolios and corporate risk management. (Lec. 3) Pre: 320 or 320H or permission of instructor.

#### **422, 423 Student Investment Fund I and II (3 each)**

Students analyze various industries and companies and manage stocks owned by the Alumni Association. (Seminar) Night class held in Trading Room. Enrollment is by competitive application. 423 is a continuation of 422 and may not be taken for credit in Finance. Pre: 321. Not for graduate credit.

#### **424 Fixed Income Security Analysis (3)**

Pricing and institutional arrangements of fixed income securities such as corporate bonds, mortgage loans, and mortgage-backed securities; portfolio management of fixed income securities. (Lec. 3) Pre: 320 or 320H and 322. Not for graduate credit.

#### **425 Mutual Funds Management (3)**

Overview of mutual funds business. Portfolio management, risk management techniques, shareholder servicing, federal and state regulatory oversight, marketing and distribution, custody, technology, and societal issues. (Lec. 3) Pre: 320 or 320H, 321 or permission of instructor.

#### **426 Bank Financial Management (3)**

Nature of the financial decisions facing the management of an individual bank. Current bank financial practices, research, and appropriate banking models considered. (Lec. 3) Pre: 320 or 320H, 322 or permission of instructor. Not for graduate credit for students in the College of Business Administration.

#### **427 Financial Theory and Policy Implications (3)**

Examination of the determinants of long-run financial success of the firm. Includes a study of how the capital budgeting process is linked to capital structure management. (Lec. 3) Pre: 320 or 320H. Not for M.B.A. credit.

#### **428 Multinational Finance (3)**

Methods of financing multinational corporations. Foreign exchange, translation of financial statements, multinational funds flow and international liquidity, international financial reporting and tax policy, international money, stock, and bond markets. (Lec. 3) Pre: 320 or 320H or permission of instructor. Not for M.B.A. credit.

#### **429 Global Investment Management (3)**

Detailed analysis of the problems encountered in the process of investing funds in international capital markets. Particular attention is devoted to multi-cur-

rency dimensions, foreign information sources, and foreign regulations. (Lec. 3) Pre: 320, or 320H, 321.

#### **430 Basic Managerial Economics (3)**

Introduction to the classic theories of demand, production, and cost management in the context of modern financial theory. Includes empirical model building using microcomputers. (Lec. 3) Pre: 320 or 320H. Not for graduate credit.

#### **435 Topics in Insurance (3)**

Analysis of selected topics and current issues in the insurance marketplace. Topics will vary from semester to semester. (Seminar) Pre: 320 or 320H, 335, and 337, or permission of instructor.

#### **441 Leadership Skills Development (3)**

Application of organizational behavior concepts to develop leadership competencies and effective employee management programs. Pre: 341 or 341H or permission of instructor.

#### **442 Organization and Management Theory II (3)**

Analysis of complex organizational situations emphasizing managerial problems dealing with structure, coordination, control, and integration. Conceptual skills for organizational analysis, including model and systems approaches. (Lec. 3) Pre: 340 or permission of instructor.

#### **443 Organizational Design and Change (3)**

Behavioral science applications to planning systematic organizational design, change and development using theory, concepts, technique, and cases for change agents and managers of change. Pre: 341 or 341H, or permission of instructor.

#### **444 Labor Relations (3)**

Public interest in labor relations and problems involved in collective bargaining. Major adjustments of public and private management to changes in labor policy of federal and state governments, community, and labor unions. (Lec. 3/Online) Pre: 342. Not for graduate credit.

#### **445 Strategic Management (3)**

Case studies, simulation or company analysis used to study strategic theory and practice and problems of functional integration in domestic and global firms. (Lec. 3) Pre: 202 and 320 or 320H and 341 or 341H and 355 and 365 or 365H and 315 or 345 (or concurrent enrollment in one of these classes) and senior standing in the College of Business Administration. Not for graduate credit.

#### **446 Advanced Management Seminar (3)**

Integrated approach to problems in major areas of business management with emphasis on administrative and executive viewpoint. (Seminar) Pre: 340.

#### **447 Compensation Administration (3)**

Concepts, models, theories, and legislation related to the employee compensation process. Discussion and skill acquisition in job analysis, job evaluation, wage surveys, and performance appraisal. (Lec. 3)

Pre: 341 or 341H or permission of instructor. Not for graduate credit.

#### **448 International Dimensions of Business (3)**

Introduction to the international aspects of business, including the cultural, legal, and political environment faced by the multinational corporation. (Lec. 3) Pre: senior standing or permission of dean. Not for M.B.A. credit.

#### **449 Entrepreneurship (3)**

Procedures for starting one's own business including business plans, financial data analysis, legal issues, and assessing feasibility of business ideas. Also addresses evaluating career interests and skills in entrepreneurship. Pre: 201 or 201H and senior standing in the College of Business Administration or permission of instructor; not open to students with credit in EEC 325.

#### **450 Small Business Management (3)**

Investigation and evaluation of the small business enterprise. Current literature studied and projects completed to enable students to understand and appreciate the operations of small businesses. (Lec. 3) Pre: senior standing in the College of Business Administration or permission of instructor.

#### **455 Business Applications Programming II (3)**

Intermediate concepts for developing software solutions to business applications using appropriate hardware platforms and software environments. (Lec. 3) Pre: junior standing in a degree-granting college. Not for graduate credit.

#### **456 Management of Databases (3)**

Concepts and methods in management of data: creation, design, and implementation; data models; integrity; and security. Use of database management systems software. (Lec. 3) Pre: junior standing in a degree-granting college.

#### **457 Design for Management Information Systems (3)**

Concepts, methods, and techniques used in the design of management information systems. Field work required. (Lec. 3) Pre: 359, 456. Not for graduate credit.

#### **458 Seminar in Management Information Systems (3)**

Preparation and presentation of papers on selected topics. (Seminar) Pre: junior standing in a degree-granting college. Not for M.B.A. credit.

#### **459 Management of Quality Control and Improvement (3)**

Principles of quality management including control charts, process management, and other techniques, with emphasis on the effect of these principles on decision making in various organizations. (Lec. 3) Pre: 110 and 211 or 212 or permission of instructor. Not for graduate credit.

**460 Global Supply Chain Management (3)**

Examines factors that impact on the design and management of global supply chains. Through simulations and cases explores impact of supply chain activities on a firm's strategies. (Lec. 3) Pre: 355 or permission of instructor. Not for graduate credit.

**461 Forecasting (3)**

Forecasting for advanced students in all areas of business administration. Introduction to time series analysis including decomposition of the multiplicative model, exponential smoothing, and ARIMA processes. A variety of software systems are employed, with special emphasis on microcomputer systems. (Lec. 3) Pre: 110 and 211 or 212 or permission of instructor. Not for graduate credit.

**462 Supply Chain Network Modeling and Optimization (3)**

Factors and practices necessary for modeling/designing existing networks, and developing optimal networks using contemporary technologies. Modeling and optimization of global sourcing and distribution networks. (Lec. 3) Pre: 335, 360, 460 or permission of instructor.

**463 Advanced Concepts in Supply Chain Management (3)**

Advanced concepts in supply chain management and operations management such as demand management; multi-location inventories, capacity planning and control; theory of constraints. (Lec. 3) Pre: 355 or permission of instructor.

**464 Supplier Relationship Management (3)**

Comprehensive examination of the management practices a firm deploys to develop effective relationships with suppliers of goods and services. (Lec. 3) Pre: 355, 460 or permission of instructor.

**465 Marketing Communications (3)**

The "communications mix" is explored in terms of a total promotional program. Characteristics of advertising media, sales promotion, public relations, and publicity are surveyed. (Lec. 3) Pre: 365 or 365H or permission of instructor. Not for M.B.A. graduate credit.

**466 Product Innovation and Strategy (3)**

Development and management of new and existing products and services from a decision-making perspective. Emphasis on value creation through the development of innovative products and services. (Lec. 3) Pre: 365 or 365H. Not for M.B.A. graduate credit.

**467 Customer Relationship Management (3)**

Planning, organization, and control relationship activities, including sales techniques and strategies, development and management of sales organizations and distribution channels, and emerging technologies. (Lec. 3) Pre: 365 or 365H. Not for M.B.A. graduate credit.

**468 Global Marketing (3)**

Focus on understanding how cultural, political, economic, legal, and other macro factors affect market strategies. Application of these factors in dealing with planning and organizing for global marketing operations. (Lec. 3) Pre: 365 or 365H or equivalent. Not for M.B.A. graduate credit.

**469 Special Topics in Marketing (3)**

Selected topics of current interest in marketing. (Lec. 3) Pre: 365 or 365H. Not for M.B.A. graduate credit.

**470 Strategic Marketing Management (3)**

Summary course focusing on the variety decisions involved in marketing including developing and managing branded goods and services. (Seminar) Pre: 365 or 365H, and 366 and 367, and either 465 or 467 or 468 or 469. Not for graduate credit.

**491, 492 Directed Study (1–3 each)**

Independent study supervised by college faculty. Seminar meetings concerned with specific business topics. (Independent Study) Must be student in College of Business Administration with more than 75 credits and permission of instructor. Not for graduate credit.

**493 Internship in Business Administration (3 or 6)**

Approved, supervised work experience with participation in management and problem solving related to the student's major field. College of Business internships for 3 credits require approximately 120 hours of field experience and 20 hours of class work. Internships for 6 credits require approximately double this amount of work. May be offered online. Pre: junior standing with 75 credits, admission into internship program, and permission of instructor. Limited to 6 credits. Not for graduate credit. S/U only.

**601 Practicum in Business Teaching (1)**

Course involves training and experience in teaching undergraduate business courses under the supervision of a full-time faculty member. Participation in the instructional development program is an essential component of the class. (Practicum) Pre: enrollment in Ph.D. program in business administration and permission of Ph.D. program director. S/U only. May be repeated.

**602 Doctoral Colloquium in Business Research (1)**

Course involves presenting the results of at least one piece of original research to faculty and other Ph.D. candidates. When not presenting, students are expected to play an active role in critiquing the presented research. (Lec. 1) Pre: permission of Ph.D. program director. S/U credit only. May be repeated.

**603 Special Problems in Business Research (1–6)**

Advanced research and writing of theoretical and empirical papers in business administration in the

student's area of specialization under the supervision of a faculty advisor. All doctoral students in Phase II of the doctoral program in business administration who have completed their course work must register for this course. Pre: permission of Ph.D. Program Director. S/U only. May be repeated.

**604 Doctoral Research Seminar (3)**

Provides a rigorous analysis of current research questions and research techniques used to address those questions in the finance discipline. Recent developments and current issues addressed. (Seminar) Pre: enrollment in Phase II of the Ph.D. program in business administration. May be repeated.

**605 Organizational Behavior (3)**

Incorporates the insights gleaned from the disciplines of psychology, sociology, anthropology, and the social sciences of politics, economics, and history in the study of the behavior of organizations and of their principal actors. (Lec. 3) Pre: MBA 502 or permission of instructor.

**606 Advanced Organizational Theory and Behavior (3)**

Previous knowledge of classical and traditional management thought used to provide concepts, analytical approaches, and skills for understanding how behavioral sciences influence complex organizational systems. (Lec. 3) Pre: 605.

**608 Doctoral Research Seminar (3)**

Provides a rigorous analysis of current research questions and the research techniques used to address those questions pertinent to Management Information Systems. Recent developments and current issues are addressed. (Seminar) Pre: enrollment in Phase II of the Ph.D. program in business administration. May be repeated.

**609 Doctoral Research Seminar (3)**

Provides a rigorous analysis of current research questions and the research techniques used to address those questions in the management science discipline. Recent developments and current issues addressed. (Seminar) Pre: enrollment in Phase II of the Ph.D. program in business administration. May be repeated.

**610 Seminar in Marketing (3)**

Preparation and presentation of papers on selected topics in marketing. (Seminar) Pre: MBA 505 or permission of instructor. May be repeated.

**611 Doctoral Research Seminar (3)**

Provides a rigorous analysis of current research questions and research techniques used to address those questions in the marketing discipline. Recent developments and current issues addressed. (Seminar) Pre: enrollment in Phase II of the Ph.D. program in business administration. May be repeated.

**612 Knowledge Systems in Managerial Disciplines (3)**

Examination of knowledge production and dissemination systems in management disciplines. Discussion of various paradigms and philosophy of science perspectives. Metascientific and research program issues are examined. (Seminar) Pre: Ph.D. candidate.

**691, 692 Directed Study in Business (3)**

Advanced doctoral level work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor.

**699 Doctoral Dissertation Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) Pre: enrollment in Phase III of the Ph.D. program in business administration. S/U credit. May be repeated.

**Chemical Engineering (CHE)**

*Chairperson:* Professor Brown

**212 Chemical Process Calculations (3)**

Orientation to chemical and biological engineering, material and energy balance computations on chemical processes, use of gas laws, vapor pressure, humidity, solubility, and crystallization. (Lec. 3) Pre: CHM 112 or 192 or permission of instructor.

**272 Introduction to Chemical Engineering Calculations (3)**

Introduction to the use of computers and numerical methods, including numerical solution of differential equations as applied to chemical and biological engineering. (Lec. 3) Pre: 212 and credit or concurrent enrollment in MTH 243 or permission of instructor.

**313 Chemical Engineering Thermodynamics I (3)**

Applications of the first, second, and third laws of thermodynamics involving thermodynamics, thermochemistry, energy balances, combustion, power cycles, refrigeration, and properties of pure fluids. (Lec. 2, Lab. 3) Pre: 212 or CHM 431 and MTH 243 or concurrent enrollment in MTH 243 or permission of instructor.

**314 Chemical Engineering Thermodynamics II (3)**

Continuation of 313 with applications to thermodynamics of mixtures, phase and chemical equilibria. (Lec. 2, Lab. 3) Pre: 313 or permission of instructor.

**328 Industrial Plants (1)**

Field trips to nearby plants demonstrating various phases of chemical engineering. Written reports are required. (Lab. 3) Pre: 348 or permission of instructor.

**332 Physical Metallurgy (3)**

Fundamentals of physical metallurgy as they apply particularly to the engineering metals and their alloys. Properties, characteristics, and structure of met-

als, theory of alloys, thermal processing, and studies in corrosion. (Lec. 2, Lab. 3) Not open to students with credit in 333. Pre: CHM 101, 103, or 191, or permission of instructor.

**333 Engineering Materials (3)**

First course in engineering materials devoted largely, but not exclusively, to physical metallurgy. Includes structure and properties of pure substances and binary systems at equilibrium and, when used intentionally, at nonequilibrium. (Lec. 2, Lab. 3) Pre: junior standing or permission of instructor. Not open to students with credit in 332.

**345, 346 Chemical Engineering Laboratory (2 each)**

Quantitative studies illustrating chemical engineering principles. Emphasis on report writing and the interpretation of experimental data. (Lab. 6) Pre: 348 or permission of instructor.

**347 Transfer Operations I (3)**

Dimensional analysis; fluid statics; mass, energy, and momentum balances for fluid systems, boundary layers, turbulence, incompressible flow; flow through fixed beds of solids and fluidized beds; filtration. (Lec. 3) Pre: MTH 243 or permission of instructor.

**348 Transfer Operations II (3)**

Heat and mass transfer: conduction, convection, radiation, diffusion, transport analogies and equipment design. Biological applications and some separations are covered. (Lec. 2, Lab. 3) Pre: 347 or permission of instructor.

**349 Transfer Operations III (2)**

Theory, design and application of separation processes with a focus on stage operations; distillation, extraction, and adsorption. Integrated processes and new technologies will be examined. (Lec. 2) Pre: 348 or permission of instructor.

**351, 352 Plant Design and Economics I and II (3 each)**

Elements of plant and process design integrating the principles learned in previous courses. Emphasis is on optimum economic design and the writing of reports. (Lec. 1, Lab. 6) Pre: (for 351) 314 and 348 or permission of instructor. Pre: (for 352) 349 and 351 and credit for or concurrent enrollment in 464 or permission of instructor.

**403 Introduction to Design of Ocean Engineering Processes (3)**

Theory and basic principles directly applicable to ocean-related processes. Desalination, mining, combating oil spills, seawater as a coolant, seawater as a waste dilutant, food processing, sulfur and petroleum production, recovery minerals. (Lec. 2, Lab. 4) Pre: permission of instructor.

**425 Process Dynamics and Control (3)**

Principles involved in automatic control of processing plants. Modeling and responses of dynamic

systems, feedback control. (Lec. 3) Pre: MTH 243, CHE 464, and credit or concurrent enrollment in 347 or MCE 354 or permission of instructor. Not for graduate credit.

**438 Failure Analysis and Prevention (3)**

Failure analysis of engineering components. Examples of overload, fatigue, creep, corrosion, and electrical failures in metals, glasses, ceramics, composites, polymers, concrete, and semiconductors. Case studies, microscopic techniques, and prevention are emphasized. (Lec. 3) Pre: 332 or 333.

**464 Chemical Kinetics and Reactor Design (3)**

Mole balances in batch and continuous chemical reactors; reaction rate fundamentals; isothermal and non-isothermal chemical reactors. (Lec. 3) Pre: 313 or permission of instructor. Not for graduate credit.

**471 Nuclear Reactor Engineering**

See Mechanical Engineering 471.

**472 Power Plant System Design and Safety Analysis**

See Mechanical Engineering 472.

**473 (or MCE 473) Nuclear Fuel Cycle and Performance (3)**

Analysis and design of stages of the nuclear fuel cycle including mining, milling, conversion, enrichment, fuel fabrication, fuel burn-up, spent fuel interim storage, reprocessing and aspects of high level waste. (Lec. 3) Pre: MTH 244 and MCE 341 or CHE 313, or permission of instructor.

**474 (or MCE 474) Nuclear Reactor Thermal-Hydraulics (3)**

Analysis and design of stages of the nuclear fuel cycle including mining, milling, conversion, enrichment, fuel fabrication, fuel burn-up, spent fuel interim storage, reprocessing, and aspects of high level waste. (Lec. 3) Pre: (MTH 244 and (MCE 341 or CHE 313)), or permission of instructor. Not for graduate credit.

**491, 492 Special Problems (1–6 each)**

Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 12 credits of which a total of 6 credits can be applied to professional electives. Not for graduate credit in chemical engineering.

**501, 502 Graduate Seminar (1 each)**

Seminars presented by speakers from academia and industry. (Seminar) Required of all graduate students, with a maximum of 1 credit per year allowed. May be repeated for a maximum of 2 credits. S/U credit.

**503 Dynamics of Chemical Engineering Applications (3)**

Emphasizes analytical and/or numerical techniques commonly used in analysis arising from classical chemical engineering applications; necessary for understanding more complex problems.

**513 Advanced Chemical Engineering Thermodynamics I (3)**

Applications of the first, second, and third laws of thermodynamics and their relation to chemical engineering processes. Emphasis on properties of fluids, chemical and physical equilibria, phase stability, and polymers. (Lec. 3) Pre: 313, 314 or equivalent, graduate standing, or permission of instructor. In alternate years.

**529 Polymer Experimental Methods (3)**

Theory and practice of experimental methods used to characterize and process polymer systems. Characterizations include chemical, thermal, and mechanical analysis. Lectures discuss methods beyond those applied in lab. (Lec. 2, Lab. 2) Pre: permission of instructor.

**530 Polymer Chemistry (3)**

Molecular weight distribution, polymer synthesis, chain conformation, solution properties and phase behavior, and characterization techniques. (Lec. 3) Pre: CHM 228 and CHE 332 or permission of instructor. In alternate years.

**531 Polymer Engineering (3)**

Glass and crystalline transitions, viscoelasticity, time-temperature superposition, polymer processing, and mechanical properties of plastics, fibers, and elastomers. (Lec. 3) Pre: 348 or MCE 448 or permission of instructor. In alternate years.

**532 Ceramic Engineering (3)**

Properties of ceramic materials as related to starting materials and forming, densification, and finishing processes. Emphasis on resulting phases and microstructure. Application of physical and chemical principles to tailor properties to engineering needs. (Lec. 3) In alternate years.

**534 (or OCE 534) Corrosion and Corrosion Control (3)**

Chemical nature of metals, electrochemical nature of corrosion. Types of corrosion, influence of environment, methods of corrosion control. Behavior of engineering materials in corrosion with emphasis on industrial and ocean environments. (Lec. 3) Pre: permission of instructor.

**537 (or OCE 537) Advanced Materials Engineering (3)**

Engineering properties, molecular design, and applications of materials. Synthesis, fabrication, and processing of materials. Effects of environment on materials, materials products, devices, and systems. (Lec. 3) Pre: PHY 341.

**539 Electron and Light Microscopy of Solids (3)**

Theory and physical principles governing the design and use of light and electron optical systems in identification, analysis, and structural characterization of

metals, ceramics, polymers, glasses, and composites. Emphasis on polarized light and scanning electron microscopy. (Lec. 3)

**541 Transport Phenomena I (3)**

Analysis of transport processes including momentum, heat and mass transfer. Development of mathematical models and their solutions. (Lec. 3) Pre: 347, 348 or equivalent, graduate standing, or permission of instructor. In alternate years.

**542 Advances in Interfacial Phenomena (3)**

Topics will include capillarity, surface tension; surface thermodynamics, electrical aspects of surface chemistry; contact angles and wettability; emulsions and foams; adsorption from solutions; hydrodynamic stability of interfaces. (Lec. 3) Pre: CHM 431, 432 or equivalent, or permission of instructor. In alternate years.

**548 Separations for Biotechnology (3)**

A study of methods of concentration used in biotechnology and pharmaceutical industries for production and isolation of products. (Lec. 3) Pre: 348 or 447. In alternate years.

**550 Bionanotechnology (3)**

Principles and applications of bionanotechnology. Intermolecular forces, self-assembly, biomolecular structure, biological processes, molecular manufacturing, and surface functionalization for designing biodevices and nanomaterials. Overview of current and emerging technologies, safety and ethics. (Lec. 3) Pre: graduate standing or permission of instructor.

**560 Chemical and Physical Processes of Integrated Circuit Fabrication (3)**

Chemical and physical processes used in the fabrication of integrated circuits and devices. Emphasis on crystal growth, oxidation, CVD, plasma processes, photochemical processes, solid-state diffusion, lithography, and their relation to device performance. (Lec. 3) Pre: CHM 431, CHE 349, or equivalent. In alternate years.

**564 Reaction Engineering (3)**

Homogeneous and heterogeneous reactions in reactor models. Kinetics of multiple reactions industrial reactor analysis. Mechanistic models of catalytic reactors. Mathematical methods for calculation of reactor performance. (Lec. 3) Pre: CHE graduate standing or permission of instructor.

**574 Biochemical Engineering I (3)**

Application of chemical engineering principles to topics in bioprocessing and biotechnology, such as enzyme and cell-growth kinetics, enzyme and cell immobilization, bioreactors, medium sterilization. Introduction to biotechnology. Includes properties of biological materials, dynamics, control, and operation of biological systems and processing of biological materials. (Lec. 3) Pre: permission of instructor. In alternate years.

**576 Process Engineering for Pollution Prevention (3)**

Management of processes and development of techniques for waste minimization in the chemical process, machine tool coating, plating, plastics, and other industries. (Lec./Workshop) Pre: permission of instructor.

**578 Seminar in Sensors and Surface Technology (1)**

Students, faculty, and invited outside speakers present and discuss selected topics related to research interests of the Sensors and Surface Technology Partnership. (Seminar) Pre: permission of instructor. May be repeated. S/U only.

**591, 592 Special Problems (1–6 each)**

Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 12 credits.

**599 Master's Thesis Research (1–9)**

Number of credits is determined each semester in consultation with the major professor. (Independent Study) S/U credit.

**614 Advanced Chemical Engineering Thermodynamics II (3)**

Advanced topics in phase stability, phase and chemical equilibrium, and statistical thermodynamics. (Lec. 3) Pre: 513. In alternate years.

**641 Transport Phenomena II (3)**

Steady, unsteady, and multidimensional heat transfer. Mass transport at low and high fluxes; approximate methods for heat and mass transfer problems. (Lec. 3) Pre: 541 or permission of instructor. In alternate years.

**691, 692 Special Problems (1–6 each)**

Advanced work under the supervision of a member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 12 credits.

**699 Doctoral Dissertation Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**Chemistry (CHM)**

*Chairperson:* Professor Euler

**100 Chemistry of Our Environment (3)**

Elementary chemistry for nonscience majors, emphasizing chemical aspects of the human environment. Chemistry of the biosphere, pollution, and aspects of industrial chemistry. (Lec. 3) (N)

**101 General Chemistry Lecture I (3)**

Fundamental chemical concepts and principles. Topics include states of matter, stoichiometry, reactivity, atomic structure, thermochemistry, bonding, molecular structure, and solutions. Not open to students with credit in 103 or 191. (N)

**102 Laboratory for Chemistry 101 (1)**

Experimental applications of chemical concepts and reactivity emphasizing safety and technique. Experiments follow the content of 101. Pre: credit or concurrent registration in 101.

**103 Introductory Chemistry Lecture (3)**

One-semester general chemistry course designed for students whose curriculums require the one-semester organic chemistry course, 124. (Lec. 3) Not open to students with credit in 101 or 191. (N)

**105 Laboratory for Chemistry 103 (1)**

Fits course content of 103. (Lab. 3) Pre: credit or concurrent enrollment in 103.

**112 General Chemistry Lecture II (3)**

Chemical kinetics, equilibrium, elementary thermodynamics, and electrochemistry integrated with descriptive chemistry and practical applications. Pre: 101 with a grade of C- or better. (N)

**114 Laboratory for Chemistry 112 (1)**

Experiments follow the content of 112. Pre: 102, credit or concurrent enrollment in 112.

**124 Introduction to Organic Chemistry (3)**

Elementary principles of organic chemistry with emphasis on aliphatic compounds, especially those of physiological significance such as amino acids and proteins, carbohydrates, fats, and waxes. (Lec. 3) Pre: 101 with grade of C- or better or 103 with grade of C- or better. Not open to chemistry or chemical engineering majors.

**126 Laboratory for Chemistry 124 (1)**

Introduction to chemistry procedures, with emphasis on properties of substances of physiological significance. (Lab. 3) Pre: 102 or 105, credit or concurrent enrollment in 124. Not open to chemistry or chemical engineering majors.

**191 General Chemistry (5)**

Atomic theory and structure, stoichiometry, chemical reactions, thermochemistry, bonding, and states of matter. Laboratory experiments illustrate basic procedures, concepts, and principles. (Lec. 4, Lab. 3) Pre: chemistry major. Not open to students with credit in 101.

**192 General Chemistry (5)**

Continuation of 191. Principles of kinetics, equilibrium, and thermodynamic integrated with descriptive chemistry and qualitative analysis. Laboratory experiments parallel lecture topics. (Lec. 4, Lab. 3) Pre: chemistry major, 101 and 102 with grade of C-

or better or 191 with grade of C- or better. Not open to students with credit in 112.

**212 Quantitative Analysis (4)**

Principles of gravimetric and volumetric analysis with detailed attention to solution of stoichiometric problems. Laboratory analysis of representative substances by gravimetric or volumetric procedures. (Lec. 3, Lab. 3) Pre: 112 and 114 with grade of C- or better or 192 with grade of C- or better.

**226 Organic Chemistry Laboratory (2)**

Common techniques and typical preparative methods in both aliphatic and aromatic series. (Lab. 6) Pre: 114, credit or concurrent enrollment in 228. Not open to students with credit in 229 or 230.

**227 Organic Chemistry Lecture I (3)**

General principles and theories with emphasis on classification, nomenclature, methods of preparation, and characteristic reactions of organic compounds in aliphatic series. (Lec. 3) Pre: 112 with grade of C- or better or 192 with grade of C- or better.

**228 Organic Chemistry Lecture II (3)**

Continuation of 227 with emphasis on the aromatic series. (Lec. 3) Pre: 227 with grade of C- or better.

**229 Organic Chemistry Laboratory I (1)**

Common techniques and typical preparative methods in aliphatic series. (Lab. 3) Pre: credit or concurrent enrollment in 227.

**230 Organic Chemistry Laboratory II (1)**

Continuation of 229 with emphasis on the aromatic series. (Lab. 3) Pre: 229 or equivalent and credit or concurrent enrollment in 228. Only for students requiring a second credit of organic laboratory.

**291 Organic Chemistry (3)**

Development of principles and theory through an examination of structure, nomenclature, and reactions of organic compounds. (Lec. 3) Pre: 192 with grade of C- or better, chemistry major. Not open to students with credit in 227.

**292 Organic Chemistry (5)**

Continuation of 291 with extension to several additional families of compounds. (Lec. 3, Lab. 6) Pre: 291 with grade of C- or better, chemistry major. Not open to students with credit in 228.

**335 Physical Chemistry Laboratory (2)**

Physical chemical properties of gases, liquids, and solutions; electrochemical cells; phase diagrams of binary and ternary systems; and chemical kinetics. Designed for chemistry majors. (Lab. 4) Pre: 431. May be taken concurrently with 431.

**353 Undergraduate Research (1–12)**

Methods of approach to a research problem. Literature, laboratory work, and a report of an original problem or problems. (Independent Study) Pre:

permission of instructor. May be repeated for a maximum of 12 credits.

**354 Undergraduate Research in Forensic Chemistry (1–12)**

Methods of approach to a research problem in forensic chemistry. Literature, laboratory work, and a report of an original problem or problems. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 12 credits.

**391 Forensic Science Overview (1)**

A seminar/discussion group designed to introduce students to the areas and issues in forensic science. Students seeking a forensic science minor should attend this weekly seminar two semesters. (Lec. 1) May be repeated for a total of 3 credits.

**392 (or FOS 392) Introduction to Criminalistics (3)**

A class designed to introduce students to the basic areas and issues in forensic science in criminalistics. It is required for students seeking a forensic science minor. (Lec. 3) May not be repeated for credit. May not be taken in the same semester as 391.

**401 Intermediate Inorganic Chemistry (3)**

Principles of inorganic chemistry broadly related to structure and reactivity. Many-electron atoms bonding theories, acid-base concepts, coordination chemistry, reaction mechanisms. (Lec. 3) Pre: 432.

**402 Physical Inorganic Laboratory (2)**

Synthesis of inorganic compounds emphasizing inert atmosphere and vacuum line techniques; characterization by spectroscopic and electrochemical techniques. (Lab. 6) Pre: 401.

**412 Instrumental Methods of Analysis (3)**

Theory and application of optical and electrical instruments to solution of chemical problems: flame photometry; emission spectroscopy; ultraviolet, visible, and infrared spectrophotometry; colorimetry; turbidimetry; nephelometry; fluorometry; potentiometry; voltametric titration methods. (Lec. 3) Pre: 228 and credit or concurrent enrollment in 432.

**414 Instrumental Methods of Analysis Laboratory (2)**

Applications of instrumental methods to the solution of problems in analytical chemistry. (Lab. 6) Pre: credit or concurrent enrollment in 412.

**425 Advanced Organic Laboratory (2)**

Techniques in organic chemical research, including handling air sensitive chemicals, flash chromatography, and instrumental methods of structure determination. Separation of mixtures and identification of components by infrared and nuclear magnetic resonance spectroscopies. (Lab. 6) Pre: 292 or 226 and 228 and credit or concurrent enrollment in 427.

**427 Intermediate Organic Chemistry (3)**

Intermediate organic chemistry with emphasis on organic reaction mechanism, stereochemistry, spectroscopic characterization, and newer synthetic methods. (Lec. 3) Pre: 226 and 228 with grade of C- or better or 292 with grade of C- or better.

**431 Physical Chemistry I (3)**

Gas laws, laws of thermodynamics, chemical equilibrium, phase equilibria, and electrochemistry. (Lec. 3) Pre: 112 and 114 with grade of C- or better or 192 with grade of C- or better and MTH 142 with grade of C- or better and PHY 112 or 204. May be taken for graduate credit by graduate students whose undergraduate programs do not require physical chemistry.

**432 Physical Chemistry II (3)**

Atomic theory, quantum chemistry, bonding, molecular interactions, chemical kinetics, kinetic theory, and spectroscopy. (Lec. 3) Pre: 431 with a grade of C- or better. May be taken for graduate credit by graduate students whose undergraduate programs do not require physical chemistry.

**441 The Chemistry of Biological Systems (3)**

Chemical biology, molecular aspects of biological structures, equilibria, energetics, reactions, and metabolism. (Lec. 3) Pre: 228, 432.

**492 Seminar in Chemistry (1)**

Preparation and presentation of papers on selected topics in chemistry. Required of seniors in chemistry. (Seminar) Pre: credit or concurrent enrollment in 432. Not for graduate credit.

**501 Advanced Inorganic Chemistry I (3)**

Systematic analysis of bonding schemes and structural aspects of molecular systems encountered in inorganic chemistry. Special emphasis on electron density distributions, physical methods of analysis, and practical applications of quantum mechanics. (Lec. 3) Pre: 401.

**502 Advanced Inorganic Chemistry II (3)**

Modern inorganic chemistry approached from experimental, theoretical, and descriptive points of view. Includes electronic structure and bonding in coordination chemistry, topology, thermodynamics of complex formation, mechanisms, lanthanides, and actinides. (Lec. 3) Pre: 401 or equivalent.

**511 Advanced Analytical Chemistry I (3)**

Complex Equilibria and Electrochemistry: Topics include solution theory; acid-base, precipitation and complexation reactions; redox chemistry, amperometry, voltammetry, specialized electrodes and electrochemical sensors. Statistical treatment of data. (Lec. 3) Pre: 412 or permission of instructor.

**512 Advanced Analytical Chemistry II (3)**

Fundamentals of chromatographic and electrophoretic separations and major spectroscopic tech-

niques. Basic theory, instrumentation, advantages, limitations, and applications of these techniques as well as new instrumental developments are discussed. (Lec. 3) Pre: 412 and MTH 243.

**519 Theoretical Concepts in NMR (3)**

The physical concepts of NMR phenomena are presented, beginning with signals generated in the probe, carried through the spectrometer console, into the computer, and finally represented as a spectrum. (Lec. 3) Pre: 292, PHY 112, and MTH 141, or equivalents, or permission of instructor.

**520 Interpretation of One-Dimensional and Two-Dimensional NMR Spectra (3)**

Uses of chemical shifts and coupling constants are presented for interpreting one-dimensional (1D) and two-dimensional (2D) proton and carbon spectra. Includes relaxation time measurements, decoupling, and simple 2D interpretation. (Lec. 3) Pre: 292, PHY 112, and MTH 141, or equivalents, or CHM 519 or permission of instructor.

**521 Advanced Organic Chemistry I (3)**

Emphasis on the structures, reactivities, and syntheses of organic molecules. (Lec. 3) Pre: 226 and 228 or equivalent.

**522 Advanced Organic Chemistry II (3)**

Advanced fundamental organic chemistry including mechanism, synthesis, organometallics, bio-organic, organic materials, and/or molecular recognition. (Lec. 3) Pre: 427 or 521 or equivalent.

**531 Advanced Physical Chemistry I (3)**

Principles and applications of chemical thermodynamics and chemical statistical thermodynamics. Includes the three laws of thermodynamics, statistical distributions, statistical thermodynamic ensembles and fluctuations. Applications to ideal gases and crystals, real fluid, and chemical equilibrium. (Lec. 3) Pre: 432 or permission of instructor.

**532 Advanced Physical Chemistry II (3)**

Principles and applications of quantum chemistry. Includes the formal development of quantum theory and applications to electronic structure as well as other problems of chemical interest. (Lec. 3) Pre: 432 or permission of instructor.

**551 Nonthesis Master's Research (3)**

Research on original problem for fulfillment of research requirement of nonthesis master's degree. Literature survey, laboratory work, and detailed report required. (Independent Study) Pre: permission of chairperson.

**552 Nonthesis Master's Research (2–3)**

Research on original problem for fulfillment of research requirement of nonthesis master's degree. Literature survey, laboratory work, and detailed report required. (Independent Study) Pre: permission of chairperson.

**599 Master's Thesis Research**

Number of credits is determined each semester in consultation with the major professor or program committee. A minimum of 6 credits is required of students who have chosen the thesis option for the master's degree. (Independent Study) S/U credit.

**618 Theory of Separations (3)**

In-depth presentation of theory of separation processes. Emphasis on methods development, advanced topics, and current advances using gas and liquid chromatography. (Lec. 3) Pre: 511 or permission of instructor.

**621 Advanced Topics in Physical Organic Chemistry (3)**

Mechanistic aspects of organic chemistry: molecular orbital theory, thermal and photochemical cyclo-additions and rearrangements. Consideration of carbenes, nitrenes, and free radicals. Evaluation of steric, stereoelectronic, and secondary orbital effects. (Lec. 3) Pre: 521 and 522 or permission of instructor.

**642, 643, 644 Graduate Seminar (1 each)**

Results of detailed literature surveys are presented orally and in writing. Required for candidates for advanced degrees in chemistry. (Seminar) S/U credit.

**691 Special Topics (1–3)**

Covers special research topics of interest. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 6 credits.

**699 Doctoral Dissertation Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**Chinese (CHN)**

*Section Head:* Assistant Professor Xiong

**101 Beginning Chinese I (3)**

Fundamentals of grammar and pronunciation, exercises in reading, writing, and conversation. (Lec. 3) Pre: no prior Chinese is required. (FC) [D]

**102 Beginning Chinese II (3)**

Continuation of 101. (Lec. 3) Students enrolling in this course should have taken 101 or equivalent. (FC) [D]

**103 Intermediate Chinese I (3)**

Development of facility in reading narrative and expository prose; exercise in grammar, listening comprehension, and speaking. (Lec. 3) Students enrolling in this course should have taken 102 or equivalent. (FC) [D]

**104 Intermediate Chinese II (3)**

Continuation of 103. (Lec. 3) Students enrolling in this course should have taken 103 or equivalent. (FC) [D]

**111 Intensive Beginning Chinese I (4)**

The fundamentals of Chinese with special emphasis on listening and speaking structures. (Lec. 4) (FC) [D]

**112 Intensive Beginning Chinese II (4)**

The fundamentals of Chinese with special emphasis on listening and speaking structures. (Lec. 4) Pre: 111 or equivalent. (FC) [D]

**113 Intensive Intermediate Chinese I (4)**

Intensive Chinese language intermediate courses. Focus on practice in listening and speaking. Development of reading and writing skills. Intermediate-level grammatical structures. (Lec. 4) Pre: 102 or 112 or equivalent. (FC) [D]

**114 Intensive Intermediate Chinese II (4)**

Intensive Chinese language intermediate courses. Focus on practice in listening and speaking. Development of reading and writing skills. Intermediate-level grammatical structures. (Lec. 4) Pre: 103 or 113 or equivalent (Lec. 4). (FC) [D]

**205, 206 Composition and Conversation (3 each)**

Development of facility in spoken and written Chinese using contemporary topics; emphasis on general classroom discussion. (Lec. 3) Pre: (for 205) 104 or permission of instructor. Pre: (for 206) 205 or permission of instructor. (FC) [D]

**215 Intensive Conversation and Composition I (4)**

Intensive course in further development of spoken and written Chinese. Advanced-low level grammatical structures. Students enrolling in 215 should have taken 104 or 114 or equivalent. (Lec. 4).

**216 Intensive Conversation and Composition II (4)**

Intensive course in further development of spoken and written Chinese. Advanced-low level grammatical structures. Students enrolling in 216 should have taken 205 or 215 or equivalent. (Lec. 4).

**305 Advanced Composition and Conversation I (3)**

Intensive practice in spoken and written Chinese using contemporary writings and topics in Chinese-speaking countries. Emphasis on classroom discussion. (Lec. 3) Pre: 206 or permission of instructor.

**306 Advanced Composition and Conversation II (3)**

Intensive practice in spoken and written Chinese using contemporary writings and topics in Chinese-speaking countries. Emphasis on classroom discussion. (Lec. 3) Pre: 305 or permission of instructor.

**315 Intensive Advanced Composition and Conversation I (4)**

Intensive course in development of spoken and written Chinese. Advanced level discourse structures. (Lec. 4) Pre: 206 or 216 or equivalent.

**316 Intensive Advanced Composition and Conversation II (4)**

Intensive course in development of spoken and written Chinese. Advanced level discourse structures. (Lec. 4). Pre: 305 or 315 or equivalent.

**320 Chinese News Media (3)**

Survey of Chinese language news media including print, television and Internet. (Lec. 3) Pre: 306 or permission of instructor.

**401 Topics on Chinese Culture and Civilization (3)**

Students will study various topics on Chinese culture, society and civilization through selected readings and multi-media. (Lec. 3) Pre: 306 or permission of instructor. Not for graduate credit.

**421 Modern Chinese Literature I (3)**

Advanced literature course focusing on readings and discussions of major modern Chinese writers and their masterpieces from the end of the Imperial Era through the Chinese Civil War in 1949. (Lec. 3) Pre: 306 or permission of instructor. Not for graduate credit.

**422 Modern Chinese Literature II (3)**

Literary works of famous writers in contemporary China. Students will read and discuss representative literary selections from the start of the New China, through the Cultural Revolution to the present. (Lec. 3) Pre: 421 or permission of instructor. Not for graduate credit.

**497, 498 Directed Study (1–3)**

Designed particularly for the advanced student. Individual research and reports on problems of special interest. (Independent Study) Pre: acceptance of a project by a faculty member and approval of section head. Not for graduate credit.

## Civil and Environmental Engineering (CVE)

*Chairperson:* Professor G. Tsiatis

**205 Introduction to Civil Engineering Tools (2)**

Introduction to the nature and history of the profession of civil and environmental engineering and tools including engineering drawings, computer-aided design, and basic computer programming. (Lec.1, Lab. 3) Pre: EGR 106.

**220 Mechanics of Materials (3)**

Theory of stresses and strains, thin-walled cylinders, beam deflections, columns, combined bending and direct stresses, joints, and indeterminate beams. (Lec. 3) Pre: MCE 262.

**230 Mechanics of Materials Laboratory (1)**

Introduction to the physical and mechanical properties of civil engineering construction materials including steel, wood and Portland cement concrete. Cement properties, mix design, testing of fresh and hardened concrete Experimental evaluation of fun-

damental material properties and behavior under a variety of controlled laboratory conditions. (Lab. 3) Pre: credit or concurrent enrollment in 220. Required for civil engineering students only.

**240 Geomatics (2)**

Science and technology of obtaining and utilizing earth measurement data, including the description and purpose of field surveying equipment, including the automatic level, transit, EDM instrument, electronic total station, and GPS instrument. Includes the collection, sorting, storage, analysis, and presentation of data for engineering purposes. (Lec. 2) Pre: MTH 141.

**241 Geomatics Lab. (1)**

Field and laboratory experience in the operation and care of surveying equipment (including the automatic level, transit, EDM instrument, electronic total station, and GPS instrument), and the application of electronically collected field data for engineering planning and design, using a CADD program. (Lab. 3). Pre: credit or concurrent enrollment in 240.

**250 CADD for Civil Engineers (3)**

Operating system issues, basic elements of Computer-Aided Design and Drafting (CADD): creation of 2-D and 3-D models, solid modeling, rendering and animation, applications of CADD in civil engineering design. (Lec. 3) Pre: EGR 106. Preference given to students enrolled in the CVE undergraduate degree program.

**323 Sustainable Solutions for Developing Communities (3)**

Focuses on creating awareness about the global challenges our society is facing and how to potentially solve them using appropriate and sustainable technologies. (Lec. 3) Pre: EGR 106 and MTH 243 and permission of instructor.

**334 Construction Management (3)**

Introduction to construction planning; procedures involved in construction activities with major emphasis on heavy construction. (Lec. 3) Pre: 220.

**340 Geomatics (3)**

Technologies to obtain measurement data using level, transit, EDM, total station, and GPS instrument. Data collection, sorting, storage, analysis, and presentation of data for civil engineering purposes. Practical surveying experiences. (Lec. 2, Lab. 3) Pre: MTH 141 and permission of instructor.

**346 Transportation Engineering (3)**

Concepts of transportation planning and design as well as traffic analysis techniques are covered with respect to Multi-Mode travel within transportation systems. (Lec. 3) Pre: at least a 2.00 (C) average in MTH 141, MTH 142, PHY 203, PHY 204, and CHM 101.

**347 Highway Engineering (3)**

Design of modern highways and streets including planning, location, geometric layout, drainage structures, bituminous materials, pavement structure, construction, operation, maintenance, and rehabilitation. (Lec. 3) Pre: 346.

**348 Highway Engineering Laboratory (1)**

Highway capacity analysis, computer applications of geometric design, soil resilient modulus test, L. A. abrasion test, asphalt viscosity test, Marshall and SuperPave mix-design, pavement management lab, and field trip. (Lab. 3) Pre: credit or concurrent enrollment in 347.

**354 Structural Analysis (3)**

Introduction to structural analysis, statically determinate systems, trusses, beams, frames, influence lines, deflections, conjugate beam, energy methods, statically indeterminate systems, force method, slope deflection, moment distribution, introduction to stiffness method. (Lec. 3) Pre: 220 and at least a 2.00 (C) average in MTH 141, MTH 142, PHY 203, PHY 204, and CHM101.

**355 Structural Engineering Lab. (1)**

The use of computer programs in structural analysis. A "teaching" type software program and "professional" type software program will be used. (Lab. 3) Pre: credit or concurrent enrollment in 354.

**370 Hydraulic Engineering (3)**

Applied hydraulics of flow in closed conduits and open channels: river and groundwater hydraulics. Analysis of hydraulic structures. Reservoir design. Principles of hydrology. (Lec. 3) Pre: MCE 354 and at least a 2.00 (C) average in MTH 141, MTH 142, PHY 203, PHY 204, and CHM 101.

**374 Environmental Engineering (3)**

Water supply and treatment systems, sewerage treatment of municipal and industrial waste waters, stream pollution, groundwater analysis, air pollution, and disposal of solid waste materials. (Lec. 3) Pre: MTH 243 or permission of chairperson and at least a 2.00 (C) average in MTH 141, MTH 142, PHY 203, PHY 204, and CHM 101.

**375 Environmental Engineering Laboratory (1)**

Laboratory studies in environmental engineering and water resources. Measurement of environmental contaminants, closed conduit flow, open channel flow. Treatment processes, pipe networks, centrifugal pump characteristics. Computer implementation for design. (Lab. 3) Pre: credit in MCE 354, CVE 374 and credit or concurrent enrollment in CVE 370.

**381 Geotechnical Engineering (3)**

Engineering properties of soils, seepage, consolidation theory, calculation of stresses, failure theories, shear strength of sand, shear strength of clay. Introduction to foundation engineering and geosynthet-

ics. (Lec. 3) Pre: 220 and at least a 2.00 (C) average in MTH 141, MTH 142, PHY 203, PHY 204, and CHM 101.

**382 Geotechnical Engineering Laboratory (1)**

Laboratory studies of physical properties and behavior of soils: index properties, compaction, consolidation, and shear strength. Interpretation, evaluation, and engineering applications of test data. Introduction to foundation engineering and geosynthetics. (Lab. 3) Pre: credit or concurrent enrollment in 381.

**391 Honors Work (3)**

Independent study under close faculty supervision. Discussion of advanced topics in civil engineering in preparation for graduate work. (Independent Study) Pre: junior standing or permission of chairperson.

**400 Civil Engineering Professional Licensure (1)**

Preparation of students to take the civil engineering oriented Fundamentals of Engineering examination. Overview of the civil engineering licensure process and importance. (Lec. 1) Pre: civil engineering major with senior standing. Not for graduate credit. S/U only.

**422 Offshore Structure Design**

See Ocean Engineering 422.

**442 Traffic Engineering (3)**

Highway traffic characteristics and methods of providing for an effective, free, and rapid flow of traffic. Types of studies, regulations, control devices and aids, planning, and administration. (Lec. 2, Lab. 3) Pre: 347 or permission of instructor.

**443 Intelligent Transportation Systems (3)**

Traffic systems operations/planning strategies; advanced transportation management systems; detection devices; benefits and evaluation; in-vehicle navigation theory; real-time dynamic routing issues. (Lec. 3) Pre: 346 or permission of instructor.

**450 Simulation Based Design for Civil Engineers (4)**

Advanced concepts of Computer-Aided Design and Drafting (CADD) as they pertain to a) digital prototyping, b) concurrent engineering, and c) continuous acquisition and lifecycle support, global standards, and file exchange formats. (Lec. 3, Lab. 3) Pre: 220 and 250.

**453 Computer Analysis of Structures (3)**

Introduction to matrix methods of structural analysis. Solutions of planar structures using a digital computer. (Lec. 3) Pre: 354 or equivalent.

**460 Steel Structures (3)**

Theory of steel structures including beams, columns, beam-columns, composite construction, and connections. Material properties, environmental loads, state of construction practice, fabrication, and economic aspects. (Lec. 3) Pre: 354 or permission.

**465 Analysis and Design of Concrete Structures (3)**

Current criteria and practice for design of reinforced and prestressed concrete structures. Elastic and ultimate strength analysis of beams, slabs, columns, and frames. Comprehensive design problems. (Lec. 3) Pre: 354 or concurrent enrollment. Not for graduate credit in civil engineering.

**470 Water and Wastewater Transport Systems (3)**

Computer analysis of water storage and transmission. Design of water distribution and wastewater collection systems. (Lec. 2, Lab. 3) Pre: 370 or 374 or permission of instructor.

**471 Water and Wastewater Treatment Systems (3)**

Development of water quality standards. Design and analysis of physical, chemical, and biological treatment processes and their application to water and wastewater purification systems. (Lec. 2, Lab. 3) Pre: 374 or permission of instructor.

**472 Industrial Air Pollution (3)**

Sources and characteristics of urban-industrial air pollution, allowable concentrations and control, stack sampling, chemical supplements in air pollution control, diffusion of pollutants, site selection, and abatement programs. Air resources management programs. (Lec. 3) Pre: permission of instructor.

**474 Water Quality Sampling and Analysis (3)**

Laboratory and field work including sampling of surface and groundwater, chemical and biological analyses for water, monitoring, treated effluent quality control, and detection of hazardous contaminants. (Lec. 1, Lab. 6) Pre: 374 or permission of instructor.

**475 Water in the Environment (3)**

Evaluation of water as a resource and its relation to the environment: hydrologic cycle, water budgets, water uses, drought, flood, current water problems. (Lec. 3) Pre: 370 or permission of instructor.

**477 Environmental Sustainability and Green Engineering (3)**

Provides an overview of the impacts in aquatic, terrestrial, atmospheric and built environment created by engineering decisions. Understand the physical, chemical, and biological principles that describe interactions between engineering and the environment. (Lec. 3) Pre: senior standing undergraduate from any engineering program or permission of instructor. Not for graduate credit.

**478 Hazardous Waste Disposal and Solid Waste Management (3)**

Sources, collection, treatment, and disposal of hazardous wastes and solid wastes. Conservation, recovery, and reuse of material. Economics of waste treatment, disposal, and reuse. (Lec. 3) Pre: permission of instructor.

**483 (or OCE 483) Shallow Foundations (3)**

Applications of geotechnical engineering principles to analysis and design of shallow foundations. Foundation types, bearing capacity, settlement, lateral earth pressures, gravity retaining walls, introduction to deep foundations. (Lec. 3) Pre: 381 or equivalent.

**491, 492 Special Problems (1–6 each)**

Advanced work under supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of chairperson. May be repeated for a maximum of 12 credits. Not for graduate credit in civil engineering.

**493 Civil Engineering Design Studies (1–6)**

Off campus civil and environmental engineering design studies. Must include significant hands-on (laboratory or field) experience, use of engineering design tools, and the design, development, test and evaluation of hardware/software systems. (Independent Study) Pre: junior standing in civil engineering and permission of the department chair. Not for graduate credit in civil engineering.

**497 Civil Engineering Design I (2)**

Detailed project planning, conceptual design and layout, and environmental impact for the civil engineering integrated capstone design project. Speakers on ethics, professionalism, and professional practice. (Lab. 4) Pre: credit or concurrent enrollment in 346, 354, 374, and 381. Must be taken immediately prior to 498. Required of all seniors in civil engineering. Not for graduate credit in civil engineering.

**498 Civil Engineering Design II (3)**

Elements of planning, analysis, and design of a civil engineering project integrating the principles learned in previous courses; a group integrated capstone design project involving all major aspects of civil engineering design. (Lec. 1, Lab. 6) Pre: credit or concurrent enrollment in 370 and 497. Required for all seniors in civil engineering. Not for graduate credit in civil engineering.

**542 Traffic Systems Operations (3)**

Signalized and unsignalized intersection treatments; coordination concepts; arterial and freeway management, operating strategies, and design issues; simulation and optimization; performance evaluation. (Lec. 3) Pre: 442 or permission of instructor.

**545 Pavement Design (3)**

Pavement types; pavement system components; stresses in the pavement structure. Design factors and criteria, pavement stabilization, structural design of flexible and rigid pavements for highways and airports, pavement maintenance and overlay design. (Lec. 3) Pre: 347 or equivalent.

**546 Urban and Rural Transportation**

See Community Planning 546.

**547 Geometric Design of Highways (3)**

Evaluation of alternative designs. Criteria and practices of geometric design; at grade intersections, interchanges, channelization, weaving parking facilities, and road appurtenances; safety considerations, lane balancing, ramps, and terminals. (Lec. 3) Pre: 347 or equivalent.

**548 Bituminous Transportation Materials and Mix-Design (3)**

Asphalt binder, bituminous mixtures, conventional and SuperPave mix-design methods, material characterization and testing, fracture, fatigue, and permanent deformation, novel pavement materials and additives, and pavement recycling. (Lec. 2, Lab. 3) Pre: 347 or equivalent.

**549 Transportation Soils and Materials**

Surficial and subgrade soils, mineral aggregates, Portland Cement Concretes, mix-design methods, material characterization and testing, fracture, fatigue, and modern transportation materials. (Lec. 2, Lab. 3) Pre: 347 or equivalent.

**551 Finite Element Analysis in Civil Engineering I (3)**

Direct stiffness method. Rayleigh-Ritz and Galerkin methods. Isoparametric elements. Frames, trusses, plane stress and strain. Bending of thin plates. (Lec. 3) Pre: 453 or permission of instructor.

**552 Structural Timber Design (3)**

Study of wood properties and design considerations. Design and behavior of beams, columns, beam-columns, and wood fasteners. Analysis and design of structural diaphragms, shear walls, and box beams. (Lec. 3) Pre: 354 or equivalent.

**561 Advanced Steel Design (3)**

Selected topics in structural steel design following the LRFD specification, including plate buckling and postbuckling, torsion, plate girders, plastic design, frame stability, tall buildings, composite design, and earthquake-resistant design. (Lec. 3) Pre: 460 or permission of instructor.

**562 Management of Highway Bridges (3)**

Comprehensive systems approach to management of highway bridges. Needs assessment, in-service monitoring and evaluation of bridges. Condition forecasting models and failure analysis. Life-cycle cost and benefit analysis, prioritization and optimization. (Lec. 3) Pre: permission of instructor.

**563 Prestressed Concrete (3)**

Theory of prestressed concrete including partial losses of prestress and long-term effects due to creep, shrinkage, and steel relaxation. Service and ultimate load evaluation of pre-tensioned and post-tensioned beam elements in flexure, shear, and torsion. Deflection, camber, and crack control evaluation. (Lec. 3) Pre: 465 or equivalent.

**564 Advanced Reinforced Concrete (3)**

Elastic and ultimate strength theory in flexure, shear, torsion, compression, and serviceability. Behavior and analysis of deep beams, corbels, slender and non-slender columns, biaxial bending, two-way slabs and plates. (Lec. 3) Pre: 465 or equivalent.

**565 Structural Dynamics (3)**

Simplified models and their equations of motion; analytical solution methods; Fourier analysis; Duhamel integral; nonlinearities; computer-oriented solution algorithms and their implementation. Application. (Lec. 3) Pre: 453.

**568 (or MCE 568) Theory of Plates (3)**

Development of basic plate equations. Classical solution examples of rectangular and circular plates. Additional topics selected from orthotropic plates, large deflections, finite element, and numerical solutions. (Lec. 3) Pre: 220 and MTH 244.

**570 Water Chemistry for Engineers (3)**

Chemical principles applied to problems in environmental engineering, including water and wastewater treatment, contaminant hydrology, and hazardous waste management. Pre: permission of instructor.

**572 Biosystems in Sanitary Engineering (3)**

Microorganisms that constitute the biological systems in water pollution, water purification, and wastewater treatment. Application of principles of microbiology and biochemistry to analysis and design in fields of sanitary engineering and water resources. (Lec. 3) Pre: permission of instructor.

**573 Theory of Water Purification and Treatment (3)**

Principles of modern water purification and engineering practices. Aeration, deodorization, sterilization, coagulation, filtration, water softening, iron removal, disinfection, and corrosion control. (Lec. 3) Pre: permission of instructor.

**575 Open-Channel Hydraulics (3)**

Analysis of uniform, critical, varied, and unsteady flow in open channels. Principles will be applied to open-channel design. (Lec. 3) Pre: 370.

**577 Environmental Sustainability and Green Engineering (3)**

Provides the conceptual, methodological, and scientific basis to understand and reduce the impact of engineering decisions on the environment. Designed for an interdisciplinary audience of engineering graduate students and will provide students with the background and tools necessary to reduce the impacts of design. Pre: permission of instructor. Not open to students with credit in 477.

**579 Advanced Soil Mechanics (3)**

Physico-chemical properties of soils, hydraulic conductivity, consolidation, and shear strength. (Lec. 3) Pre: 381 or equivalent.

**580 Consolidation, Seepage, and Clay Mineralogy (3)**

Consolidation of soils, permeability; steady state and transient seepage; stress distributions; clay mineralogy. (Lec. 3) Pre: 381 or equivalent.

**581 (or OCE 581) Experimental Geomechanics (3)**

Advanced methods and techniques of geotechnical testing. Behavior of granular and cohesive soils with determination of engineering properties. Interpretation, evaluation, and engineering applications of test data. Emphasis on shearing strength, consolidation, bearing capacity, earth pressures, seepage, and slope stability. (Lec. 3) Pre: 381 or equivalent.

**582 Seabed Geotechnics**

See Ocean Engineering 582.

**583 (or OCE 583) Deep Foundations (3)**

Applications of soil mechanics principles to analysis and design of piles and drilling shafts under vertical and lateral loading. Static and dynamic load testing. Introduction to ground improvement technologies. (Lec. 3) Pre: 381 or equivalent.

**584 Designing with Geosynthetics (3)**

Overview of geosynthetic materials, properties, test methods, and current standards. Design methods involving geotextiles, geogrids, geomembranes, and geocomposites. Applications to problems in geomechanics, geoenvironmental engineering, and transportation-related fields. (Lec. 3) Pre: 381 or equivalent.

**585 Soil Dynamics (3)**

Vibration characteristics, wave propagation in soils, foundation vibration theory, foundation design for vibrating loads, vibration isolation, blast vibrations, dynamic soil properties, liquefaction potential, vibratory and dynamic compaction, computer applications. (Lec. 3) Pre: credit or concurrent enrollment in 483 or equivalent.

**587 Groundwater Flow and Seepage Pressures (3)**

Hydrodynamics of fluid flow through porous media. Analytical methods for steady and unsteady seepage in aquifers; theoretical analysis with practical modification of seepage problems involving foundations, drainage structures, earth dams, and dewatering. (Lec. 3) Pre: 381 or equivalent.

**588 Groundwater Hydrology (3)**

Quantitative methods of groundwater hydrology including determination of aquifer properties and yield. Modeling of groundwater systems for management quantity of water, movement of contaminants, and well design. Field and laboratory measurements. (Lec. 3) Pre: 370 and 381 or equivalent.

**591, 592 Special Problems (1–6 each)**

Advanced work under supervision of a faculty member arranged to suit individual requirements of the

student. (Independent Study) Pre: permission of chairperson.

**594 Special Topics in Civil and Environmental Engineering (1–3)**

Intensive inquiry into a certain important field of current interest in civil and environmental engineering. (Lec. 1–3) Pre: permission of instructor.

**596 Numerical Methods in Structural Engineering (3)**

Methods of successive approximations and numerical procedures in the solution of stress, vibration, and stability problems in structural members. Non-uniform members, elastic supports, plates, torsion. (Lec. 3) Pre: permission of instructor.

**599 Master's Thesis Research (1–9)**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**601, 602 Graduate Seminar (1 each)**

Presentations by researchers and practicing professionals covering topics in various areas of civil engineering and related fields. Presentations and discussions of research by graduate students. (Seminar) Required of all full-time graduate students. May be repeated for a maximum of 2 credits. Fall semester: 601; spring semester: 602. Pre: graduate standing. S/U credit.

**641 Pavement Evaluation and Rehabilitation (3)**

Pavement performance concepts. Criteria for pavement evaluation. Measurement of pavement distress and structural capacity. Analysis and interpretation of pavement evaluation data. Correlation of data with performance ratings. Formulation and evaluation of maintenance and rehabilitation alternatives. (Lec. 3) Pre: 545 or equivalent.

**651 Design of Highway Bridges (3)**

Design specifications and analysis methods for highway bridges. Loads. Design of steel I-beam bridges, reinforced concrete bridges, and plate girders. Orthotropic analysis. Bridge details and substructure. (Lec. 3) Pre: 561, 465, and 453.

**652 Advanced Topics in Bridge Engineering (3)**

Load and resistance factor design of prestressed concrete bridges. Analysis and design of segmental concrete bridges using the span-by-span and the cantilever methods of construction. Time dependent effects. Long span bridges. Bridge condition assessment and rating. (Lec. 3) Pre: 651 or permission of instructor.

**657 Structural Stability (3)**

Introduction; principal forms of equilibrium paths and their stability; conservative elastic systems; buckling of prismatic members; imperfections; plastic

deformations; postbuckling of frames and reticulated structures; numerical methods; catastrophe theory. (Lec. 3) Pre: permission of instructor.

**667 Structural Reliability (3)**

Probabilistic applications in structural analysis and design. Statistical models for forces and material strengths. Component and system structural reliability. Random vibration applications in structural engineering. (Lec. 3) Pre: permission of instructor.

**672 Water Pollution Control and Treatment of Wastewater (3)**

Wastewater characteristics, effects, and purification in natural water, government control strategies and impacts, cost of control, theory and mathematical concepts of secondary and tertiary treatment process, their limitations, and late developments. (Lec. 3) Pre: one year of chemistry and biology, MTH 243 and CVE 572 or their equivalents, and permission of instructor.

**677 Stream and Estuarine Analysis (3)**

Fundamentals and mathematical concepts of physical and biological factors applied to the evaluation of the pollution capacity of streams and estuaries. (Lec. 3) Pre: MTH 244.

**687 Geotechnical Earthquake Engineering (3)**

Seismology and seismicity; surface faulting and ground motion characteristics; response spectra; dynamic soil properties; dynamic response of soil layers, embankments, and slopes; influence of local soil conditions on site response; evaluation of design earthquakes; response analysis. (Lec. 3) Pre: credit or concurrent enrollment in 483 and graduate standing.

**688 Marine Geomechanics**

See Ocean Engineering 688.

**691, 692 Special Problems (1–6 each)**

Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of chairperson. May be repeated for a maximum of 12 credits.

**694 Advanced Special Topics in Civil and Environmental Engineering (1–3)**

Intensive inquiry into a certain important field of current interest in civil and environmental engineering, requiring advanced sophistication of a 600-level course. (Lec. 1–3) Pre: permission of instructor.

**699 Doctoral Dissertation Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## Classics (CLA)

*Section Head:* D. Carpenter

### 110 Ancient Greece: History and Archaeology

See History 110.

### 301 The Hellenistic World

See History 301.

### 302 The Roman Empire

See History 302.

### 391 Ancient Laughter: The Comic Tradition in Greece and Rome (3)

Introduction to the comic tradition in Western literature through its origins in Greece and Rome. Readings in English translation include examples of comic drama, novel, and satire. (Lec. 3) (A) [D]

### 395 Greek Mythology: Gods, Heroes, and Humans (3)

Nature and function of myth in the ancient world and today: ideas of divinity, relationship of divine to human, origins of cosmos and human society, male and female principles, power hierarchies, coming of age, the heroic experience. Theories of myth analysis. Readings in English translation. (Lec. 3) (A) [D]

### 396 Myths of Rome (3)

Nature and function of myth in Roman society; origins and influence of Romanitas as found in Roman literature: history, epic, lyric, novel. Roman religion: magic, animism, anthropomorphism, gods and goddesses. Readings in English translation. (Lec. 3) (A) [D]

### 397 Greek Myth and Tragedy (3)

Relationship between Greek myth and classical tragedy, birth and evolution of tragedy (ancient, medieval, French, English, American), employment of the same myth for different dramatic and political purposes. Readings in English translation. (Lec. 3) (A) [D]

### 497 Directed Study (1–6)

Individual research. (Independent Study) Pre: faculty acceptance of project. Prior or concurrent registration in a LAT or GRK or CLA course recommended. May be repeated for credit with different topic. Not for graduate credit.

See also course listings under Greek and Latin.

## Communication Studies (COM)

*Chairperson:* Associate Professor Derbyshire

### 100 Communication Fundamentals (3)

Integrates basic theory and experience in a variety of communication contexts including public speaking, small groups, and interpersonal communication. Examines human differences in order to develop more effective communication skills. (Lec. 3) Not open to students with credit in 110. (EC) [D]

### 108 (or ECN 108 or SUS 108) Spaceship Earth: An Introduction to Systems (4)

Through in-depth study of films, readings, and Web sites, students will explore the economic and ecological principles of sustainability and the rhetorical strands linking scientific evidence, public policies, and individual behavior. (Lec. 3, Rec. 1) (EC) or (S)

### 110 Communication Fundamentals (4)

Integrates basic theory and experience in communication contexts including public speaking, small groups, and interpersonal communication. Examines human difference in order to develop more effective communication skills, and uses online environments to extend classroom instruction (Lec. 3, Lab. 2) Pre: junior standing. Not open to students with credit in 100. (EC) [D]

### 202 Public Speaking (3)

Theory, attitudes, and skills essential to effective and ethical public communication. Focus on research, selection and use of evidence, construction of arguments, organization, audience analysis, and presentational skills. (Lec. 3) Pre: 100 or 100H or 110.

### 207 Forensic Workshop (1)

Open to students participating in speech or debate activities. (Practicum) Pre: permission of the director of debate. May be repeated for a maximum of 4 credits. Pre: 100 or 100H or 110.

### 208 Argumentation and Debate (3)

Introduces argumentation theory through the model of academic debate. Stresses critical-thinking skills including analysis, research, organization, and written and oral presentations. Debates are conducted on important social and political issues. (Lec. 3) Pre: 100 or 100H or 110.

### 209 Great American Speeches (3)

The study of historically significant ideas, issues, and causes through the critical analysis of selected American speeches. (Lec. 3) Pre: 100 or 100H or 110.

### 210 Persuasion: The Rhetoric of Influence (3)

Analysis of communication influencing beliefs, attitudes, and/or behavior. Investigation of rhetorical elements of logical, emotional, and ethical appeals. Study of elements critical for effective producers and consumers of persuasion. (Lec. 3/Online) Pre: 100 or 100H or 110.

### 221 Interpersonal Communication (3)

Examines basic theory and skills, including impact of perception, self-concept, listening, nonverbal messages, and language on interpersonal communication, including conflict, relationship development, friendship, family, and romantic relationships. (Lec. 3/Online) Pre: 100 or 100H or 110.

### 231 Oral Interpretation of Literature (3)

Recognition and appreciation of content and communication of thought and emotion through oral

reading. Practice in the analysis and interpretation of poetry and prose fiction. (Lec. 3)

### 246 New Media and Society (3)

Introduction to basic practices and theories necessary for understanding and contributing to digital culture. Combines new media theory and practice on topics including blogging, social networking, and virtual reality. (Lec. 3) (L) [D]

### 251 Small Group Communication (3)

The study of communicative functions in the small group setting. Includes group dynamics, leadership, problem solving, and decision making. Emphasis on theory and application. (Lec. 3/Online) Pre: 100 or 100H or 110.

### 271 Web Design and Programming (4)

For students who want to learn to communicate effectively using Web development technology. Explores principles and techniques of client-side programming using XHTML, CSS, and JavaScript following leading-edge standards. Includes designing for Web standards, accessibility, usability, and workflow for Web design. (Lec. 2, Lab. 4)

### 291 Communication Teaching Practicum (1)

Supervised participation in instructional practice for students in communication. Provides exposure to pragmatic classroom issues and experience in various aspects of teaching at a college level. (Practicum) Pre: permission of instructor. May be repeated for a maximum of 2 credits. S/U only.

### 302 Advanced Public Speaking (3)

Advanced study of public speaking and speech writing. Speaking in television and business settings. Speaking with a manuscript, writing speeches for others, and speech criticism. (Lec. 3) Pre: 202 and junior standing in a degree-granting college or permission of instructor.

### 307 Audio Communication in the Media (3)

Examination of techniques and production of audio communication including radio drama, commercials, news reporting, sports commentary, monologues, narration, and voice-over work. (Lec. 3) Pre: junior standing in a degree-granting college or permission of instructor.

### 308 Advanced Argumentation and Debate (3)

Analysis of the theories of argumentation through specialized forms of debate. Use of legislative, legal, and other situationally specific forms of debate to apply the theories of argumentation. (Lec. 3) Pre: 208 and junior standing in a degree-granting college or permission of instructor.

### 310 Topics in Communication (3)

Analysis of contemporary rhetorical theories as they relate to speaking in business, civil rights, education, government, labor, law, and religion. Focus each semester on a critical contemporary issue. (Lec. 3/On-

line) Some topics may be offered online. Pre: junior standing in a degree-granting college or permission of instructor. May be repeated for credit.

### 315 (or SUS 315) Environmental Dimensions of Communication (3)

Investigation of individual and mediated environmental messages; analysis and experimentation with the ways communication can affect environmental knowledge, attitudes, and behavior; design of communication campaigns to affect resource use and ecological responsibility (Lec. 3/Online) Pre: junior standing in a degree-granting college.

### 316 Communication Criticism (3)

Study of select methods in the evaluation of communication. Critical methods include but are not limited to rhetorical, media, cultural, and various critical theories of race and gender. 316A Rhetorical Criticism. May be offered online. 316B Television Criticism. (Lec. 3/Online) Pre: 202 and 208 or 209 or 210 and junior standing in a degree-granting college or permission of instructor. May not be repeated.

### 322 Gender and Communication (3)

Survey of theories and research on gender and communication. Examines interface of gender and human interaction in interpersonal, group (including family), educational, organizational, mass media, and social movement contexts. (Lec. 3/Online) Pre: junior standing in a degree-granting college or permission of instructor.

### 324 Nonverbal Communication (3)

Examines nonverbal communication codes, including their structures, usages, and interrelationships. Stresses student understanding, analysis, and application of nonverbal communication through lecture, discussion, and experiential activities. (Lec. 3) Pre: 202 or 221 and junior standing in a degree-granting college or permission of instructor.

### 325 Communication in Interviewing (3)

Theory and practice of interviewing as planned communication in different settings for various purposes, including research, professions, and employment. Human diversity, ethics, interpersonal dynamics, and writing are emphasized. (Lec. 3) Pre: 202 and junior standing in a degree-granting college or permission of instructor.

### 326 Family Communication (3)

Examines family communication from a symbolic interaction and systems theory perspective. Focuses on primary family functions, including cohesion, and on case studies. (Lec. 3/Online) Pre: 202 and 221 and junior standing in a degree-granting college or permission of instructor.

### 333 (or AAF 333) Oral Interpretation of Black Literature (3)

Study and oral presentation of literature by black American authors. Class performances, discussion, reports, and analysis of the literature. (Lec. 3) Pre:

junior standing in a degree-granting college or permission of instructor. 231 recommended.

### 334 Orality and Ancient Greece (3)

Integration of the significant role of rhetoric, orality, presentation skills/styles, literature and history with the culture of the time. (Lec. 3) Pre: 100 and junior standing in a degree-granting college or permission of instructor.

### 335 Orality and Ancient Rome (3)

Integration of the significant role of rhetoric, orality, presentation skills/styles, literature and history with the culture of the time. (Lec. 3) Pre: 100 and junior standing in a degree-granting college or permission of instructor.

### 340 Electronic Media Programming (3)

Overview of various aspects of the operation of radio, television, and cable TV, including industry structure, audience measurement (ratings), programming, and promotion. (Lec. 3) Pre: junior standing in a degree-granting college or permission of instructor.

### 341 Documentary Pre-production (3)

Understanding the documentary form in both its historic and modern context. Basic camera, shooting, and interviewing techniques are studied. Research and writing a documentary proposal required. (Lec. 3) Pre: junior standing in a degree-granting college or permission of instructor.

### 342 Documentary Production (3)

Builds on work completed in 341. Field camera operation, lighting, archival materials, writing, directing, producing, and editing a documentary short on a topic researched and pre-produced in 341. (Lec. 3) Pre: 341 and junior standing in a degree-granting college or permission of instructor.

### 346 Social and Cultural Aspects of Media (3)

Explores social and cultural dimensions of media. Includes case studies of print, television, film, video, and computer-mediated communication. (Lec. 3) Pre: junior standing in a degree-granting college or permission of instructor.

### 351 Organizational Communication Skills (3)

Examination of business and organizational communication. Emphasis on channels of communication, communication barriers, leadership, and the development of communication skills for business and professions. (Lec. 3) Pre: junior standing in a degree-granting college or permission of instructor.

### 354 International Business Communications Exchange

See Business 317. May be offered online.

### 361 Intercultural Communication (3)

Study of cultural similarities and differences as they affect communication within and across cultural boundaries. (Lec. 3/Online) Pre: junior standing in a degree-granting college or permission of instructor.

### 372 Dynamic Web Design and Programming (4)

Leading edge Web-based information technology for communication in all disciplines. Technology will vary by semester, covering Microsoft or Open Source server-side programming technologies and databases, and relevant design and security issues. (Lec. 2, Lab. 4) Pre: 271 and junior standing in a degree-granting college or permission of instructor.

### 381 Research Methods in Communication (3)

Basic concepts and techniques of communication research. Emphasis on analysis of existing communication research and on application of research processes to communication problems or phenomena. (Lec. 3/Online) Pre: 202 and junior standing in a degree-granting college or permission of instructor.

### 382 Communication Theory (3)

A critical survey of social science-based communication theories; an examination of the nature, processes, and functions of communication theory in a variety of contexts. (Lec. 3) Pre: 100, 202 or 221 and junior standing in a degree-granting college or permission of instructor.

### 383 Rhetorical Theory (3)

Surveys and analyzes rhetorical communication theories and theorists from classical to contemporary times and focuses on rhetoric's relationship with philosophy, knowledge, reason, science, technology, and culture. (Lec. 3) Pre: junior standing in a degree-granting college or permission of instructor, 202 and 221 or 210 recommended.

### 385 Communication and Social Influence (3)

Focuses on theories of social influence in interpersonal, group, and public settings. Topics include audience analysis, ethics, motivation, messages, psychological and rhetorical, principles, source credibility, and attitude change. (Lec. 3) Pre: 202 or 210 or 221, and junior standing in a degree-granting college or permission of instructor.

### 391, 392 Communication Honors Work (1–3 each)

Thesis work or an equivalent independent project under faculty supervision for honor students. (Independent Study) Pre: junior standing in a degree-granting college or permission of instructor.

### 402 Leadership and Motivation (3)

Examination of theory and research in the areas of leadership and motivation in organizational settings. Emphasis on application of theory in developing essential leadership skills within individuals and in creating effective motivational programs within organizations. (Lec. 3) Pre: BUS 340, 341 or COM 251 and junior standing in a degree-granting college or permission of instructor.

### 405 Humor in Communication (3)

Examination of genres, history, content, structure, and performance styles of presentational comedy. Exploration of role of humor in society. Development of original materials for public performance. (Lec. 3)

Pre: junior standing in a degree-granting college or permission of instructor. Not for graduate credit.

#### **409 Seminar in American Public Address and Criticism (3)**

Study of selected American speakers, speeches, and/or movements. Rhetorical analysis used to measure the impact of speakers, speeches, and social and political movements. (Seminar) Pre: 316A or 316B or 383 and junior standing in a degree-granting college or permission of instructor.

#### **410 Advanced Topics in Communication Studies (3)**

Advanced study of selected topics. Subject will vary according to the expertise and availability of instructors. (Lec. 3) Pre: 100 and any 300-level COM course and junior standing in a degree-granting college or permission of instructor. May be repeated for a total of 9 credits with different topics. Not for graduate credit.

#### **411 Advanced Rhetorical Theory (3)**

Advanced study of select contemporary rhetorical theories and their relevance to current topics in language, knowledge, philosophy, culture, modernity, and postmodernity. (Lec. 3) Pre: 383 and junior standing in a degree-granting college or permission of instructor.

#### **414 The Rhetoric of Sports in Film (3)**

Studies the rhetoric of sports in film. Students identify and analyze rhetorical messages embedded in films that deal with sports as reflections of the filmmaker's vision by applying film and rhetorical theory. (Lec. 3/Online) Pre: 381 and 383 and junior standing in a degree-granting college or permission of instructor. Not for graduate credit.

#### **415 The Ethics of Persuasion (3)**

Relation of persuasion to ethics is examined. Purposes, means, results, and contexts are considered in making rhetorical judgments of interpersonal, political, and institutional communication. (Lec. 3/Online) Pre: junior standing in a degree-granting college or permission of instructor.

#### **416 Propaganda (3)**

Examines the history, theory and practice of propaganda (Lec. 3) Pre: 383 and junior standing in a degree-granting college or permission of instructor.

#### **421 Advanced Interpersonal Communication (3)**

Critical study of major issues and theories of interpersonal communication. Focuses on history, models, and research, including conversation, influence, intimacy, language, and relationships. (Lec. 3) Pre: 221 and junior standing in a degree-granting college or permission of instructor.

#### **422 Communication and Conflict Intervention (3)**

An examination of the role of communication theories in conflict intervention in interpersonal, group,

and organizational settings. Emphasis on applying theories through simulations, role plays, case studies, and discussions. (Lec. 3) Pre: 221 or 251 and junior standing in a degree-granting college or permission of instructor.

#### **435 Directing Group Performance of Nondramatic Literature (3)**

Practice in Reader's Theatre and Chamber Theatre. Emphasis on direction as a rhetorical device in group work with nondramatic literature and compilation of scripts for individual and group performance. (Lec. 3) Pre: 231 and junior standing in a degree-granting college or permission of instructor. In alternate years.

#### **440 Telecommunications Processes and Audience Behavior (3)**

Surveys theories and research concerning role of electronic mass media in contemporary society. Focuses on interplay between mass media content and audience behavior; provides framework for analyzing current telecommunications issues. (Lec. 3/Online) Pre: 340 and junior standing in a degree-granting college or permission of instructor.

#### **441 Race, Class, and Gender in the Media.(3)**

Exploration of the complex dynamics of race relations and political discourse as contextualized in the media. Rhetorical methods of analysis are used to study contemporary media coverage of race issues. (Lec. 3/Online) Pre: 316A or 383 and junior standing in a degree-granting college or permission of instructor.

#### **442 Strategic Media Communication**

See Public Relations 442.

#### **445 Media Advertising (3)**

Examination of theory and practice in media advertising. Students will acquire and analyze commercials made by professionals and create and produce media advertisements. (Lec. 3) Pre: 210 and junior standing in a degree-granting college or permission of instructor. Not for graduate credit.

#### **446 Media Theory (3)**

Examines major theoretical approaches to the study of media. Includes perspectives on media institutions, media texts, and media audiences. (Lec. 3) Pre: 210 and junior standing in a degree-granting college or permission of instructor. Not for graduate credit.

#### **450 Organizational Communication Theory (3)**

Surveys theory and practice of communication in organizations. Examines interface of organizational, management, and communication theories. Explores human interaction, flows, and formats in organizations; stresses student analysis of organizational communication. (Lec. 3) Pre: 251 and junior standing in a degree-granting college or permission of instructor.

#### **455 Science and Communication in a Century of Limits (3)**

Communication of scientific observations and projections of global resource and environmental limits is focused on persuading formation of publics and social movements needed for widespread action in the 21st century. (Lec. 3) Pre: seniors with varied backgrounds in science and communications. Not for graduate credit.

#### **461 Managing Cultural Differences in Organizations (3)**

Exploring how to manage cultural differences in organizations and to adapt to culturally diverse organizations by applying the skills of intercultural sensitivity and intercultural competence. (Lec. 3) Pre: junior standing in a degree-granting college or permission of instructor. Not open to students who have credit for BUS 448, MBA 579.

#### **462 Communication and Global Society (3)**

Exploring various aspects of the relationship between communication and globalization, including a new sense of community, cultural diversity, cultural identity, global media, and global citizenship. (Lec. 3/Online) Pre: six credits in communication and junior standing in a degree-granting college or permission of instructor.

#### **471, 472 Internship in Communication Studies (1–3 each)**

Provides the student with direct supervised participation in a variety of communication situations and occupations. (Practicum) Pre: 18 credits in communication studies and junior standing in a degree-granting college and permission of instructor. S/U only.

#### **491, 492 Special Problems (1–3 each)**

Selected areas of study pertinent to communication. Instruction may be offered in class seminar or tutorial environments according to specific needs and purposes. (Independent Study) Pre: junior standing in a degree-granting college and permission of instructor.

#### **501 Communication Theory (3)**

Discusses the significance of theory to the understanding of communication. Gives an overview of select major theories applicable to the study of communication. Explores the relationship between theory and research and investigates emerging theories and applications of theory to emerging forms of communication. (Seminar)

#### **502 Communication Methods (3)**

Explores research methods to understand communication phenomena, critique and analyze the value of communication studies, and independently conduct research to answer communication questions and problems. (Seminar)

#### **503 Graduate Practicum Teaching Communication Seminar (1)**

Practicum for students teaching postsecondary courses in communication. Provides pedagogical

training through discussion, observation, and critique. Development and practice of skills, strategies, and pragmatic aspects of teaching in a university community. S/U credit. Offered fall and spring semesters. Must be taken for a total of 3 credits. (Seminar) Pre: communication studies graduate teaching status.

**510 Seminar in Interpersonal Communication (3)**  
In-depth examination of a topic in interpersonal communication. Students review and discuss appropriate literature and author a major research paper. (Seminar) May be repeated under a different topic. Pre: graduate standing or permission of instructor. Every second or third semester.

**520 Seminar in Media Studies (3)**  
In-depth examination of a topic in mass or electronic media, or new information technologies. Students review and discuss appropriate literature and author a major research paper. May be repeated under a different topic. (Seminar) Pre: graduate standing or permission of instructor.

**530 Seminar in Organizational Communication (3)**  
In-depth examination of a topic in organizational communication. Students will review and discuss appropriate literature and author a major research paper. May be repeated once under a different topic. (Seminar)

**540 Seminar in Public Discourse (3)**  
In-depth examination of a topic in public discourse. Students will review and discuss appropriate literature and author a major research paper. May be repeated once under a different topic. (Seminar)

**591, 592 Independent Study (1–3 each)**  
Students will work with faculty on independent research projects designed to enhance their research skills and further emphasize the content area most germane to the student.

**599 Master's Thesis Research**  
Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## Communicative Disorders (CMD)

*Chairperson:* Professor Kovarsky

**160 Introduction to Communicative Disorders (3)**  
Survey of speech, language, and hearing disorders. Discussion includes etiology, symptomatology, and the profession of SLP and audiology. (Lec. 3)

**175 Gestural Communication (3)**  
Visual language systems with emphasis on the chirology and syntax of Ameslan, and levels of language among deaf communicators; finger spelling and sign language for educational, rehabilitative, and artistic goals studied. (Lec. 3)

**272 Auditory and Speech Mechanisms (3)**  
Structure and function of the organs of hearing and speech as they relate to normal and pathological communication; theories of cortical involvements, central and peripheral nervous systems relevant to rehabilitation procedures. (Lec. 3) Pre: junior standing.

**273 Phonetics (3)**  
International Phonetic Alphabet; analysis of phonetic and phonemic elements in major American English dialects; practice in transcription of standard and defective speech. (Lec. 3) Pre: junior standing.

**274 Communication Processes (3)**  
Psychological and cognitive processes basic to language and communication; models of language processing; explorations into biological and social bases. (Lec. 3) Pre: junior standing.

**276 Introduction to Speech Science (3)**  
Physical properties of the speech signal, analysis of the physical bases of speech production, instrumentation used to assess speech output, theories of speech perception. (Lec. 3) Pre: 272 and 273.

**278 Introduction to Hearing Science (3)**  
Overview of the measurement of sound, acoustic properties of the sound wave, and perception of sound by human beings. Psychophysical methods of sound perception, psychoacoustics, use of instrumentation to measure sounds. Anatomy and physiology of the normal auditory mechanism. (Lec. 3) Pre: 276.

**361 Introduction to Audiology (3)**  
Pathologies of the hearing mechanism, methods of audiological assessment, interpretation of the audiogram, recommendations based on diagnostic audiology results. Methods of middle ear and retrocochlear assessment. Training in the administration of basic audiological evaluations. (Lec. 3) Pre: 278 and junior standing.

**375 Language Development (3)**  
Development phenomena in speech and language; causal factors of delayed speech and language; survey of evaluative and habilitative programs for children with deviant language development. (Lec. 3) Pre: junior standing.

**377 Functional Neuroanatomy (3)**  
Examination of the brain and spinal cord, emphasizing connection and functions of the neural system. This course is designed for communicative disorders majors. (Lec. 3) Pre: 372 and junior standing.

**440 Advanced Head and Neck Anatomy**  
See Physical Therapy 440.

**454 Rehabilitative Audiology (3)**  
Theoretical and methodological approaches to aural rehabilitation of the adult with impaired hearing. Topics include use of amplification, speechreading,

assistive listening devices, auditory training, and case management. (Lec. 3) Pre: 160, and three of the following—372, 373, 374, 375, 376—and senior or graduate standing with 551 as prerequisite for graduate standing.

**460 Speech and Language Disorders (3)**  
Survey of developmental and acquired speech and language disorders. Discussion includes etiology, symptomatology, and assessment. (Lec. 3) Pre: 160 and 272 and 273 and 274 and 276 and 375 and 377; or permission of instructor.

**465 Clinical Methods in Communicative Disorders (4)**  
Observation of diagnosis and treatment of communicative disorders; developing interviewing, report writing, and counseling techniques; introduction to diagnostic procedures; establishing therapeutic goals, treatment, and remediation of various disorders. (Lec. 4) Senior or graduate standing only. Pre: 160, and three of the following—372, 373, 374, 375, 376. Not for graduate credit in communicative disorders.

**491, 492 Special Problems (1–3 each)**  
Selected areas of study pertinent to communicative disorders. Instruction may be offered in class seminar or tutorial environments according to specific needs and purposes. (Independent Study) 491: S/U credit.

**493 Cultural and Linguistic Diversity in Communicative Disorders (3)**  
Application of concepts and information from the study of cultural and linguistic diversity to issues involving communicative incompetence and disorder. (Lec. 3)

**494 Autism and Pervasive Developmental Disorders (3)**  
Current perspectives on diagnosis, etiology, and core challenges in social communication and emotional regulation for children with autism and PDD. Role of speech-language pathologists within a comprehensive intervention framework. (Lec. 3) Pre: senior standing or 375 or permission of instructor.

**504 Research in Communicative Disorders (3)**  
Types of research in speech pathology, audiology, and communication science; critiques of representative models with special emphasis on experimental research; individual pilot projects or master's thesis. (Lec. 3) Pre: 372, 373, 374, 375, graduate standing, or permission of instructor.

**550 Audiology for Speech-Language Pathologists A,B,C (1–3)**  
Introduction to audiology for the speech-language pathology graduate student. Hearing disorders, hearing assessment, child and adult aural rehabilitation. Modular format with variable credits. (Lec.1–3) Offered once per year.

**551 Measurement of Hearing I (4)**

Diagnostic protocols for routine audiologic assessment including pure tone, speech, and immittance procedures. Discussion of etiology and symptomatology of hearing disorders. (Lec. 4) Pre: 372, 373, 374, 375, and 376; graduate standing or permission of instructor.

**553 Pediatric Audiology (3)**

Theoretical and methodological approaches to the identification and management of children with auditory disorders. Topics discussed include auditory development, audiometric evaluation, and hearing aids. (Lec. 3) Pre: 551 or permission of instructor. In alternate years.

**554 Advanced Rehabilitative Processes for Hearing Impaired (3)**

Advanced techniques and technology in aural rehabilitation including family-based management, multidiscipline approaches, and complex assistive devices. (Lec. 3) Pre: 454 and 551. Offered spring.

**556 Hearing Aids (3)**

Application of technological and behavioral strategies in fitting hearing aids, including aid selection and delivery, counseling, assessment of wearer performance, marketing, and legal issues. (Lec. 3) Pre: 555. In alternate years.

**557 Electrophysiological Measures in Audiology (4)**

Basic electrophysiological assessment procedures and instrumentation. Otoacoustic emissions, electrocochleography, auditory brainstem response, and middle, late, and steady-state auditory evoked potentials. (Lec. 4) Pre: 551 or permission of instructor. In alternate years.

**560 Voice Disorders (3)**

Etiology and symptomatology of vocal pathology for adults and children: intervention strategies for organic, behavioral and psychological voice disorders: rehabilitation team approach to voice-resonance problems associated with cleft palate. (Lec. 3) Pre: graduate standing or permission of the instructor. (Lec. 3) Pre: 372, 373, 374, 375, graduate standing, or permission of instructor.

**561 Phonological Disorders (3)**

Assessment, design, and implementation of therapeutic management programs for various speech production disorders at the articulatory and phonological levels. (Lec. 3) Pre: 372, 373, 374, 375, or equivalent, or permission of instructor.

**562 Speech-Language Pathology for Audiologists A,B,C (1–3)**

Speech-language pathology for audiology students. Language disorders in children, speech sound disorders, speech/language change and disorders in adults. Modular format with variable credits (Lec. 1–3) Offered alternate years in the spring semester.

**563 Language Disorders in Infants and Toddlers (3)**

The speech-language pathologist's role and responsibilities in the diagnosis and treatment of infants and toddlers (0–3) either at risk for or exhibiting bona fide communication delays or disorders; family-centered approaches to intervention. (Lec. 3) Pre: graduate standing, completion of 375 (language development) or equivalent or permission of instructor. Offered alternate years in the spring semester.

**564 Language Disorders in School-Aged Children (3)**

Study of communication deficits in learning-disabled school-aged children; differential diagnoses; assessment of cognitive functioning; language processing and discourse; and therapeutic strategies for training abstract and functional language. (Lec. 3) Pre: graduate standing or permission of instructor.

**565 Pre-Practicum in Speech-Language Pathology (1)**

Case study methodology to facilitate students' transition from coursework to clinic. Solve open-ended real world problems. Apply course knowledge to analyze issues and formulate workable solutions. (Seminar) Pre: graduate standing. S/U

**569 Test and Measurement in Speech-Language Pathology (3)**

Procedures for evaluation and diagnosis in speech-language pathology. Psychometric considerations in testing. Implications of evaluation information for differential diagnosis, prognosis, referrals, and therapeutic programs. Multicultural considerations in the diagnostic process. (Lec. 3) Pre: 372, 373, 374, 375, 465 or equivalent; graduate standing or permission of instructor.

**570 Clinical Practicum in Communicative Disorders (1–5)**

Supervised assessment and rehabilitation procedures with persons experiencing communicative disorders in speech-language pathology and/or audiology. Practicum sites scheduled on campus and within hospital, school, institutional, and private settings. (Practicum) Pre: graduate standing, 25 observation hours, and appropriate course work.

**571 Medical Speech-Language Pathology (2)**

Teaches evaluation, diagnosis, and treatment of adults and children seen in a medical setting. Appropriate for clinicians working in a medical setting or treating people discharged from a medical setting. (Seminar) Pre: graduate standing.

**574 Hearing Conservation (2)**

The auditory and nonauditory effects of noise on human beings. Hearing conservation plan development and monitoring as well as legal issues will be reviewed. (Lec. 2) Pre: permission of instructor. Offered spring.

**575 Management of Deaf and Special Populations (3)**

Identification of needs related to health, communication, and quality of life in deaf and special populations. Management strategies and the audiologist's role will be described. (Lec. 3) Pre: 454 and 551. Offered spring.

**576 Cochlear Implants (2)**

Concepts and issues related to cochlear implantation as a remediation for deafness in adults and children. Hardware, programming, rehabilitative, and surgical issues will be addressed. (Lec. 2) Pre: graduate standing in audiology or permission of instructor. Offered fall every third year.

**577 Vestibular Rehabilitation and Tinnitus Management (2)**

Management of the vertiginous patient to reduce symptoms and restore function. Tinnitus assessment and therapeutic strategies are reviewed. (Lec. 2) Pre: 454, 551, and 572. Offered spring.

**580 Augmentative and Alternative Communication (2)**

Review of unaided (manual) approaches to communication. Discussion of aided methods using communication boards or other mechanical electronic devices. (Lec. 2) Pre: graduate standing or permission of instructor.

**581 Dysphagia (3)**

Basic introduction to the knowledge and skills needed by speech-language pathologists providing clinical services to dysphagic patients in medical settings. (Lec. 3) Pre: graduate standing or permission of instructor.

**582 Motor Speech Disorders (3)**

Neurosystem pathologies and mechanisms affecting speech. Prepares students to diagnose, assess, and treat adults with acquired motor speech disorders. (Lec. 3) Pre: graduate standing and a neuroanatomy course or concurrent registration in 377.

**583 Acquired Cognitive Communication Disorders (3)**

Study of acquired cognitive problems resulting from neurological disorders and diseases; differential diagnoses; assessment of the domains of cognition; and therapeutic strategies for cognitive rehabilitation. (Lec. 3) Pre: graduate standing.

**584 Language Disorders in Developmentally Young Children (3)**

Study of communication deficits in developmentally young and multi-handicapped children; types of language problems; differential diagnoses; assessment of conceptual requisites and concrete language skills; and interactive therapeutic strategies. (Lec. 3) Pre: graduate standing or permission of instructor.

**585 Language Disorders in Adults (3)**

Provides basic information on the characteristics, assessment, and treatment of adults with acquired language disorders secondary to stroke, head injury, and progressive neurological diseases. (Lec. 3) Pre: graduate standing or permission of instructor.

**592 Disorders of Fluency (3)**

Study of nature and causes of stuttering; analyses of current theories and research concerning stuttering and cluttering; development of a rationale for diagnosis, case selection, and intervention. (Lec. 3) Pre: graduate standing and/or permission of instructor.

**594 Counseling in Communicative Disorders (1)**

Considerations in counseling in speech-language pathology and audiology. Multiple factors influencing communication between client/family and professionals. Study of clinical skills in counseling. Ethical and professional issues. (Lec. 1) Pre: graduate standing or permission of instructor. In alternate years.

**595 Instrumentation and Computer Use in Communicative Disorders (1)**

Topics in applied instrumentation and computer use for students in speech-language pathology and audiology. Practical experience in calibration of instruments and the use of current professional software. (Lab. 2) Pre: graduate standing or permission of instructor. In alternate years.

**598 Special Problems (1–6)**

Selected areas of study pertinent to communicative disorders. Instruction may be offered in class seminar or tutorial environments according to specific needs and purposes. (Independent Study) Pre: graduate standing.

**599 Master's Thesis Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**658 Advanced Electrophysiological Assessment of Hearing (4)**

Study of the most current research regarding electrophysiological assessment of hearing. Detailed consideration of such issues as stimulus variables, age, sex, sleep state, etc. Consideration of the neurophysiology underlying the measured electrical potentials. Must be taken concurrently with 659. (Lec. 4) Pre: graduate standing in audiology or permission of instructor. Offered fall every third year.

**670 Audiology Residency (6)**

Full-time equivalent off-campus clinical residency in audiology. Direct clinical experience with on-site supervision plus oversight by URI faculty. Placements may vary and combine more than one site. (Externship) May be repeated for a total of 12 credits. Pre: graduate standing in audiology and completion of 570.

**691 Independent Study in Audiology (1–3)**

Selected areas of study pertinent to audiology. Instruction may be offered in class seminar or tutorial environments according to specific needs and purposes. (Independent Study) Pre: graduate standing in audiology.

**698 Capstone Project in Audiology (3)**

This registration purposes to tie together classroom and clinical experiences. Discussions will be based on externship experiences. A major paper on one clinical problem chosen by the student will be presented to students and faculty in audiology. (Seminar) Pre: graduate standing in audiology.

**Community Planning (CPL)**

*Chairperson:* Professor Green (Landscape Architecture)

**202 (or GEG 202) Introductory Urban Geography: Understanding Cities (3)**

Introduction to urbanization processes, primarily in North America; national settlement systems; intra urban form; migration, racial, ethnic, gender, and class segregation; urban economics; environmental issues; planning and governance; urban applications of GIS. (Lec. 3/Online) (S) [D]

**300 (or NRS 300) Introduction to Global Issues in Sustainable Development (3)**

Role of the United States in development assistance to foreign nations. Topics include foreign aid, sustainable development, transfer of technology, and international career opportunities. (Lec. 3) (FC) [D]

**391, 392 Directed Study in Community Planning (1–3)**

Independent work in planning for individual students or groups. (Independent Study) Pre: 410 and permission of instructor.

**397 Field Work in Community Planning (1–3)**

Student works as a part time intern in a planning agency under the supervision of a faculty advisor. Fieldwork must be pre-arranged with agency and instructor. (Practicum) Pre: 410 and permission of instructor.

**410 Fundamentals of Community Planning Practice (3)**

Survey of the planning profession and its different functional areas: land use, environment, urban design, transportation, housing, economic development, and growth management. (Lec. 3) Pre: junior, senior, or graduate standing, or permission of instructor.

**434 (or LAR 434) Introduction to Environmental Law (3)**

Surveys issues arising out of laws designed to protect the environment and manage resources: right to a decent environment, government regulation versus

private property rights, citizen participation in planning environmental controls. (Lec. 3) Pre: sophomore standing (45 credits completed) and above.

**450 Urban Design (3)**

Concepts of contemporary urban landscapes, ranging from entire cities to specific building sites. Includes private development, public spaces, transportation systems, aesthetics and sprawl. Emphasis on urban design processes and standards. (Lec. 3) Pre: junior, senior, or graduate standing, or permission of instructor.

**475 (or GEG 475) The Revolutionary City: Cuba (3)**

Taught in Cuba, summer session. Theory and practice of Cuban urbanization. Cities in the revolutionary relationship between city and country, morphology of Cuban cities, residential differentiation, housing, community activism, and Cuban urban policy. Field trips to Cuban cities (Lec. 3) Pre: permission of instructor. Application required. Not for graduate credit.

**483 Land Development (3)**

Study of land development including land acquisition, development and project effectiveness. Techniques focus on land suitability and project viability, as well as environmental considerations. Focus on coastal development. (Lec. 3) Pre: junior, senior, or graduate standing, or permission of instructor.

**485 Environmental Planning (3)**

Theories, methodologies, and substantive concerns of environmental resource analysis with attention given to coastal environmental issues. Focus on land, soils, watersheds, water quality, vegetation, air quality, wildlife, noise pollution. (Lec. 3) Pre: junior, senior, or graduate standing, or permission of instructor.

**487 (or NRS 487) International Development Internship (1–6)**

Supervised participation in programs related to sustainable international development. Minimum 35 hours of internship per credit. (Practicum) Pre: 300 and/or permission of instructor. Not for graduate credit. S/U only.

**495 (or NRS 496) International Development Seminar (3)**

Seminar in sustainable international development for advanced-level students interested in international development. (Seminar) Pre: 300 and/or permission of instructor. Not for graduate credit.

**498 Community Planning Seminar (3)**

Seminar in community planning from an interdisciplinary perspective. (Seminar) Pre: 210 or 410 or permission of instructor. Not for graduate credit.

**501 Introduction to Community Planning Practice (3)**

The development of community planning in the United States, history of governmental planning and evaluation of the planning profession, and the elements of planning practice. (Lec. 3)

**510 Community Planning and Political and Social Change (3)**

Introduction to systems and central theories of determinants for social and planned change in urban and urbanizing communities. Focus on methodologies for political and social assessments. (Seminar) Pre: 523 or permission of instructor.

**516 Seminar on the Urban Waterfront**

See Marine Affairs 516.

**522 Planning Law (3)**

General review and discussion of legal principles and thought concerned with property rights, political power, and the legal aspects pertinent to the planning and development of public and private activities. (Lec. 3) Pre: second-year graduate standing or permission of instructor.

**523 Planning Theory (3)**

Critical survey of planning theories and contemporary planning concepts. Values, assumptions, and processes of various planning paradigms as related to decisions in community planning. Specific emphasis on values and ethics in planning theory. (Seminar) Service learning.

**525 Introduction to Planning Methods (4)**

Application of basic quantitative methods in planning: collection, analysis, and presentation of demographic, housing, and economic data. Introductory survey techniques. Introduction to computer applications in planning. (Lec. 3, Lab. 2) Pre: one course in statistics or permission of instructor.

**526 Techniques and Methodologies of Planning Research (4)**

Elementary social science research methods. Introduction to methodological approaches, research design, quantitative and qualitative data collection, and computerized data analysis in community planning and related urban social science. (Lec. 3, Lab. 2) Pre: 525.

**536 International Comparisons in Urban and Regional Planning (3)**

Urban and regional development issues and policies in advanced and developing countries. Emphasis on population growth, urbanization, and spatial development. (Seminar) In alternate years.

**537 (or EEC 532) Land Resources Economics (3)**

The study of economic relationships of human and scarce natural and human-made resources. Supply and demand, rent theory, resources conservation, and the impact of public policy and law. (Lec. 3)

**538 Site Planning (3)**

Site analysis, planning and design processes. Principles and techniques addressing residential, commercial and mixed-use developments. Presents techniques to review site plans and evaluate post-development impacts. Pre: graduate standing or permission of instructor.

**539 Environmental Law (3)**

Analysis of specific environmental issues and policies including facility siting, land use and constitutional issues, comprehensive planning, public trust doctrine, concurrence, and state impact assessments. Independent research and presentation required. (Lec. 3)

**546 (or CVE 546) Urban and Rural Transportation (3)**

Issues confronting planning for urban and rural transportation systems; the variety of policies that governments pursue in addressing issues and problems; technical and political constraints, transportation studies, and demand analysis techniques. (Lec. 3) Pre: 410 or 501 or permission of instructor. In alternate years.

**549 Seminar in Ecological Planning (3)**

Advanced seminar in ecological planning. Topics include hazardous waste, power plant siting, major transportation facilities, solid waste, aquifer protection, among others. Particular emphasis on wetlands and marine and coastal settings. (Seminar) Pre: 511 or permission of instructor.

**591, 592 Special Problems in Planning (1–6 each)**

Individual investigation of special problems in planning. (Independent Study)

**Community Service (CSV)**

*Coordinator:* Dean Richmond

Note: The total number of credits in community service that may be earned toward graduation may not exceed 12.

**301 Course-Based Community Service (1–3)**

Learning through a community service experience related to course content. Experience defined by a job description and learning contract; includes orientation and reflection. (Practicum) Service learning. Pre: junior standing or above, or permission of instructor. Concurrent enrollment in a course that offers community service experience. May be repeated for a maximum of 6 credits. S/U only.

**302 Community Service at URI (1–4)**

Learning through a community service project that addresses a specific community need at the University. Project proposed and supervised by an instructor, and varies each semester. Includes mandatory seminar. (Practicum) Service learning. Pre: junior standing or above, or permission of instructor. May be repeated for a maximum of 9 credits.

**303 Service in the Community (1–4)**

Learning through a community service project that addresses a specific need in the off-campus community. Project proposed and supervised by an instructor, and varies each semester. (Practicum) Service learning. Pre: junior standing or above, or permission of instructor. May be repeated for a maximum of 8 credits. S/U only.

**Comparative Literature Studies (CLS)**

*Coordinator:* Professor Leo

**160 Literatures of the World**

See English 160. (A) or (L) [D]

**335 (or ENG 335) Interdisciplinary Studies in Comparative Literature (3)**

Study of the interrelationships of two or more national literatures (in translation) with another discipline. (Lec. 3) May be repeated for credit as often as topic changes.

**450 Studies in Comparative Literature (3)**

Detailed study of a literary movement, genre, or an aspect of literature as seen in two or more literatures. (Lec. 3) Pre: 6 credits in literature or permission of instructor. May be repeated for credit as often as topic changes.

**451 Advanced Topics in International Film Media (4)**

See Film Media 451.

**530 Approaches in Comparative Literature (3)**

Study of theme/myth, movement/era, genre/forms in two or more literatures, or interrelations with other disciplines. (Seminar) Pre: graduate standing or permission of chairperson. May be repeated once with change of topic.

**597 Special Problems (1–6)**

Group and/or individual investigation of special problems in comparative literature studies. (Independent Study)

See other listings under English.

**Computer Science (CSC)**

*Chairperson:* Professor Peckham (Computer Science and Statistics)

**101 Computing Concepts (4)**

Capabilities and limitations of computers. Applications of computers in today's society. Overview of computing systems and programs. Students will complete several projects using a computer. (Lec. 3, Lab. 2/Online) Not open to students who have credit in any college-level computer science course. Not for major credit in computer science. (MQ)

**110 Survey of Computer Science (4)**

How computers work. Design of a simple computer. Computer software, programming, and languages. Capabilities and limitations of computers. Artificial intelligence. (Lec. 3, Lab. 2) Open only to computer science majors with 4 or fewer credits in CSC courses.

**200 Computer Problem Solving for Science and Engineering (4)**

An integrated symbolic, numerical, and graphical approach to computer problem solving. Structured design; fundamental programming techniques. Computer algebra systems. Scientific, engineering, and mathematical applications. (Lec. 3, Lab. 2) Pre: credit or concurrent enrollment in MTH 131 or 141. Not for major credit in computer science. May not be taken for credit by students with credit in 201 or 211.

**201 Introduction to Computer Programming (4)**

Computer characteristics, algorithms, data representation, program development. Students will write several programs to solve numerical and non-numerical problems. (Lec. 3, Lab. 2) Pre: MTH 111 or equivalent. May not be taken for credit by students with credit in 200 or 211. Not for major credit in computer science. (MQ)

**211 Introductory Programming and Design (4)**

Problem specification, solution design, and algorithm development. Object-oriented programming and program structure. Functions, selection, iteration, recursion, classes, arrays, and files. Required programs will solve numerical and non-numerical problems. (Lec. 3, Lab. 2) Pre: prior experience with computers and programming and MTH 111 or equivalent. Intended for computer science and computer engineering majors.

**212 Data Structures and Abstractions (4)**

Abstract data types and data structures. Pointers, linked lists, stacks, queues, binary trees, and tables. Fundamentals of software engineering. Development of object-oriented programming techniques. (Lec. 3, Lab. 2) Pre: 211 and MTH 141. Intended for computer science and computer engineering majors.

**301 Fundamentals of Programming Languages (4)**

Organization of programming languages, data and control structures, syntax and semantics, compilers and interpreters. Block structured languages, recursion, parameter passing, run-time storage management. Procedural, functional, object-oriented, and logical languages. (Lec. 3, Lab. 2) Pre: 212.

**305 Software Engineering (4)**

Programming environments and methodologies for the design, development, testing, and maintenance of large software systems. Student teams will develop a substantial software product from require-

ments to delivery using disciplined techniques. (Lec. 3, Project 3) Pre: 301.

**320 Social Issues in Computing (4)**

Discussion of the social and ethical issues created by the use of computers. The problems that computers solve and those that they produce. Ethics and responsibilities of the computer professional. (Lec. 4) Pre: 212, junior standing, or permission of instructor.

**340 Mathematical Foundations of Computer Science (4)**

Combinatorial techniques used in non-numerical computation and analysis of algorithms. Logic, proofs, enumerations, recurrence relations, graphs and networks, finite automata. Complexity analysis of several representative problems and algorithms for their solutions. (Lec. 4) Pre: 212 and credit or concurrent enrollment in MTH 215.

**350 Fundamentals of Mathematical Computation (4)**

Symbolic, numerical, and graphical approaches to mathematical computation. Pitfalls in numerical computation. Root finding. Numerical integration and differentiation. Approximation of functions. Interpolation and curve fitting. Linear systems. Ordinary differential equations. (Lec. 3, Lab. 2) Pre: 212 and MTH 215 and 243.

**402 Compiler Design (4)**

Grammars and languages; lexical analysis, parsing and translation, symbol tables, run-time storage administration, object code generation. Students will construct a compiler for a small programming language. (Lec. 3, Project 3) Pre: 301.

**406 Computer Graphics (4)**

Interactive raster graphics; hardware, software, and algorithms. Point plotting, line drawing, geometrical transformations, clipping and windowing. Three-dimensional graphics including curves, surfaces, perspective, hidden objects, shading. User interfaces; graphical programming environments. (Lec. 3, Project 3) Pre: 305, MTH 215 and 243.

**411 Computer Organization (4)**

Logical structure of computer systems viewed as a hierarchy of levels. Assembly language programming, assemblers, linkers, loaders. Computer architecture including digital logic, processor organization, instruction sets, addressing techniques, virtual memory, microprogramming. (Lec. 3, Project 3) Pre: 212 and 301 and either junior standing or permission of instructor.

**412 Operating Systems and Networks (4)**

General concepts underlying operating systems and computer networks. Topics include process management, concurrency, scheduling, memory management, information management, protection and security, modeling and performance, networking and communication. (Lec. 3, Project 3/Online) Pre:

212 and 301 and either junior standing or permission of instructor.

**414 Computer Systems Fundamentals (4)**

The operating principles and analysis of current computer hardware systems, operating systems, and networks. (Lec. 3, Lab. 2) Pre: 101 or permission of instructor.

**415 Introduction to Parallel Computing (4)**

Programming techniques to engage a collection of autonomous processors to solve large-scale numerical and non-numerical problems. Processor interconnections. Parallel programming languages and models. Performance measures. (Lec. 3, Project 3) Pre: 301. In alternate years.

**417 Computer Communications**

See Electrical Engineering 437.

**418 Information and Network Security**

See Electrical Engineering 438.

**436 Database Management Systems (4)**

Construction and management of large data systems. Data modeling, relational and object-oriented systems, main memory databases, query languages, query optimization, concurrency control, transaction management, distributed systems, disk organization, indexes, emerging technologies. (Lec. 3, Project 3) Pre: 301 or 412 or permission of instructor.

**440 Algorithms and Data Structures (4)**

Algorithm design and analysis, advanced data structures, computational complexity. Sorting, searching including hashing and balanced trees, string pattern matching, polynomial and matrix calculations, graph and network algorithms, NP-completeness and intractability. (Lec. 3, Project 3) Pre: 340.

**445 Models of Computation (4)**

Abstract models of computational systems. Classical models for uniprocessor, sequential, and stored program computers. New models based on recent advances in hardware, software, and communications and their implications in practice. (Lec. 3, Project 3) Pre: 340. In alternate years.

**447 Discrete Mathematical Structures**

See Mathematics 447.

**481 Artificial Intelligence (4)**

Theories, formalisms, techniques to emulate intelligent behavior using information processing models. Symbolic programming, search, problem solving, knowledge-based techniques, logic, theorem proving. Optional topics: natural language processing, machine learning, computer vision. (Lec. 3, Project 3) Pre: 301 or permission of instructor. In alternate years.

**485 Computer Forensics (4)**

The science, technology, procedures, and law of acquiring and analyzing digital evidence from comput-

ers and devices. (Lec. 3, Lab. 3/Online) Pre: 412, or permission of instructor.

#### 486 Network Forensics (4)

The science, technology, procedures, and law of acquiring and analyzing digital evidence from computer network activity. (Lec. 3, Lab. 3) Pre: 485.

#### 491 Directed Study in Computer Science (1–4)

Advanced work in computer science. Conducted as supervised individual projects. (Independent Study) Pre: permission of chairperson. S/U credit.

#### 492 Special Topics in Computer Science (1–4)

Advanced topics of current interest in computer science. (Lec. 1–4, Project 1–3) Pre: permission of instructor.

#### 499 Project in Computer Science (4)

Supervised work on a capstone project in computer science that prepares students for careers in industry and graduate study. (Practicum) Pre: advanced standing in computer science and departmental approval. Normally taken twice in two consecutive semesters. May be repeated for a maximum of 8 credits. Not for graduate credit. S/U credit.

#### 501 Programming Language Semantics (4)

Design, analysis, implementation, and comparative study of major programming language families. Topics include procedural and block-structured languages, interpretive languages, concurrency, functional languages, object-oriented programming, logic programming, dataflow languages and machines. (Lec. 3, Project 3) Pre: 301.

#### 502 Theory of Compilers (4)

An advanced course in compiler construction covering advanced parsing techniques, compiler-writing tools, type checking and type inference, code optimization, and compiling nonstandard language features. (Lec. 3, Project 3) Pre: 402. In alternate years.

#### 505 Advanced Topics in Software Engineering (4)

Lifecycle models; software development environments; project management. Metrics, performance, and testing. Paradigms for software design and architecture. Legal and ethical issues. (Lec. 3, Project 3) Pre: 305. In alternate years.

#### 509 Object-Oriented System Design (4)

Object-oriented design and programming, the software engineering process. Traditional and current object-oriented design methods. Software reuse. Design tools. Impact of the technology on traditional software engineering. (Lec. 3, Project 3) Pre: 305 and working knowledge of an object-oriented language. In alternate years.

#### 511 Advanced Computer Organization (4)

Evaluation of high-performance computer systems with respect to architectures, operating systems, and algorithms. High-speed conventional machines; array processors; multiprocessors; data flow machines;

RISC architectures; VLSI-based machines. (Lec. 3, Project 3) Pre: 411. In alternate years.

#### 512 Topics in Distributed Systems (4)

Advanced topics in distributed systems. Networking; standard distributed computing environments. Distributed computing algorithms. Concurrency and threading. Real-time computing, scheduling, concurrency control, load allocation. (Lec. 3, Project 3) Pre: 412. In alternate years.

#### 519 Computer Networks

See Electrical Engineering 543.

#### 522 Bioinformatics

See Biomedical and Pharmaceutical Sciences 542.

#### 525 Systems Simulation

See Industrial and Systems Engineering 525.

#### 536 Topics in Data Management Systems (4)

Current research and developments in database management systems. Relational, semantic, object-oriented, real-time, distributed, heterogeneous, and logic databases. Concurrency control, security, active rules, recovery, and integrity subsystems. (Lec. 3, Project 3) Pre: 436 or permission of instructor. In alternate years.

#### 541 Advanced Topics in Algorithms (4)

Algorithm design techniques such as dynamic programming, greedy method, branch and bound. Linear programming; NP-completeness; graph algorithms; number theoretic algorithms; approximation algorithms for NP-complete problems; probabilistic and parallel algorithms. (Lec. 3, Project 3) Pre: 440 or 445. In alternate years.

#### 542 Mathematical Analysis of Algorithms (4)

Mathematical techniques for the analysis of algorithms. Sums and products; finite difference calculus; properties of binomial coefficients; Stirling, harmonic, and Fibonacci numbers; recurrence relations; generating functions; asymptotic approximation. Case studies. (Lec. 3, Project 3) Pre: 440. In alternate years.

#### 544 Theory of Computation (4)

Finite automata, pushdown automata, formal grammars and Chomsky hierarchy, Turing machines, computability, basics of complexity theory. Advanced topics including some of the following: cryptography, interactive proofs, circuit complexity, completeness for various complexity classes, relations among complexity classes, new models of computation. (Lec. 3, Project 3) Pre: 440 or 445. In alternate years.

#### 547 Combinatorics and Graph Theory

See Mathematics 547.

#### 548 Graph Theory

See Mathematics 548.

#### 550 Computer Algebra (4)

Symbolic mathematical computation; history, use, representation of information, algorithms and heuris-

tics. Big number arithmetic, manipulation of polynomials and rational expressions; algebraic simplification; factoring; symbolic integration. Organization and implementation of computer algebra systems. (Lec. 3, Project 3) Pre: 350, 440. In alternate years.

#### 581 (or ELE 581) Special Topics in Artificial Intelligence (3)

Topics of specialized or current interest, which may change. Topics may include expert systems, natural language processing, neural network models, machine learning. AI applications in remote sensing. (Lec. 3) Pre: 481 or permission of instructor. May be repeated with permission. In alternate years.

#### 583 Computer Vision

See Electrical Engineering 583.

#### 585 Topics in Computer Forensics (4)

Advanced topics in computer forensics. Emerging research, law, and techniques in acquiring and analyzing digital evidence from computers and devices. (Lec. 3, Lab. 3) Pre: 485, or permission of instructor.

#### 586 Topics in Network Forensics (4)

Advanced topics in network forensics. Emerging research, law, and techniques in acquiring and analyzing digital evidence from computer networks. (Lec. 3, Lab. 3) Pre: 585.

#### 590 Digital Forensics Practicum (3)

The application of digital forensics acquisition, analysis and law to real world scenarios. Pre: 586.

#### 591 Directed Study in Computer Science (1–4)

Advanced work in computer science conducted as supervised individual projects. (Independent Study) Pre: permission of chairperson. S/U credit.

#### 592 Special Topics in Computer Science (1–4)

Advanced topics of current interest in computer science. (Lec. 1–4, Project 1–3) Pre: permission of chairperson. May be taken more than once.

#### 599 Master's Thesis Research

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

#### 699 Doctoral Dissertation Research

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## Cross-Cultural Competence (CCC)

*Coordinator:* Associate Dean Dvorak (Letters)

#### 151 (or LET 151) Topics in Cross-Cultural Competence (3)

Topics promote understanding of one's own cultural perspective in a multicultural world and develop the skills necessary to work, live, and interact with persons from different background, including the comparative study of cultures. (Seminar) Topics include

"Francophone Hip-Hop Culture, Contemporary France," "The European Union," "Franco-American Relations." May be taken once for general education credit. (FC) [D]

## Economics (ECN)

*Chairperson:* Professor Bodah

### 100 Introduction to Economics (3)

General overview of concepts economists employ to address issues of public policy. Description of major institutions of present-day American economy. Historical approach to subject matter. (Lec. 3/Online) (S) [D]

### 108 Spaceship Earth: An Introduction to Systems

See Communication Studies 108.

### 201 Principles of Economics: Microeconomics (3)

Principles underlying resource allocation, production, and income distribution in a market economy. Topics include demand and supply, consumer behavior, firm behavior, market structure, and elementary welfare analysis. Institutional foundations explored. (Lec. 3/Online) (S)

### 202 Principles of Economics: Macroeconomics (3)

Principles underlying aggregate demand and aggregate supply in a market economy. Topics include national income determination, inflation, unemployment, economic growth, and international trade. Institutional foundations explored. (Lec. 3/Online) Pre: 201 or equivalent. (S)

### 305 Competing Traditions in Economics (3)

Introductory exposure to the history of economic thought and also to competing schools of thought within modern economics. Connections between present-day controversies and competing traditions are explored. Pre: 201, 202. May be taken concurrently with 202.

### 306 Introduction to Economic Research Methods (3)

Development of supplementary skills needed to carry out economic research. Topics include: 1) widely used computer operating systems, 2) economic data sources, 3) elementary mathematical and statistical techniques, and 4) library research methods. Pre: 201, 202. May be taken concurrently with 202. (S)

### 310 Economics of Sports (3)

Economic analysis of professional sports. Topics include sports and television, the collegiate foundation, franchise finance, athletes' compensation, and impact upon local public finance. (Lec. 3) Pre: 100, 201, an equivalent course, or permission of instructor. Offered fall.

### 323 Intermediate Microeconomics (3)

Theory of consumer behavior, the firm, market equilibrium, general equilibrium, imperfect competition,

optimization over time, and linear models. Models of microeconomics are developed using calculus and linear algebra. (Lec. 3) Pre: 201, 202 and MTH 131 or 141. Offered spring.

### 324 Intermediate Macroeconomics (3)

Theory of consumption, investment, monetary and fiscal policy, static and dynamic models, economic growth, unemployment, and inflation. Macroeconomics developed using calculus and linear algebra. (Lec. 3) Pre: 201, 202 and MTH 131 or 141. Offered fall.

### 327 Intermediate Economic Theory: Income and Employment (3)

Measurement of national income. Theory of the determination of the general level of income, employment, and prices. Business fluctuations. (Lec. 3) Pre: 202 or 590 or permission of instructor. Not available for credit for students who have taken 324.

### 328 Intermediate Economic Theory: Pricing and Distribution (3)

Market conditions and forces affecting the pricing and production of goods and services, the allocation of resources, and the distribution of income. (Lec. 3) Pre: 201 or permission of instructor. Not available for credit for students who have taken 323.

### 334 Money, Financial Markets, and Monetary Policy (3)

Structure and functioning of monetary institutions. Analyses of monetary theories. The role of monetary policy. U.S. banking structure: its operations and functioning. (Lec. 3) Pre: 201 and 202 or permission of instructor. Offered fall.

### 335 Intermarket Economic Analysis (3)

Analyzes the basic functioning of markets using microeconomics generalizing to basic macroeconomic models. Emphasis on analyzing macroeconomic behavior through the interrelationships between the stock, bond, currency, and commodity markets. (Lec. 3) Pre: 201 and 202 or equivalents. These may not be taken concurrently.

### 337 Industrial Organization and Public Policy (3)

Historical and present attitudes and policies of various levels of government toward the changing structure of American business. Emphasis on legal and economic concepts of business activity. (Lec. 3) Pre: 201 or 202 or permission of instructor. Offered spring in alternate years. Next offered 2012–13.

### 338 International Economics (3)

Theory and evidence on international trade and finance. Includes determinants and welfare effects of foreign trade, international investment, migration, exchange rates, and the balance of payments. (Lec. 3) Pre: 100 or 201 or permission of instructor. Offered spring.

### 342 Public Finance (3)

Examination of the theory and practice of public expenditures, revenues, and fiscal policy with major emphasis on federal fiscal affairs. (Lec. 3) Pre: 201 or 202 or permission of instructor.

### 344 (or PSC 344) International Financial Economics (3)

History, theory, and politics of the international financial system. Topics include the foreign exchange market, international banking, macroeconomic stabilization under fixed and floating exchange rates, exchange rate reform, and the global debt crisis. (Lec. 3) Pre: 100 or 202 or permission of instructor.

### 351, 352 Assigned Work (3 each)

Special work in economics when it can be arranged to meet the needs of individual students who desire independent work. (Independent Study) Pre: 201 or 202 or permission of instructor. S/U credit.

### 360 Health Economics (3)

Economic analysis of health services. Topics include demand and supply in markets for health care and insurance, government regulation, and performance of national health systems. (Lec. 3) Pre: 201. Offered spring.

### 363 Economic Growth and Development (3)

Basic problems in economic growth and development of so-called backward or preindustrial countries. Emphasis on population trends, agrarian reforms, capital formation, international aid programs, respective roles of private and public enterprise. (Lec. 3) Pre: 201 or 202 or permission of instructor. Offered fall.

### 368 Labor Economics (3)

Impact of industrialization on workers; survey of the basic principles of labor market organization and operation; unemployment and remedies; wage determination under union and nonunion conditions. (Lec. 3) Pre: 201 and 202. Offered spring.

### 371 Economics in Islamic Societies (3)

Principles of Islamic economic systems, private property, and the market. Freedom of enterprise and role of the state. Comparison with capitalism and socialism. Pre: 201, 202 or permission of instructor. Offered spring.

### 375 Introduction to Quantitative Methods I (3)

Mathematical techniques used in modern economic theory. Linear algebra, the calculus of several variables, constrained maximization, and differential equations. Application to economic problems. (Lec. 3) Pre: 201 and 202 and MTH 131 or 141, or permission of instructor. Offered spring.

### 376 Introduction to Econometrics (4)

Application of econometric methods to economic problems. Econometric tools applied to micro- and macroeconomic problems. (Lec. 3, Lab. 2) Pre: 201 or permission of instructor. Offered fall.

**386 (or WMS 386) The Economics of Race, Gender, and Class (3)**

An economic examination of the historical interrelations of race, class, and gender issues. (Lec. 3) Pre: 100 or 201 or permission of instructor. Offered fall.

**445 Senior Research Project (3)**

Collaborative group research under guidance of department member. Topic jointly selected by members of group, subject to faculty approval. Written report required. (Independent Study) Pre: final semester for majors in the economics B.A. and B.S. applied programs. Not for graduate credit.

**515, 516 Economic Research (1–3 each)**

Independent research. (Independent Study) S/U credit.

**526 Economics of Labor Markets**

See Labor and Industrial Relations 526.

**527 Macroeconomic Theory**

See Environmental Economics 527.

**528 Microeconomic Theory**

See Environmental Economics 528.

**576 Econometrics**

See Environmental Economics 576.

**590 Principles of Economics (3)**

Survey of micro- and macroeconomic theory. (Lec. 3) Pre: graduate standing in accounting, labor and industrial relations, or M.B.A. program.

**628 Advanced Microeconomic Theory I**

See Environmental Economics 628.

**676 Advanced Econometrics**

See Environmental Economics 676.

**Education (EDC)**

*Director:* Professor Byrd

**102 Introduction to American Education (3)**

Introduction to the fundamental structure, functions, and problems of American education. Emphasis on education as both a sociocultural phenomenon and an embodiment of philosophical commitments. Diversity, writing, and speaking focus. (Lec. 2, Rec. 1) Not for major credit in elementary or secondary education. (S) [D]

**250 Supervised Preprofessional Field Experience (1)**

Supervised early field experience and seminar for students wishing to explore one or more possible career choices in education. (Practicum) May be repeated for credit. S/U only.

**279 Career Development Seminar (1)**

Individualized approach to career concerns, skill identification, self-awareness, career development theory, decision making. Emphasis on understanding long- and short-term goals. (Seminar)

**312 The Psychology of Learning (3)**

An analysis of learning with emphasis on principles and procedures applicable to any human teaching and learning situation. (Lec. 3) Pre: PSY 113.

**350 Primary School Practicum (1)**

Students apply methodology in a public school setting for grades K–2 for three hours each week for 10 weeks. Lessons are taught and principles of classroom management, individualized instruction, and integrated curriculum are applied. (Practicum) Pre: HDF 200 and acceptance into the early childhood education program. S/U only.

**371 Educational Measurements (3)**

An analysis of concepts and procedures involved in creating, selecting, summarizing, and using tests and other measurement devices in educational settings. (Lec. 3) Pre: 312.

**400 Middle School Curriculum Assessment and Methods (4)**

Contemporary middle school curriculum, assessment, methods, and research-based models are emphasized. Focus is on adolescents; teaming; thematic, integrated, interdisciplinary, standards-based instruction; differentiated instruction; and multiple intelligences. (Lec. 3 and 30 hours of field experience) Pre: prior or concurrent enrollment in 312 or 424 or 448 or permission of instructor. Undergrad/M.A./TCP candidates must take this course, one or two semesters prior to student teaching, if seeking middle level endorsement.

**402 Educating Students with Special Needs in Inclusive Settings (3)**

Legislative, judicial, social, and psychological issues related to assessment, identification, and education of students with special needs in general education classrooms. (Lec. 3) Pre: acceptance into a teacher preparation program or teacher certification.

**403 Observation in a Middle Level Classroom (1)**

Seminar and practicum (minimum of 30 hours) to observe teaching practices and adolescent behavior in middle school. Completion of a shadow study of an adolescent. Pre: concurrent enrollment in 569 or permission of instructor.

**415 Adolescents and Classroom Management (4)**

Seminar and practicum addressing issues of adolescent development manifested in the classroom, emphasizing management strategies for learning and adolescent developmental needs. (Seminar and 30 hours of field experience) Pre: in- or pre-service major in secondary education or elementary education, or seeking middle level endorsement, or graduate level candidate, or permission of instructor.

**422 Technology Applications in Education and Training (3)**

Introduction to the use of microcomputers in pre-K through adult education settings. Current use and techniques will be explored for evaluating hardware

and software, implementation issues, and future developments. (Lec. 3) Pre: senior standing. Not for graduate credit.

**423 Teaching Comprehension and Response in the Elementary School (3)**

Analysis of narrative and expository text; strategies for teaching literacy in elementary grades using these texts, specifically focusing on vocabulary, comprehension, response, and integrating these literacy practices throughout the curriculum. (Lec. 3) Pre: acceptance into a teacher preparation program or teacher certification, and prior or concurrent enrollment in 312 or 512; or permission of instructor.

**424 Teaching Literacy in the Primary Grades (3)**

Fundamental knowledge base in literacy development and primary grade literacy instruction. Bridges theory and practice through exposure to a variety of methods and materials used to create a comprehensive primary literacy curriculum. (Lec. 3) Pre: Elementary education majors: 312 or 512, and 423; Early childhood education majors: HDF 302 or EDC 423; Non elementary or early childhood education majors: graduate standing or permission of instructor.

**425 Web Site Technology In Education and Training (3)**

Focus on designing Web-based curriculum. Topics include incorporating multimedia technologies into a Web site, appropriate androgogical and pedagogical strategies, and Web site design and development. (Lec. 3) Pre: senior standing or permission of instructor. Not for graduate credit.

**426 Integrated Primary School Curriculum (4)**

Principles and practices of developing knowledge, skills, and activities in language arts/reading, math, science, social studies, music, art, and physical education/health. (Lec.) Pre: portfolio interview/acceptance into ECE teaching program. Concurrent enrollment in 350. Not for graduate credit in education.

**429 Emergent Literacy and Storytelling (2)**

Theoretical foundations and practical applications of emergent reading, writing, and language development including field-based storytelling experiences at early childhood sites. Focuses on children birth to six years. (Lec. 2) Pre: portfolio interview/acceptance into ECE teaching program (except summer) and credit or concurrent enrollment in 424 (except summer). Spring enrollment limited to students admitted to ECE teaching program and scheduled to student teach the following fall. Not for graduate credit. Optional service learning.

**430 Methods and Materials in Secondary Education (3)**

Principles of education as related to curricular materials and classroom situations. Sectioned by academic major: English, mathematics, modern language, science, social studies. (Lec. 3) Pre: 102 and 250 and senior standing or permission of instructor.

Concurrent enrollment in 431 required. Open only to secondary education majors and secondary M.A./TCP students. Not for graduate credit in education.

#### 431 Clinical Experiences for Secondary Education (1)

Secondary school clinical experience, taken concurrently with secondary methods course (430) during semester prior to student teaching. Student applies content learned in methods course and prior course work to peer teaching and classroom settings.

Restricted to majors. (Practicum) Not for graduate credit. S/U only.

#### 435 The Teaching of Composition

See Writing 435.

#### 448 Literacy Practices for Content Subjects (3)

Emphasis on the development of specialized vocabulary, textbook reading techniques, and other study skills needed to read math, science, social studies, business, and other content area materials. (Lec. 3) Pre: 312, 512 or graduate standing.

#### 449 Teaching Adolescent Literature (3)

The current canon of adolescent literature will be reviewed and expanded, and methodologies for literature instruction will be explored. (Lec. 3) Pre: acceptance into the English education program or permission of instructor. Not open to students who have taken LSC 531.

#### 452 Evaluation of Elementary and Middle School Students (2)

Purposes and means of evaluating elementary and middle school children will be critically analyzed. Types of tests and measurement tools will be examined, such as observation checklists, sociograms, rating scales, and portfolios. (Seminar) Pre: 453, 454, and acceptance into the elementary education program. Not for graduate credit.

#### 453 Individual Differences (3)

Analyzing the needs of various student populations with attention given to the concomitant values, resources, and curriculum modifications necessary for success in learning. (Lec. 3) Pre: acceptance in the elementary education program. Not for graduate credit.

#### 454 Individual Differences Field Component (1)

Supervised field experience related to 453 consisting of special education, language minority, compensatory education, gifted and talented, and at-risk students. (Practicum) Pre: acceptance in the elementary education program. Not for graduate credit.

#### 455 Language Arts Methods in Elementary and Middle School Teaching (2)

Language arts and reading principles and practices of guiding children in the skillful use of basic means of communication (speaking, listening, writing, and reading) in the elementary and middle school classroom. (Lec. 2) Pre: 452, 456, 457, acceptance into

the elementary education program, and concurrent enrollment in 458 and 459. Not for graduate credit.

#### 456 Mathematics Methods in Elementary and Middle School Teaching (2)

Principles and practices of developing knowledge and skills in mathematics with elementary and middle school children. Service learning. (Lec. 2) Pre: 453, 454; acceptance into the elementary education program. Concurrent enrollment in 452 and 457. Not for graduate credit.

#### 457 Science Methods in Elementary and Middle School Teaching (2)

Principles and practices of developing knowledge and skills in science with elementary school children. (Lec. 2) Pre: 453, 454, acceptance into the elementary education program or permission of director, and concurrent enrollment in 452 and 456. Not for graduate credit.

#### 458 Social Studies Methods in Elementary and Middle School Teaching (2)

Principles and practices of developing knowledge and skills in social studies with elementary and middle school children. (Lec. 2) Pre: 452, 456, 457, acceptance into the elementary education program, and concurrent enrollment in 452 and 459. Not for graduate credit.

#### 459 Supervised Elementary Methods Practicum I (1)

Supervised field experience related to evaluation of elementary students and methods courses: assessment, mathematics, and science. Students will observe and teach. (Practicum) Pre: admission into the elementary education program; 102, 250, 312, and 424; and concurrent enrollment in 425, 452, 456, and 457. Not for graduate credit.

#### 460 Supervised Elementary Methods Practicum II (2)

Supervised field experience related to evaluation of elementary students and methods courses: teaching special needs students, social studies, and language arts. Students will observe and teach. Students meet periodically throughout the semester to focus on issues of classroom management. (Practicum) Pre: admission into the elementary education program; 102, 250, 312, and 424; and concurrent enrollment in 402, 455, and 458. Not for graduate credit.

#### 478, 479 Problems in Education (1–3 each)

Advanced work in education conducted as seminars, supervised individual projects, or supervised field experiences. Topics for 478 include “Heads Up! Reading” and “NBPTS: Pre-candidates.” Topics for 479 include “NBPTS” and “Literacy-Based Early Childhood Education Curriculum” as permanent topics. (Independent Study) Students in seminars and supervised individual projects will be graded using standard grades (A–F); students in supervised field

experiences will be graded using S/U only. May be repeated for credit with different topic.

#### 484 Supervised Student Teaching

Under approved critic teachers, students participate in classroom teaching and other school activities for a period determined by credit to be earned. Areas include secondary education, middle level education, elementary education, early childhood education, and music. (Practicum) Pre: methods course(s) of department involved. Not for graduate credit in education. S/U credit except for music.

#### 485 Seminar in Teaching (3)

Seminar associated with student teaching. Classroom issues, resource materials, and teaching models are addressed. Course work from throughout the undergraduate program and student teaching is integrated into a professional portfolio. Capstone. Areas include secondary nonvocational, elementary early childhood education, home economics, resource development, business, music, physical education (S/U only), theatre. (Seminar) Pre: concurrent enrollment in 484 or permission of director. Not for graduate credit in education.

#### 486 Student Teaching in Elementary Physical Education (6)

Under selected and approved critic teachers, students participate in classroom teaching and other school activities. (Practicum) Pre: methods courses of department. Not for graduate credit in education.

#### 487 Student Teaching in Secondary Physical Education (6)

See 486.

#### 500 Foundations of Adult Education (3)

Examination of fundamental structure, functions, problems, and history of adult education in America. Focus on socioeconomic factors and philosophical commitments that have shaped various programs. (Lec. 3) Pre: graduate or senior standing and permission of instructor.

#### 502 Foundations of Curriculum (3)

History and analysis of foundational ideas and schools of thought about curriculum and how they shape modern practices in curriculum development, implementation, evaluation, and change in the United States. (Lec. 3)

#### 503 Education in Contemporary Society (3)

Leading educators’ responses to issues and challenges confronting American education. Emphasis on identification and analysis of contemporary theories and practices reflecting the relationship between characteristics of society and educational values. (Lec. 3)

#### 504 Adult Basic Education (3)

Teaching of adults whose educational level is below high school completion. Physical, social, and psychological characteristics of disadvantaged adults and

various techniques and materials useful in motivating and teaching them. (Lec. 3) Pre: permission of instructor.

### **505 Leadership Development in Adult Programs (3)**

Discussion of leadership concepts, styles, and implications. Discussion and practice in the use of several adult education methods and techniques for increasing the effectiveness of groups and organizations. (Lec. 3) Pre: permission of instructor.

### **508 Interdisciplinary Curriculum Development (3)**

Curriculum development of interdisciplinary units for schools. Focus is on grade-level units, which incorporate multiple subject areas. Both individual and group projects required. (Lec. 3) Pre: permission of instructor.

### **509 Thinking Math I (3)**

Examines current research in mathematics instruction (K–12). It helps teachers deepen their mathematical understanding, use assessment to guide instruction, and use research-based practices to improve student performance. (Lec. 3) Pre: teaching certification.

### **510 Reading Instruction (3)**

Examines research in beginning reading and best practices for primary (K–2) literacy instruction, and links these to the Rhode Island Reading Policy and the Tri-State GLEs. (Lec. 3) Pre: teaching certification.

### **511 Reading Comprehension Instruction (3)**

Examines reading comprehension research, strategies, and instructional techniques for both narrative and expository texts and links these to the RI Reading Policy and performance standards. (Lec. 3) Pre: teaching certification.

### **512 Educational Psychology/Classroom Learning (3)**

Survey and analysis of classroom learning literature. Particular attention paid to interaction of theory and research for instructional practice. Introduces relevant measurement, statistical, and research concepts. (Seminar) Pre: previous course in psychology, or permission of instructor.

### **516 Teaching English as a Second Language (3)**

Methods and materials for those who plan to teach English as a second language. Students develop and implement appropriate strategies and techniques for teaching of ESL. (Lec. 3) Pre: permission of instructor.

### **517 Teaching Social Studies in the Elementary School (3)**

Intensive research in various cross-subject topics within the social studies. Systematic analyses of learning theories and methods as they relate to the teaching of social studies in the elementary grades. (Lec. 3) Pre: graduate or postgraduate standing.

### **518 Teaching Science in the Elementary School (3)**

Emphasis on methods and materials for use in the teaching of science in technology, life, earth, space, and physical science topics. (Lec. 3) Pre: permission of instructor.

### **520 Teaching of Mathematics (3)**

For the experienced teacher, examination of the principles underlying the teaching of mathematics in the elementary school; comprehensive survey of materials and methods available for the classroom teacher of mathematics. (Lec. 3) Pre: senior or graduate standing. In alternate years. Next offered 2011–12.

### **521 Teaching Basic Reading to Adults (3)**

Techniques for teaching basic reading skills to illiterate adults; diagnosis, methods, and materials. (Lec. 3) Pre: 504 or permission of instructor.

### **522 Technology Applications in Education and Training (3)**

Introduction to the use of microcomputers in pre-K through adult education settings. Current use and techniques will be explored for evaluating hardware and software, implementation issues, and future developments. (Lec. 3) Pre: senior or graduate standing.

### **525 Web Site Technology In Education and Training (3)**

Focus on designing Web-based curriculum. Topics include incorporating multimedia technologies into Web site, appropriate androgogical and pedagogical strategies, and Web site design and development. (Lec. 3) Pre: 522 or permission of instructor.

### **527 (or PSY 527) Language Study for Teachers of Reading (3)**

Focuses on the structure of language at the sound, syllable, and word level. Applies concepts to reading and spelling development, teaching phoneme awareness, interpreting student errors, and planning instruction. (Seminar)

### **528 Teaching Language Arts (3)**

Preparation, presentation, use, and evaluation of methods and materials for teaching reading, writing, speaking, and listening in the language arts classroom and throughout the curriculum for K–6 grades. Pre: graduate standing.

### **529 Foundations of Educational Research (3)**

Analysis of the current major research approaches to educational problems with emphasis on interpreting published research involving the language of statistics. Functional skills in basic descriptive statistics needed prior to enrolling. (Lec. 3)

### **539 Evaluation and Monitoring of Education Programs (3)**

Evaluation and monitoring theory and practice for education and training programs. Focus on develop-

ment of evaluations for programs in job training, public education, and private sector programs. (Lec. 3) Pre: 529 or permission of instructor.

### **540 Learning Disabilities: Assessment and Intervention**

See Psychology 540.

### **544 Reading Acquisition and Reading Disability: Research and Implications for Practice**

See Psychology 544.

### **555 Quantitative Thinking and Applications for Education (3)**

Basic logic and techniques of quantitative data analysis. For education Ph.D. students planning to conduct applied research in educational settings, this course provides foundations of receptive and expressive literacy. This course satisfies the prerequisite for EDP 625, but cannot be used for program credit. (Lec. 3) Pre: admission to joint URI-RIC Ph.D. in education program. (Spans both summer sessions.)

### **562 Methods of Intervention for Literacy Difficulties (3)**

Teachers will explore methods and materials used for developing phonological awareness, sound/symbol knowledge, word reading skills, fluency, comprehension, and vocabulary through readings, discussions, application, and reflection. (Lec. 3) Pre: restricted to students accepted to teacher education, or graduate standing, or permission of instructor.

### **563 Teaching Reading to Multicultural Populations (3)**

Identification of the strengths of learners whose cultural and socioeconomic backgrounds vary, and the implications for teaching reading. Special emphasis on the selection and development of appropriate materials and teaching strategies. (Lec. 3) Pre: 424 or permission of instructor.

### **564 Diagnosis of Literacy Difficulties (4)**

Use informal and formal techniques to assess students' reading and writing skills, evaluate contextual factors, and evaluate the match between learner and context. Culminates in case report and plan for instruction. (Lec./Lab. 4) Pre: admission to reading master's program or permission of reading program.

### **565 Advanced Literacy Research Seminar (3)**

In-depth review of literacy research and theory from a variety of perspectives. Analysis of the relationships among research, theory, and political/instructional decisions. Includes development of a proposal to conduct literacy research. (Lec. 3) Pre: acceptance into reading master's program or permission of reading program.

### **566 Intervention in Reading and Writing Difficulties (3)**

Supervised clinical experience in reading and writing difficulties. Students work directly with struggling readers and writers to diagnose reading/writing dif-

faculties and plan and implement an appropriate program of instruction. (Practicum) Pre: 564 and 565.

### 567 Field Study in Literacy (3)

Supervised clinical experience in reading and writing difficulties. Students work directly with struggling readers and writers to diagnose reading/writing difficulties and plan and implement an appropriate program of instruction. (Practicum) Pre: 565.

### 568 Differentiation of Instruction (3)

Strategies for differentiating instruction to meet diverse student needs in a heterogeneous classroom are addressed. Development of lessons using integrated differentiated instruction and assessment strategies is required. (Lec. 3) Pre: 400 or 424 or 448 or 569 or permission of instructor.

### 569 Best Practices in the Middle Level Classroom (3)

Examination of state and school improvement data at the middle level to improve curriculum, instruction, and assessment practices. Action research is performed with an emphasis on designs, processes, and models. (Lec. 3) Pre: graduate standing or permission of instructor.

### 570 Elementary School Curriculum (3)

Modern curriculum in the elementary school with emphasis on the needs of children. Covers language arts, social studies, science, arithmetic, and special subjects. (Lec. 3) Pre: 529 or equivalent. In alternate years. Next offered 2011–12.

### 574 Current Trends in Secondary Education (3)

Effective use of instructional materials, media of communication, and organization of personnel and current research. (Lec. 3) Pre: 529 or permission of director.

### 575 Supervised Field Study/Practicum and Seminar in Education (3)

For nonthesis candidates. Lectures, seminars, and field work. Candidates plan and conduct a field study/practicum project approved by the instructor and the student's professor. A formal proposal is developed, submitted, and approved, the project completed, and a formal paper defended. (Practicum) Pre: admission to a master's program in education and permission of instructor. May be repeated for a maximum of 6 credits.

### 579 Labor Relations and Collective Bargaining in Education

See Labor and Industrial Relations 579.

### 581 Administering Adult Programs (3)

Administration, personnel management, resource management, recruitment, development, and supervision within programs dealing with adults as learners. (Lec. 3) Pre: 505 or permission of instructor.

### 582 Instructional Systems Development for Adult Programs (3)

Designing and implementing instructional systems. Discussion of the basic tenets underlying theories of instructional technology, curriculum development, and curriculum change as they apply to adult learners in a variety of settings. (Lec. 3) Pre: 581 or permission of instructor.

### 583 Planning, Design, and Development of Adult Learning Systems (3)

Overview of the program planning process including goal setting, needs analysis, program planning, and implementing change strategies. Discussion of effective functioning in the role of change agent within an organization. (Lec. 3) Pre: permission of instructor.

### 584 The Adult and the Learning Process (3)

Examination of the adult as a learner with emphasis on the factors that affect adult learning and learning processes related to instruction. (Lec. 3) Pre: permission of instructor.

### 586 Problems in Education (0–3 each)

Advanced work for graduate students in education. Courses conducted as seminars or as supervised individual projects. (Independent Study) For 586, topics include: "Consortium on Reading Excellence," "Hosting a SALT Visit," "Instructional Strategies for Diversified Classrooms," "Orton-Gillingham Reading Instruction," "Orton-Gillingham Reading Practicum," "Reflective Practitioner-Using Data to Inform Instruction," "SALT Visit," "Schools Attuned," "Using Blogs & Wikis to Facilitate Learning," "4 Roles of Leadership," "Using the Internet for Teaching, Learning, & Practical Applications," "Seven Habits of Highly Effective People," "Teaching the Write Traits," "Disciplinary Literacy," "Thinking Math II," and "Building Teams & Leading Change." Pre: permission of director. May be repeated for credit with different topic.

### 594 Organization and Supervision of Literacy Programs (3)

Field experience in the roles/responsibilities of a reading specialist. Requires shadowing reading professionals, visiting schools, involvement in professional groups, developing action plans, and developing and presenting professional development sessions. (Lec./Lab. 3) Pre: 565 or permission of reading program. In alternate years. Next offered 2011–12.

### 599 Master's Thesis Research

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

### 683 Psychology of the Exceptional Child

See Psychology 683.

### 920 Workshop for Teachers (1–3)

Current issues in education. Specific topics offered for in-service teachers and administrators. May be repeated with different topic. (Workshop) Topics in-

clude: "Using the Internet for Teaching," "Learning, and Practical Applications," "RITES 1" and "Immersion Program for Teachers of Spanish." Pre: teacher certification.

### 921, 922, 923 Workshop for Teachers (1–3 each)

Current issues in education. Specific topics offered for in-service teachers and administrators. For 921, topics include: "Using Blogs & Wikis to Foster Literacy." (Workshop/Online) Pre: certified teacher.

## Ph.D. in Education (EDP)

Co-Director: Professor Young

### 610 Core Seminar I: Issues and Problems in Educational Inquiry and Foundations (3)

Examination of issues and problems related to philosophical and historical aspects of educational thought and the role of society. Empirical analysis of classroom settings is emphasized. (Seminar) Pre: admission to the Ph.D. program in education.

### 611 Core Seminar I: Issues and Problems in Educational Inquiry and Foundations (3)

Examination of issues and problems related to philosophical and historical aspects of educational thought and the role of society. Empirical analysis of classroom setting is emphasized. (Seminar) Pre: 610.

### 612 Qualitative Research Methods in Education (3)

Survey of qualitative methods of educational research: terminology, historical development, assumptions, and models of inquiry. Pre: Current enrollment in the URI/RIC Joint Ph.D. Program.

### 613 Introduction to Quantitative Research (4)

Educational research data are quantitatively analyzed. Data collected during Core Seminar I are analyzed and interpreted. Applications of the general linear model to a variety of research designs and analytic strategies are emphasized. (Lec.3, Rec. 1) Pre: 611 and a course in introductory statistics, or permission of instructor.

### 620, 621 Core Seminar II: Issues and Problems in Human Development, Learning, and Teaching (3 each)

Issues and problems related to human development, curriculum, teaching, and learning are examined. Ways of gathering and evaluating evidence about school and curriculum effectiveness are emphasized. (Seminar) Pre: (for 620) 610, 611, 615. Pre: (for 621) 620.

### 623 Research Design (3)

Research design process including developing problem statements, research questions, hypotheses and appropriate methods (i.e., qualitative, quantitative, or mixed). Course considers philosophical world-views, literature reviews, theory use, and research ethics. Pre: 610, 611, 612, 613.

**630, 631 Core Seminar III: Issues and Problems in Organizational Theory, Leadership, and Policy Analysis (3 each)**

Issues and problems related to applications of organizational theory, leadership theory, and policy analysis are studied. Core seminar examines cases related to district, state, and/or regional educational offices and agencies. (Seminar) Pre: (for 630) 620, 621.

**641 Field Research Seminar (1)**

Bi-weekly forums present first-, second-, and third-year students' evolving research questions and empirical designs. Discussion and feedback refine individuals' research plans, enhancing the methodological perspectives and tools of all participants. (Seminar) Pre: admission to joint (URI-RIC) Ph.D. program in education. May be repeated up to a maximum of six semesters (a total of 6 credits).

**665 Social Justice in Higher Education (3)**

This course provides a broad overview of historical and contemporary issues of social justice in higher education. Pre: permission of instructor.

**692, 693 Directed Readings and Research Problems (3–6 each)**

Directed readings and advanced research work under the supervision of a member of the graduate faculty, arranged to suit the individual requirements of the students. (Independent Study) May be repeated for a maximum of 12 credits. Pre: 611, 615, 2 credits of 641, and permission of instructor.

**699 Doctoral Dissertation Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U only.

**Special Education (EDS)**

*Coordinator:* Professor Eichinger

**500 Inclusive Educational Practices (2)**

Historical, sociological, and legal factors that shape education for students with disabilities. Definitions of disabilities and educational implications, focusing on the role of the special educator in inclusive education. (Lec. 2) Pre: acceptance into the master's degree program in special education. To be taken concurrently with 502, 503, 505, and 510 for students seeking elementary/middle certification. To be taken concurrently with 503, 507, 513, and EDC 568 for students seeking secondary/middle certification.

**501 Collaboration and Co-Teaching (2)**

Provides future special educators with knowledge and skills to implement culturally responsive collaboration with family members and school-based professionals. (Lec. 2) Pre: acceptance into master's degree program in special education; 500, 502, 503, 505, and 510 for students earning elementary/middle certification; 500, 503, 507, 513, and EDC 568 for stu-

dents earning secondary/middle certification. To be taken concurrently with 504, 506, 509, and 511 for students seeking elementary/middle certification. To be taken concurrently with 504, 508, 516, and 517 for students seeking secondary/middle certification.

**502 Assessment for Elementary Special Educators (3)**

Provides future special educators with knowledge and skills to assess students using standardized and curriculum-based measures and to implement the response to intervention model. (Lec. 3) Pre: acceptance into the master's degree program in special education. To be taken concurrently with 500, 503, 505, and 510.

**503 Positive Behavior Supports (3)**

Provides future special educators with the knowledge and skills to examine causes of behaviors, to teach pro-social behaviors and to develop individualized positive behavioral supports. (Lec. 3) Pre: acceptance into the master's degree program in special education. To be taken concurrently with 500, 502, 505, and 510 for students seeking elementary/middle certification. To be taken concurrently with 500, 507, 513, and EDC 568 for students seeking secondary/middle certification.

**504 Research in Special Education (3)**

**Critical analysis of research publications in special education, the translation of research findings into practical instructional applications, and the identification of an area of proposed study in special education.** (Lec. 3) Pre: acceptance into the master's degree program in special education; 500, 502, 503, 510 and 505 for students in the elementary/middle certification program; 500, 503, 507, 513 and EDC 568 for students in the secondary certification program. To be taken concurrently with 501, 506, 509, 511 for students in the elementary program, or with 501, 508, 516, 517 for students in the secondary program. **505 Supervised Practicum: Elementary and Middle Level (1)**

Provides future special educators with opportunities to assess students and instruct students with disabilities under the supervision of a certified special educator. Students will be observed once by University instructor. (Practicum). Pre: acceptance into the master's degree program in special education. To be taken concurrently with 500, 502, 503, and 510. S/U only.

**506 Supervised Practicum: Elementary and Middle Level (1)**

Provides future special educators with opportunities to collaborate with other professionals to provide instruction under supervision of a certified special educator. One observation by University instructor. (Practicum) Pre: acceptance into the master's degree program in special education and 500, 502, 503,

505, and 510. To be taken concurrently with 501, 504, 509, and 511.

**507 Supervised Practicum: Secondary and Middle Level (1)**

Provides future special educators with opportunities to assess and instruct students with disabilities under the supervision of a certified special educator. One observation by university supervisor. (Practicum). Pre: acceptance into the master's degree program in special education. To be taken concurrently with 500, 503, 513, and EDC 568. S/U only.

**508 Supervised Practicum: Secondary/Middle Level (1)**

Provide future special educators opportunities to collaborate with other professionals to plan and implement instruction under a certified special educator. One observation by a University supervisor. (Practicum) Pre: acceptance into the master's degree program in special education and 500, 503, 507, 513, and EDC 568. To be taken concurrently with EDS 501, 504, 516, and 517.

**509 Teaching Students with Severe Disabilities (3)**

Provides the knowledge and skills future special educators need to plan individualized instruction for students with moderate or severe disabilities in general education classes. (Lec. 3) Pre: acceptance into the master's degree program in special education; and 500, 502, 503, 505, and 510. To be taken concurrently with 501, 504, 506, and 511.

**510 Teaching Elementary Students with Mild Disabilities (3)**

Provides future special educators with the knowledge and skills to plan individualized instruction for students with mild disabilities based on assessment data and current research on effective instructional practices. (Lec. 3) Pre: acceptance into the master's degree program in special education. To be taken concurrently with 500, 502, 503, and 505 for students seeking elementary/middle certification.

**511 Literacy and Language Instruction (3)**

Provides future special educators with the knowledge and skills to plan instruction in literacy and language for students with disabilities. (Lec. 3) Pre: acceptance into the Master's degree program in special education. For elementary/middle certification: 500, 502, 503, 505, and 510. To be taken concurrently with 501, 504, 506, and 509. For middle/secondary certification no prerequisites. To be taken concurrently with 500, 503, 513, and 507.

**512 Leadership and Elementary Program Management (3)**

Future special educators acquire knowledge and skills to coordinate their students' schedules, train and supervise paraprofessionals, conduct action research, and restructure service delivery models in special education. (Lec. 3) Pre: acceptance into the master's

degree program in special education and 500, 501, 502, 503, 504, 505, 506, 509, 510, and 511. To be taken concurrently with 518.

### 513 Assessment for Secondary Special Educators (3)

Provides future special educators with knowledge and skills to assess students using standardized and curriculum-based measures, to implement the response to intervention model, and to plan for transition. (Lec. 3) Pre: acceptance into the master's degree program in special education. To be taken concurrently with 500, 503, 507, and EDC 568.

### 516 Teaching Secondary Students with Mild Disabilities (3)

Provides future special educators with knowledge and skills to plan instruction for adolescents with mild or moderate disabilities, including literacy skills, language skills and content strategy instruction. (Lec. 3) Pre: acceptance into the master's degree program in special education and 500, 503, 507, 513, and EDC 568. To be taken concurrently with 501, 504, 508, and 517.

### 517 Transition Planning for Post-School Outcomes (3)

Provides future special educators with knowledge and skills to implement transitions for secondary students to work or other post-secondary options. (Lec. 3) Pre: acceptance into the master's degree program in special education and 500, 503, 507, 513, and EDC 586. To be taken concurrently with 501, 504, 508, and 516.

### 518 Supervised Internship (9)

Under the supervision of a certified special educator, students teach in general education classes which include students with special needs, for ten (10) weeks. (Practicum) Pre: acceptance into the master's degree program in special education and 500, 501, 502, 503, 504, 505, 506, 509, 510, 511 for students seeking elementary certification; 500, 501, 503, 504, 507, 508, 513, 516, 517, and EDC 568 for students seeking secondary certification. To be taken concurrently with 512 for elementary students and 520 for secondary students. S/U only.

### 520 Leadership and Secondary Program Management (3)

Future special educators acquire knowledge and skills to coordinate their students' programs, develop effective schedules, train and supervise paraprofessionals, conduct action research, and restructure existing service delivery models. (Lec. 3) Pre: acceptance into the master's degree program in special education and 500, 501, 503, 504, 507, 508, 513, 516, 517, and EDC 586. To be taken concurrently with 518.

## Electrical Engineering (ELE)

*Chairperson:* Professor Fischer (Electrical, Computer and Biomedical Engineering)

### 101 Introduction to Electrical Engineering (1)

Seminar series given by instructor, invited experts, and students with a focus on electrical engineering applications and professional practice. (Seminar) Pre: (credit or concurrent enrollment in MTH 141) or permission of instructor.

### 201 Digital Circuit Design (3)

Digital concepts. Combinational logic: gates, Boolean algebra, K-maps, standard implementations. Sequential circuits: flip-flops, timing diagrams, state diagrams, counters and registers, design methods. MSI devices, memory, and programmable devices. (Lec. 3) Pre: (credit or concurrent enrollment in MTH 141) or permission of instructor.

### 202 Digital Circuit Design Laboratory (1)

Laboratory experience in digital electronics. Logic design projects using standard SSI and MSI integrated circuits. (Lab. 3) Pre: credit or concurrent enrollment in 201.

### 205 Microprocessors (2)

Hands-on familiarization with computer and microprocessor software and hardware. Computer architecture and interfacing with input and output devices. (Lec. 2) Pre: (credit or concurrent enrollment in 206 and MTH 141) or permission of instructor.

### 206 Microprocessor Laboratory (1)

Laboratory exercises related to topics in 205. (Lab. 3) Pre: credit or concurrent enrollment in 205.

### 208 Introduction to Computer Systems (2)

Bits, binary representations, digital logic structures, the von Neumann computing model, the machine and assembly language, interrupt and traps, input and output, subroutines, stack and high-level programming in computing systems. (Lec. 2) Pre: (credit or concurrent enrollment in 209 and MTH 141) or permission of instructor.

### 209 Introduction to Computer Systems Laboratory (1)

Laboratory exercises related to topics in 208. (Lab. 3) Pre: credit or concurrent enrollment in 208.

### 212 Linear Circuit Theory (3)

Kirchhoff's Laws, DC-resistive networks, dependent sources, natural and forced response of first- and second-order circuits, sinusoidal steady-state response, phasors, AC power. (Lec. 3) Pre: (PHY 204, (credit or concurrent enrollment in MTH 244 or 362), and (at least a 2.0 (C) average in MTH 141, MTH 142, PHY 203, and PHY 204)) or permission of instructor PHY 204, credit or concurrent enrollment in MTH 244 or 362, and at least a 2.00 (C) average in MTH 141, MTH 142, PHY 203, and PHY 204.

### 215 Linear Circuits Laboratory (2)

DC measurements, natural and step response of first- and second-order circuits, AC measurements, impulse and frequency response, operational amplifier circuits. (Lec. 1, Lab. 3) Pre: credit or concurrent enrollment in 212.

### 220 Passive and Active Circuits (3)

Electrical circuit laws and theorems, transient and steady-state response, phasors, frequency response, resonance. Diode and transistor circuits, digital logic devices. (Lec. 3) Pre: PHY 204 or permission of instructor. PHY 204 or 214. Not open to biomedical, computer, or electrical engineering majors.

### 301 Electronic Design Automation (3)

Digital design, simulation, synthesis, and verification using electronic design automation tools. IEEE VHDL hardware description language and rapid prototyping with FPGAs. Register transfer level design with reusable modules and cores. (Lec. 3) Pre: (201 and 202 and 212 and 215 and (credit or concurrent enrollment in 302)) or permission of instructor 201 and 202 and 212 and 215 and (credit or concurrent enrollment in 302).

### 302 Electronic Design Automation Laboratory (1)

Laboratory exercises related to topics in 301. (Lab. 3) Pre: credit or concurrent enrollment in 301.

### 305 Introduction to Computer Architecture (3)

Introduction to CPU, instruction set architecture, instruction pipeline, hazard avoidance, and branch prediction. Concept and evaluation of cache memory and memory management. Bus architecture and input and output interfaces. (Lec. 3) Pre: 201 and 212 and (205 or 208)) or permission of instructor 201 and 212 and (205 or 208).

### 313 Linear Systems (3)

Fourier series, Fourier transforms, transfer functions of continuous and discrete-time systems, transient and steady-state response, natural response and stability, convolution. (Lec. 3) Pre: (212, EGR 106, (MTH 244 or 362), and ((at least a 2.0 (C) average in 212, (MTH 244 or 362), and PHY 204)) or permission of instructor 212 and (MTH 244 or 362) and (EGR 106 or permission of instructor).

### 314 Linear Systems and Signals (3)

Continuous-time and discrete-time systems, frequency response, stability criteria, Laplace transforms, z-transforms, filters, sampling, feedback, and applications. (Lec. 3) Pre: 313 or permission of instructor.

### 322 Electromagnetic Fields I (4)

Electrostatics and magnetostatics, forces on charged particles. Analysis employs vector algebra and vector calculus in orthogonal coordinates. Simple applications to engineering problems. (Lec. 3, Rec. 1) Pre: (212 and MTH 243 and PHY 204) or permission of instructor.

**325 Electrical Power Distribution Systems (3)** 

Theory of 3-phase power systems, introduction to per unit system of analysis, distribution system components (transformers, lines, switch-gear, loads), system layout, analysis of unbalanced systems with symmetrical components. (Lec. 3) Pre: (212 and MTH 243 and PHY 204) or permission of instructor 212 and PHY 204 and MTH 362.

**331 Introduction to Solid State Devices (4)**

Electrical and optical properties of semiconductors. Characteristics of p-n and metal-semiconductor junctions. Application to diodes, transistors, and light emitting and absorbing devices. Fabrication technology is introduced. (Lec. 3, Rec. 1) Pre: (212 and MTH 243 and PHY 306) or permission of instructor.

**338 Electronics I (3)** 

Review of linear circuit theory, operational amplifiers, diode and transistor circuits, computer-aided design, linear and nonlinear circuit applications, CMOS logic (Lec. 3) Pre: 201, 212, 215, (EGR 106 or permission of instructor), (credit or concurrent enrollment in 339), and ((at least a 2.0 (C) average in 201, 212, 215, MTH 142, and PHY 204) or permission of instructor).

**339 Electronics I Laboratory (1)**

Laboratory exercises related to topics in 338. (Lab. 3) Pre: (credit or concurrent enrollment in 338).

**343 Electronics II (3)** 

Bipolar and MOS transistor biasing, small signal amplifiers, amplifier frequency response, operational amplifiers, SPICE, nonlinear circuits, statistical circuit simulation. (Lec. 3) Pre: ((338 and 339) or 342) and (credit or concurrent enrollment in 344)) or permission of instructor 344).

**344 Electronics II Laboratory (1)**

Laboratory exercises related to topics in 343. (Lab. 3) Pre: credit or concurrent enrollment in 343.

**391, 392, 393 Special Problems (1–43)** 

Independent study of special engineering problems. Topic and number of credits determined in consultation with the instructor. Pre: permission of instructor. 393 is for S/U credit.

**400 Introduction to Professional Practice (1)** 

Engineering ethics. Discussions with faculty, visiting engineers, and invited speakers on ethical, social, economic, and safety considerations in engineering practice; career planning; graduate study. (Lec. 1) Pre: ((205 or 208 or BME 207) and 212) or permission of instructor (205 or 208) and 212. Not for graduate credit.

**401 Lasers, Optical Fibers, and Communication Systems (3)**

Introduction to lasers, LEDs, optical fibers and detectors. Properties of Gaussian beams, optical resonators, and diffraction of Gaussian beams. Properties of Fabry-Perot cavities. Introduction to fiber optical

communications systems. (Lec. 3) Pre: ((205 or 208) and 313 and 322 and 331 and ((338 and 339) or 342) and (credit or concurrent enrollment in 402)) or permission of instructor.

**402 Lasers, Optical Fibers, and Communication Systems Lab. (1)**

Laboratory exercises related to topics in 401. (Lab. 3) Pre: credit or concurrent enrollment in 401.

**405 Digital Computer Design (3)**

Hardware implementation of digital computers. Arithmetic circuits, memory types and uses, control logic, basic computer organization, microprogramming, input/output circuits, microcomputers. (Lec. 3) Pre: (301, 305, and (credit or concurrent enrollment in 406)) or permission of instructor.

**406 Digital Computer Design Laboratory (1)**

Laboratory exercises related to topics in 405. (Lab. 3) Pre: credit or concurrent enrollment in 405.

**408 Computer Organization (3)**

Engineering design problems involving hardware, software, and interface of computer and embedded systems. Students will apply skills and knowledge accumulated through the curriculum in a group senior design project. (Lec. 3) Pre: (305 and 313, ((338 and 339) or 342) and (credit or concurrent enrollment in 409)), or permission of instructor.

**409 Computer Organization Laboratory (1)**

Laboratory exercises related to topics in 408. (Lab. 3) Pre: credit or concurrent enrollment in 408.

**423 Electromagnetic Fields II (4)**

Transmission lines, Maxwell's equations, wave equation, reflection and refraction phenomena, polarization effects waveguides and antennas. Design project requiring application of electromagnetic theory and use of numerical methods. (Lec. 4) Pre: (313 and 322 and ((338 and 339) or 342)) or permission of instructor. Not for graduate credit.

**427 Electromechanical Systems (3)**

State-variable models. Electromechanical devices and systems in translation and rotation. Design of sensors, actuators, and systems as used in control applications. (Lec. 3) Pre: (313 and 322 and 331 and ((338 and 339) or 342) and (credit or concurrent enrollment in 428)) or permission of instructor.

**428 Electromechanical Systems Laboratory (1)**

Laboratory exercises related to topics in 427. (Lab. 3) Pre: credit or concurrent enrollment in 427.

**432 Electrical Engineering Materials (4)**

Continuation of 331. Electronic and optical properties of materials, mainly semiconductors, applied to the performance and design of electronic devices. Measurements and analysis of these properties will be performed in the laboratory. (Lec. 4) Pre: (313 and 322 and 331 and ((338 and 339) or 342)) or permission of instructor.

**435 Communication Systems (3)**

Representation of signals and noise. Basic principles of modulation and demodulation. Waveform and digital transmission systems. Design of a component of a communication system. (Lec. 3) Pre: ((215 or (338 and 339) or 342) and 314 and EGR 106 and (credit or concurrent enrollment in 436)) or permission of instructor.

**436 Communication Systems Laboratory (1)**

Laboratory exercises related to topics in 435. (Lab. 3) Pre: credit or concurrent enrollment in 435.

**437 (or CSC 417) Computer Communications (3)**

Computer networks, layering standards, communication fundamentals, error detection and recovery, queuing theory, delay versus throughput trade-offs in networks, multiple-access channels, design issues in wide and local area networks. (Lec. 3) Pre: ((205 or 208 or CSC 211) and (436 or MTH 451 or ISE 411)) or permission of instructor.

**438 (or CSC 418) Information and Network Security (4)**

Elementary cryptography, public key, private key, symmetric key, authentication protocols, firewalls, virtual private networks, transport layer security, and wireless network security. (Lec. 3, Project 3) Pre: 208 or MTH 362 or MTH 451 or ISE 411 or junior or senior standing in computer engineering or computer science or permission of instructor.

**444 Advanced Electronic Design (3)**

Review of number systems, combinatorial and sequential logic, state machine. Design capture tools, hardware/software design, system implementation using PC's, MSI circuits, and FPGAs (Lec. 3) Pre: ((205 or 208) and 313 and ((338 and 339) or 342) and concurrent enrollment in 445)) or permission of instructor.

**445 Advanced Electronic Design Laboratory (1)**

Laboratory exercises related to topics in 444. (Lab. 3) Pre: credit or concurrent enrollment in 444.

**447 Digital Integrated Circuit Design I (3)**

Introduction to full custom digital integrated circuit design. Analysis of logic functions and timing at the transistor level. Realization of logic functions via hand crafted transistor layout. Design project. (Lec. 3) Pre: (202 and ((338 and 339) or 342) and 313 and PHY 204 and (credit or concurrent enrollment in 448)) or permission of instructor.

**448 Digital Integrated Circuit Design I Laboratory (1)**

Laboratory exercises related to topics in 447. (Lab. 3) Pre: credit or concurrent enrollment in 447.

**457 Feedback Control Systems (3)**

Fundamental techniques for the analysis and design of linear feedback systems. Stability, sensitivity, performance criteria, steady-state error, Nyquist criterion, root locus techniques, and compensation

methods. (Lec. 3) Pre: ((205 or 208 or BME 207) and 314) or permission of instructor.

#### 458 Digital Control Systems (3)

Analysis and design of digital control systems using state-space techniques. State feedback and observers. Laboratory includes computer simulation and hardware implementation of control laws for electromechanical systems. (Lec. 3) Pre: ((205 or 208 or BME 207) and (314 or 461 or BME 461) and ((338 and 339) or 342) and (credit or concurrent enrollment in 459)) or permission of instructor((205 or 208) and (314 or 461 or BME 461) and ((338 and 339) or 342) and (credit or concurrent enrollment in 459)) or permission of instructor.

#### 459 Digital Control Systems Laboratory (1)

Laboratory exercises related to topics in 458. (Lab. 3) Pre: credit or concurrent enrollment in 458.

#### 461 Physiological Modeling and Control

See Biomedical Engineering 461.

#### 470 Mobile Computing (3)

Application of modern mobile computing platforms, user interface, software application development, hardware interface; view controllers; data interaction; application distribution (Lec. 2, Lab. 3) Pre: basic course in C programming; basic course in microcomputers; at least junior standing; permission of instructor.

#### 480 Capstone Design I (3)

Application of engineering skills; teams focus on the design and communication of solutions to problems with real-world constraints (may include aspects of other engineering disciplines). First of a two-course sequence (Lec. 2, Lab. 3). Pre: (205 or 208) and 313 and ((338 and 339) or 342) and ((at least a 2.0 (C) average in 212, 313, and 338)) and permission of instructor((205 or 208) and 313 and ((338 and 339) or 342) and permission of instructor. Not for graduate credit.

#### 481 Capstone Design II (3)

Application of engineering skills; teams focus on the design and communication of solutions to problems with real-world constraints (may include aspects of other engineering disciplines). Second of a two-course sequence. (Lab. 6) Pre: (205 or 208) and 313 and ((338 and 339) or 342) and ((at least a 2.0 (C) average in 212, 313, and 338)) and permission of instructor. Not for graduate credit.

#### 491, 492, 493 Special Problems (1–4)

Independent study of special engineering problems. Topic and number of credits determined in consultation with the instructor. 493 is for S/U credit. Pre: permission of instructor. Not for graduate credit.

#### 501 Linear Transform Analysis (3)

Transform analysis (including Fourier, Laplace, and z-transforms) of continuous- and discrete-time systems and signals. Properties of transforms, computational

efficiency, and applications such as compact representations of video and sound. (Lec. 3) Pre: vectors, matrices, calculus with real and complex variables.

#### 502 Nonlinear Control Systems (3)

Analysis of nonlinear systems: phase-plane analysis, Lyapunov theory, advanced stability theory, describing functions. Design of nonlinear control systems: feedback linearization, sliding control. (Lec. 3) Pre: 503 or permission of instructor.

#### 503 (or MCE 503) Linear Control Systems (4)

State-variable description of continuous-time and discrete-time systems, matrices and linear spaces, controllability and observability, pole-placement methods, observer theory and state reconstruction, MATLAB exercises for simulation and design. (Lec. 4) Pre: 314 or MCE 366 or equivalent and MTH 215 or equivalent.

#### 504 (or MCE 504) Optimal Control Theory (3)

Quadratic performance indices and optimal linear control, frequency response properties of optimal feedback regulators, state estimation, separation theorem, optimal control of nonlinear systems, Pontryagin's minimum principle. (Lec. 3) Pre: 503.

#### 506 Digital Signal Processing (4)

Review of z-transform, frequency response of LTI systems, digital filter structures, sampling theorem, spectral analysis, DFT and FFT algorithms, windows, periodogram, introduction to design of FIR and IIR filters. (Lec. 4) Pre: 501 or permission of instructor.

#### 509 Introduction to Random Processes (4)

Probability and random variables; random process characterizations and techniques. Useful models. Discrete and continuous systems with random inputs. Applications to detection and filtering problems. (Lec. 4) Pre: MTH 451 or equivalent and knowledge of calculus, linear systems, and transform methods.

#### 510 Communication Theory (4)

Communication theory for discrete and continuous channels. Optimum-receiver principles and signal design. Fundamentals of information theory. Channel models, modulation techniques, source encoding, error control coding, decoding algorithms. (Lec. 4) Pre: 509.

#### 511 Engineering Electromagnetics (3)

Review of electrostatics and magnetostatics. Maxwell's equations, wave propagation in dielectric and conducting media. Boundary phenomena. Radiation from simple structures. Relations between circuit and field theory. (Lec. 3)

#### 515 Systems Simulation

See Industrial and Systems Engineering 525.

#### 525 Fiber Optic Communication Systems (3)

Survey of important topics in optical communication devices and systems. The physical principles and operation of lasers, LEDs, fibers, and detectors are covered. (Lec. 3) Pre: 423, 331, 401 or equivalent.

#### 531 Solid State Engineering I (3)

Review of quantum mechanics, crystal properties, energy-band theory, introduction to scattering, generation-recombination processes, Boltzmann's transport equation, semiconductor junctions, devices. (Lec. 3) Pre: 331 or permission of instructor.

#### 532 Solid State Engineering II (3)

Properties of insulators, semiconductors, conductors, and superconductors from quantum mechanical principles. Semiconductor physics and band theory of solids as applied to current semiconductor and optoelectronic devices. (Lec. 3) Pre: 531 or equivalent.

#### 534 MOS Devices (3)

Device physics and computer modeling of MOS devices, capacitors, metal semiconductor contacts, PMOS, NMOS, and DMOS transistors, short channel effects, modeling, small signal equivalent circuits. (Lec. 3) Pre: 331 or permission of instructor.

#### 537 Digital Integrated Circuit Design II (4)

Device physics for CMOS technology, design techniques for static and dynamic logic families and arithmetic elements, design capture tools, synthesis strategies, scaling and next generation CMOS technologies, design project. (Lec. 3, Lab. 3) Pre: 447 and 501.

#### 539 Analog Integrated Circuit Design (4)

IC processing, device modeling and simulation, building blocks for analog circuits, amplifiers, continuous and discrete-time filters, band-gap references, Nyquist-rate converters, oversampled converters, design project. (Lec. 3, Lab. 3) Pre: 447 and 501.

#### 542 Fault-Tolerant Computing (3)

Fault and error modeling, reliability modeling and evaluation, fault-tolerant computer systems, digital and mixed analog/digital VLSI testing, concurrent error detection, and design for VLSI yield enhancement. (Lec. 3) Pre: 405 or equivalent or permission of instructor.

#### 543 (or CSC 519) Computer Networks (4)

Computer network architectures, data link control and access protocols for LANs, Internet protocols and applications, software and hardware issues in computer communication, delay analysis, and current research in computer networking. (Lec. 4) Pre: 437 or equivalent or CSC 412 or equivalent.

#### 544 Arithmetic Algorithms and Hardware Designs (4)

Hardware algorithms and implementation of fixed and floating-point adders, multipliers, and dividers. Error and time complexity analysis. Applications to DSP algorithms. Circuit design in VHDL and prototype with FPGA. Pre: 301 or equivalent or permission of instructor.

#### 545 Advanced Digital Circuits and Systems (4)

Advanced topics in Boolean algebra and digital designs. Arithmetic circuits, low-power designs,

cryptography, communication, concurrent error detection/correction, SoC, and quantum computing. Project in design and implementation of complex digital systems. (Lec. 3, Proj. 3) Pre: 301 or equivalent or permission of instructor.

#### 546 Design of Computer-Based Instrumentation (3)

Design of memory systems, input-output techniques, direct memory access controllers, instrument buses, video displays, multi- and co-processors, real-time operations, device handler integration into high-level language and mass storage. (Lec. 2, Lab. 3) Pre: 408 or permission of instructor.

#### 547 Embedded Computer Systems and Applications (4)

Principles of embedded computer system designs; CPU, memory, I/O, interfacing of embedded computers; modern hardware/software tools for embedded computing, and design of advanced systems including wired/wireless networking, image acquisition/processing, controls, medical equipment, or consumer electronics. (Lec. 3, Lab. 3)

#### 548 Computer Architecture (4)

Classification and taxonomy of computer architectures. RISC vs. CISC. Cache and virtual memory systems. Pipeline and vector processors. Multi-processor and multi-computer systems. Interprocessor communication networks. Dataflow machines. Parallel processing languages. (Lec. 4) Pre: 305 or equivalent or permission of instructor.

#### 549 Computer System Modeling (4)

Basic techniques used in computer system modeling, queuing theory, stochastic processes, Petri net, product form networks, approximation techniques, solution algorithms and complexity, computer simulation, performance studies of modern computer systems. (Lec. 4) Pre: 548 and 509 or MTH 451.

#### 550 Ocean Systems Engineering

See Ocean Engineering 550.

#### 561 Physiological Modeling and Control (3)

Principles of physiological modeling and control of linear and nonlinear systems, stability analysis, root locus, Bode plots, linearization. Not for undergraduate credit. Not open to students who have credit in 461 or BME 461. Pre: graduate standing in electrical engineering or permission of instructor.

#### 562 Biomedical Instrumentation Design (3)

Fundamentals of biomedical instrumentation, bio-compatibility, medical device materials; safety, noise rejection, biomedical signal processing; measuring, recording, monitoring, and therapeutic devices. Not for undergraduate credit. Not open to students who have credit in 489 or BME 461. (Lec. 3) Pre: graduate standing in electrical engineering or permission of instructor.

#### 563 Biomedical Instrumentation Laboratory (1)

Development of a portable heart function monitor that measures the electrocardiogram and photoplethysmogram; embedded system design using instrumentation amplifier, op-amp, graphic LCD module, and PIC microprocessor with C programming. Not for undergraduate credit. Not open to students who have credit in 489 or BME 463. (Lab. 3) Pre: graduate standing in electrical engineering or permission of instructor.

#### 564 Medical Imaging (3)

Engineering and clinical applications of medical imaging systems including X-ray, computed tomography, radioisotope imaging, ultrasound, magnetic resonance imaging; picture archiving and communications system and medical image processing. Term paper required. May not be taken by students who have credit in BME 464 (Lec. 3) Pre: senior standing in electrical or computer engineering or permission of instructor.

#### 565 Medical Image Processing Laboratory (1)

Development of medical image processing algorithms with graphical user interface in C++ under the Windows operating system: smoothing and sharpening filters, morphological filters, area measurement and edge tracer. Projects involving advanced algorithms. May not be taken by students who have credit in BME 465. (Lab. 3) Pre: senior standing in biomedical engineering or permission of instructor.

#### 568 Neural Engineering (3)

Principles and technologies of neuroengineering and clinical applications; brain stimulator, spinal cord stimulation, functional electrical stimulation (FES), neural-machine interface for motor prosthesis control, artificial visual/auditory devices for augmented sensory perception. May not be taken by students who have credit in BME 468. Pre: graduate standing in electrical engineering or permission of instructor.

#### 571 Underwater Acoustics I

See Ocean Engineering 571.

#### 575 (or MTH 575) Approximation Theory and Applications to Signal Processing (3)

Interpolation; uniform approximation; least squares approximation; Hilbert space; the projection theorem; computation of best approximations; applications to the design of filters and beamformers, position location and tracking, signal parameter estimation. (Lec. 3) Pre: advanced calculus, elements of the theory of functions of a complex variable, and elements of linear algebra.

#### 581 Special Topics in Artificial Intelligence

See Computer Science 581.

#### 583 (or CSC 583) Computer Vision (3)

Algorithms used to extract information from two-dimensional images. Picture functions. Template matching. Region analysis. Contour following. Line

and shape descriptions. Perspective transformations. Three-dimensional reconstruction. Image sensors. Interfacing. Applications. (Lec. 3) Pre: MTH 362 or equivalent.

#### 584 (or STA 584) Pattern Recognition (3)

Random variables, vectors, transformations, hypothesis testing, and errors. Classifier design: linear, nonparametric, approximation procedures. Feature selection and extraction: dimensionality reduction, linear and nonlinear mappings, clustering, and unsupervised classification. (Lec. 3) Pre: 509 or introductory probability and statistics, and knowledge of computer programming.

#### 585 Digital Image Processing (3)

Digital representation of images. Image improvement techniques: restoration models and spatial, point, spectral, and geometric operators. Image analysis: morphological operators, edge detection, feature extraction, segmentation, and shape analysis. (Lec. 2, Lab. 2) Pre: 501 and 509.

#### 591, 592 Special Problems (1–3 each)

Advanced work under supervision of a faculty member arranged to suit individual requirements of student. (Independent Study) Pre: graduate standing. May be repeated for a maximum of 6 credits. 592: S/U credit.

#### 594 Special Topics in Electrical Engineering (1–3)

Intensive inquiry into a certain important field of current interest in electrical engineering. (Lec. 1–3) Pre: permission of instructor.

#### 599 Master's Thesis Research (1–9)

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

#### 601 Graduate Seminar (1)

Seminar discussions presented by faculty and outside speakers on topics of current research interest. (Seminar) May be repeated for a total of 2 credits. May be taken concurrently with 602. S/U credit.

#### 602 Graduate Seminar (1)

Student seminars including the presentation of research results and detailed literature surveys. Pre: permission of instructor. May be repeated for a total of 2 credits. S/U credit.

#### 606 Digital Filter Synthesis (3)

Review of z-transforms and discrete-time systems, properties of digital-filter networks, design of finite and infinite-impulse-response filters, accuracy considerations for coefficients and data, hardware implementation, system examples. (Lec. 3) Pre: 506 or equivalent.

#### 610 Applications of Information Theory (3)

Information theoretic underpinnings and practical techniques for data compression, channel coding for error control, and encryption and cryptography for

secure information transmission. (Lec. 3) Pre: 509 or permission of instructor.

### 648 Advanced Topics in Computer Architectures (3)

Modern high-performance computer structures, parallel and distributed hardwares and softwares, instruction level parallelism, memory hierarchy, fault tolerant computing, and future generation computers. (Lec. 3) Pre: 548.

### 661 Estimation Theory (3)

Extraction of information from discrete and continuous data, best linear estimation, recursive estimation, optimal linear filtering, smoothing and prediction, nonlinear state and parameter estimation, design and evaluation of practical estimators. (Lec. 3) Pre: 503 and 509.

### 665 Modulation and Detection (3)

Advanced treatment of modulation and detection theory. Minimum meansquare error, maximum likelihood, and maximum posterior probability estimators. Applications to communications systems and to radar and sonar systems. (Lec. 3) Pre: 510.

### 670 Advanced Topics in Signal Processing (3)

Seminar for advanced students. Selected topics of current research interest. Material will be drawn primarily from recent literature. (Lec. 3) Pre: 506 and 606.

### 672 Underwater Acoustics II

See Ocean Engineering 672.

### 677 (or OCE 677) Statistical Sonar Signal Processing (3)

Basic results in probability and statistics, signal processing, and underwater acoustics are applied to the design of detection, estimation, and tracking in active sonar, passive sonar, and underwater acoustic communication. (Lec. 3) Pre: MTH 451 or ELE 509, ELE 506, and ELE 571 (or OCE 571), or equivalents. ELE 510 is useful and closely related, but not required.

### 691, 692 Special Problems (1–3 each)

Advanced work under supervision of a faculty member arranged to suit individual requirements of a student. (Independent Study) Pre: permission of chairperson. May be repeated for a maximum of 6 credits. S/U credit.

### 694 Advanced Special Topics in Electrical Engineering (1–3)

Intensive inquiry into a certain important field of current interest in electrical engineering, requiring advanced sophistication of a 600-level course. (Lec. 1–3) Pre: permission of instructor.

### 699 Doctoral Dissertation Research

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## Engineering (EGR)

Dean: Professor Wright

### 105 Foundations of Engineering I (1)

Introduction to engineering. Problem solving. (Lec. 1)

### 106 Foundations of Engineering II (2)

Engineering problem solving. (Lec. 1, Lab. 2) Pre: MTH 141 or concurrent registration in MTH 141.

### 133 Artifacts in Modern Society (3)

Materials Science will be introduced to non-science and non-engineering freshman using a "case study" approach. (Lec. 3) Not open to engineering or science majors. (N)

### 316 (or PHL 316) Engineering Ethics (3)

A broad introduction to moral theory and its application to engineering, professionalism, and moral responsibility as an engineer. An understanding of engineering in a societal context. (Lec. 3) Pre: sophomore standing. (L) [D]

### 411 (or GER 411) Advanced Technical German (3)

Seminar on advanced scientific and engineering topics in an international context. All reading, discussion, and associated writing is conducted in German. (Lec. 3) Pre: any 400-level course in German and senior standing in an approved engineering program. Not for graduate credit.

### 412 (or SPA 412) Advanced Technical Spanish (3)

Seminar on advanced scientific and engineering topics in an international context. All reading, writing, and discussion will be conducted in Spanish. (Seminar) Pre: any 400-level course in Spanish and senior standing in an approved engineering program. Not for graduate credit.

## English (ENG)

Chairperson: Associate Professor Trimm

### 110 Introduction to Literature (4)

Analysis of literature through reading and discussion of a number of genres derived from a variety of literary cultures. (Lec. 4) Not available for English major credit. (A) or (L) [D]

### 160 (or CLS 160) Literatures of the World (4)

Introduction to significant works of world literature. (Lec. 4) (A) or (L) [D]

### 201 Principles of Literary Study (4)

Introduction to the study of literature through reading and discussion of major methodologies, analytical approaches, and perspectives in literary study. Students will also participate in a series of faculty presentations reflecting current critical and creative practices in the discipline. (Lec. 3, Rec. 1) Restricted to English majors.

### 205 Creative Writing (4)

Writing and analysis of works written by class members and professional writers. 205A Poetry; 205B Fiction; 205C Nonfiction; 205D Screen Writing. In 205C, type of writing varies with instructor. (Lec. 3, Project 3) 205A and 205B may be offered online. Students may repeat for a total of 12 credits but may not repeat the same letter.

### 245 Introduction to Film Decades (4)

Introduction to study of film in cultural context over an historical decade, e.g., Modernism and the Silent Era of the Twenties; Cinema of Wartime in the Forties; Vietnam, Nixon, and the Seventies Blockbuster. May be repeated once with a different emphasis. (Lec. 3, Project 3) A [D]

### 241, 242 U.S. Literature I, II (4 each)

241: Selections from U.S. literature, beginnings to the mid-19th century. 242: Selections from U.S. literature, mid-19th century to the present. 241 not required for 242. (Lec. 3, Project 3)

### 243 The Short Story (4)

Critical study of the short story from the early 19th century to the present (Lec. 3, Project 3) (A) or (L) [D]

### 245 Introduction to Film Decades (4)

Introduction to study of film in cultural context over an historical decade, e.g., Modernism and the Silent Era of the Twenties; Cinema of Wartime in the Forties; Vietnam, Nixon, and the Seventies Blockbuster. May be repeated once with a different emphasis. (Lec. 3, Project 3) A [D]

### 247 (or AAF 247) Introduction to Literature of the African Diaspora (4)

Major themes, genres, and motifs of the literatures of Africa and the Americas. Focus on one or more of these regions. Study of black oral and written literatures with emphasis on cultural, historical, political, and socioeconomic contexts. (Lec. 3, Project 3) (A) [D]

### 248 (or AAF 248) African-American Literature from 1900 to the Present (4)

Twentieth-century African-American literature, with emphasis on major issues, movements, and trends, including the study of W.E.B. DuBois, the Harlem Renaissance, the civil rights movement, and the black arts movement. (Lec. 3, Project 3) (A) [D]

### 250 (CLS) Themes and Myths (4)

Intensive study of the evolution and transformation of a myth or theme in several national literatures. An introduction to a comparative and interdisciplinary approach. (Lec. 3, Project 3) May be repeated for credit as often as topic changes.

### 251, 252 British Literature I, II (4 each)

251: Selections from British literature, beginnings to 1798. 252: Selections from British literature, 1798

to the present. (Lec. 3, Project 3) 251 not required for 252.

#### **260 Women and Literature (4)**

Critical study of selected topics. (Lec. 3, Project 3) (A) [D]

#### **262 Introduction to Literary Genres: Non-fiction (4)**

Introduction to the study of various types of non-fiction prose. (Lec. 3, Project 3) (A) [D]

#### **263 Introduction to Literary Genres: The Poem (4)**

Introduction to the study of the poem. (Lec. 3, Project 3) (A) [D] Professor Stein's section is Writing Intensive [WI].

#### **264 Introduction to Literary Genres: The Drama (4)**

Introduction to the study of the drama. (Lec. 3, Project 3) (A) [D]

#### **265 Introduction to Literary Genres: The Novel (4)**

Introduction to the study of the novel. (Lec. 3, Project 3) (A) [D]

#### **280 Introduction to Shakespeare (4)**

Introduction to the major plays and poetry of Shakespeare. (Lec. 3, Project 3) (A) or (L) [D]

#### **300 Literature into Film (4)**

Analysis of themes, techniques, printed and film narratives. 300A Drama; 300B Narrative. (Lec. 3, Lab 2)

#### **302 Topics in Film Theory and Criticism (4)**

Introduction to film theory and criticism. Emphasis on semiotics, auteur theory, psychoanalysis, genre studies, feminist theory, materialist critique, or cultural studies, with focus on range of popular, experimental, and documentary film traditions. May be repeated for credit when taken with different emphasis. (Lec. 3, Lab 2)

#### **303 Cinematic Auteurs (4)**

Literary study of one or more major directors with a substantial body of work exhibiting recurrent themes and distinctive style (e.g. Hitchcock, Kubrick, Kurasawa). Emphasis will vary. May be repeated once with different director. (Lec. 3, Lab 2)

#### **304 Film Genres (4)**

Literary study of the particular conventions and evolution of one or more film genres (e.g. romantic comedy, science fiction, western). Emphasis will vary. (Lec. 3, Lab 2) May be repeated once with a different genre.

#### **305 Advanced Creative Writing (3)**

Intensive writing and reading workshop for students at the advanced level who have preferably taken at least one previous class in creative writing. 305A Poetry; 305B Fiction; 305C Nonfiction; 305D Screen Writing. In 305C, type of writing varies with instruc-

tor. (Lec. 3, Project 3/Online). 305A and B may be offered online. Students may repeat for a total of 12 credits but may not repeat the same letter.

#### **317 Contemporary Women Novelists of the Americas**

See Women's Studies 317. (A) or (L) [D]

#### **330 The Structure of American English (4)**

Introduction to the phonology, morphology, and syntax of American English. Emphasis on skills needed to understand the prescriptive rules of grammarians and the descriptive rules of critics and teachers. (Lec. 3, Project 3) (S)

#### **332 The Evolution of the English Language (4)**

History of English from a minor dialect of the North Sea to a major language of the Renaissance. Focus on the languages and cultures of Beowulf, Chaucer, and Shakespeare. (Lec. 3, Project 3)

#### **335 Interdisciplinary Studies in Comparative Literature**

See Comparative Literature Studies 335.

#### **336 The Language of Children's Literature (4)**

Introduction to stylistic analysis using children's literature. Focus on sound patterns, word choice, and sentence structure to discuss appropriateness, interpretation, and evaluation. Emphasis on one writer or work. (Lec. 3, Project 3)

#### **337 Varieties of American English (4)**

Study of regional and social dialects of American English. Emphasis on variations in pronunciation and word choice and on New England varieties. Includes independent or group field projects. Course contains language that may be offensive to some students. (Lec. 3, Project 3)

#### **338 Native American Literature (4)**

Study of the literature of Native Americans. May cConsiders early texts including mythology, legends, and traditions as well as contemporary works. (Lec. 3, Project 3)

#### **339 Literary Nonfiction (4)**

Intensive study in one or more forms of nonfiction narrative (memoir, nature meditation, medical narrative, extended journalistic account, true crime, science narrative, historical account). (Lec. 3, Project 3) May be repeated once for a total of 6 credits when taken with different emphasis.

#### **345 Topics in American Colonial Literatures (4)**

Studies in the literature and culture of the New World. Topics include discovery, exploration, early modern empire, settlement of the Americas. May include fictional and non-fictional prose, poetry, or dramatic works by major authors and their contemporaries. (Lec. 3, Project 3) May be repeated once for a total of 6 credits, barring duplication of topics.

#### **347 Antebellum U.S. Literature and Culture (4)**

Study of literature and culture in the United States during the decades leading to the Civil War (the period also known as the American Renaissance/American Romanticism). (Lec. 3, Project 3)

#### **348 U.S. Literature and Culture from 1865 to 1914 (4)**

Study of post-Civil War poetry and prose. Readings may include Chesnut, Chopin, Crane, DuBois, James, Twain, Wharton, and others. (Lec. 3, Project 3)

#### **350 Literary Theory and Criticism (4)**

Introduction to theories of literature and their application in the analysis of selected texts. (Lec. 3, Project 3) May be repeated for credit as often as topic changes.

#### **352 Black Images in Film**

See African and African-American Studies 352.

#### **355 Literature and the Sciences (4)**

Study of the representation of scientific themes in literature and/or the relationship between literature and the sciences. (Lec. 3, Project 3) Pre: junior or senior standing. Enrollment priority given to students majoring in the sciences. (A) or (L) [D]

#### **356 Literature and the Law (4)**

Study of the representation of legal themes in literature and/or the relationship between literature and the law. (Lec. 3, Project 3) Pre: junior or senior standing. Enrollment priority given to students with career interests in law. (L) [D]

#### **357 Literature and Medicine (4)**

Study of the representation of medical themes in literature and/or the relationship between literature and medicine. (Lec. 3, Project 3) Pre: junior or senior standing. Enrollment priority given to students with interest in medical careers. (A) [D]

#### **360 Africana Folk Life**

See African and African American Studies 360.

#### **362 (or AAF 362) African-American Literary Genres (Other than Short Story and Novel) (4)**

Study of drama and poetry in the continued oral and written heritage of Africa and America, excepting short story and the novel.. Focus on Baraka, Bullins, Dunbar, Giovanni, Hughes, and Walker. (Lec. 3, Project 3)

#### **363 (or AAF 363) African-American Fiction (4)**

Study of formal and thematic developments in the African-American novel and short story. Focus on Baldwin, Chesnut, Ellison, Gaines, Hurston, Jacobs, Marshall, Morrison, Naylor, Reed, Walker, Wideman, Wilson, and Wright. (Lec. 3, Project 3)

#### **364 (or AAF 364) Contemporary African Literature (4)**

Study of contemporary African literature by genre, region, or theme, with emphasis on literary tradi-

tions, issues, and socio-cultural contexts. (Lec. 3, Project 3)

### 367 The Epic (4)

Studies in epic literature from Homer to the modern period. Historical emphasis will vary with instructor. (Lec. 3, Project 3)

### 368 The Bible (4)

Introduction to poetry and narrative in the Old Testament and the Apocrypha, primarily in the Authorized (King James) Version. (Lec. 3, Project 3)

### 374 British Literature: 1660–1800 (4)

Study of major trends in late 17th- and 18th-century verse, prose, drama, and fiction by such writers as Milton, Dryden, Behn, Congreve, Pope, Finch, Swift, and Johnson. (Lec. 3, Project 3)

### 376 Topics in Victorian Literature and Culture (4)

Notable literary and cultural movements and motifs of the Victorian era. May include prose, poetry, or dramatic works by major authors and their contemporaries. (Lec. 3, Project 3) May be repeated once with a different topic.

### 377 Topics in Romanticism (4)

Notable literary and cultural movements and motifs of Romantic literature and culture. May include prose, poetry, or dramatic works by major Romantic authors and their contemporaries. May be repeated once with a different topic. (Lec. 3, Project 3) May be repeated once with a different topic.

### 378 Aspects of Postmodernism (4)

Introduction to major issues and theories of post-modern literature and culture. Emphases may include temporality, borders, cyberculture, theories of the image, and constructions of subjectivity. (Lec. 3, Project 3)

### 379 Contemporary Literature (4)

Studies in contemporary literature with an emphasis on cultural and interdisciplinary issues. Movements and emphases may include multiculturalism, culture and technology, globalization, and politics of the body. (Lec. 3, Project 3)

### 381 Topics in Medieval Literature (4)

Emphasis on cultural and interdisciplinary issues. (Lec. 3, Project 3) May be repeated once with a different topic.

### 382 Topics in Renaissance Literature (4)

Emphasis on cultural and interdisciplinary issues. (Lec. 3, Project 3) May be repeated once with a different topic.

### 383 Modernist Literature, 1900–1945 (4)

Poetry, drama, fiction, and/or nonfiction prose with an emphasis on writers such as Eliot, Faulkner, Hurston, Joyce, Stevens, Yeats, Woolf, and Wright. (Lec. 3, Project 3)

### 385 (or WMS 385) Women Writers (4)

Analysis of the poetry, drama, or fiction of women writers. Emphasis on 18th-century, 19th-century, 20th-century, or contemporary authors. (Lec. 3, Project 3) May be repeated for credit when taken with different emphasis.

### 387 Foundational Texts in Modern Gay and Lesbian Culture (4)

Study of literary works that trace the origins and ongoing definitions of modern homo/heterosexual identities. Selections from writers such as Whitman, Wilde, Proust, Woolf, Lawrence, Gide, Mann, Cather, and Baldwin. (Lec. 3, Project 3)

### 394, 395 Independent Study (1–4 each)

Extensive individual study and research, culminating in a substantial essay. (Independent Study) Pre: permission of chairperson. May be repeated for a maximum of 8 credits.

### 396 Literature of the Sea: The Rumowicz Seminar (4)

Studies of maritime literature and culture. Poetry and prose of the sea. Guest lecturers and field trips. (Seminar)

### 399 Special Topics in Literature (4)

Specialized topics in the study of literature offered by specialists in the field. (Lec. 3, Project 3)

### 432 Cultural History of the English Language (4)

Studies in the history of the English language with a focus on cultural and social context. Attention to the relation between linguistic change and the role of language in cultural and political events. (Lec. 3) Not for graduate credit.

### 446 Drama (4)

Intensive studies in drama. **May include special topics in plays, performance, and playwrights.** (Seminar) **Not for graduate credit.**

### 447 Poetry (4)

Study of major contributions and movements in poetry of any period. (Seminar) Not for graduate credit.

### 451 Advanced Topics in International Film Media

See Film Media 451.

### 469 The Novel (4)

Focuses on generic considerations of the novel in relation to historical contexts such as national/cultural politics, philosophy, psychology. The “novel” is examined against the historical specificity of its production. (Seminar) Not for graduate credit.

### 472 Shakespeare (4)

Studies in Shakespeare’s drama and poetry. (Seminar) Not for graduate credit.

### 478 Medieval Authors (4)

Studies in works by one or more major medieval authors. (Seminar) May be repeated once, barring duplication of writers. Not for graduate credit.

### 479 Renaissance Authors (4)

Studies in works by one or more major Renaissance authors (excepting Shakespeare). May be repeated once, barring duplication of writers. Not for graduate credit.

### 480 British Restoration and Enlightenment Authors (4)

Studies in works by one or two major Restoration and Enlightenment authors. (Seminar) May be repeated once for a total of 8 credits, barring duplication of writers. Not for graduate credit.

### 482 American and U.S. Authors to 1820

Studies in works by one or two major American and U.S. authors to 1820. (Seminar) May be repeated once for a total of 8 credits, barring duplication of writers. Not for graduate credit.

### 485 U.S. Authors after 1900 (4)

Studies in works by one or two major United States authors. (Seminar) May be repeated once for a total of 8 credits, barring duplication of writers.

### 486 British Authors: 19th Century (4)

Studies in works by one or two major British authors. (Seminar) May be repeated once for a total of 8 credits, barring duplication of writers. Not for graduate credit.

### 487 World Authors (4)

Studies in works by one or two major world authors (excepting U.S. or British authors). (Seminar) May be repeated once for a total of 8 credits, barring duplication of writers. Not for graduate credit.

### 489 Literature and Empire (4)

Studies of specific authors, literary movements, or comparative themes in texts reflecting the impact of colonization and imperialism. (Seminar) .Not for graduate credit.

### 493, 494 Internship in English (4)

Exploration of career goals and job opportunities. Participate in a variety of work situations, supervised by both faculty member and on-site personnel. 156 hours per 4 credits. (Practicum) Pre: 20 credits in English and permission of chairperson. May be taken for a total of 8 credits, only 4 of which may be used as credit toward the English major. Not for graduate credit. S/U only.

*All 500-level courses require graduate standing in a degree program or permission of instructor. All courses except ENG 510 and 511 may be repeated once if emphasis changes.*

### 501 Workshop in Creative Writing (3)

Close supervision and discussion of creative writing, including poetry, nonfiction, short prose forms, scripts, and novels. (Lec. 3)

### 510 Introduction to Professional Study I (1.5)

Orientation to the major discourses, critical frameworks, and databases constituting graduate research

in language and literary studies, including computer-assisted research methodologies. (Seminar). S/U only.

### 511 Introduction to Professional Study II (1.5)

Orientation to the major discourses, critical frameworks, and databases constituting graduate research in language and literary studies, including computer-assisted research methodologies. (Seminar). Pre: 510. S/U only.

### 514 History of Critical Theories (3)

Historical survey of critical theory from antiquity to the present. Pre: graduate standing or permission of instructor.

### 535 Old English (3)

Introduction to the language and literature. (Lec. 3)

### 540 Studies in American Texts Before 1815 (3)

Cultural texts and topics of the Western Hemisphere before 1815: literary and nonliterary writings and genres; exploration and captivity narrative; African transmissions; critical theory; culture, gender, race, and class. (Lec. 3)

### 543 Studies in 19th-Century American Texts (3)

Literary and nonliterary cultural texts, genres, and topics of the Western Hemisphere. May include media; oral, industrial, and popular cultures; critical theory and the analysis of discourses; issues of class, gender, and race. (Lec. 3)

### 545 Studies in American Texts After 1900 (3)

Modern, contemporary, and postmodern cultural texts, genres, and topics of the Western Hemisphere; e.g. literary and nonliterary writings, performance modes, media, theory, and cultural studies of race, genre, and class. (Lec. 3)

### 550 Studies in British Texts Before 1700 (3)

Literary and nonliterary cultural texts and genres of the medieval, Renaissance, and Restoration periods. May include oral and written forms; the roles of audience, gender, class, and other social relations. (Lec. 3)

### 553 Studies in British Texts 1700–1832 (3)

Literary and nonliterary cultural texts and genres during the Restoration, Augustan, Enlightenment, and Romantic periods; e.g., drama, media, rhetoric, theory, and discourse analysis of gender, class, race, and other social relations. (Lec. 3)

### 555 Studies in 19th-Century British Texts (3)

Literary and cultural texts and genres during the 19th century. May include drama and other performance modes; critical theory and the analysis of discourses; representations of class, gender, and race. (Lec. 3)

### 557 Studies in British Texts After 1900 (3)

Modern, contemporary, and postmodern cultural texts; e.g., literary and nonliterary writings, drama,

colonial and European cultural relations, film, theory, and cultural studies of institutional life and other social relations. (Lec. 3)

### 560 Studies in European Texts (3)

Introduction to the study of European texts in translation. May include different historical periods; literary and nonliterary writings; theory; film; rhetoric; and issues of culture, gender, race, class, and sexuality. (Lec. 3)

### 570 Studies in Postcolonial Texts (3)

Investigation of similarities and differences between nonoccidental and occidental genres; traditions and practices of postcolonial oral, written, and visual cultural forms from Africa, Australia, New Zealand, the Americas, India, Ireland, and Scotland. (Lec. 3)

### 590 Selected Topics (1–3)

Selected topics in American and British literature and topics of special interest not covered by traditional department offerings. (Lec. 1–3)

### 595 Master's Project (3)

Student produces MA portfolio in consultation with major professor and committee. S/U only.

### 599 Master's Thesis Research

Student produces MA thesis in consultation with major professor and committee. S/U only.

*All 600-level (seminar) courses require graduate standing in a degree program or permission of instructor.*

*Courses include specialized topics, intensive readings, occasional lectures, and frequent presentation of ongoing research by students. A substantial research project is required. May be repeated once if emphasis changes.*

### 601 Seminar in Creative Writing (3)

Seminar for advanced students under supervision of a member arranged to suit individual project requirements of students. (Seminar)

### 605 Seminar in Genres (3)

In-depth study of a single or several genres and/or subgenres, such as epic, drama, or horror film. (Seminar)

### 610 Seminar in Historical Periods (3)

Selected topics of relevance for historical periods. Periods emphasized are medieval, 16th- and 17th-century British, 18th- and 19th-century British, North American, and postcolonial. (Seminar)

### 615 Seminar in Authors (3)

In-depth and critical study of selected works of one or two authors from any historical period, genre, or medium; theories and traditions of authorship; authorship and gender. (Seminar)

### 620 Seminar in Culture and Discourse (3)

Contrasting theoretical conceptions of culture, discursive practices, hegemony, the public and private spheres, and related concerns; may cross any historical formation or period. (Seminar)

### 625 Seminar in Media (3)

Critical and theoretical conceptions of one or more media across any historical formation or period. (Seminar)

### 630 Seminar in Canons (3)

Critical and theoretical conceptions of canons and canonicity, including emerging or revisionist canons. (Seminar)

### 635 Seminar in Subjectivities (3)

Critically investigates class, race, gender, sexuality, and/or other subject positions as they are constructed by literary or other media. Might emphasize reading and writing communities, form and ideology, or identity politics. (Seminar)

### 650 Seminar in Critical Theory (3)

In-depth study of one or several critical theories such as psychoanalytic, feminist, postcolonial, and cultural studies. (Seminar)

### 660 Seminar in Special Topics (3)

Topics of special interest not covered by other offerings. (Seminar)

### 691, 692 Independent Graduate Study (3 each)

Advanced study of an approved topic under the supervision of a faculty member. (Independent Study) Pre: permission of ENG graduate director. May not be repeated for credit.

### 699 Doctoral Dissertation Research

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

### 999 Methods of Teaching Literature (0)

Materials and various methods of teaching literature on the college level. Required of teaching assistants who will teach English department literature courses as part of their TA assignment. (Seminar) Pre: graduate standing.

## English Language Studies (ELS)

### 112 Expository Writing in English (3)

Equivalent to WRT 104 but restricted to students whose first language is not English. Varieties and strategies of expository writing for different audiences and situations. (Lec. 3) (ECw)

### 122 Academic Writing in English (3)

Practice in writing assignments for introductory and general education courses across the curriculum. Restricted to students whose first language is not English. (Lec. 3) (ECw)

### 312 Oral English Skills for the Public Sphere (3)

Focus on pronunciation, listening and speaking skills, and a variety of speaking projects. Special emphasis on speaking freely in academic and social situations. (Lec. 3)

**322 Oral English Skills for the Academic Sphere (3)**

Intensive focus on pronunciation, listening and speaking skills, and a variety of communicative projects. Develop oral presentation skills. (Lec. 3)

**512 Oral Communication Skills for International Teaching Assistants (3)**

Intensive focus on pronunciation, listening and speaking skills, and awareness of colloquial American speech. (Lec. 3) Pre: graduate standing and permission of instructor. May be repeated until oral proficiency requirement is met.

**612 Advanced Communication Skills for International Teaching Assistants (3)**

Focus on pronunciation, teaching skills, and cross-cultural differences in education. Priority given to international teaching assistants. (Lec. 3) Pre: graduate standing. May be repeated until oral proficiency requirement is met.

**Entomology (ENT)**

*Chairperson:* Professor Maynard (Plant Sciences)

**286 Humans, Insects, and Disease**

See Biological Sciences 286.

**385 (or BIO 385) Introductory Entomology (3)**

Introduction to the diverse components of entomology, emphasizing basic principles of insect morphology, physiology, behavior, and ecology. Current topics in insect biodiversity and management strategies. (Lec. 3) Pre: BIO 101 and 102, or permission of instructor.

**386 (or BIO 386) Introductory Entomology Laboratory (1)**

Insect structure, function, and systematics with field studies in ecology, survey, and collection of beneficial and pest insects in their natural environment. (Lab. 3) Pre: 385 or concurrent enrollment in 385.

**387 Insects of Turf and Ornamentals (3)**

Biology, ecology, and management of insects affecting turfgrasses, trees, and ornamental plants. (Lab. 3) Pre: PLS 200 or permission of instructor.

**390 (or AVS 390) Wildlife and Human Disease (3)**

Introduction to the important diseases of humans carried by wildlife, including surveillance, epidemiology, transmission, public health impact, and prevention. Interdisciplinary approach with emphasis on problem solving using real-life examples. (Lec. 3) Pre: BIO 101; BIO 262 or ENT 385 or equivalent.

**411, 511 Pesticides and the Environment (3 each)**

Review of the historical issues regarding pesticides, regulation, how they work, and costs/benefits associated with their use. Pre: BIO 102, CHM 103, 105; PLS 200, or permission of instructor. 411: not for graduate credit.

**519 Insect Biological Control (3)**

Natural regulation of pest abundance. Theoretical issues and practical experience in the use of biological controls for managing insect and weed problems. (Lec. 2, Lab. 1) Pre: 385 or permission of instructor. In alternate years. Next offered spring 2012.

**520 Insect Morphology and Physiology (3)**

An introduction to the structure and function of the insects and related arthropods. (Lec. 2, Lab. 2) Pre: 385 or permission of instructor.

**544 (or BIO 544) Insect Ecology (2)**

Ecology of insects and other terrestrial arthropods at the physiological, individual, population, community, and ecosystem levels. Pre: permission of instructor. In alternate years. Next offered fall 2011.

**550 Insect Taxonomy and Systematics (3)**

External morphology of insects and taxonomy of major families. (Lec. 2, Lab. 2) Pre: 385. In alternate years. Next offered fall 2011.

**555 Insect Pest Management (3)**

Evaluation of past and present pest-control strategies in light of insect ecology. Development of pest-management systems emphasizing biological control, resistant plants, and ecosystem redesign. (Lec. 3) Pre: PLS 200 or ENT 385 or permission of instructor. In alternate years. Next offered spring 2013.

**561 Aquatic Entomology (3)**

Biology of insects in aquatic environments, including systematics, morphology, and ecology. Field trips emphasize relations between species and habitat and the role of insects in aquatic management programs. (Lec. 2, Lab. 3) Pre: 385 or permission of instructor. In alternate years.

**571 (or MIC 571) Insect Microbiology (3)**

A two-part investigation of insect-microbe associations, concentrating on the comparative pathobiology of microbial agents in the insect host and the transmission of disease organisms by the insect vectors. (Lec. 3) Pre: 385 and MIC 211, or permission of instructor. In alternate years. Next offered spring 2013.

**586 Medical and Veterinary Entomology**

See Biological Sciences 572.

**591, 592 Special Problems in Entomology (1–3 each)**

Advanced independent research projects supervised by members of the research and unrelated to thesis research. Projects developed to meet individual needs. (Independent Study) Pre: permission of instructor by override only.

**Environmental Economics (EEC)**

*Chairperson:* Professor Opaluch

**101 Freshman Inquiry into Environmental and Natural Resource Economics (1)**

Introduction for freshmen to the opportunities, careers, research activities, applied outreach, and educational programs in the Department of Environmental and Natural Resource Economics. Interact weekly with faculty. Explore hands-on modules. (Lec. 1) S/U credit.

**105 Introduction to Resource Economics (3)**

Application of microeconomic principles to selected resource problem areas. The market mechanism and its alternatives are examined as methods of resolving contemporary resource use problems. (Lec. 3) (S)

**110 Multimedia Presentation of Environmental Issues (3)**

Research pressing environmental issues and create multimedia presentations using computer technologies to combine slides, video, audio, and computer graphics. No technical knowledge or computer skills are necessary. (Lec. 2, Lab. 2)

**205 Resource Management and Conservation (3)**

Introduction to economically efficient resource management, the development of management regimes that support a sustainable economy; valuation, property rights, market structure, dynamic resource management. (Lec. 3) Pre: 105.

**310 Economics for Environmental Resource Management and Policy (3)**

Economic approaches to natural resource use and environmental policies. Exploring measures of the "economic value of environment." How scientists, managers, and markets can affect the environmental quality of life. (Lec. 3) Pre: 105 or ECN 201. (S)

**325 Planning and Managing a Small Natural Resources Firm (3)**

Directed toward students with an interest in managing a small marine, agricultural, or other natural resources firm. (Lec. 3) Pre: 105 or ECN 100 or 201 or permission of instructor.

**345 Sustainable Development, Trade, and the Environment (3)**

To understand the relationship between economic development, international trade and the environment. Topics include sustainable development, trade policies and the environment, climate change and development, and institutions for managing the commons. (Lec. 3) Pre: 105 or ECN 201 or permission of instructor.

**356 Tourism Economics (3)**

Application of economic principles and research methods to tourist and tourism industry behavior.

Practical research methods for assessing economic, social, and environmental benefits and costs of tourism development are examined. (Lec. 3) Pre: 105 or permission of instructor. (S)

#### **410 Fish and Wildlife Economics (3)**

Institutional, biological, and economic factors affecting the use of fish and wildlife resources. Economic analysis is applied to problems of fish and wildlife management in both marine and terrestrial ecosystems. (Lec. 3) Pre: 310 or ECN 328 or 323 or permission of instructor.

#### **432 Environmental and Resource Economics and Policy (3)**

Economic analysis of policies that address environmental and natural resource problems. Topics include pollution-control policies, economic incentives, and the optimal use of renewable and nonrenewable natural resources. (Lec. 3) Pre: 205 or ECN 201.

#### **435 Aquacultural Economics (3)**

Economics of international and domestic development of aquaculture, environmental and resource regulations on aquaculture, and management of and decision making in aquacultural enterprises. Analysis of public and private aquaculture production and marketing. (Lec. 3) Pre: 105 or ECN 201 or permission of instructor.

#### **440 Benefit-Cost Analysis (3)**

Basic concepts in benefit-cost analysis. Measurement, comparison of benefits and costs over time, and criteria for evaluation of projects and public policies. Problems and case studies in evaluation of current natural resources issues. (Lec. 3) Pre: 105 or permission of instructor.

#### **441 Markets, Trade, and Natural Resources (3)**

Analysis of the role of markets in the valuation, management, and distribution of natural resources (esp. fish); price analysis; international trade; channels of distribution; commodity futures and options markets; marketing information; regulations and controls; cooperative marketing. (Lec. 3) Pre: 105 or ECN 201 or permission of instructor.

#### **491, 492 Special Projects (1–3 each)**

Workshop for advanced students where individuals or small groups are assigned projects requiring the analysis of natural resource and allocation problems with particular emphasis on marine resources. (Independent Study) Pre: permission of chairperson.

#### **501 Graduate Seminar in Natural Resource Economics (1)**

Presentation of research and discussion of current issues and methodologies in environmental and natural resource economics. (Seminar) Enrollment is required of all full-time graduate students in residence; exceptions made with permission from chairperson. No more than one credit may be taken for program credit. S/U credit.

#### **502 Research Methodology in Environmental and Natural Resource Economics (3)**

Practice and methods of applied research in environmental and natural resource economics. Topics include philosophical foundations, research project design, reporting research results, and criticism of proposals and research papers. (Lec. 3) Pre: 528 and 576 or permission of instructor.

#### **514 Economics of Marine Resources (3)**

Role of economics in management of estuarine and marine resources. Particular attention to resource valuation, environmental issues, and management of renewable and nonrenewable resources. (Lec. 3) Not for graduate credit in resource economics.

#### **518 Mathematics for Economists (2 or 4)**

Introduction to mathematical methods in economics and business. Economic applications of constrained and unconstrained optimization, matrix algebra, primal and dual functions, eigen roots, with illustrations from economics, finance, and environmental and natural resource economics. (Lec. 2 or 4) Pre: ECN 328 and MTH 131 or equivalent or permission of instructor.

#### **520 Production Economics (2)**

Production in natural resource economics. The formulation and estimation of production functions. Technological change in economic growth and its measures. New directions in production theory and applications. (Lec. 2) Pre: at least 2 credits of 518, or MTH 131.

#### **522 Computer Intensive Methods in Resource Economics (3)**

Use of selected software packages to analyze topics and numerical problems in environmental and natural resource economics, including GAMS/MINOS, spreadsheets, Crystal Ball, Matlab, GIS, and SAS. (Lec. 2, Lab. 2) Pre: 518 or equivalent (may be taken concurrently).

#### **527 (or ECN 527) Macroeconomic Theory (3)**

Static and dynamic models of aggregate economic behavior developed and analyzed. (Lec. 3) Pre: ECN 327 and 375 or equivalent, or permission of instructor.

#### **528 (or ECN 528) Microeconomic Theory (3)**

Analytic tools of optimization. Neoclassical price and production theory. Neoclassical theory of consumer and producer behavior, price and distribution, partial and general equilibrium, and welfare economics. (Lec. 3) Pre: ECN 328 and 375 or equivalent, or permission of instructor.

#### **529 Game Theory (3)**

Analysis of situations of conflict and cooperation, with economics and business applications. Introduction to cooperative and noncooperative games, including the extensive and strategic forms, Nash equilibrium, repeated games, and bargaining. (Lec. 3) Pre: 528 or permission of instructor.

#### **532 Land Resource Economics**

See Community Planning 537.

#### **534 Economics of Natural Resources (4)**

Microeconomic theory applied to problems of natural resource allocation. The rationale for government intervention in the market's provision of natural resources and alternative techniques for optimally allocated natural resources are investigated. (Lec. 4) Pre: 528 or permission of instructor.

#### **535 Environmental Economics (3)**

Theory of externalities; incentive-based and regulatory policy instruments for addressing market failure; theory and methods for valuing natural resource and environmental services; other environmental topics. (Lec. 3) Pre: 528 or equivalent.

#### **540 Applied Resource Economics (3)**

Examines issues in agricultural and natural resource policy through applications of theoretical and empirical tools. Applications include pollution control, fisheries management, and water and agricultural policy. (Lec. 3) Pre: 528 or permission of instructor.

#### **542 Conservation Biology and Resource Economics**

See Natural Resources Science 532

#### **543 Economic Structure of the Fishing Industry (3)**

Analysis of fishing industries from the standpoint of activity and efficiency. Problems related to common property resources, government policy, labor, and legal and institutional factors. (Lec. 3) Pre: 514 or permission of instructor. In alternate years. Next offered fall 2012.

#### **570 Experimental Economics (3)**

Controlled laboratory experiments to study economic theories, institutions, and policies. Provides an overview of experiment design and nonparametric data analysis. Applications include game theory, markets, public goods, and uncertainty. (Lec. 3) Pre: 528 or permission of instructor.

#### **576 (or ECN 576 or STA 576) Econometrics (4)**

Application of statistics and mathematics to economic analysis. Implication of assumption required by statistical methods for testing economic hypotheses. Current econometric methods examined and discussed. (Lec. 3, Lab. 2) Pre: ECN 575 or equivalent, STA 308 or equivalent, or permission of instructor.

#### **591, 592 Special Projects (1–3 each)**

Advanced work under supervision arranged to suit the individual requirement of the student. (Independent Study) Pre: permission of chairperson.

#### **595 (or PSC 595 or SOC 595) Environment and Development Economics (3)**

Application of economic principles and research methods to understand the economics of environmental and natural resource management and

poverty alleviation. (Lec. 3) Pre: 528 or permission of instructor.

#### 598 Master's Nonthesis Research (1–3)

Credit for completion of major paper. (Independent Study) Pre: enrollment in nonthesis master's program in resource economics.

#### 599 Master's Thesis Research

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

#### 602 Research Methodology (1)

Practice and methods of research in environmental and natural resource economics. Philosophical foundations, competing views on methodology, project design, execution and communication of results to different audiences. (Lec. 1) Pre: 528 and 576 and concurrent registration in 502. In alternate years. Next offered spring 2012. S/U credit.

#### 610 Advanced Studies (1–3)

Advanced topics in resource economics. Mathematical models in resource management. (Independent Study) May be repeated with different topics.

#### 624 Dynamic Economic Models (3)

Fundamentals of dynamic economic theory. Dynamic optimization techniques applied to environmental and natural resource economics. (Lec. 3) Pre: 528 or permission of instructor.

#### 628 (or ECN 628) Advanced Microeconomic Theory I (3)

Neoclassical value and distribution theory. Theories of imperfect competition, general equilibrium theory, and dynamic analysis. (Lec. 3) Pre: 528 or permission of instructor.

#### 630 Advanced Microeconomic Theory II (3)

Development and application of welfare theory to natural resource use. Welfare concepts such as consumer surplus, producer surplus, and marginal cost pricing in policy decisions for agriculture and natural resources. (Lec. 3) Pre: 628 or permission of instructor. In alternate years. Next offered spring 2013.

#### 634 Advanced Economics of Natural and Environmental Resources (4)

Concepts of economic efficiency applied to natural resources with emphasis on intertemporal allocation of nonrenewable and renewable resources. Application of welfare and institutional economics to resource management and development; analysis of optimum allocation among users. (Lec. 4) Pre: 534 and 624 or permission of instructor.

#### 635 Marine Resources Policy (3)

Analysis of public policy problems relating to estuarine and marine resources, including natural resource damage assessment, environmental issues, coastal zone concerns, and other selected topics. (Lec. 3) Pre: 534. In alternate years. Next offered spring 2012.

#### 676 (or ECN 676) Advanced Econometrics (4)

A course covering the tools necessary for professional research in resource economics. Reviews the general linear model, but emphasis is on simultaneous equation models. Assumes a knowledge of introductory econometrics, statistical theory, and matrix algebra. (Lec. 4) Pre: 576 or its equivalent.

#### 677 Econometric Applications in Resource Economics (3)

Special topics in econometrics as applied to agriculture and natural resources. Topics include time series models, Bayesian analysis, and dichotomous dependent variables. (Lec. 3) Pre: 676. In alternate years. Next offered fall 2011.

#### 699 Doctoral Dissertation Research

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## Environmental Sciences (EVS)

*Chairperson:* Professor McWilliams (Natural Resources Science)

#### 366 Communicating Environmental Research and Outreach (2)

Value and techniques of communicating scientific research and outreach efforts. Focus on technical and communication skill development. Student must be engaged in a personal research or outreach experience. (Seminar) Pre: permission of instructor; by override only.

#### 484 Environmental Hydrogeology

See Geosciences 484.

#### 501 Development of Learning Outcomes for MESM (1)

Formulate learning outcomes and develop professional internships for new MESM students through interaction with URI faculty involved in the MESM tracks, develop skills in environmental communication, leadership, and ethics. (Seminar). Pre: enrollment in MESM graduate program.

#### 502 Seminar in Environmental Science and Management (1)

Presentation of proposed, ongoing and completed major projects by MESM graduate students. Discussion among graduate students, faculty, and other mentors on project design, methods, analysis, and presentation (Seminar) Pre: enrollment in MESM graduate program.

#### 582 Innovative Subsurface Remediation Technologies

See Geosciences 582.

#### 584 Environmental Hydrogeology

See Geosciences 584.

#### 597 Professional Internship in Environmental Science and Management (1–3)

Supervised work performed with an environmental agency, nongovernmental organization, or private firm as part of the requirements of the Master of Environmental Science and Management degree program. (Practicum) Pre: enrollment in M.E.S.M. degree program.

#### 598 Professional Master's Research (3)

Independent investigation to satisfy the research requirement for the Master of Environmental Science and Management degree. Substantial paper required. (Independent Study). Pre: enrollment in M.E.S.M. degree program.

#### 599 Master's Thesis Research

To be taken by students in the Master of Science in environmental sciences degree program. Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

#### 610 Multidisciplinary Problem Solving in Coastal Ecosystems (3)

Focus on integrated research/policy in estuarine, watershed, and fisheries research through case studies emphasizing the integration of policy and science in coastal management. Methodology will stress work in multidisciplinary teams framed in humanities perspectives. (Lec./Lab.). May be repeated for credit twice. Pre: permission of instructor.

#### 612 Leadership and Communication in Coastal Ecosystem and Management (1–3)

Weeklong workshop for development of skills and/or knowledge in the areas of social equity, ethics, human values, communication, and leadership for application in bridging science and policy in coastal stewardship. Pre: 610. May be repeated for up to 5 credits. S/U credit only.

#### 614 White Papers in Integrated Coastal Science (6)

Preparation of a written synthesis of environmental, economic, social, and ethical dimensions of current issues in coastal ecosystem management. Project completed in collaboration with a nonacademic partner institution. (Independent Study). Pre: 610, 612.

#### 616 Field Practicum in Coastal Science (6)

Science field practicum using array of investigative methods; insight into nature and scale, analytical and interpretative approaches applied to data; approaches to describe uncertainty; and ways research can inform policymakers. (Practicum)

#### 618 Internship in Coastal Management (9–12)

Supervised internship in an approved work setting to provide students with experience relevant to their career goals. Students work with advisors to secure internship positions and design learning contract. Pre: permission of instructor.

**699 Doctoral Dissertation Research**

To be taken by students in the Ph.D. in environmental sciences degree program. Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**Film Media (FLM)**

*Director:* Professor Wills

**101 Introduction to Film Media (3)**

Introduction to techniques of film practice, film history, genres, analysis of film texts, and reading of film images in their aesthetic, cultural, and literary context. (Lec. 2, Lab. 2/Online) (A) [D]

**110 Introduction to Film Media Production Technologies (4)**

Introduction to single-camera field production styles and aesthetics with emphasis on camera operation, lighting and editing by means of fundamental critical studies, field projects, studio supervision and experience. (Lec. 3, Lab. 2)

**203 Film Theory (3)**

An introductory survey of classical and contemporary approaches to film theory and criticism. (Lec. 3). (A) [D]

**204 History of Film I (3)**

A survey of world cinema from its invention in the 1890s to the early 1950s, examining the production, distribution, and exhibition of narrative, documentary, and experimental among other forms of film. (Lec. 2, Lab. 2). (A) [D]

**205 History of Film II (3)**

A survey of world cinema from the 1950s to the present time, examining the production, distribution, and exhibition of narrative, documentary, and experimental among other forms of film. (Lec. 2, Lab. 2). (A) [D]

**351 Topics in Film Media Production (4)**

Application of one or more production technologies in film media genres and analysis of their aesthetic implications. (Lec. 3, Lab. 2) Pre: sophomore standing or permission of instructor. FLM 110 or video or filmmaking course from ART, COM, or JOR recommended. May be repeated for a maximum of 12 credits with permission of the director and change of topic.

**352 Topics in Film Media Critical Studies (4)**

Critical examination of historical, theoretical and aesthetic topics in world cinema. (Lec. 3, Lab. 2) Pre: sophomore standing or permission of instructor. FLM 101, 204 or 205 recommended. May be repeated for a maximum of 12 credits with permission of the director and change of topic.

**401 Field Experience in Film Media (1–6)**

Structured academic work in a business, industry, educational, or agency setting under the supervision of a faculty advisor. (Practicum) Pre: permission of faculty advisor.

**444 Advanced Topics in Documentary Film Media Production (4)**

Critical examination and research of selected historical, theoretical or aesthetic issues in international documentary filmmaking. (Lec. 3, Lab. 2) Pre: junior standing or permission of instructor; 101 and 204 or 205. May be repeated once with permission of the instructor and with change of emphasis. Not for graduate credit.

**445 Advanced Topics in Film Media Production (4)**

Advanced study and practice of production techniques, technologies and aesthetics through projects, studio supervision and field experience. (Lec. 3, Lab. 2) Pre: junior standing or permission of instructor, and either ART 215 or COM 341 or COM 342 or JOR 331 or FLM 351. May be repeated with change of emphasis and permission of instructor. Not for graduate credit.

**451 (or ENG 451 or CLS 451) Advanced Topics in International Film Media (4)**

Study of international film genres from one or more national, regional, or diasporic cultures and traditions. Emphases on theoretical, historiographic, and media research methods. (Lec. 3, Lab. 2) Pre: junior standing or permission of the instructor. FLM 204 or 205 recommended. May be repeated for a maximum of 8 credits with change of emphases or topics.

**491 Directed Studies in Film Media (1–6)**

Directed study for students wanting to do advanced work in film media. Individual research and reports on problems of special interest. (Independent Study) Pre: acceptance of project by faculty member and approval by program director. May be repeated for a total of 6 credits.

**495 Seminar in Film Media (3)**

An intensive, interdisciplinary capstone course; exploring writings and ideas about film across two or more fields of study; or examining cross-cultural themes and issues in world cinema. Topic to be announced. (Seminar) Pre: 101 and 203 or ENG 302 or permission of instructor.

*Following are related courses in other departments eligible for both the film media major and minor.*

**African and African-American Studies**

352 Black Images in Film

**Art**

204 Digital Art and Design I

215 Video and Filmmaking I

304 Digital Art and Design II

316 Video and Filmmaking II

417 Video and Filmmaking III

**Art History**

374 Topics in Film

376 History of Animation

377 History of Experimental Film

**Communication Studies**

341 Documentary Film Pre-Production

342 Documentary Film Production

346 Social and Cultural Aspects of Media

414 Rhetoric of Sports in Film

445 Media Advertising

**English**

205D Creative Writing: Screen Writing

245 Introduction to Film Decades

300A Literature into Film: Drama

300B Literature into Film: Narrative

302 Topics in Film Theory and Criticism

303 Cinematic Auteurs

304 Film Genres

305D Advanced Creative Writing: Screenwriting

352 Black Images in Film

**French**

320 Studies in French Cinema

**Italian**

315 Italian Cinema

**Journalism**

110 Introduction to the Mass Media

230 Introduction to Radio and Television News

311 Media Criticism in America

331 Electronic News Gathering

**Spanish**

320 Studies in Spanish Cinema

**Theatre**

182 Script Analysis: Film Media

*In addition, special topics and temporary courses offered by other departments may be eligible for both the film media major and minor.*

**Fine Arts and Literature (FAL)**

*Coordinator:* Associate Dean Dvorak (Letters)

**151 (or LET 151) Topics in Fine Arts and Literature (3)**

Historical and critical study of the arts and literature as well as creative activity or aesthetic interpretation and appreciation of art or literature and its role in human experience. (Seminar) May be repeated for credit with different topic. Topics include Franco-American Relations; "Jewish American Literature and Culture from 'The Great Tide' of Immigration (1881–1924) to the Present." May be taken once for general education credit. (A) [D]

**Forensic Science (FOS)**

*Chairperson:* Professor Euler (Chemistry)

**392 Introduction to Criminalistics (3)**

See Chemistry 392.

## French (FRN)

*Section Head:* Assistant Professor de Bruin

### 101 Beginning French I (3)

Fundamentals of grammar and pronunciation; exercises in reading, writing, and conversation. (Lec. 3) Pre: no prior French is required. Will not count toward the language requirement if the student has studied French for more than one year within the last six years. (FC) [D]

### 102 Beginning French II (3)

Continuation of 101. Students enrolling in this course should have taken 101 or equivalent. (Lec. 3) (FC) [D]

### 103 Intermediate French I (3)

Development of facility in reading texts of moderate difficulty; supplemented by further work in grammar, conversation, and composition. Students enrolling in this course should have taken 102 or equivalent. (Lec. 3) (FC) [D] 104 Intermediate French II (3)

Continuation of 103. Students enrolling in this course should have taken 103 or equivalent. (Lec. 3) (FC) [D]

### 201 French Pronunciation (1)

The sounds of French; relationship between spelling and pronunciation; regional variation. Practice in pronouncing French prose and poetry. (Lab. 2) Pre: 104 or equivalent or permission of instructor.

### 204 French Composition I (3)

Practice in writing French; topics selected from everyday events and readings in French; emphasis on vocabulary building; some grammar study, frequent compositions. Students enrolling in this course should have taken 104 or equivalent. (Lec. 3) (FC) [D]

### 207 French Oral Expression I (3)

Training in the spontaneous use of oral French. Students will extend the quantity and quality of spoken French that they are able to produce. Special focus on narration or storytelling in French. (Lec. 3) Pre: 104 or equivalent or permission of instructor. (FC) [D]

### 303 The French in North America (3)

Surveys the background and current status of the French diaspora in North America, including Acadians, Quebecers, French Canadians, and French Americans, with special emphasis on the literary, artistic, and other contributions of these groups to the civilization(s) of the continent. Taught in French. (Lec. 3) Pre: 204 or 207 or permission of instructor.

### 304 French Composition II (3)

Writing of literary French. Frequent compositions and critiques with emphasis on the stylistic devices. Recommended for those concentrating in French. (Lec. 3) Pre: 204.

### 307 Oral Expression II (3)

Discussion, short speech making, pronunciation, everyday vocabulary, and improvement of conversation. Matters of current interest in French selected by instructor and students. (Lec. 3) Pre: 207.

### 309 French Culture and Literature to 1789 (3)

Survey of the significant developments in the arts, society, and literature in France from the Middle Ages to the French Revolution. (Lec. 3) Pre: 204 or permission of instructor. (A) (FC) [D]

### 310 Modern French Culture and Literature (3)

Survey of the significant developments in the arts, history, and literature in France from the French Revolution to the present. (Lec. 3) Pre: 204 or permission of instructor. (A) (FC) [D]

### 315, 316 French Internship Abroad (3)

Supervised work experience in a French-speaking country for advanced language students. (Practicum) Pre: 200-level French course or equivalent or permission of instructor.

### 318 French Across the Curriculum (1)

Reading and discussion of original French texts in conjunction with courses throughout the university curriculum. Designed to maintain and improve French language skills and to enrich study through exposure to texts in the original language. (Lec. 1) Pre: permission of instructor. May be repeated.

### 320 Studies in French Cinema (3)

Study of major French/Francophone film genres and of prominent French/Francophone directors. Emphasis will vary. (Lec. 3/Online) Course taught in English. Students counting the course for a major or minor in French are required to do all written work in French and must have credit for FRN 204 and 207. Topics include: "Films of Luc Besson," "Survey of French Cinema," and "French Film Comedies." Pre: 204 and 207 or permission of instructor. May be repeated with different topics for a maximum of 9 credits. (A) or (FC) [D]

### 391 Literature to 1789 in Translation (3)

Major developments in French literature from the Middle Ages through 1789. Reading in translation of selected literary works from representative authors. (Lec. 3) Not for major credit in French. (A) or (FC) or (L) [D]

### 392 Nineteenth-Century Literature in Translation (3)

Reading in translation of selected literary works from representative 19th-century authors. (Lec. 3/Online) Not for major credit in French. (A) or (FC) or (L) [D]

### 393 Twentieth-Century Literature in Translation (3)

Reading in translation of selected literary works from representative 20th-century authors. (Lec. 3/Online) Not for major credit in French. (A) or (FC) or (L) [D]

### 408 The French Language: Past, Present, and Future (3)

Introduction to the history and present state of French. Study of standard and colloquial French, dialects, regional variations, language of youth and professions. Current tendencies; the Francophone movement. (Lec. 3) Pre: 304 or permission of instructor.

### 412 Topics in French Culture and Literature (3)

Topics in French literature and culture. (Lec. 3/Online) Pre: 309 or 310 or permission of instructor. May be taken more than once for credit on different topics.

### 473 French Canadian Literature (3)

Early historical and biographical works, but primarily the novel, poetry, and theatre of the 20th century. (Lec. 3) Pre: 309 or 310 or permission of instructor.

### 474 African Literature in French (3)

Authors of Africa and the diaspora; includes Camara, Cesaire, Dadie, Senghor. (Lec. 3) Pre: 309 or 310 or permission of instructor.

### 480 Business French (3)

Study of concepts and terminology relating to the French business world. (Lec. 3) Pre: junior standing, credit or concurrent enrollment in at least one 300-level French language course.

### 497, 498 Directed Study (3 each)

For the advanced student. Individual research and reports on problems of special interest. (Independent Study) Pre: acceptance of a project by a faculty member and approval of section head.

## Genetics

### Aquaculture and Fisheries Science

576 Seminar in Genetics of Aquatic Organisms

### Biochemistry

242 Human Genetics and Human Affairs

353 Genetics Laboratory

452 Advanced Topics in Genetics

### Biological Sciences

352 General Genetics

573 Developmental Genetics

579 Advanced Genetics Seminar

### Microbiology

502 Techniques of Molecular Biology

552 Microbial Genetics

561 Recent Advances in Molecular Cloning

### Plant Sciences

250 Plant Breeding and Genetics

471 Plant Improvement

## Geography (GEG)

*Chairperson:* Professor Green (Landscape Architecture)

### 101 World Geography (3)

An examination of major world regions. Basic geographic concepts are presented. Physiographic, political, economic, social, and cultural influences are addressed in a spatial context. (Lec. 3) (S) [D]

### 104 Political Geography (3)

Pattern of political units throughout the world; special emphasis on boundaries, newly independent nations, and other aspects of political control over territory. (Lec. 3) (S) [D]

### 200 Human Geography (3)

The evolution of human environments from the Stone Age to the contemporary megalopolis and the emergent world city in terms of human-earth-space-resource relationships. (Lec. 3)

### 202 Introductory Urban Geography: Understanding Cities

See Community Planning 202.

### 203 Economic Geography (3)

Surveys the geographic backgrounds of economic activities. Populations and the resources of agriculture, industry, and commerce in terms of their world and regional distribution. (Lec. 3)

### 488 Geographic Applications in the K-12 Curricula (3)

Learning how geography interrelates with other topical curricula. Classroom teachers integrate geographic concepts, for lesson plan development using National Geographic Standards and other source materials, into their subject specialization. Emphasis on the spatial aspects of all curricula. (Lec. 3)

## Geosciences (GEO)

*Chairperson:* Professor Fastovsky

### 100 Environmental Geology (3)

Geologic processes, how they affect people and vice versa; geologic hazards, earthquake impact, shoreline development, offshore oil, waste disposal, water, energy and other resources, climate change. (Lec. 3) (N)

### 102 Evolution and Extinction of the Dinosaurs (3)

General introduction to the dinosaurs. Variety, habits, warm-bloodedness, and extinction discussed. Pterosaurs and bird origins presented. (Lec. 3) (N)

### 103 Understanding the Earth (4)

Processes operating within and upon the earth. Relationship of plate tectonics to volcanism, earthquakes, and mountain building. Development and modification of landscapes by rivers, glaciers, wind, waves, and ground water. Environmental implications of geologic processes. (Lec. 3, Lab. 2) (N)

### 110 The Ocean Planet

See Oceanography 110. (N)

### 113 Natural Disasters (3)

The science of natural disasters from a physical, chemical and geological perspective. Understanding of the development of and factors controlling the occurrence of natural disasters. (Lec. 3) (N)

### 120 Geology of U.S. National Parks (3)

Selected parks are used to illustrate geologic processes and age relationships to understand earth history. Includes plate tectonics, volcanic and plutonic activity, glaciation, cave formation, stream and coastal processes, landscape formation. (Lec. 3) (N)

### 204 Problem Solving in Earth History (4)

Geological problem solving, emphasizing questions in Earth history. Time, plate movements, ancient environments, climates, and the fossil record introduced in an historical context (Lec. 3, Lab. 2). Pre: 103, equivalent, or permission of instructor.

### 210 Landforms: Origin and Evolution (4)

Development, distribution, and geologic significance of landforms produced by rivers, glaciers, coastal processes, weathering, and other geomorphic agents. Interpretation of landforms through field studies, topographic maps, and aerial photographs. (Lec. 3, Lab. 2) Pre: 103 or permission of instructor.

### 272 Introduction to Evolution

See Biological Sciences 272.

### 305 Global Warming (4)

Scientific treatment of climate change during the last 100,000 years. Implications for earth systems in context of past climates and future projections. (Lec. 3, Lab. 2) Pre: 100 or 103 or OCG 110 or permission of instructor.

### 320 Earth Materials (4)

Hand-sample identification and characterization of minerals and rocks, including crystallography, composition, classification, origin, and relationship to geological occurrence; also includes aspects of soil-forming minerals, ore deposits, and other mineral resources. (Lec. 3, Lab. 2) Pre: 103, credit or concurrent enrollment in CHM 101 or 103.

### 370 Structure of the Earth (4)

Stress and strain relationships as they pertain to rocks. Manifestations of these phenomena in geologic structures and criteria for recognizing them. (Lec. 3, Lab. 2) Pre: PHY 213 and 285 or 111 and 185 or permission of instructor.

### 450 Introduction to Sedimentary Geology (4)

Principles underlying formation and composition of lithofacies and sedimentary environments. Methods, procedures, and techniques used to study sedimentary processes, depositional environments, sediment and rock sequences, and paleogeography. (Lec. 3, Lab. 2) Pre: graduate or advanced undergraduate

standing in environmental, resource, or engineering major.

### 465 Introduction to Geophysics (3)

Physical properties of earth and the application of geophysical methods to explore the earth's interior for natural resources. Introductory interpretation of gravity, magnetic, seismic, and radiometric surveys. (Lec. 2, Lab. 2) Pre: 103, PHY 112, MTH 132.

### 468 Groundwater Chemistry (4)

Introduction to the chemical processes controlling water chemistry in low-temperature environments. Chemical weathering, ion exchange, redox, mineral equilibrium, isotopes, and chemical modeling of aqueous systems. (Lec. 3, Lab. 2) Pre: CHM 101, 102, 112, 114; GEO 103, 320. Offered in odd-numbered years. Next offered fall 2011.

### 472 Advanced Evolutionary Biology

See Biological Sciences 472.

### 480 Summer Field Camp (4-8)

Geologic field mapping and principles. (Practicum) Pre: 210, 320, 370, and 450 recommended. Course not offered through URI; prior approval of selected camp required by the Department of Geology. Recommended between junior and senior years. Not for graduate credit in geology.

### 482 (or NRS 482 or EVS 482) Innovative Sub-surface Remediation Technologies (4)

Innovative remediation technologies for treating contaminated groundwater and sediments: theory, applications, and limitations of selected methods. Discussion of case studies. (Lec. 4) Pre: permission of instructor. In alternate years. Not for graduate credit.

### 483 Hydrogeology (4)

Study and interpretation of groundwater flow systems and the interaction between groundwater and the geologic framework, including groundwater flow, aqueous geochemistry, groundwater resource evaluation, and groundwater in geologic processes. (Lec. 3, Lab. 2) Pre: 103, 210, and MTH 131 or 141, or permission of instructor.

### 484 (or NRS 484 or EVS 484) Environmental Hydrogeology (4)

Physico-chemical principles and fundamental relationships that describe the fate and transport of contaminants in the hydrologic system. (Lec. 3, Lab. 2) Pre: 483 or CVE 588 or NRS 510, or permission of instructor. Not for graduate credit. Offered every other year.

### 491 Special Topics (1-3)

Advanced work for undergraduates under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. Not for graduate credit in geology.

**497 Field Experience in the Geological Sciences (4)**

Capstone field trip. (Lec. 2, Field Trip) Pre: 204, 320, 370, and 450. 3.00 GPA in major/2.50 GPA overall required, and permission of instructor. Extended field trip required. May be repeated for credit.

**499 Senior Thesis (3)**

Independent research. Student selects an area of study and works in close conjunction with a faculty member of his or her choice. (Independent Study) Pre: senior standing and permission of instructor. Not for graduate credit in geology.

**500 Graduate Seminar (1)**

Weekly seminar series featuring oral presentations of the results of ongoing, topical research. S/U credit.

**501 Vertebrate Paleontology (1–3)**

Advanced work in vertebrate paleontology under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor.

**502 Readings in Paleontology (1–3)**

Advanced readings in paleontology under the supervision of a member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. S/U

**510 Glacial Sedimentation Research (1–3)**

Advanced research in glacial sedimentation under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor.

**511 Quaternary Paleoclimates (1–3)**

Advanced work in Quaternary paleoclimates under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor.

**515 Glacial Geology (3)** Investigation of glacial environments and processes including areas with presently existing glaciers. Emphasis on the development of glacial landscapes and deposits. Field trips in New England area. (Lec. 2, Lab. 3) Pre: graduate or advanced undergraduate standing in environmental, resource, or engineering major.

**525 Chemistry of the Earth (3)**

See Oceanography 525.

**530 Petrogenetic Igneous Processes (4)**

Examination of key physico-chemical processes responsible for the diversity of igneous rocks and igneous activity. Emphasis on geochemistry, petrography, field relationships, and tectonic setting. (Lec. 3, Lab. 2) Pre: 320 or permission of instructor. In alternate years. Next offered spring 2013.

**531 Metamorphic Petrology (3)**

Facies concept and other methods of interpreting metamorphic mineral assemblages. Chemical and fabric changes during metamorphism, including

principles of structural petrology. (Lec. 2, Lab. 3) Pre: 321 or permission of instructor. In alternate years.

**532 Analytical Geochemistry (1–3)**

Advanced work in analytical geochemistry under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor.

**533 Readings in Petrology (1–3)**

Seminar in petrology with readings drawn from the current professional literature. S/U credit.

**551 Coastal Sedimentation Research (1–3)**

Advanced research in coastal sedimentation under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor.

**552 Readings in Sedimentation (1–3)**

Seminar in sedimentary geology with readings drawn from the current professional literature. S/U credit.

**555 Reconstructing Terrestrial Paleoenvironments (4)**

Sedimentological and paleontological methods used in the interpretation of the terrestrial sedimentary record. (Lec. 3, Lab. 2) Pre: 450 or permission of instructor. Offered in spring of even-numbered years.

**565 Geophysical Models (3)**

Model interpretation of gravity, magnetic and geoelectric field surveys with geologic constraints. Conversion of quantitative geophysical models into geologic/hydrologic structures. (Lec. 2, Lab. 2) Pre: MTH 132, PHY 112 or equivalent. Offered in spring of odd-numbered years.

**568 Isotopes in Hydrogeology (3)**

Use of environmental isotopes in groundwater studies; dating groundwater, delineating flow paths and identifying recharge areas; geochemical evolution of groundwater and assessment of contamination. (Lec. 3) Pre: 483 and 468 or permission of instructor. Offered in even-numbered years.

**577 Coastal Geologic Hazards (3)** Geologic hazards in the coastal zone and their impact on people. Includes waves, storm-surge, mass-wasting, and sea-level rise. Geologic effectiveness of engineering structures and management techniques. Emphasis on field study. (Lec. 2, Lab. 3) Pre: graduate or advanced undergraduate standing in environmental, resource, or engineering major.

**580 New England Geology (3)**

Review of the bedrock geology of New England, and its applications for the Appalachian/Caledonides mountain chain and theories of orogenesis. Mandatory field trips. (Lec. 3) Pre: 320, 370, or permission of instructor. Offered in fall of odd-numbered years.

**581 Topics in Tectonic Geology (3)**

Review of selected topics in continental and oceanic tectonics. (Seminar) Pre: permission of instructor. Offered in fall of even-numbered years.

**582 (or NRS 583, or EVS 582) Innovative Subsurface Remediation Technologies (4)**

Innovative remediation technologies for treating contaminated groundwater and sediments: theory, applications, and limitations of selected methods. Discussion of case studies. Offered alternate years. (Lec. 4) Pre: permission of instructor.

**583 Groundwater Modeling (3)**

Numerical modeling of groundwater flow and solute transport. Numerical methods, model conceptualization, assumptions, boundary conditions, and complex aquifer systems. Modeling exercises including full-scale modeling project using MODFLOW. (Lec. 2, Lab. 3) Pre: 483, or NRS 361 or CVE 588, or permission of instructor. Offered in odd-numbered years.

**584 (or NRS 584, or EVS 584) Environmental Hydrogeology (4)**

Develop an understanding of the physico-chemical principles and fundamental relationships that describe the fate and transport of contaminants in the hydrologic system. (Lec. 3, Lab. 2) Pre: 483 or CVE 588 or NRS 510 or permission of instructor.

**586 Readings in Hydrogeology (1–3)**

Seminar in hydrogeology with readings drawn from the current professional literature. S/U credit.

**590, 591 Special Problems (1–3 each)**

Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. S/U credit for 591.

*Note: For other related courses, see OCG 540, 625, 628, 643, 644, 645, 646, 649, 651, 652, 678, 681; OCE 582, 688; and CVE 581, 585, 587, 588, 677, 681, 682, 687.*

**German (GER)**

*Section Head:* Associate Professor Rarick

**101 Beginning German I (3)**

Fundamentals of grammar and pronunciation; exercises in reading, writing, and conversation. (Lec. 3) Pre: no prior German is required. Will not count toward the language requirement if the student has studied German for more than one year within the last six years. (FC) [D]

**102 Beginning German II (3)**

Continuation of 101. Students enrolling in this course should have taken 101 or equivalent. (Lec. 3) (FC) [D]

**103 Intermediate German I (3)**

Development of facility in reading narrative and expository prose; exercise in grammar, listening comprehension, and speaking. Students enrolling in this course should have taken 102 or equivalent. (Lec. 3) (FC) [D]

**104 Intermediate German II (3)**

Continuation of 103. Students enrolling in this course should have taken 103 or equivalent. (Lec. 3) (FC) [D]

**105, 106 Basic Conversation I, II (1 each)**

105: Practice in conversational skills. (Lec. 1) Pre: credit or concurrent enrollment in 103. 106: Continued practice in conversational skills. (Lec. 1) Pre: credit or concurrent enrollment in 104.

**111, 112 Intensive Beginning German (4 each)**

Study of the fundamentals of German with special emphasis on listening and speaking skills. Students enrolling in 112 should have taken 111 or equivalent. (Lec. 4). Not for major credit in German.

**113, 114 Intensive Intermediate German (4 each)**

Practice in listening and speaking. Development of basic reading and writing skills. Review of grammatical structure. Students enrolling in 113 should have taken 112 or equivalent; students enrolling in 114 should have taken 113 or equivalent. (Lec. 4)

**201, 202 Intermediate Conversation I, II (1 each)**

Conversation skills for students who have completed intermediate German. 202: Continuation of 201. Students enrolling in 201, 202 should have taken 104 or equivalent. (Lec. 3)

**205, 206 Conversation and Composition (3 each)**

Development of facility in spoken and written German using contemporary writings and topics; special emphasis on general classroom discussion. Students enrolling in 205, 206 should have taken 104 or equivalent. (Lec. 3) (FC) [D]

**215, 216 Advanced Conversational German (4 each)**

Intensive practice in speaking and listening, with some attention to writing skills. Students enrolling in 215, 216 should have taken 114 or equivalent. (Lec. 4)

**221 Introduction to Business German (1)**

Conversational practice in German with emphasis on the acquisition of vocabulary pertinent to international business. (Lec. 1) Pre: 112 or equivalent.

**305 Advanced Conversation (3)**

Intensive practice in spoken German based on matters of current interest in German-speaking countries. (Lec. 3) Pre: 206 or equivalent. In alternate years.

**306 Advanced Composition (3)**

Training in various forms of writing by means of frequent compositions and critiques. (Lec. 3) Pre: 206 or equivalent. In alternate years.

**315, 316 Language Study Abroad (3–5 each)**

Credit for advanced language study in a German-speaking country. (Practicum) Pre: 206 or equivalent and permission of section head.

**327 Introduction to German Studies and Literature (3)**

Major developments and figures in German culture, literature, art, and society of the 20th century. (Lec. 3) Pre: 206 or permission of instructor.

**328 Introduction to German Cultural History and Literature (3)**

Overview of major German cultural developments starting with the “Germany” of the Romans and ending with unification. Significant figures and developments in literature, art, and society. (Lec. 3) Pre: 206 (or equivalent) or permission of instructor.

**408 (or LIN 408) The German Language: Past and Present (3)**

Introduction to the history and present state of the German languages. Study of standard and colloquial German, dialects, Swiss and Austrian variations, language of youth and professions. Analysis of various test types. Tendencies in present-day German. (Lec. 3) Pre: 305 or permission of instructor. Not for graduate credit.

**411 Advanced Technical German**

See Engineering 411.

**421 Business German (3)**

Study of the concepts and terminology of the German language common to the realm of international business. Intended for advanced students of business and German. (Lec. 3) Pre: junior standing, credit or concurrent enrollment in 305 and 306.

**485, 486 Special Studies (3 each)**

Special topics in German literature not emphasized in other courses. (Seminar) Pre: one semester of German at the 300 level or permission of section head. May be repeated with a change in topic. In alternate years.

**497, 498 Directed Study (1–3 each)**

Designed particularly for the advanced student. Individual research and reports on problems of special interest. (Independent Study) Pre: acceptance of project by a faculty member and permission of section head.

**585, 586 Seminar in German Studies (1–3 each)**

Topics in German literature and civilization. (Seminar) Pre: graduate standing or permission of instructor. May be repeated with different topics.

**598 Directed Studies (1–3)**

Individual research on problems of special interest. (Independent Study) Pre: graduate standing, acceptance of project by a faculty member, and permission of chairperson. May be repeated with different topics.

**Gerontology**

Director: Professor P. Clark

**Human Development and Family Studies**

312 Adult Development  
314 Introduction to Gerontology  
421 Death, Dying, and Bereavement  
431 Family and the Elderly  
440 Environmental Context of Aging  
513 (514) Seminar in Older Adulthood  
527 Health Care Policy

**Human Science and Services**

530 Multidisciplinary Health Seminars for the Elderly

**Kinesiology**

563 Fitness Programs for the Middle-Aged and Elderly

564 Physiology of Aging

**Nursing**

349 Aging and Health

**Nutrition and Food Science**

395 Nutrition in the Life Cycle II

**Sociology**

438 Aging in Society

**Grand Challenges (GCH)****101 Grand Challenges in Fine Arts and Literature (3–4)**

Study of important global challenges (such as poverty, racism and diversity, global health, global economic or environmental problems, etc.), their representation in fine arts and literature, and the role of art and artists in addressing these problems. (Lec. 3–4) Taken concurrently with URI 101 and a 100-level general education course in (EC) or (ECw). Interdisciplinary general education course for freshmen only. (A)

**102 Grand Challenges in Letters (3–4)**

Study of important global challenges (such as poverty, racism and diversity, global health, global economic or environmental problems, etc.), their representation in the humanities, and the role of the humanities in addressing these problems. (Lec. 3–4) Taken concurrently with URI 101 and a 100-level general education course in (EC) or (ECw). Interdisciplinary general education course for freshmen only. (L)

**103 Grand Challenges in the Natural Sciences (3–4)**

Study of important global challenges (such as poverty, racism and diversity, global health, global economic or environmental problems, etc.), and the role of the natural sciences in addressing these problems. (Lec. 3–4) Taken concurrently with URI 101 and a 100-level general education course in (EC) or (ECw). Interdisciplinary general education course for freshmen only. (N)

**104 Grand Challenges in the Social Sciences (3–4)**  
Study of important global challenges (such as poverty, racism and diversity, global health, global economic or environmental problems, etc.), and the role of the social sciences in addressing these problems. (Lec. 3–4) Taken concurrently with URI 101 and a 100-level general education course in (EC) or (ECw). Interdisciplinary general education course for freshmen only. (S)

## Greek (GRK)

*Chairperson:* Professor Hedderich (Languages)

For Modern Greek, see LAN 191, 192.

### 101 Ancient Greek I (3)

Grammar and syntax of Attic Greek, reading practice. (Lec. 3) Pre: no previous Greek is required. Will not count toward the language requirement if the student has studied Greek for more than one year within the last six years. (FC) [D]

### 102 Ancient Greek II (3)

Continuation of 101. Students enrolling in this course should have taken 101 or equivalent. (Lec. 3). (FC) [D]

### 301 Intermediate Greek I (3)

Grammar review; readings such as *Lysias' Against Eratosthenes*. Students enrolling in this course should have taken 102 or equivalent. (Lec. 3) (FC) [D]

### 302 Intermediate Greek II (3)

Readings selected in accordance with interests of students. Students enrolling in this course should have taken 301 or equivalent. (Lec. 3) May be repeated for credit with a different topic. May be taken once for general education credit. (FC) [D]

### 310 Greek Across the Curriculum (1)

Reading of original Greek texts and discussion in conjunction with courses throughout the University curriculum. Designed to maintain language skills and to enrich the study of different subjects by texts in the original language. (Lec. 1) Pre: 301 or permission of instructor.

### 497 Directed Study (1–6)

Individual readings and research. (Independent Study) Pre: acceptance of project by faculty member and approval of chairperson. May be repeated for credit with a different topic.

## Health Services Administration (HSA)

*Coordinator:* Assistant Professor Hubbard

### 360 Health Services Administration (3)

Introduction to key concepts and principles in health services administration through both didactic and experiential means. (Seminar/Online) Pre: admission

to the B.I.S. program as a health services administration major and a minimum of 60 credits. Offered fall.

### 380 Introductory Practicum in Health Services Administration (3)

Didactic and experiential introduction to the delivery of health services including acute care, long-term care, nursing homes, and special services problems such as hepatitis, tuberculosis, and HIV. (Practicum) Pre: admission to the B.I.S. program as a health services administration major and a minimum of 75 credits.

### 480 Advanced Practicum in Health Services Administration (6)

An intensive experience in a health care setting selected by the student, combined with class meetings. (Practicum) Pre: admission to the B.I.S. program as a health services administration major and a minimum of 90 credits. Not for graduate credit.

## Health Studies (HLT)

*Director:* Assistant Professor Fallon

### 200 Introduction to Interdisciplinary Health Studies (4)

Foundational concepts, theories, and research in interdisciplinary perspectives on health. Includes applications to real world health-related problems. Emphasis on developing key knowledge and skills bases for the major. (Lec. 4)

## Hebrew (HBW)

*Chairperson:* Professor Hedderich (Languages)

### 101 Beginning Hebrew I (3)

Fundamentals of grammar and pronunciation; exercises in reading, writing, and conversation. (Lec. 3) Pre: no prior Hebrew is required. Will not count toward the language requirement if the student has studied Hebrew for more than one year within the last six years. (FC) [D]

### 102 Beginning Hebrew II (3)

Continuation of 101. Students enrolling in this course should have taken 101 or equivalent. (Lec. 3) (FC) [D]

### 103 Intermediate Hebrew I (3)

Development of facility in reading narrative and expository prose; exercise in grammar, listening comprehension, and speaking. Students enrolling in this course should have taken 102 or equivalent. (Lec. 3) (FC) [D]

### 104 Intermediate Hebrew II (3)

Continuation of 103. Students enrolling in this course should have taken 103 or equivalent. (Lec. 3) (FC) [D]

## History (HIS)

*Chairperson:* Professor Rollo-Koster

### 110 (or CLA 110) Ancient Greece: History and Archaeology (3)

An introduction to the history and archaeology of ancient Greece and Greek Civilization from the Bronze Age to the death of Alexander the Great. (Lec. 2, Rec. 1)

### 111 Ancient Rome: History and Archaeology (3)

An introduction to the history and archaeology of ancient Rome and Roman Civilization from the founding of the city through to the death of the emperor Nero. (Lec. 3) (L)

### 112 History of Medieval Europe (3)

Primarily western Europe. Continuation of 111. Medieval church, feudalism, revival of town life, commerce, industry, and money economy, rise of national states, and development in the arts. (Lec. 3) (L)

### 113 History of Western Civilization from the Late Middle Ages to 1789 (3)

Introductory course treating Western civilization in its broadest sense from the late Middle Ages to the French Revolution and the beginnings of industrialization. (Lec. 3) (L) [D]

### 114 History of Western Civilization Since 1789 (3)

Continuation of 113. Western civilization of the present time. (Lec. 3) (L) [D]

### 116 History of Western Science (3)

Development of western science from ancient Greece and Rome until the present. Topics include relations of science and religion, emergence of science-based industry, and interaction between science and politics, especially during war. (Lec. 3) (L)

### 117 History of Medicine (3)

Professionalization of medicine, status of healers in different cultures, creation of scientific medicine, alternative medical practice, effect of changing disease patterns on medical theory/practice. Focus on the U.S. in the 19th and 20th centuries. (Lec. 3) (L)

### 118 Women in European History (3)

Attitudes toward women, their role in society, women's work, and the feminist movement. Emphasis on 19th and 20th centuries with background material from earlier periods. (Lec. 3) (L) [D]

### 130 History and the Sea (3)

The history of seafaring from ancient times to the 20th century. The course considers the political, military, economic, and social history of the maritime world. (Lec. 3) (L) [D]

### 132 Introduction to Russian and Soviet History (3)

Selected topics in the development of Russian civilization since the ninth century. (Lec. 3) (FC) or (L) [D]

**141 History of the United States to 1877 (3)**

Colonial and Revolutionary periods, and economic, social, and political development of the United States through the Civil War and Reconstruction. (Lec. 2, Rec. 1) (L) [D]

**142 History of the United States Since 1877 (3)**

General social, economic, and political development from 1877 to the present. (Lec. 2, Rec. 1) (L) [D]

**145 Women in the North American Colonies and the United States, 1500–1890 (3)**

Legacies of Native-American, Hispanic, and Anglo-American culture; slavery and abolition; women's work and sexuality; women's rights movements; ethnic and regional diversity, with emphasis on women in the West, the South, and Northeast. (Lec. 3) (L) [D]

**146 Women in the United States, 1890–Present (3)**

Impact of immigration and industrialization; legacy of slavery and segregation; changes in sexuality, reproduction, and work; images of women in popular culture; women's political movements. (Lec. 3) (L) [D]

**150 (or AAF 150) Introduction to Afro-American History (3)**

Survey of Afro-American history from African origins to the current racial confrontation. (Lec. 3) (L) [D]

**160 Technology and American Life: 1800–Present (3)**

Surveys the development and social impact of technology on American life during the past two centuries. (Lec. 3) (L) [D]

**171 East Asian Culture and History (3)**

Introduction to the culture and history of East Asia. Emphasis on the literary, artistic, and philosophical traditions of East Asia, especially those aspects which relate to and influence contemporary developments. (Lec. 3) (FC) or (L) [D]

**172 Southeast Asian Culture and History (3)**

Broad overview of the culture and history of Southeast Asia. Emphasis on society, culture, and religion and their influence on contemporary developments. (Lec. 3) (FC) or (L) [D]

**180 Introduction to Latin American Civilization (3)**

Social, cultural, and political history of the Latin American region from the pre-conquest era to the present time. (Lec. 3) (FC) or (L) [D]

**301 (or CLA 301) The Hellenistic World (3)**

The history, archaeology, and civilization of the Hellenistic World from Alexander the Great to the Death of Cleopatra VII. (Lec. 3) Pre: sophomore standing or permission of instructor.

**302 (or CLA 302) The Roman Empire (3)**

The history, archaeology, and civilization of the Roman Empire from Augustus to Constantine. (Lec. 3) Pre: sophomore standing or permission of instructor.

**304 Western Europe in the High Middle Ages (3)**

Primarily France and England in the 12th and 13th centuries. Emphasis on the medieval Gothic-Catholic culture, the rise of towns, and the development of a money economy. (Lec. 3) Pre: sophomore standing or permission of instructor.

**305 The Renaissance (3)**

Europe in transition during the 14th through the early 16th centuries. The economic, social, and religious backgrounds of the Renaissance. Emphasis on culture and artistic developments. (Lec. 3) (L) Pre: sophomore standing or permission of instructor.

**308 Between Eve and Mary: Women in the Middle Ages (3)**

History of women in western Europe from about 500 A.D. to about 1500 A.D. Understanding the variety of medieval women's experiences (rich or poor, secular or religious, urban or rural) and how women were perceived by their society. (Lec. 3) Pre: sophomore standing or permission of instructor.

**309 The French Revolution and Napoleon (3)**

Examination of the Revolution and Napoleonic eras with emphasis on the connections among economic, social, and political developments. Special attention to problems in interpretation. (Lec. 3) Pre: junior standing.

**310 History of Europe: 1815–1914 (3)**

Major political, economic, and intellectual developments in Europe from the defeat of Napoleon I to the outbreak of World War I; emphasis on the revolutions of 1848, unification of Italy and Germany, impact of the Industrial Revolution, nationalism and imperialism, background of World War I. (Lec. 3) Pre: junior standing. (L) [D]

**311 History of Europe Since 1914 (3)**

Detailed study of developments from 1914 to present: wars, postwar adjustments, communist and fascist ideologies, history of individual states, and social and intellectual trends. (Lec. 3) Pre: junior standing. (FC) or (L) [D]

**314 Seventeenth- and Eighteenth-Century European Cultural History (3)**

Intellectual and social movements of the Age of Reason and the Age of Enlightenment. (Lec. 3) Pre: sophomore standing or permission of instructor. (L)

**323 History of Great Britain in the 19th Century (3)**

Politics, culture, and economy of Great Britain in the 19th century: elements of both continuity and change in the social life and organization of its inhabitants, and in their religious and social beliefs:

effects of British imperial expansion on the colonizers and on the colonized. (Lec. 3) Pre: sophomore standing or permission of instructor. (L) [D]

**327 German History Since 1914 (3)**

Topics in German social and political history from the first world war to the present. Emphasis on the history of National Socialism. (Lec. 3) Pre: sophomore standing or permission of instructor. (FC) or (L) [D]

**328 The Holocaust (3)**

Study of Nazi efforts to exterminate Jews and others in Europe. Focuses on Nazi programs and policies; Jewish experiences; and the responses of the outside world. (Lec. 3) Pre: junior standing.

**332 History of Imperial Russia (3)**

Russian society, politics, and world view from the modernizing reforms of Peter the Great to the installation of parliamentary government in 1905. Emphasis on student writing, analysis of documents, trends, interconnections. (Lec. 3) Pre: sophomore standing or permission of instructor. (L) [D]

**333 Twentieth Century Russia (3)**

From Imperial Russia's progress toward modernization to society, economy, and politics in the 1990s. The Soviet experiment is studied from domestic and international angles. Close attention given to the Stalin Revolution, Cold War, and attempts to revitalize the one party state. (Lec. 3) Pre: sophomore standing or permission of instructor. (L) [D]

**335 American Colonial History to 1763 (3)**

American history from the founding of the colonies to the end of the French and Indian War, including developments within the colonies as well as their relationship with England. (Lec. 3) Pre: sophomore standing or permission of instructor.

**336 The American Revolution and Confederation: 1763–1789 (3)**

Social, political, and economic aspects of the Revolution and Confederation periods. (Lec. 3) Pre: sophomore standing or permission of instructor.

**337 Creation of the Union: America from 1789–1848 (3)**

The development of the new nation through the Jacksonian years, with emphasis on the transformation of society and politics. (Lec. 3) Pre: sophomore standing or permission of instructor.

**339 Emergence of Industrial America: 1877–1914 (3)**

Growth and consolidation of business, urbanization, and the Populist and Progressive movements. America's emergence as a world power. (Lec. 3) Pre: sophomore standing or permission of instructor.

**340 United States History from 1914 to 1941 (3)**

Social, political, and economic developments in the U.S. from the onset of World War I through the end of the Great Depression. (Lec. 3) Pre: sophomore standing or permission of instructor. (L) [D]

- 341 United States History from 1941 to 1974 (3)**  
U.S. involvement in World War II. Social, political and economic developments in the postwar era. Equal emphasis on the domestic sphere and America's role in world affairs. (Lec. 3) Pre: sophomore standing or permission of instructor. (L) [D]
- 342 United States History from 1968–2001 (3)**  
From Woodstock to the AIDS crisis, Richard Nixon to George Bush, Vietnam to Iraq, and Bob Dylan to Jay-Z, students will explore the developments that created today's United States. (Lec. 3) Pre: 142 and sophomore standing.
- 344 History of the North American Indian (3)**  
Native North Americans from pre-Columbian times to present. Emphasis on ideological conflict between Indians and whites. (Lec. 3) Pre: sophomore standing or permission of instructor.
- 346 Immigration, Ethnicity, and Race in America (3)**  
History of immigration to the U.S. from the colonial period to the present, with emphasis on the 19th and 20th centuries. Compares different waves, explores shifting attitudes toward immigrants, and discusses how race and ethnicity shaped immigrants' experiences. (Lec. 3) Pre: sophomore standing or permission of instructor. (L) [D]
- 349 History of American Labor (3)**  
Changes in work, lifestyle, and political consciousness of American workers in the 19th and 20th centuries; conflicts between labor and capital, and relationship to emergence of labor movements. (Lec. 3) Pre: sophomore standing or permission of instructor.
- 351 Historical Perspectives on Women and Health (3)**  
History of women healers, including midwives, nurses and physicians. Topics in women's health care will also be addressed. (Lec. 3) Pre: sophomore standing or permission of instructor. (L) [D]
- 352 Topics in the History of Women and Gender (3)**  
Themes in women's history, sexual identities, and the construction of gender roles. Primarily deals with United States since 1800. (Lec. 3) Pre: sophomore standing or permission of instructor. May be repeated.
- 354 United States Diplomacy in the 20th Century (3)**  
Analysis of people, ideas, and institutions that have shaped American relations with the rest of the world from World War I to the present. (Lec. 3) Pre: sophomore standing or permission of instructor.
- 355 (or AAF 355) Black Women in the U.S.: Colonial Times to the Present (3)**  
Women's experiences in the study of African-American history. Assigned readings familiarize students with the state of scholarship and examine the inter-
- section of race, class, and gender in that experience. (Lec. 3) Pre: sophomore standing. (L) [D]
- 356 (or AAF 356) Black Urban History: Late 19th and 20th Centuries (3)**  
Examines the historical black experience in urban environments in the U.S. Assigned readings, research, and group discussions examine the issues of migration, community, politics, class, and gender. (Lec. 3) Pre: sophomore standing. (L) [D]
- 357 History of Religion in the United States (3)**  
Diversity of religious traditions in the U.S. especially in the 19th and 20th centuries. Emphasis on political, cultural, and ethnic/racial dimensions of religion. (Lec. 3) Pre: sophomore standing or permission of instructor.
- 359 (or AAF 359) History of Slavery in America (3)**  
Origins, development, and demise of slavery, with emphasis on the area that currently constitutes the United States. (Lec. 3) Pre: sophomore standing or permission of instructor.
- 360 American Culture 1865–1940 (3)**  
Explores the nature and sources of American culture with emphasis on the diversity of its origins and forms of expression. (Lec. 3) Pre: sophomore standing or permission of instructor.
- 361 (or WMS 361) Women's Lives in New England, 1790–1930 (3)**  
Social, political and literary history of women in New England with an emphasis on women's work and how that work shaped gender relations. Theoretical approaches from women's studies, race and gender studies will inform the treatment of women's history and the history of material culture in New England. (Lec. 3) Pre: junior standing or permission of the instructor.
- 362 History of Rhode Island (3)**  
History of Rhode Island from the first English settlement to the present day. Social, political, and economic aspects of internal development and the relation of the state to the region and the nation. (Lec. 3) Pre: sophomore standing or permission of instructor.
- 363 Public History: Presenting Rhode Island's Past (3)**  
The presentation of Rhode Island's history to the public through such media as museums, historic sites, monuments, documentaries, websites, and social networking media from the state's colonial beginnings. (Lec. 3) Pre: sophomore standing or permission of instructor.
- 365 Civil War and Reconstruction (3)**  
American history during the period 1850–1877, giving equal emphasis to the background of the Civil War, the war itself, and the social, political, and economic aspects of Reconstruction. (Lec. 3) Pre: sophomore standing or permission of instructor.
- 366 (or AAF 366) Twentieth Century Black Politics and Protest (3)**  
Explores the development and evolution of black politics and protest in the twentieth century including the Civil Rights and Black Power Movements and their legacies. (Lec. 3) Pre: 150 or AAF150 or HIS 142 and sophomore standing or permission of Instructor
- 374 History of Modern China (3)**  
Political, social, economic, and cultural development of China since 1800 with emphasis on the development of Chinese nationalism and on the rise, theory, and practice of Chinese communism. (Lec. 3) Pre: sophomore standing or permission of instructor. (FC) or (L) [D]
- 375 History of Modern Japan (3)**  
Background and significance of the Meiji restoration (1868) and modernization; the development of Japanese militarism, the fall of the Japanese Empire, and the emergence of the "New Japan." (Lec. 3) Pre: sophomore standing or permission of instructor. (FC) or (L) [D]
- 376 Women in Muslim Societies (3)**  
Examines gender relations in the modern Middle East through novels, poetry, and oral histories, as well as through historical and anthropological studies. (Lec. 3) Pre: sophomore standing or permission of instructor.
- 377 Revolution in Islam (3)**  
Examines the history of revolutionary ideology in Islamic thought and places modern revolutions—such as the Iranian revolution of 1978—within a broader context of both Sunni and Shi'i radical activism. (Lec. 3) Pre: sophomore standing or permission of instructor.
- 381 History of Colonial Latin America (3)**  
The interaction of American-Indian civilizations with European and African elements in the Spanish and Portuguese empires of the New World, concluding with the wars for independence. (Lec. 3) Pre: sophomore standing or permission of instructor.
- 382 History of Modern Latin America (3)**  
Historical analysis of the political, cultural, and social-economic dimensions of tradition, reform, and revolution in Latin America since 1810. (Lec. 3) Pre: sophomore standing or permission of instructor.
- 384 The Modern Caribbean(3)**  
Historical roots of the contemporary Caribbean world, emphasizing globalization's powerful influence and the region's efforts toward cultural, political and economic independence. (Lec. 3) Pre: sophomore standing or permission of instructor.
- 385 Revolution and Unrest in Central America and the Caribbean (3)**  
Historical origins of social unrest in Central America and the Spanish-speaking Caribbean. Cuban and Nicaraguan revolutions, civil conflict in Guatemala

and El Salvador, U.S. policy. (Lec. 3) Pre: sophomore standing or permission of instructor.

**387 (or WMS 387) Latin American History at the Movies (3)**

Latin Americans see themselves very differently than how they are perceived by North Americans. Their self-portrayal, in literature and film, is the key to understanding their history and conflicts. (Lec. 3) Pre: 180 is suggested but not required.

**388 (or AAF 388) History of Sub-Saharan Africa (3)**

Ancient and medieval Africa, and the impact of Islam; the "Glorious Age" of the Sudanic empires; the slave trade and the age of exploration; the period of European partition and the rise of African nationalism. (Lec. 3) Pre: junior standing.

**389 Exploration, Commerce, and Conflict in the Atlantic World, 1415–1815 (3)**

The Atlantic world from the 15th to early 19th centuries. Voyages of exploration, cultural contact, Atlantic economy, piracy, smuggling, fishing, naval warfare, imperialism, migration, and life at sea in the Age of Sail. (Lec. 3) Pre: sophomore standing or permission of instructor.

**390 The Atlantic World in the Age of Iron, Steam, and Steel (3)**

The Atlantic world in the 19th and early 20th centuries. Maritime technology, seaborne commerce, naval warfare, imperialism, migration, whaling, the slave trade, piracy, and life at sea. (Lec. 3) Pre: sophomore standing or permission of instructor.

**391 Directed Study or Research (3)**

Special work arranged to meet the needs of individual students who desire advanced work. (Independent Study) Pre: permission of chairperson. May be repeated for a total of 6 credits with permission of instructor and chairperson.

**393 Topics in History (1–3)**

Subject, course content, and years offered will vary according to expertise and availability of instructors. (Lec. 1–3) May be repeated for credit with permission of chairperson. Pre: sophomore standing or permission of instructor.

**396 Maritime History and Underwater Archaeology Field School (3)**

Usually, but not exclusively, taught in Bermuda. Students may select an archaeological diving option, an archaeological non-diving option, or an archival research option. Pre: junior standing and those students who select the archaeological diving option will be required to go through the URI research diving certification process prior to departure.

**397 The Historical Landscape of Britain (3)**

Taught in England. Examines the impact of political, military, religious, economic, and social change in the past six or seven centuries on the landscape of

village and field and town and country. (Lec. 2, Lab. 3) Usually taught in conjunction with ENG 397. Pre: sophomore standing or permission of instructor.

**398 History Through Science Fiction (3)**

Ideas about history in popular culture as seen in the literary genre of science fiction. (Lec. 3) Pre: sophomore standing or permission of instructor.

**401 Advanced Topics in European History (3)**

Subject and course content will vary from semester to semester. Student work will emphasize historiographical analysis and the use of specialized research materials. (Lec. 3) Pre: junior, senior, or graduate standing in history or permission of instructor. May be repeated for credit with permission of chairperson.

**441 Advanced Topics in American History (3)**

Subject and course content will vary from semester to semester. Student work will emphasize historiographical analysis and the use of specialized research materials. (Lec. 3) Pre: junior, senior, or graduate standing in history or permission of instructor. May be repeated for credit with permission of chairperson.

**481 Advanced Topics in Asian or Latin American History (3)**

Subject and course content will vary from semester to semester. Student work will emphasize historiographical analysis and the use of specialized research materials. (Lec. 3) Pre: junior, senior, or graduate standing in history or permission of instructor. May be repeated for credit with permission of chairperson.

**482 (or NRS 482 or EVS 482) Innovative Sub-surface Remediation Technologies (4)**

Innovative remediation technologies for treating contaminated groundwater and sediments: theory, applications, and limitations of selected methods. Discussion of case studies. (Lec. 4) Pre: permission of instructor. In alternate years. Not for graduate credit.

**490 (or APG 490) Underwater Historical Archaeology (3)**

Methodological and theoretical foundations of underwater historical archaeology. Examines the contribution of shipwrecks and other inundated sites to our understanding of the global nature of modern life. (Seminar) Pre: at least 3 credits of course work at the 300-level in history, anthropology, or art history, or permission of instructor.

**495 Seminar in History (3)**

Development of skills in historical research and writing and in the critical analysis of historical works. Topics vary. (Seminar) Pre: completion of 401 or 441 or 481, with the same instructor, or permission of the department. This course is required of undergraduate history majors. May be repeated for credit with different topic with permission of instructor.

**502, 503 Special Readings in European History (3 each)**

Intensive tutorial work, research, and readings in European history. (Independent Study) Pre: graduate standing, permission of instructor, and concurrent audit of parallel 300-level course. May be repeated.

**506 Seminar in European History (3)**

Selected topics in European history, with intensive reading of important secondary and/or primary sources; critical written analysis of historical method, research, and modes of interpretation. May be repeated for credit with different topics. (Seminar) Pre: graduate standing or permission of instructor.

**507 Seminar in United States History (3)**

Selected topics in United States history, with intensive reading of important secondary and/or primary sources; critical written analysis of historical method, research, and modes of interpretation. May be repeated for credit with different topics. (Seminar) Pre: graduate standing or permission of instructor.

**508 Seminar in Asian or Latin American History (3)**

Selected topics in Asian or Latin American history, with intensive reading of important secondary and/or primary sources; critical written analysis of historical method, research, and modes of interpretation. May be repeated for credit with different topics. (Seminar) Pre: graduate standing or permission of instructor.

**536, 537 Special Readings in American History (3 each)**

Intensive tutorial work, research, and readings in American history. (Independent Study) Pre: graduate standing, permission of instructor, and concurrent audit of parallel 300-level course. May be repeated.

**544 Colloquium in Worker History**

See Labor and Industrial Relations 544.

**588 Special Readings in Asian or Latin American History (3)**

Intensive tutorial work, research, and readings in Asian or Latin American history. (Independent Study) Pre: graduate standing and permission of instructor. Concurrent audit of parallel 300-level course. May be repeated.

**591 Directed Study or Research (3)**

Directed readings, research, or study designed to meet the particular needs of individuals or small groups of graduate students. (Independent Study) Pre: permission of chairperson.

**599 Master's Thesis Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## Honors Program (HPR)

Director: Professor R. McIntyre

*Honors courses (HPR) are open only to eligible students. See "Honors Program" in this catalog or the Honors Program brochure for requirements. Sections of honors courses that have been approved for general education credit are marked.*

*For a complete listing of all honors courses, consult the Honors Program Web site at [uri.edu/hpr](http://uri.edu/hpr), or use the "Class Search" feature of e-Campus, choose "Additional Search Criteria" and type the word "Honors" in the field "Course Title Keyword." Specific topics are listed in the Schedule of Courses.*

### 107 Honors Seminar in Letters (3–4)

Exploration of themes and topics in the field of Letters. Topics include: "U.S. and Francophone Hip Hop Culture;" "Narratives of Ability and Disability;" and "Spain, the Jews, and the Inquisition." (Seminar) (L)

### 108 Honors Seminar in Mathematics (3–4)

Exploration of topics and creative use of problem solving in mathematics. Topics include "Computer Forensics." (Seminar) (MQ).

### 109 Honors Seminar in Natural Sciences (3–4)

Exploration of themes and topics in the natural sciences. Topics include "Biology for the Citizen." (Seminar) (N).

### 110 Honors Seminar in Social Sciences (3–4)

Exploration of themes and topics in the social sciences. (Seminar) Topics include: "Psychology of Violence and Nonviolence" and "The Irish in Ireland, the United States, and Rhode Island." (S)[D]

### 112 Honors Seminar in Writing (3–4)

Exploration of the elements of writing. (Seminar) (ECw)

### 119 Honors Seminar in Interdisciplinary Studies (3–4)

Topics include: "Loss in the Lives of Children and Adolescents." (Seminar)

### 124 Honors Seminar in Fine Arts (3–4)

(Seminar) (A)

### 125 Honors Seminar in Literature (3–4)

Topics include "Origins of Fantasy." (Seminar) (A)

### 201, 202 Honors Colloquium (3–4 each)

(Lec. 2–3, Rec. 1–2) May be repeated for a maximum of 8 credits each. Pre: GPA of 3.30 or better and one completed honors course, or permission of the director of the honors program. 201A, 202A (A); 201F, 202F (FC); 201L, 202L (L); 201M, 202M (MQ); 201N, 202N (N); 201S, 202S (S).

### 301, 302 Honors Tutorial Topic: Administrative Internship (1–4 each)

Experiential course that provides an opportunity for students to learn and practice administrative

decision-making and to develop research skills in an administrative setting. Placements include Brown Medical School, the Institute for International Sport, RI Planned Parenthood, and the URI Honors program. 302: a continuation of 301. (Practicum) Pre: GPA of 3.50 or better and permission of the director of the honors program.

### 307 Honors Tutorial in Letters (3–4)

(Seminar) Pre: 3.30 GPA or better or permission of the director of the honors program. (L)

### 308 Honors Tutorial in Mathematics (3–4)

(Seminar) Pre: 3.30 GPA or better or permission of the director of the honors program.

### 309 Honors Tutorial in Natural Sciences (3–4)

(Seminar) Pre: 3.30 GPA or better or permission of the director of the honors program. (N)

### 310 Honors Tutorial in Social Sciences (3–4)

(Seminar) Pre: 3.30 GPA or better or permission of the director of the honors program. (S)

### 319 Honors Tutorial in Interdisciplinary Studies (3–4)

Topics include: "The Global Challenge of Emerging Infectious Diseases." (Seminar)

### 324 Honors Tutorial in Fine Arts (3–4)

Topics include "Rebel Images in Film." (Seminar) Pre: 3.30 GPA or better or permission of the director of the honors program. (A)

### 325 Honors Tutorial in Literature (3–4)

Topics include "Dwarves and Elves: The World According to Tolkien." (Seminar) Pre: 3.30 GPA or better or permission of the director of the honors program. (A)

### 326 Honors Tutorial in Writing (3–4)

(Seminar) Pre: 3.30 GPA or better or permission of the director of the honors program. (ECw)

### 397 Honors Directed Study (1–4)

(Independent Study) Pre: 3.30 GPA or better or permission of the director of the honors program.

### 401, 402 Honors Project (3 each)

(Independent Study) Pre: permission of the director of the honors program.

### 411, 412 Honors Seminar (3–4 each)

Topics for 411 include "Controversies in Environmental Science" and "Film and Video Practicum." (Seminar)

*Following are honors sections of courses which may be taken for credit through the Honors Program. Courses approved for general education are identified.*

### African and African American Studies

408H Honors section of AAF 408: African Government and Politics

466H Honors section of AAF 466: Urban Problems

### Art History

251H Honors section of ARH 251: Introduction to Art History: Ancient to Medieval (A) [D]

252H Honors section of ARH 252: Introduction to Art History: Renaissance to Modern (A), [D]

### Biochemistry

311H Honors Section of BCH 311: Introductory Biochemistry

### Business Administration

140H Honors section of BUS 140: Introduction to Business

201H Honors section of BUS 201: Financial Accounting

315H Honors Section of BUS 315: Legal and Ethical Environment of Business I

320H Honors section of BUS 320: Financial Management

341H Honors section of BUS 341: Organizational Behaviors

365H Honors section of BUS 365: Marketing Principles

402H Honors section of BUS 402: Leadership and Motivation

445H Honors section of BUS 445: Strategic Management

### Chemistry

226H Honors Section of CHM 226: Organic Chemistry Laboratory

227H Honors Section of CHM 227: Organic Chemistry Lecture I

228H Honors Section of CHM 228: Organic Chemistry Lecture II

### Chinese

101H Honors Section of CHN 101: Beginning Chinese I

### Civil Engineering

323H Honors Section of CVE 323: Sustainable Solutions for Developing Communities

### Communication Studies

100H Honors section of COM 100: Communication Fundamentals (EC), [D]

322H Honors section of COM 322: Gender, Communication, and Culture

361H Honors section of COM 361: Intercultural Communication

### Community Service

302H Honors section of CSV 302: Community Service at URI

### Comparative Literature

335H Honors section of CLS 335: Interdisciplinary Studies in Comparative Literature

### Economics

100H Honors section of ECN 100: Introduction to Economics (S), [D]

### Education

102H Honors section of EDC 102: Introduction to American Education (S) [D]

**Engineering**

- 105H Honors section of EGR 105: Foundations of Engineering I  
 106H Honors section of EGR 106: Foundations of Engineering II  
 316H Honors section of EGR 316: Engineering Ethics (L) [D]

**English**

- 263H Honors Section of ENG 263: Introduction to Literary Genres—The Poem  
 265H Honors Section of ENG 265: Intro to Literary Genres: The Novel  
 335H Honors section of ENG 335: Interdisciplinary Studies in Comparative Literature  
 357H Honors Section of ENG 357: Literature and Medicine  
 485H Honors Section of ENG 485H: U.S. Authors

**Film Media**

- 101H Honors section of FLM 101: Introduction to Film Media (A), [D]

**Geosciences**

- 102H Honors section of GEO 102: Evolution and Extinction of the Dinosaurs (N)

**Grand Challenges**

- 102H Honors section of GCH 102: Grand Challenges in the Letters (L)  
 104H Honors section of GCH 104: Grand Challenges in the Social Sciences (S)

**History**

- 305H Honors section of HIS 305: The Renaissance (L)  
 328H Honors section of HIS 328: The Holocaust  
 351H Honors section of HIS 351: Historical Perspectives on Women and Health (L) [D]

**Human Development and Family Studies**

- 434H Honors section of HDF 434: Children and Families in Poverty  
 471H Honors Section of HDF 471: Responding to Grief

**Journalism**

- 110H Honors section of JOR 110: Introduction to Mass Media (L) or (S), [D]  
 230H Honors section of JOR 230: Introduction to Radio and Television News

**Mathematics**

- 108H Honors section of MTH 108: Topics in Mathematics (MQ)

**Natural Resources Science**

- 492H Honors Section of NRS 492: Special Projects

**Nursing**

- 150H Honors section of NUR 150: Human Sexuality (S), [D]  
 360H Honors section of NUR 360: Impact of Death on Behavior (L), [D]

**Pharmacy Practice**

- 317H Honors Section of PHP 317: Pharmacy Practice in Contemporary Health Care

**Philosophy**

- 101H Honors section of PHL 101: Critical Thinking (Ec) or (L)  
 212H Honors section of PHL 212: Ethics (L) [D]  
 235H Honors section of PHL 235 Modern Thought: Philosophy and Literature (L)  
 325H Honors section of PHL 325: American Philosophy (L) [D]

**Physics**

- 203H Honors section of PHY 203: Elementary Physics I (N)  
 204H Honors section of PHY 204: Elementary Physics II (N)  
 205H Honors section of PHY 205: Elementary Physics III (N)  
 273H Honors section of PHY 273: Elementary Physics Laboratory I (N)  
 274H Honors section of PHY 274: Elementary Physics Laboratory II (N)  
 275H Honors section of PHY 275: Elementary Physics Laboratory III (N)

**Political Science**

- 341H Honors section of PSC 341: Political Theory: Plato to Machiavelli (L)  
 342H Honors section of PSC 342: Political Theory: Modern and Contemporary (L)  
 422H Honors section of PSC 422: International Political Economy  
 466H Honors section of PSC 466: Urban Problems

**Psychology**

- 200H Honors section of PSY 200: Quantitative Methods in Psychology  
 300H Honors section of PSY 300: Quantitative Methods in Psychology  
 479H Honors section of PSY 479: Honors Topics in Psychology

**Thanatology**

- 360H Honors section of THN 360: Impact of Death on Behavior (L), [D]  
 471H Honors section of THN 471: Responding to Grief

**Women's Studies**

- 490H Honors Section of WMS 490: Advanced Topics in Women's Studies

**Writing**

- 104H Honors Section of WRT 104: Writing to Inform and Explain (ECw)

**Human Development and Family Studies (HDF)**

*Chairperson:* Professor Adams

**180 Personal and Career Development in Human Services (1)**

Exploration of skills and interests related to career development. Seminar for human service career opportunities. Understanding of short- and long-term goal process emphasized. (Seminar) HDF students only.

**190 First Year Leaders Inspired to Excellence (3)**

Leadership development course focusing on leadership theories, personal and academic adjustment issues, civic leadership and community service, and basic communication skills. Core requirement for the minor in leadership studies. (Lec. 3)

**200 Life Span Development I (3)**

Physical, social, cognitive, and emotional growth and development of young children within the family and varied cultural settings. Review of contemporary issues and their relevance for social policy. (Lec. 3)

**201 Life Span Development II (3)**

Physical, social, cognitive, and emotional growth and development from adolescence to senescence. Attention to varied cultural settings and relevant social policy. (Lec. 3)

**202 Research Perspectives in Human Development and Family Studies (3)**

Introduction to research processes in human development and family studies. Emphasis on reading and evaluating the research literature and preparing and presenting literature reviews. (Lec. 3/Online) Pre: admission to the human development and family studies program.

**203 Introduction to Work with Children (4)**

Theory and practice in care, teaching, and guidance of preschool children. Lectures, discussion, and participation in a field setting for three hours a week. (Lec. 3, Lab. 3) Pre: 200 or PSY 232. Service learning.

**205 Family Financial Issues Across the Life Span (3)**

Introduction to financial issues faced by families and individuals at each stage of the life cycle from different income levels, family types, and cultural backgrounds. (Lec. 3)

**225 Consumer in the Economy (3)**

Application of basic economic principles to consumer problems in a complex marketplace, buyer-seller relationships, effective consumer decision making, effects of government policies on consumers. (Lec. 3/Online). (S)

**230 Marriage and Family Relationships (3)**

Male-female and other close relationships in courtship and family systems as influenced by personality and culture in a changing society. Professional and functional orientation. (Lec. 3/Online)

**290 Modern Leadership Issues (3)**

Introductory leadership class. Topics include basic leadership theories, international governance/economic systems, critical thinking, and leadership in: U.S. education; community service organizations; families; diverse workplaces. Core option for the leadership studies minor. (Lec. 3) Pre: permission of instructor.

**291 Rose Butler Brown Peer Mentoring Program (3)**

Explores cultural identity, adult development, leadership, body image and the media, issues relevant to women of color, community engagement and mentoring. Elective for leadership minors (Lec. 3). Pre: permission of instructor.

**297 Contemporary Issues in Student Development (1–3)**

Student orientation, leadership, and training practices presented by various Student Affairs and other University programs, such as Student Life, Residential Life, Health Services, University College, and Affirmative Action. (Seminar) May be repeated for up to 6 credits. S/U only.

**298 Contemporary Issues in Student Development (1–3)**

Student leadership models and practices in various student development settings, such as Student Affairs, Student Life, Residential Life, University College, and Health Services. (Seminar) Topic A: FLITE is service learning. May be repeated for a maximum of 6 credits.

**301 Curriculum in Early Childhood (3)**

Program planning and teaching techniques that foster development of the young child in all curriculum areas. Includes Piagetian assessment and three hours per week in a local child care setting. (Lec. 2, Lab. 3) Pre: 203 and admission to the early childhood education program, or permission of instructor. Service learning.

**302 Literature for Children (3)**

Literary heritage of American children from all subcultures, and criteria for the selection and presentation of literature to children. (Lec. 3) Pre: junior standing.

**303 Early Childhood Practicum (4)**

Early childhood curriculum design and assessment; supervised teaching for three hours a week in the Child Development Center with preschool and kindergarten age children. (Lec. 3, Lab. 3) Service learning. Pre: 301 and admission to the early childhood education program or permission of instructor.

**305 Involving Families in Diverse Early Childhood (3)**

This class examines how early childhood professionals establish and maintain positive, ongoing, effective reciprocal relationships with diverse families in various settings. (Lec. 3) Pre: 203 or 306, and 230.

**306 Infant Development (4)**

Study of development in the first three years including family interaction and early education. Emphasis is on cultural differences in parenting. Supervised observation/participation working with infants and toddlers three hours a week included. (Lec. 3, Lab. 3) Pre: 200 or PSY 232.

**310 Adolescent Growth and Development (3)**

Physical, psychological, social, and emotional growth and development of the individual during adolescent years. Lecture, discussion, and participation in a field setting with concurrent enrollment in 311. (Lec. 3) Pre: 201 or permission of instructor.

**311 Early Field Experience With Adolescents (1)**

Supervised observation and participation experience working with adolescents. Pre: concurrent with 310. S/U only.

**312 Adult Development (3)**

Identification of influences, processes, and forces shaping adult development to late life. Environmental and lifetime theoretical approaches emphasized and stage theories reviewed. (Lec. 3) Pre: 201 or permission of instructor.

**314 Introduction to Gerontology (4)**

Introduction to the study of aging processes: biological, psychological, and social theories. Health, social, and other age-related problems. Lecture, discussion, and participation in a field setting. (Lec. 3, Lab. 3) Pre: completion of 24 or more credits.

**357 Family and Community Health (3)**

Specific health and maintenance concerns throughout the life span. Community and world health needs and related agencies. (Lec. 3) Pre: junior standing.

**400 Child Development: Advanced Course (3)**

Review and critique of major theories of child development. Examination of research studies and issues associated with the first decade of life. Emphasis on cultural contexts. (Lec. 3) Pre: 200 or PSY 232 and HDF 201.

**412 Historical, Multi-Ethnic and Alternative Leadership (3)**

Examines issues of cultural anthropology, critical thinking, theories of inclusion, and crisis leadership. Capstone requirement for leadership minors. (Lec. 3). Pre: permission of instructor and 190 or 290 and junior or senior standing.

**413 Student Organization Leadership Consulting (3)**

Examines experiential education, organizational development, facilitation techniques, and ethical issues of peer leadership. Elective for leadership minors (Lec. 3). Pre: permission of instructor and 190 or 290.

**414 Leadership for Activism and Social Change (3)**

Explores issues related to social change, power and privilege, coalition building, non-violence, civic engagement and activist movements. Elective for leadership minors (Lec. 3). Pre: permission of instructor and 190 or 290.

**415 FLITE Peer Leadership (3)**

Explores mentoring strategies, leadership and identity development models, leadership style, and community involvement. Elective for leadership minors (Lec. 2, Lab. 2). Pre: permission of instructor and HDF 190 or 290.

**416 Personal and Organizational Leadership (3)**

Topics include leadership theory and style, experiential learning, peer mentoring, critical thinking, quality improvement, and organizational development. (Lec. 3) Elective for leadership minors Pre: 290 or 190 and permission of instructor.

**417 Internship for Leadership Minors (3)**

Supervised internship experience for leadership studies minors. A core requirement for the minor in leadership studies. (Practicum 3). Pre: permission of instructor and 190 or 290 and enrollment in the leadership minor.

**418 Personal Finance (3)**

Personal financial planning and decisions for attaining individual and family goals. Factors that affect, protect, and enhance financial security. (Lec. 3) Pre: completion of 24 or more credits.

**421 (or THN 421) Death, Dying, and Bereavement (3)**

Exploration of human death, dying, and bereavement. Focus on biomedical, psychological, social, and multicultural dimensions. Implications for social policy. (Lec. 3) Pre: junior standing or above.

**424 Personal Finance Applications (3)**

Application of principles of family financial planning and decision making. Emphasis on mathematical and analytical evaluation and analysis including the use of computer software. (Lec. 3/Online) Pre: 418 or permission of instructor.

**426 Retirement Planning (3)**

Explanation and evaluation of financial information needed for effective retirement planning, including defining goals, estimating expenses, and analyzing resources. Pre: 418 or permission of instructor.

**428 Consumer Protection (3)**

Effectiveness of diverse approaches to consumer protection. Analysis of techniques such as information disclosure, standards for products and services, government and private agencies, redress channels, and legislation. (Lec. 3/Online) Pre: 205 or 225 or permission of instructor.

**430 Family Interaction (3)**

Interdisciplinary approach to the dynamics of intra-family relationships, interactions of family units and family members within the sociocultural environment. Implications for social policy. (Lec. 3) Pre: 202 and 230.

**431 Family and the Elderly (3)**

Emphasis on the elderly in analysis of intergenerational organization and relationships. Cultural values, psychosocial factors, economic considerations, and societal trends relative to family life. (Lec. 3)

**432 Perspectives on Parenting (3)**

Historic examination of childhood and parenting philosophies and comparison of practices among different cultures. Attention to contemporary social policy and practices surrounding parenting. (Lec. 3) Pre: 200 or PSY 232.

**433 Family Life Education (3)**

History, philosophy, and goals of Family Life Education including requirements for certification. Program planning, implementation, and evaluation. Current issues, trends, research, and theory. Emphasis on diversity of clientele and settings. (Lec. 3) Pre: 202 and 230.

**434 Children and Families in Poverty (3)**

Interdisciplinary approach to understanding the effects of poverty with attention to cultural, political, and policy issues and implications. (Lec. 3) Service learning. Pre: senior standing in the major or permission of instructor and 202.

**437 (or SOC 437) Law and Families in the United States (3)**

Seminar to investigate family roles, relationships, rights, and responsibilities as defined by the law. Emphasis on explicit and implicit family policy revealed in the various branches of law. (Seminar) Pre: 200 and 230 or SOC 212.

**440 Environmental Context of Aging (3)**

Study of normal aging-related changes as design determinants of the physical environment. Identifies theories and models of person-environment interaction and environment-behavior issues and procedures for post-occupancy evaluation studies. (Lec. 3) Pre: 202 and 314.

**450 Introduction to Counseling (3)**

Introduces students in human sciences to interviewing and counseling skills in both professional and paraprofessional settings. Integrates theory, practice, and application by didactic and experiential learning. (Lec. 3) Pre: senior standing in HDF, graduate standing, or permission of instructor.

**451 Financial Counseling and Debt Management (3)**

Examination of debt and budgeting problems affecting families. Utilization of a problem-solving approach and inclusion of financial counseling strategies for coping with financial issues and becoming proactive in family financial management. (Lec) Pre: 418 and 450.

**455 Assessment in Early Childhood (3)**

An overview of cognitive, affective, and psychomotor assessments used by early assessment techniques, and examination of current trends and practices. (Lec. 3) Pre: student teaching or equivalent and permission of instructor. In alternate years. Next offered spring 2012.

**456 Assessment Practicum (3)**

Supervised experience in completing cognitive, affective, and psychomotor assessments of young children. (Practicum) Pre: credit or concurrent enrollment in 455. In alternate years. Next offered spring 2012.

**458 R.I. Early Learning Standards (3)**

Prepares early childhood professionals to implement the R.I. Early Learning Standards in diverse early care and education settings to increase program quality and support children's learning and development. (Lec. 3) Pre: enrollment in R.I. Early Learning Standards Project sponsored by R.I. Dept. of Education. S/U only for undergraduate students. A-F grades for graduate students.

**471 (or THN 471) Responding to Grief (3)**

Examines conceptual, psychosocial, somatic, and pragmatic issues faced when grieving and how to cope or assist others accommodating imminent or realized loss due to death. (Lec. 3) Pre: 421, or prior thanatology course or permission of instructor.

**477, 478 Field Experience in Family Financial Counseling and Planning (3)**

Approved, supervised work experience related to consumer well-being. Examples include research, advocacy, education, and dissemination of information, or provision of service. (Practicum) Pre: senior standing or permission of instructor. S/U credit. Not for graduate credit.

**480 Senior Field Experiences in Community Agencies (6–12)**

Senior field experience in community agencies. (Practicum) Service learning. Pre: concurrent enrollment in 481; senior standing and permission of instructor. Application must be made on or before Feb. 1 in the year preceding internship. Orientation and learning contract occurs semester before field work. Not for graduate credit. S/U only.

**481 Field Experience Seminar and Reflections (1)**

Group discussions of field experiences in community agencies and related academic assignments. Includes senior reflections and portfolio. (Seminar) Service learning. Pre: permission of instructor. Not for graduate credit.

**492 Leadership Minor Portfolio (1)**

Preparation of portfolios required for graduation with minor in leadership studies. (Seminar) Pre: enrollment in leadership studies minor.

**497 Special Problems (1–3)**

Open to qualified seniors who wish to do advanced work primarily consisting of lab or field experiences. Students must obtain written approval from proposed faculty supervisor prior to registration. Pre: senior standing and permission of chairperson. May be repeated for no more than 9 credits. Not for graduate credit. S/U only.

**498 Special Problems (1–3)**

Open to qualified seniors who wish to do advanced work. Conducted as a seminar or supervised individual project. Students must obtain written approval from proposed faculty supervisor prior to registration. Pre: senior standing and permission of chairperson. May be repeated for no more than 9 credits. Not for graduate credit.

**501 Developmental Science in Family Contexts (3)**

Critical analysis of developmental science theories and related contemporary research. Using a lifespan perspective, the course will examine individual and family theories of development, and consider relevant practice and research implications. Pre: graduate standing or permission of instructor.

**505 Human Sexuality and Counseling (3)**

Historical, cultural, and developmental issues in human sexuality and counseling. Implications for self and client understanding through personal exploration and desensitization to sensitive topics. (Lec. 3) Pre: graduate standing or permission of instructor.

**506 Rhode Island Early Childhood Institute (1–3)**

Intensive institute focused on contemporary issues in early childhood education in Rhode Island and the nation. Topics vary, with discussion of theoretical, empirical, and practical issues. (Seminar) Pre: enrollment in Early Childhood Institute program or permission of instructor. May be repeated as topics vary.

**507 Seminar in Early Childhood Education**

Seminar in trends and model programs in early childhood education. Special attention to substantive evaluation and program design issues for the professional early childhood educator. (Seminar) Pre: student teaching or equivalent classroom experience or permission of instructor.

**511 Seminar on Infancy Through Childhood (3)**

Examines trajectories, theories and research associated with child development from infancy through childhood. Topics include early brain development, culturally sensitive caregiving, health, education, behavior, and the impact of public policy on this developmental stage. Pre: graduate standing or permission of instructor.

**512 Seminar on Adolescence Through Young Adulthood (3)**

Examine theories and research associated with adolescence and young adulthood. Topics include

transitions, risky behaviors, health issues, work-family tensions, and the impact of public policy on this developmental stage. Pre: graduate standing or permission of instructor.

### 513 Seminar in Older Adulthood (3)

Examine theories and research associated with older adulthood and aging. Emphasis on current research and practice issues. Interdisciplinary focus on biopsychosocial aspects of growing older. Pre: graduate standing or permission of instructor.

### 518 Seminar in Life-Span Financial Issues (3)

Survey and critical examination of research on life-span financial issues. Implications for diverse populations and human service settings will be drawn. (Independent Study) Pre: 418 or permission of instructor.

### 527 Health Care Policy (3)

Development of policy frameworks and their application for understanding current major health care policy issues across lifespan, including economic, political, and ethical dimensions. Exploration of the experiences of other countries. (Seminar) Pre: graduate standing.

### 530 Advanced Family Studies (3)

Intensive study of theories in the family field, integrated with contemporary family issues and family intervention. (Seminar) Pre: graduate standing or permission of the instructor.

### 533 Family Policy and Program Evaluation (3)

Seminar examining the political, socio-economic, and cultural forces influencing development and implementation of national and local family policies with emphasis on evaluations of child and family programs. (Seminar) Pre: graduate standing or permission of instructor.

### 535 Families Under Stress: Coping and Adaptation (3)

Theoretical models of family interaction, development, and stress as applied to understanding of family behavior in managing stress or events. Concepts of stress, vulnerability, adaptability, coping, regenerative power, social supports, and related research. (Seminar) Pre: 430 or equivalent course work in family development or family sociology and permission of instructor.

### 540 Interdisciplinary Teamwork in Health and Human Services (3)

Basic principles of interdisciplinary teamwork in health care, human service, and education professions. Practice in promoting effective communication, conflict resolution, and leadership in teams. Focus on social and experiential learning. Pre: permission of instructor.

### 551 Counseling Theory and Techniques (3)

Theoretical foundation and practice of counseling with diverse adult populations. (Lec. 3) Pre: graduate standing and permission of instructor.

553 Higher Education Practicum (3) Supervised practicum in higher education placements. Emphasis on applied assignments in the initial stages of college student personnel program. (Practicum) Pre: credit or concurrent enrollment in 567, permission of instructor. S/U only.

### 559 Gender Issues in Therapy (3)

Systemic integration of the issues and therapeutic dilemmas growing out of society's changing views of women and men. Emphasis on research, therapist self-awareness, and evaluation of current therapies. (Seminar) Pre: 450 or equivalent and graduate standing or permission of instructor.

### 560 Group Procedures and Leadership (3)

Approaches and processes for conducting a range of group interventions from small group meetings to psychoeducational techniques. A practical and theoretical approach to facilitation skills, team leadership, and group dynamics in higher education and other adult settings. Enrollment is limited. (Lec. 2, Lab. 4) Pre: graduate standing and permission of instructor.

### 562 Organization Development in Human Services (3)

Conceptual and technical components of organization development (OD) and consultation to various types of organizations, with emphasis on human service arenas. Approaches to the different phases of intervention in planned change efforts using theoretical frameworks, case, and client applications. (Lec. 2, Lab. 4) Pre: graduate standing and permission of instructor.

### 563 Marital and Family Therapy I (3)

Major theoretical perspectives, including system theory as related to therapy. Communication and relationship skills, negotiation and behavioral contracting, treating specific relationship problems, therapy evaluation. (Seminar) Pre: permission of instructor.

### 564 Marital and Family Therapy II (3)

Major contemporary theories of family therapy and the development of family therapy as a unique intervention strategy; special consideration of issues and problems commonly confronted in conducting family therapy. (Seminar) Pre: permission of instructor.

### 565 Family Therapy Practicum (3)

Supervised clinical experience in marriage and family therapy. Case materials will be presented by students, and taped segments of actual counseling sessions will be reviewed. (Lec. 3) Pre: admission to MFT program or permission of instructor. May be repeated for a maximum of 18 credits.

### 566 Theoretical and Clinical Problems (3)

Examination of major ongoing and emerging theoretical issues in family therapy. The implications of these problems in clinical practice with families. (Lec. 3) Pre: 564 and graduate standing.

### 567 Principles and Practices of College Student Personnel (3)

Survey of the historical, philosophical, sociological, and cultural influences on college student personnel work as a profession and exploration of selected functional areas within student affairs. (Lec. 3) Pre: graduate standing in CSP and permission of instructor.

### 568 College Student Development and Learning (3)

Examination of human development and learning of students in higher education. Emphasis on psychosocial, intellectual, and moral development in a sociohistorical context. (Lec. 3) Pre: 567.

### 569 Assessment in Family Therapy (3)

Administration and interpretation of assessment instruments for treatment, planning, and evaluation. Ethical, legal, and theoretical issues related to family systems assessment are discussed. (Seminar) Pre: graduate standing or permission of instructor.

### 570 Research in Human Development and Family Studies (3)

Historical, philosophical, and procedural foundations of scientific inquiries into individuals and families. Explores the various ways to acquire information about human development and family relationships. (Lec. 3) Pre: graduate standing or permission of instructor.

### 572 Administrative Practices in Human Development and Family Studies (1)

Introduction to administrative practices affecting entry level professionals in HDF. (Lec. 3) Pre: permission of instructor.

### 573 Legal Issues in Higher Education (1–3)

An overview of the effect of federal and state legal systems on university administration and service delivery. Reviews authorities and agencies, major court decisions, and the application of substantive and procedural law principles. (Lec. 1–3) Pre: graduate standing and permission of instructor.

### 574 Environmental Theory and Assessment in Higher Education (3)

Overview of selected person-environmental interaction theories and assessment frameworks applicable in higher education settings. Emphasis on campus ecology, cultural, perceptual, human aggregate, physical/architectural, and behavior setting approaches. (Seminar) Pre: 568 and 570.

**575 Cultural Competence in Human Services (1)**  
Exploration of skills needed to enhance a diverse work environment and other human service settings. (Seminar) Pre: graduate standing and permission of instructor.

**576 Diversity in Higher Education (2)**  
Survey of the historical and current demographical profile of students in higher education. Emphasis on implications for programs, policies, and leadership. (Lec. 2) Pre: graduate standing in College Student Personnel or permission of instructor.

**577 Seminar: Topics in Higher Education (1–3)**  
Recent developments and current issues in higher education. May be repeated for a maximum of 6 credits. (Seminar)

**578 Ethical, Legal, and Professional Concerns in Family Therapy (3)**  
Ethical, legal, and professional issues encountered by family therapists in the delivery of services. These aspects of therapy practice along with systemic theory are cornerstones of competent practice. (Seminar) Pre: 563 and 565, 530 and 535, concurrent enrollment in 583, and permission of instructor.

**580 Professional Seminar (1–3)**  
Emphasizes initial implementation phases of master's research requirement as well as legal, ethical, and professional issues. (Seminar) Pre: advanced standing and permission of instructor.

**581 Professional Seminar (1–3)**  
Emphasizes research applications, completion of master's research requirement, and making a transition to a professional position. (Seminar) Pre: concurrent enrollment in 584 and permission of instructor.

**583, 584 Master's Internship (3 or 6 each)**  
Supervised field experience in various settings. Culminating experience integrates program theory and skills. (Practicum) Pre: advanced standing and permission of instructor. College Student Personnel students must enroll concurrently in 580, 583 (fall) and 581, 584 (spring). S/U credit.

**595 Master's Project: Action Research (1–6)**  
Number of credits is determined each semester in consultation with the major professor. Minimum of 6 credits is required of students who have chosen the action-thesis option. (Independent Study) S/U credit.

**597, 598 Advanced Study (1–3 each)**  
Survey of important research contributions significant to the understanding of human development and relationships. (Independent Study)

**599 Master's Thesis Research**  
Number of credits is determined each semester in consultation with the major professor or program committee. Minimum of 6 credits is required of students who have chosen the thesis option. (Independent Study) S/U credit.

## Human Science and Services (HSS)

*Dean: Professor McKinney*

**130 (or PSY 130) The Problem of Hunger in the U.S (4)**  
Survey of the problem of hunger in the United States, the causes, effects on individuals and society, and the policies and programs intended to help hungry people. (Lec. 2, Practicum) (S) [D]

**270 Field Experience in Human Science and Services II (2–6)**  
Didactic and experiential learning in student-selected settings. Emphasis on achievement of pre-established learning goals leading to selected competencies. Goals established by the students, instructor, and site supervisor. (Practicum) Pre: admission to the human science and services program and permission of instructor.

**370 Field Experience in Human Science and Services (6–12)**  
Supervised field experience in human service agencies. Prior to placement, the student must develop a learning contract in consultation with the agency and his or her faculty advisor. (Practicum) Pre: junior standing in human science and services and permission of instructor. S/U only.

**470 Fourth-Year Field Experience in Human Science and Services (2–6)**  
Didactic and experiential learning in student-selected settings. Emphasis on achievement of pre-established learning goals leading to selected competencies. Goals established by the students, instructor, and site supervisor. (Practicum) Pre: admission to the human science and services program and permission of instructor. Not for graduate credit.

**480 Senior Seminar in Human Science and Services (3)**  
Interdisciplinary capstone seminar, with content developed to fit learning goals and programs of study of the students. Portfolio development and assessment as culminating experience. (Seminar) Pre: senior standing in human science and services and permission of instructor. Not for graduate credit.

**491 Special Problems (1–3)**  
Advanced work in the human services under the supervision of a faculty member. (Independent Study) Pre: permission of instructor and the Division of Interdisciplinary Studies. Not for graduate credit in human development and family studies.

**530 Multidisciplinary Health Seminars for the Elderly (3)**  
Field experience for students in various health disciplines. Development of assessment techniques, curricular materials, and team delivery of health

seminars to the elderly at community sites. (Seminar) Service learning. Pre: graduate standing or permission of instructor.

**590 Seminar in Human Science (3)**  
Investigation of human science as lived experience, reflective inquiry, and reflective practice. Development and presentation of individual projects embodying these characteristics of human science. (Seminar)

## Industrial and Systems Engineering (ISE)

*Chairperson: Professor Taggart (Mechanical, Industrial and Systems Engineering)*

**220 Introduction to Systems Engineering (1)**  
An exploration of the practice of systems engineering and the interrelationships between industrial, mechanical and other systems. Systems performance evaluation, improvement and planning. Ethics in the practice of engineering. (Seminar).

**240 Manufacturing Processes and Systems (3)**  
**Introduction to a wide variety of manufacturing processes. Basic facility layout and manufacturing system design, including material handling and lean principles. (Lec. 3) Pre: CHM 101. 241 Laboratory for Manufacturing Processes and Systems (1)**  
Laboratory demonstrations and experiments in machining, casting, metrology, and rapid prototyping. Plant visits and lab tours. (Lab. 3) Pre: credit or concurrent enrollment in 240.

**325 Computer Tools for Engineers (3)**  
Visual basic programming, including VBA and other computer applications used for engineering problem solving, system design and evaluation. (Lec. 2, Lab. 3) Pre: MTH 141.

**391, 392 Special Problems in Industrial Engineering (1–3 each)**  
Independent study and seminar work under close faculty supervision. Discussion of advanced topics in preparation for graduate work. (Independent Study) Pre: junior standing and permission of instructor.

**401 Industrial and Systems Engineering Capstone Design I (3)**  
Application of engineering skills using a team-based approach. Design process methodology and communication of solutions to real-world engineering problems. First of a two course sequence. (Lecture 2, Lab 3) Pre: 240, 412, and 432, or 433 or permission of instructor. Not for graduate credit.

**402 Industrial and Systems Engineering Capstone Design II (3)**  
Application of engineering skills using a team-based approach. Design process methodology and communication of solutions to real-world engineering

problems. Second of a two course sequence. (Lecture 2, Lab 3). Pre: 401 or permission of instructor. Not for graduate credit.

#### 404 Engineering Economy and Project Planning (3)

Effects of economics on engineering decisions in design, selection, and product or project proposals, project planning, resource allocation, and scheduling using computer-based tools. (Lec. 3) Not for graduate credit in industrial and systems engineering.

#### 411 Probability and Statistics for Engineers (3)

Introduction to probability and statistics in engineering applications including data analysis, probability theory, probability distributions, sampling distributions, statistical inference, hypotheses testing, confidence intervals, analysis of variance, and receiver operating characteristics. (Lec. 3) Pre: MTH 142 or permission of instructor.

#### 412 Statistical Methods and Quality Systems (3)

Study of statistical methods and quality systems in engineering applications including statistical methods, quality improvement tools, control charts, process capability, linear regression, design of experiments, and acceptance sampling. (Lec. 3) Pre: 411 or STA 409 or MTH 451 or permission of instructor.

#### 432 Operations Research: Deterministic Systems (3)

Introduction to major areas of operations research and their application to systems analysis. Linear programming, transportation and transshipment models, elementary network analysis, integer programming, and related topics. (Lec. 3) Pre: MTH 362 or 215 or permission of instructor

#### 433 Operations Research: Stochastic Systems (3)

Markov chains, dynamic programming, queuing theory, simulation, forecasting, game theory simple stochastic models, and their relation to selected problems. (Lec. 3) Pre: 411 and MTH 362 or 244 or permission of instructor.

#### 443 Machining and Machine Tools (3)

Machine tool motions, power requirements, and machining times. Mechanics and economics of metal machining. Introduction to numerical control and computer-aided programming of CNC machine tools. (Lec. 3) Pre: CVE 220 and ISE 240.

#### 444 Assembly and Handling Automation (3)

Types and economics of automatic assembly systems. Analyses of automatic feeding and orienting techniques for small parts. Application of robots in assembly. (Lec. 3) Pre: MCE 263 and ISE 240.

#### 446 (or MCE 446) Metal Deformation Processes (3)

Study of the characteristics of metal flow under different loading conditions. Theories, capabilities, and

limitations of a wide range of deformation processes applied to industrial metalworking. (Lec. 3) Pre: 240, CVE 220, and CHE 333.

#### 449 (or MCE 449) Product Design for Manufacture (3)

Techniques for analyzing product structures for ease of assembly and manufacture. Manual, robot, and high-speed mechanized assembly systems considered for mechanical and electronic products. Covers choice of material and processes in early design. (Lec. 3) Pre: 240 or 343, or permission of instructor.

#### 451 Production System Design (3)

Stochastic and deterministic models of production and inventory systems. Push and pull production control systems. Manufacturing system design, scheduling, material handling and facility layout. (Lec. 3) Pre: 432 or 433 or permission of instructor.

#### 452 Industrial Engineering Design (3)

A team project approach to industrial engineering design including assembly lines, transfer lines, scheduling, cellular manufacturing, flexible manufacturing facilities, operation and material flow design; facilities design and operation; production systems design. (Lec. 3) Pre: 451 or permission of instructor.

#### 460 Product Design for Environment (3)

Principles and practices of designing more environmentally beneficial products. Environmental effects. Life cycle analysis, recycling and remanufacturing. Design for disassembly and environment. Group projects on product and process design using LCA and DFE analysis tools. (Lec. 3) Pre: 240, CHE 333 or 437.

#### 491, 492 Special Problems (1–6 each)

Advanced work under the supervision of a member of the faculty and arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 12 credits.

#### 500 Project Planning and Management in Systems Engineering (3)

Presents the tools and processes to help plan and manage real-world systems engineering projects including network planning, scheduling, analysis, synthesis; critical path method/PERT; computer-aided planning; and other contemporary tools. (Lec. 3) Pre: 432 or permission of instructor.

#### 513 (or STA 513) Quality Systems (3)

Topics in statistical quality control systems. Single, multiple, and sequential sampling. Design and analysis of a wide variety of statistical control systems used in conjunction with discrete and continuous data, for several kinds of data emission. (Lec. 3) Pre: 411 or equivalent.

#### 525 (or CSC 525 or ELE 515) Systems Simulation (3)

Simulation of random processes and systems. Continuous and discrete simulation models. Data structures and algorithms for simulation. Generation of random variates, design of simulation experiments for optimization and validation of models and results. Selected engineering applications. (Lec. 3) Pre: CSC 212 or ISE 325, ISE 433 or ELE 509, or permission of the instructor.

#### 533 Advanced Statistical Methods for Research and Industry (3)

Describing and analyzing data, design of experiments, analysis of variance, regression analysis, and applications in industry and applied science research. (Lec. 3) Pre: 411 or permission of instructor.

#### 540 Production Control and Inventory Systems (3)

Theory and practice of industrial production control and inventory systems. A broad spectrum of mathematical models for static, dynamic, perpetual, and periodic inventory systems as they affect and relate to production. (Lec. 3) Pre: 432 or permission of instructor.

#### 541 Advanced Materials Processing (3)

Engineering analyses in the processing of materials. Rapid manufacturing fundamentals. Nontraditional manufacturing techniques. Dynamic coupling, tool-work-piece interaction, energy and thermal analysis; mechanics of material removal and displacements. (Lec. 3) Pre: 240 or permission of instructor.

#### 542 Introduction to Computer-Aided Manufacturing (3)

Use of computers in manufacturing. Solid modeling principles and applications. Numerical and adaptive control. CNC programming. Introduction to rapid manufacturing. (Lec. 3) Pre: 240 or permission of instructor.

#### 543 Fundamentals of Machining (3)

Fundamental treatment of the mechanics and economics of metal machining and grinding. Includes an introduction to numerical control and computer-aided programming of CNC machine tools. (Lec. 3) Pre: CVE 220 or ISE 240 or permission of instructor. Not for graduate credit for students with credit in 443.

#### 544 Automatic Assembly Systems (3)

Types and economics of automatic assembly systems. Analysis of automatic feeding and orienting techniques for small parts. Application of robots in assembly. Economics of assembly systems for printed circuit boards. (Lec. 3) Pre: 240 or permission of instructor. Not for graduate credit for students with credit in 444.

**545 Manufacturing Systems: Analysis, Design, Simulation (3)**

Problems in system analysis and design as related to modern manufacturing. Quantitative models and simulation methods for manufacturing planning, control, scheduling, flexible manufacturing and highly automated manufacturing systems. (Lec. 3) Pre: 432 or permission of instructor.

**546 Advanced Metal Deformation Processes (3)**

Theory of metal flow under different loading conditions. Prediction of metal forming process capabilities. Advanced topics include effects of anisotropy and mechanics of powder forming. (Lec. 3) Pre: 240 or permission of instructor. Not for graduate credit for students with credit in 446.

**549 (or MCE 549) Advanced Product Design for Manufacture (3)**

Techniques for analyzing product structures for ease of assembly and manufacture. Considers mechanical and electronic products and choice of materials and processes. A design project and term paper are required. (Lec. 3) Pre: 240 or permission of instructor. Not for graduate credit for students with credit in 449.

**550 Design for Producibility (3)**

Project work on product development, collaboration with industry, and submission of design project report. Concentration on effect of design decisions on manufacturing efficiency and cost. (Independent Study) Pre: 449 or 549 or permission of instructor.

**552 Lean Systems (3)**

Advanced study of enterprise system design including application of lean principles to service industries. Specific topics include lean manufacturing, waste elimination, reduction of cycle and set-up times, reconfigurable systems, quality and performance analysis. (Lec. 3) Pre: 451 or 540 or permission of instructor.

**555 Deterministic Systems Optimization (3)**

Linear, nonlinear, and integer formulations and solutions. Sensitivity analysis and pricing problems; degeneracy and duality; decomposition methods for large-scale systems; use of mathematical programming languages and applications. Pre: 432 or permission of instructor. In alternate years.

**591, 592 Special Problems (1–6 each)**

Advanced work under supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 12 credits.

**599 Master's Thesis Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**634 Design and Analysis of Experiments (3)**

Advanced topics in the design and analysis of experiments: factorial designs, blocking and confounding in factorial designs, fractional factorial designs, response surface methods and designs, nested and split-plot designs, other design and analysis topics. (Lec. 3) Pre: 533 or permission of instructor.

**660 Nonlinear Systems Optimization (3)**

Methods of optimization: indirect, direct elimination, climbing. Geometric programming. Problems and other topics in applied optimization. (Lec. 3) Pre: 432 or permission of instructor.

**691, 692 Advanced Special Problems in Industrial Engineering (1–6 each)**

Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 12 credits.

**699 Doctoral Dissertation Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U only.

**Internships and Experiential Education (ITR)****301, 302 Field Experience I, II (3–12 each)**

Field experience gained at placement site through participation in the ITR program. The experience will be defined by a job description and learning contract arranged by the ITR director between the student intern, the intern's faculty advisor, and the relevant agency supervisor. (Practicum) Pre: junior or senior standing, a minimum quality point average of 2.50, participation in the ITR program, and permission of faculty advisor. May be repeated for a maximum of 24 credits. S/U credit.

**303, 304 Colloquium I, II (3 each)**

Seminar format. Discussions of issues and problems raised by internship experiences in public service agencies. (Seminar/Online) Pre: concurrent enrollment in 301 for 303, and in 302 for 304. Required for and open only to students enrolled in the ITR program.

**Italian (ITL)**

*Section Head:* Professor Sama

**100 (111) Accelerated Elementary Italian (6)**

Equivalent to 101 and 102. Develops basic communication skills in Italian. Explores the products, practices, and perspectives of Italian culture. (Lec. 6) Pre: freshman or sophomore status only, or permission of instructor. (FC) [D]

**101 Beginning Italian I (3)**

Elements of the language, pronunciation, grammar, inductive reading; exercises in reading, writing, and conversation. (Lec. 3) Pre: no prior Italian is required. Will not count toward the language requirement if the student has studied Italian for more than one year within the last six years. (FC) [D]

**102 Beginning Italian II (3)**

Continuation of 101. Students enrolling in this course should have taken 101 or equivalent. (Lec. 3) (FC) [D]

**103 Intermediate Italian I (3)**

Development of facility in reading texts of moderate difficulty, supplemented by further work in grammar, conversation, and composition. Students enrolling in this course should have taken 102 or equivalent. (Lec. 3) (FC) [D]

**104 Intermediate Italian II (3)**

Continuation of 103. Students enrolling in this course should have taken 103 or equivalent. (Lec. 3) (FC) [D]

**105 Basic Conversation (1)**

Practice in basic Italian conversation skills. (Lec. 1) Pre: credit or concurrent enrollment in 103 or 104. May be repeated once for maximum of 2 credits.

**205, 206 Conversation and Composition (3 each)**

Intensive course in conversation and composition. Promotes facility in speaking and understanding idiomatic Italian. Students enrolling in 205 should have taken 104 or equivalent. (Lec. 3) (FC) [D]

**301, 302 Civilization of Italy (3 each)**

The most important aspects of Italian civilization. 301: From the Middle Ages to the end of the Renaissance. 302: From the 17th century to the present. (Lec. 3) Pre: 205 or 206 or permission of chairperson.

**305 Advanced Conversation and Composition (3)**

Intensive practice in spoken and written Italian. (Lec. 3) Pre: 205 or 206 or permission of chairperson.

**309 Techniques of Translation (3)**

Principles and techniques of translating written Italian into English and vice versa. Text materials of different types used in practical work: scientific, journalistic, business, and literary language. (Lec. 3) Pre: 205 or 206 or permission of chairperson.

**315 Italian Cinema (3)**

Representative Italian films and their directors through viewing and discussions of films, lectures, and readings. Course taught in English. (Lec. 3) Students counting the course for a major or minor in Italian are required to do written work in Italian and must have credit for 205 or 206 or permission of instructor. May be repeated with different topics for a maximum of 9 credits.

**325, 326 Introduction to Italian Literature (3 each)**

Appreciation of literature. Representative texts of Italian narrative, drama, and lyric poetry. Elements of the methods of criticism. (Lec. 3) Pre: 205 or 206 or permission of chairperson.

**391, 392 Masterpieces of Italian Literature (3 each)**

Reading in English translation of selected Italian authors of greatest significance. 391: Medieval and Renaissance. 392: Post-Renaissance to 20th century. (Lec. 3) Not for major credit in Italian.

**395 Dante's Divine Comedy (3)**

Reading in English translation of Dante's chief work. (Lec. 3) Not for major credit in Italian.

**450 Women Writers: Renaissance to the Enlightenment (3)**

Examines Italian women who were active participants in the literary and artistic developments of Italian and European culture from the Renaissance to the Enlightenment: poets, playwrights, journalists, courtesans, matrons, and nuns. Study of their correspondence, dialogues, poetry, plays, literary periodicals, and fashion magazines in the context of the contemporary debates on the condition of women in society. (Lec. 3) Pre: one 300-level ITL course or permission of instructor. Not for graduate credit.

**455 Selected Italian Authors (3)**

Works of one or more major authors of Italian literature. Specific author(s) are designated the semester before the course is given. (Lec. 3) Pre: one 300-level course or permission of instructor. May be repeated for a maximum of 12 credits.

**465 Topics in Italian Literature (3)**

Special topics or themes in Italian literature not treated or emphasized in other courses. (Lec. 3) Pre: one 300-level course or permission of instructor. May be repeated with change in topic for a maximum of 9 credits.

**480 Business Italian (3)**

Study of concepts and terminology relating to the Italian business world. (Lec. 3) Pre: junior standing, credit or concurrent enrollment in at least one 300-level Italian course, or permission of instructor.

**481 The Works of Dante Alighieri (3)**

Dante's works with special attention given to analysis and interpretation of the Divine Comedy from the social, religious, philosophical, and political viewpoints of the Middle Ages. (Lec. 3) Pre: one 300-level course or permission of instructor.

**497, 498 Directed Study (3 each)**

Designed particularly for the advanced student. Individual research and reports on problems of special interest. (Independent Study) Pre: acceptance of project by a faculty member and approval of chairperson.

**Japanese (JPN)**

*Chairperson:* Professor Hedderich (Languages)

**101 Beginning Japanese I (3)**

Fundamentals of grammar and pronunciation, exercises in reading, writing, and conversation. (Lec. 3) Pre: no prior Japanese is required. Will not count toward the language requirement if the student has studied Japanese for more than one year within the last six years. (FC) [D]

**102 Beginning Japanese II (3)**

Continuation of 101. Students enrolling in this course should have taken 101 or equivalent. (Lec. 3) (FC) [D]

**103 Intermediate Japanese I (3)**

Development of facility in reading narrative and expository prose; exercise in grammar, listening comprehension, and speaking. Students enrolling in this course should have taken 102 or equivalent. (Lec. 3) (FC) [D]

**104 Intermediate Japanese II (3)**

Continuation of 103. Students enrolling in this course should have taken 103 or equivalent. (Lec. 3) (FC) [D]

**Journalism (JOR)**

*Chairperson:* J. Pantalone

**110 Introduction to the Mass Media (3)**

Surveys newspapers, magazines, radio, movies, television, advertising, and emerging technologies. Examines economic and news functions of each. Considers First Amendment, legal and ethical problems, restrictions, and social consequences of media. (Lec. 3) Recommended for nonmajors. Not for major credit in journalism. (L) or (S) [D]

**115 Foundations of American Journalism (3)**

Introduction to basic theories and principles of American journalism, and some of the major issues journalists confront. Examines news media audiences, effects, freedom, and responsibility. (Lec. 3) For journalism majors only.

**210 History of American Journalism (3)**

Development of American newspapers, magazines, and broadcast industry with analysis of the ideas that have changed American journalism. Exploration of the journalist's experience at periods in American history; the effects of economic and social changes on the press. (Lec. 3) Pre: 110 or 115 or permission of instructor. In alternate years. Next offered fall 2011.

**211 History of Broadcasting (3)**

Survey of broadcasting. Examines its pioneers and the impact of significant historical events as covered by radio and television. Considers the origins of modern news shows, talk-show formats, magazine

broadcasts, and quiz shows. (Lec. 3) Pre: 110 or 115. In alternate years. Next offered fall 2012.

**215 Free Speech and American Society (3)**

Legal and social parameters of freedom of speech in the United States. The legal and social history of freedom of speech will be examined and applied to discussions of recent free-speech controversies. (Lec. 3) Pre: 110 or 115.

**220 Media Writing (3)**

An introduction to writing for newspapers, magazines, broadcasting, and public relations. Includes consideration of objectivity, information gathering, language use, clarity and style, legal and ethical concerns. (Lec. 2, Lab. 2) Pre: WRT course with a grade of B or better and major in journalism or public relations, or permission of instructor.

**221 Multimedia Reporting (3)**

Introduces students to reporting and writing stories for listeners and viewers as well as readers, including gathering and using sound, video and still pictures. Frequent out-of-class assignments. (Lec. 2, Lab. 2) Pre: journalism majors only; 220 with grade of C or better. Not open to students with credit in 230.

**310 Media Law for Journalists (3)**

Role of government and the law in the communication of news, including basic laws affecting freedom of the press, journalists' privileges and responsibilities, privacy, broadcasting, and advertising. Case studies. (Lec. 3) Pre: junior standing and 110 or 115 and one 300-level journalism skills course or permission of instructor.

**311 Journalism Criticism (3)**

Examines news media performance in the United States by studying the works of media critics, both historical and contemporary. Practice in media monitoring and writing media criticism. (Lec. 3) Pre: 110 or 115 or permission of instructor.

**313 Alternative News Media in the United States (3)**

Critical analysis of nontraditional media in the United States, including black, religious, feminist, gay and lesbian press, as well as broadcast stations operated by and for minority groups. (Lec. 3) Pre: 110 or 115. In alternate years. Next offered spring 2012.

**320 Public Affairs Reporting and Writing (3)**

Practice in gathering and writing news of public affairs, including local and state government, courts, law enforcement. Introduces public records, alternatives to straight news story, interviewing techniques, rewriting. Frequent out-of-class and off-campus assignments. (Lec. 2, Lab. 2) Pre: 220 with a grade of C or better and major in journalism or public relations, or permission of instructor.

**321 Magazine Article and Feature Writing (3)**

Planning, researching, and writing articles and feature stories for magazines and newspapers.

Discussion of markets, freelance and job opportunities. Articles written and submitted to publications. (Seminar) Pre: junior standing and 220 with a grade of C or better and major in journalism or public relations, or permission of instructor.

### 330 Television News (3)

Reporting, writing, anchoring and producing news for television. Group work leads to production of a half-hour studio newscast. Frequent out-of-class and off-campus assignments. (Lec. 2, Lab. 2) Pre: 221 or 230 with a grade of C or better.

### 331 Electronic News Gathering (3)

Skill development in the visual technology of television news. Techniques of single-camera field production are stressed. Introduction to fundamentals of videotape editing; practice in ENG photography and editing. Frequent out-of-class and off-campus assignments. (Lec. 2, Lab. 2) Pre: 330 with a grade of C or better.

### 340 Public Relations

See Public Relations 340.

### 341 Editing for Publication (3)

An introduction to editing for the print media, including newspapers, magazines, and public relations. Focuses on taking work written by others and preparing it for publication. Includes consideration of legal and ethical issues. (Lec. 2, Lab. 2) Pre: junior standing and 220 with a grade of C or better and major in journalism or public relations, or permission of instructor.

### 345 Journalism Internship (3 or 6)

Supervised experience in (a) reporting and writing; (b) editing; (c) radio news; (d) television news; (e) public relations. Requires a minimum of 120 hours (3 credits) or 240 hours (6 credits). Weekly one-hour class meeting. Maximum of 6 credits allowed toward graduation. (Practicum) Pre: journalism majors and minors and public relations minors only. Prerequisite courses depend on internship. Permission of instructor and application required.

### 410 Ethics in Journalism (3)

Critical analysis of current issues affecting journalists and society in general, based on readings, videotapes, case studies, and discussion. Emphasis on ethics and decision making. (Lec. 3) Pre: 110 or 115 and senior standing or permission of instructor. Not for graduate credit.

### 411 Senior Portfolio (1)

Structured opportunity to select, review and reflect on examples of work for a portfolio. Formal presentations of portfolio to faculty required. (Portfolio) Pre: journalism major and senior standing and concurrent enrollment in 410. Not for graduate credit.

### 415 (or WRT 415) Perspectives on Reporting (3)

Critical assessment of reporting through the reading and analysis of book-length works of journalism and

magazine and newspaper series of articles. (Seminar) Pre: 110 or 115 and junior standing. Not for graduate credit.

### 420 Advanced Reporting and Writing (3)

Planning, developing, and writing complex news stories for publication. Emphasizes story-idea generation, information gathering from multiple sources, using public records and documents, and advanced interviewing techniques. Frequent out-of-class and off-campus assignments. (Lec. 2, Lab. 2) Pre: junior standing and 320 with a grade of C or better. Not for graduate credit.

### 430 Advanced Television News (3)

Practical experience in longer, more specialized news formats. Students report, write, videotape in-depth television news pieces. (Lec. 3) Pre: 330 with a grade of C or better.

### 440 Independent Study (1–3)

Individual reading programs, research, or project in journalism or mass media. (Independent Study) Pre: junior standing and submission to chairperson of proposal signed by supervising faculty member. Not for graduate credit.

### 441 Public Relations Practices

See Public Relations 441.

### 442 Publication Design for Journalism and PR (3)

An introduction to designing and producing for the print media, including newspapers, magazines, and newsletters. Extensive use of computers and desktop-publishing technology. Includes consideration of legal and ethical issues. (Lec. 2, Lab. 2) Pre: junior standing. 341 with a grade of C or better recommended. Not for graduate credit.

### 443 Strategic Media Communication (3)

See Public Relations 442.

### 445 Special Topics in Journalism (3)

Subject, course content, and years offered will vary according to expertise and availability of instructors. Pre: permission of instructor. May be repeated for credit with different topic. Not for graduate credit.

## Kinesiology (KIN)

*Chairperson:* Professor Riebe

### 116 Teaching Individual Sports Activities (1)

Emphasis on learning rules of play, sport specific skills, and teaching and instructional methods for sport activities and games that are individually based. (Lab. 3) Pre: kinesiology majors only.

### 117 Teaching Team Sports Activities (1)

Emphasis on learning rules of play, sport specific skills, and teaching and instructional methods for sport activities and games that are team based. (Lab. 3) Pre: kinesiology majors only.

### 118 Teaching Lifetime Physical Activities (1)

Emphasis on learning rules of play, sport specific skills, and teaching and instructional methods for physical activities and games that are lifetime fitness based. (Lab. 3) Pre: kinesiology majors only.

### 120 Weight Training and Physical Conditioning (1)

Principles of weight training and conditioning with emphasis on constructing individual and group exercise programs. (Studio 3) Open to kinesiology majors only.

### 121 Principles of Youth Fitness (1)

Principles of exercise as it relates to children and adolescents. Emphasis on teaching principles of aerobic exercise, flexibility, and resistance training. (Lec. / Lab. 2) Open to kinesiology majors only.

### 122 Human Anatomy and Physiology (4)

Structure and function of organ systems of the human body with emphasis on applications to human health. (Lec. 3, Rec. 1) Not for major credit for B.S. in Biological Sciences.

### 123 Foundations of Health (3)

Development of attitudes and practices that lead to more healthful living. Personal and community health problems studied. (Lec. 3) (S) [D]

### 222 Basic Movements and Gymnastics (1)

Techniques and acquisition of basic skills. Includes theory and analysis of basic through advanced skills of apparatus and tumbling with special emphasis on teaching and safety procedures. (Studio 3) Open to kinesiology majors only. Final offering 2011–12.

### 243 Prevention and Care of Athletic Injuries (3)

Conditioning, use of physiotherapy equipment, massaging, taping and bandaging technique. Latest American Red Cross procedures with the opportunity to receive standard certification. (Lec. 2, Lab. 2) Open to kinesiology majors only or with permission of instructor.

### 270 Introduction to Teaching Physical Education and Health (3)

Foundations of teaching physical education and health. Application of current theories of effective practices of teaching physical education and health in the elementary and secondary schools. (Lec. 3)

### 272 Basic First Aid and CPR Instructor (1)

Instruction and practice in performance and teaching the basic level of injury prevention and first aid and CPR procedures. Students successfully meeting requirements will receive First Aid and CPR Instructor certifications. (Lec. /Lab. 2) Open to kinesiology majors only.

### 275 Introduction to Exercise Science (3)

Principles of exercise, components of health-related fitness, weight control, and stress management. Basic exercise prescription for cardiorespiratory

endurance, muscular strength, and endurance and flexibility. (Lec. 3/Online)

### 278 Physical Activity, Cultural Diversity, and Society (3)

Introduction to the multiple ways in which issues of cultural diversity shape physical activity in American society. (Lec. 3) Pre: open to kinesiology majors only or with permission of instructor.

### 304 Methods of Teaching Physical Education in Elementary Schools (3)

Instruction in contemporary techniques used in a program of physical education for elementary school children. Types of activities found in basic programs and in planned progressions for various age groups. (Lec. 2, Lab. 2) Pre: concurrent enrollment in 305, admission to the teacher education program by the start of semester.

### 305 Supervised Experience—Physical Education in the Elementary School (1)

Students participate in supervised experience laboratory for methods learned in 304. (Practicum) Pre: concurrent enrollment in 304, admission to the teacher education program by the start of semester.

### 307 Methods of School Health Instruction (3)

Designed to teach methods, techniques, learning styles, and skills necessary to recognize the developmental, physical, social, and emotional growth of elementary and secondary level students. (Lec. 3) Pre: admission into the PHETE program.

### 309 Supervised Experience in Health Education (1)

Students participate in supervised experience laboratory for methods learned in 307: Methods of School Health Instruction; (Practicum) Pre: concurrent enrollment in 307 and admission in the PHETE program.

### 310 Principles of Human Motor Development (3)

Overview of the principles of motor development for the physical education teacher. Examines human motor development across the life span with emphasis on assessment and program development. Includes basic principles of motor learning. (Lec. 3) Pre: admission to the teacher education program and PSY 232 or HDF 200; or permission of chairperson.

### 314 Methods of Teaching Physical Education in Secondary Schools (3)

Instruction in contemporary techniques used in a program of physical education for secondary school children. Types of activities found in basic programs and in planned progressions for various age groups. (Lec. 2, Lab. 2) Pre: 304, 305, concurrent enrollment in 315, admission to the teacher education program.

### 315 Supervised Experience—Physical Education in the Secondary School (1)

Students participate in supervised experience laboratory for methods learned in 314. (Practicum) Pre: 304, 305, concurrent enrollment in 314, admission to the teacher education program.

### 322 Outdoor Leisure Pursuits (1)

Principal philosophical foundations of adventure theory and wilderness leadership are examined while the student learns to teach outdoor leisure activities. Concepts of judgment, decision making, leadership, and environmentally sensitive practices are introduced. (Lec. 1) Pre: kinesiology majors only.

### 324 Rhythms and Dance (1)

Instruction in the fundamental skills of folk, square, ballroom, and social dances, emphasizing personal skill acquisition and the skills necessary for teaching dances in the public/private school physical education environment. (Lab. 3) Pre: kinesiology majors only.

### 325 Exercise Testing and Prescription (3)

Theory and application of physical fitness assessments with focus on appropriate test selection and performance. Emphasis on practical skills of test administration. Preparation for ACSM-HFI certification. (Lec. 2, Lab. 2) Pre: 275.

### 334 (or BIO 334) Physiology of Exercise (3)

Applied human physiology, with applications to work, health, physical education, and athletic sports. Particular attention to adjustments of the circulatory and respiratory systems during physical activity. Application of latest technology in the field of fitness and health. (Lec. 3) Pre: BIO 201 or 242, junior or senior standing; or permission of instructor.

### 335 (or BIO 335) Physiology of Exercise Laboratory (1)

Student participation in laboratory sessions designed to understand the physiology of exercise relating to body composition, EKG, pulmonary, and metabolic functions. (Lab. 3) Pre: 201 or 242.

### 341 Techniques of Officiating I (3)

Presentation of current methods and techniques of officiating selected fall team sports. Provides necessary training and practical experience for students. (Lec. 2, Lab. 2)

### 368 Assessment in Physical Education and Health (3)

Focuses on the method and materials for measurement and evaluation in PE. Provides a basic introduction to data analyses and statistical inference. (Lec. 3) Pre: basic mathematics background.

### 369 Measurement and Evaluation in Kinesiology (3)

Students learn statistical basis for descriptive analyses and hypothesis testing in kinesiology. Students also learn to select, administer, and create reliable and

valid tests in exercise, sport, fitness, health, and physical education. (Lec. 3) Pre: completion of math general education requirement; completion of at least 30 credit hours. Open to kinesiology majors only.

### 370 Kinesiology (3)

The study of human movement based on anatomical, physiological, and mechanical principles. Emphasis on application of these principles to fundamental movement and physical education activity. (Lec. 3) Pre: BIO 121 and 242. For majors only.

### 382 Psycho-Social Aspects of Physical Education and Sport (3)

The scientific study of the behavior of individuals and groups within sport and physical activity. (Lec. 3) Pre: PSY 113, or permission of instructor.

### 391 Directed Study (1–3)

Development of an approved project supervised by a member of the department faculty. (Independent Study) Pre: junior standing and permission of chairperson and instructor.

### 401 Current Issues in Health Education (3)

Designed to develop student awareness of contemporary issues that are of concern to school health and other health educators. Extensive review of contemporary literature and film and critical analysis of selected issues and their effect on health education at the local, national, and global level. (Lec. 3) Pre: acceptance into the PHETE program.

### 410 Adapted Physical Education (3)

Planning and evaluation of physical education programs for individuals with special needs. Includes issues regarding disability laws and various mental, psychological, and physical conditions. (Lec. 2, Lab. 2) Pre: credit or concurrent enrollment in 304 or 314 or permission of instructor.

### 411 Assessment of Special Populations (3)

Assessment and programming of fitness, motor, and functional skill behaviors for individuals with special needs. (Lec. 2, Lab. 2) Pre: 410, 369 or permission of chairperson.

### 414 Fundamentals of Strength and Conditioning (3)

Scientific and practical basis for developing, designing, evaluating, and implementing resistance training programs. Emphasis on the physiological basis of program design. Prepares students for National Strength and Conditioning Association certification. Pre: BIO 242, KIN 334, and KIN 370.

### 420 Fitness Programs for Individuals with Chronic Diseases (3)

Theory and application of physical fitness programs and testing of individuals with cardiovascular, musculoskeletal, and metabolic diseases. (Lec. 3) Pre: 325, 334, and 335. Not for graduate credit.

**425 Fitness and Wellness Program Development (3)**

Development and administration of fitness and wellness programs. Includes program leadership and managerial skills for corporate, commercial, community, and clinical settings. (Lec. 3) Pre: 275.

**430 Adapted Aquatics (3)**

Planning, administering, and teaching adapted aquatics. Application of kinesiological concepts, characteristics, and methods of teaching aquatics to people with disabilities. (Lec. 2, Lab. 2) Pre: 410, intermediate level swimming ability, admission to the teacher education program or permission of instructor.

**475 Gender Issues in Sport and Physical Culture (3)**

Use of critical social theories to examine the complexities of how gender manifests within, and unavoidably structures, every person's experience in sport and physical culture. (Lec. 3) Pre: SOC 100 or WMS 150 or JOR 110 or KIN 278 or permission of instructor.

**478 Sport, Cultural Politics, and Media (3)**

Critical examination of social issues and cultural politics mediated through print, film, television, Internet and video games related to sports, fitness, and physical activity. (Lec. 3) Pre: SOC 100 or WMS 150 or JOR 110 or KIN 278 or permission of instructor.

**484 Supervised Field Work (12)**

Supervised field work in health, physical education, or recreation in community and/or commercial agencies. (Practicum) Pre: 369, 370, and 420. Not for teacher certification or graduate credit.

**486 Field Experience Seminar (3)**

Seminar for students completing fieldwork in health, physical education, or recreation. Topics include identification of problems, resource materials, and discussions of future career concerns. (Seminar) Pre: concurrent enrollment in 484. Not for graduate credit in physical education.

*Note: Student teaching includes practicum in both elementary and secondary schools under the supervision of the department. See EDC 485, 486, 487, 488, and 489.*

**501 Seminar in Kinesiology (1)**

This course provides a forum for students, faculty, and staff from the Department of kinesiology to present and discuss research and current issues related to the field of kinesiology. (Seminar) Pre: graduate standing or permission of chairperson. Must be taken twice prior to graduation.

**508 Physical Activity Promotion: Theory and Practice (3)**

This course examines theory and methods to facilitate individual and group behavior change, focused on promoting physical activity. Concepts in behavioral sciences affecting health behavior, motivation, and decision making are explored. (Lec. 3)

**510 Current Issues in Physical Education, Health, and Recreation (3)**

Designed to develop student awareness of contemporary situations that are of concern to the above professions. Extensive review of contemporary literature. Critical analysis of selected issues, their components and effects. (Lec. 3) Pre: permission of instructor.

**515 Physiology of Physical Activity and Health (3)**

The physiological basis of human movement, including contemporary topics such as the relationship between physical activity and health, obesity, exercise and aging, and youth fitness. (Lec. 3)

**520 Curriculum Construction in Physical Education (3)**

Analysis of criteria and procedures for curriculum construction in physical education. Standards for the evaluation and revision of elementary and secondary school physical education courses. (Lec. 3) Pre: permission of instructor.

**524 Obesity: Causes, Consequences, and Care (3)**

Overview of the obesity epidemic and implications for morbidity and mortality. Consideration of energy balance issues and metabolism. Emphasis on the role of physical activity in preventing and treating obesity. (Lec. 3) Pre: graduate standing or permission of instructor.

**530 Research Methods and Design in Physical Education and Exercise Science (3)**

An introduction to the basic aspects of research, including problem selection, literature review, instrumentation, methodology, and the writing of research reports and articles. (Lec. 3) Pre: competence in basic statistics and permission of instructor.

**531 Advanced Experimental Techniques in Exercise Science (3)**

Instruction in using the computer for research purposes with an emphasis on data analysis (i.e., statistical techniques). (Lec. 3) Pre: 530 or permission of instructor.

**545 Advanced Motor Development (3)**

Advanced study of the continuous process of motor development across the life span. Planning and directing movement experiences, factors mediating growth and development, and individual and gender differences are investigated. (Lec. 3)

**555 Women in Sport: Issues and Controversies (3)**

Critical analysis of women's sports using contemporary feminist perspectives. Emphasis on psychosocial and political-economic constructs that regulate women's emergence into sport. (Lec. 3)

**559 Principles of Exercise Testing and Interpretation (3)**

Theory and practical application of the graded exercise test including oxygen consumption measurements. Special emphasis on writing a safe exercise prescription based on the interpretation of the exercise test data. (Lec. 3) Pre: BIO 343 or permission of instructor.

**560 Seminar in Health, Physical Education, and Recreation (3)**

Selected topics within the three areas, depending on availability of specialized instruction including visiting professorship. (Seminar) Pre: permission of instructor.

**562 Advanced Exercise Physiology (3)**

Advanced study of the physiological factors limiting physical performance and work capacity with emphasis on the effects of physical conditioning on health and fitness. (Lec. 3) Pre: BIO 343 or permission of instructor.

**563 Epidemiology of Physical Activity (3)**

Presentation of exercise epidemiology and the effects of exercise on health. Current findings regarding the association between physical activity and chronic diseases and their risk factors. (Lec. 3) Pre: graduate standing or permission of instructor.

**564 Physiology of Aging (3)**

Library searches, reports, and discussion of topics of current research on the physiology of aging. Subject matter adapted to meet interests of students. (Lec. 3) Pre: BIO 242 or permission of instructor.

**565 Cardiovascular Disease: Prevention and Rehabilitation (3)**

Focus on cardiac rehabilitation, underlying pathology and pathophysiology, diagnostic and prognostic testing, and principles of rehabilitation. Special emphasis on electrocardiographic analysis and exercise intervention. (Lec. 3) Pre: BIO 343 or permission of instructor.

**578 Cultural Studies of Sport and Physical Activity**

Survey course focusing on the social, cultural, political, and economic conditions that produce and influence sport and physical activity. Emphasis on critical analyses of the social and political dimensions of physical activity, fitness, sport, health and wellness. (Lec. 3) Pre: 278, graduate level standing, or permission of instructor.

**580 Inclusive Practices in Adapted Physical Education (3)**

Strategies for inclusion of children and youth with disabilities into general physical education, including legal, moral, and ethical considerations and responsibilities; theories of inclusive practices; and application based on individual needs. (Lec. 3)

**581 (or PSY 581) Psychological Aspects of a Healthy Lifestyle (3)**

Considers the psychological processes and behaviors related to exercise participation and the adoption of a healthy lifestyle. Analysis of models and theories used in exercise psychology, associated research, and the implications for practitioners. (Lec. 3) Pre: graduate standing, PSY 113 and 232, or permission of instructor.

**582 Applied Sport Psychology (3)**

Focus on performance enhancement techniques (i.e., imagery, goal-setting, etc.) designed to improve individual and team performance. (Lec. 3) Pre: graduate standing, PSY 113 and 232, or permission of instructor.

**585 Disability Sports (3)**

Sports and recreational opportunities for individuals with disabilities; federal legislation effecting participation opportunities; spectrum of participation in community recreation to elite athletic opportunities within various disability sports organizations and events. (Lec. 3)

**591 Special Problems (3)**

Written paper reporting an in-depth investigation of a pertinent problem in the field, including a review of relevant literature, and analysis and solution of the problem based on scientific methodology, with recommendations for improved practices. (Independent Study) Limited to and required of all graduate students in physical education who elect the non-thesis option.

**592 Internship in Physical Education and Exercise Science (3)**

Directed field experience under the supervision of a faculty member and a professional member of the cooperating institution. Application of knowledge, synthesis of practical experiences. Paper required. (Practicum) Pre: a minimum of 12 graduate credits in physical education and permission of major professor and chairperson.

**595 Independent Study (3)**

Development of an approved project supervised by a member of the graduate faculty. (Independent Study) Pre: permission of chairperson and instructor. May not be substituted for 591 or 599.

**599 Master's Thesis Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**Labor Relations and Human Resources (LRS)**

*Director:* Professor Scholl

**432 Work, Employment, and Society**  
See Sociology 432.**500 (or MBA 571) Labor Relations and Human Resources (3)**

Introduction to labor relations and human resources, including employment practices in unionized and non-union organizations; also issues related to data sources and research methodology. (Lec. 3) Pre: graduate standing or permission of instructor.

**503 Problems in Public Personnel Administration**  
See Political Science 503.**520 Developments in Worker Representation (3)**

Structure, functions, responsibilities, and programs of unions and union leadership. Emphasis on policies and decision making. Evaluation of labor and management performance. Consideration of administrative problems associated with growth of white collar unions. (Lec. 3) Pre: graduate standing or permission of instructor.

**521 (or PSC 521) Comparative Labor Relations Systems (3)**

Comparative labor and industrial relations systems, including union, management, and government functions and roles; also the functions of international organizations in labor relations. (Lec. 3) Pre: permission of instructor.

**526 (or ECN 526) Economics of Labor Markets (3)**

The theory of labor market behavior, and application of theory for public policy analysis in areas such as discrimination, unemployment, and education. (Lec. 3) Pre: ECN 201 and 202 or 590 or equivalent.

**531 Employment Law (3)**

Analysis of legislation protecting worker health, employment, and income security, including OSHA, workers' compensation, equal opportunity, fair labor standards, Walsh-Healy and Davis-Bacon, pension funds, unemployment compensation, and social security. (Lec. 3) Pre: permission of Labor Research Center director.

**532 Seminar in Employment Law (3)**

Advanced seminar to review and evaluate current issues and changing trends in selected aspects of employment law. May be repeated for credit with different topic, for maximum of 6 credits. (Seminar) Pre: permission of instructor.

**533 Pension, Health Care, and Employee Benefit Programs (3)**

An analysis of employee assistance plans (EAPs), health fringe benefits, and pension plans and their negotiation within both private and public sectors. (Lec. 3) Pre: permission of instructor and Labor Research Center director.

**541 Labor Relations Law (3)**

Legal framework for private and public sector collective bargaining. Regulation of activities with emphasis on individual rights, collective rights, and policy considerations of federal and state courts, the NLRB, and state labor boards in determining society's rights. Case studies. (Lec. 3) Pre: graduate standing or permission of instructor.

**542 Labor Relations and Collective Bargaining (3)**

Collective bargaining literature, theories, and practice. Emphasis on the institutional features of bargaining in both public and private sectors as well as techniques and dynamics of the bargaining process. (Lec. 3) Pre: graduate standing or permission of instructor.

**544 (or HIS 544) Colloquium in Worker History (3)**

Selected topics in American worker history with an emphasis on the most recent literature in the field. (Seminar) Pre: graduate standing or permission of instructor.

**545 Arbitration and Mediation of Labor and Employment Disputes (3)**

Students prepare, present, and analyze labor and employment arbitration/mediations. The course also covers interest arbitration and innovative methods for resolving disputes. Pre: graduate standing or permission of instructor.

**546 Negotiation and Alternative Dispute Resolution (3)**

Examination of the interpersonal dynamics of negotiations and conflict resolution processes, including interest-based or collaborative bargaining in a variety of contexts; e.g. labor relations, community, environmental, divorce, racial, commercial. (Lec. 3) Pre: permission of instructor.

**551 (or MBA 571) Human Resource Strategy (3)**

Human resource issues addressed in context of changing product and labor markets, including relationship among human resource policies, the economic, social, and political environment, and firms' strategic objectives. (Lec. 3) Pre: permission of instructor.

**573 (or MBA 573) Staffing Organizations (3)**

Introduction to the staffing process from scientific, legal, administrative, and strategic perspectives. Covers workforce planning, strategic staffing, job analysis, recruitment, selection testing, interviewing, and making final hiring decisions. Pre: MBA 502 or LRS 500 or MBA 571.

**579 (or EDC 579) Labor Relations and Collective Bargaining in Education**

Collective bargaining in public and private educational sectors, K-12, higher education; literature, theory, practice, and legal foundations in education. Comprehensive case studies will be used. (Lec. 3)

**580 Professional Seminar in Labor Relations and Human Resources (3)**

Advanced labor relations seminar of variable coverage and focus; adjusted yearly to consider most recent labor relations developments. Major research paper required. (Seminar) Pre: final semester graduate standing in labor relations and human resources and permission of Labor Research Center director.

**581 Internship: Labor Relations and Human Resources (3–6)**

Variable length internship with a trade union, a public or private sector personnel or industrial relations department, or a governmental administrative or regulatory agency, under the supervision of both a URI Labor Research Center faculty member and a member of the affiliated organization. May be taken as one 6-credit unit or two 3-credit units. (Practicum) Pre: graduate standing in labor relations and human resources and permission of Labor Research Center director. S/U only.

**590, 591 Directed Readings and Research in Labor Relations and Human Resources (3 each)**

Readings and research under the direction of LRC-associated faculty to meet individual student requirements. (Independent Study) Pre: graduate standing in labor relations and human resources and permission of Labor Research Center director and instructor.

**Landscape Architecture (LAR)**

*Chairperson:* Professor Green

**101 Freshman Inquiry into Landscape Architecture (1)**

Introduction for freshmen to landscape architecture: the profession, practices, and principles. Interact weekly with faculty and staff. Explore hands-on studio and field studies. (Lec. 1) S/U credit.

**201 Survey of Landscape Architecture (3)**

Introduction to landscape design theory and composition as an applied art form. (Lec. 3/Online) (A)

**202 Origins of Landscape Development (3)**

Examines the impact of environment, social history, philosophy, art, and literature on architecture and landscape development from ancient to modern times. Emphasis on European Renaissance through contemporary United States. (Lec. 3) (L) [D]

**243 Landscape Architecture Graphics (4)**

Introduction to landscape graphic communication techniques with emphasis on design and construction drawing and perspective illustration. (Lec. 2, Studio 4) For landscape architecture majors only. Pre: permission of instructor is required.

**244 Basic Landscape Architectural Design (4)**

Introduction to the development of outdoor space with emphasis on the design process and the manipulation of spatial volumes. (Lec. 2, Studio 4) Service learning. Pre: 243.

**246 Digital Design Media for Landscape Architecture (1)**

Introduction to digital media software with emphasis on principles and practices within the profession of landscape architecture. (Lec. 1, Studio 2) Pre: 243.

**300 Computers in Landscape Architecture (4)**

Intensive course in computer usage for landscape architects. Focus on the application of landscape architecture computer-aided design software to project development applications. (Lec. 2, Studio 4) Pre: sophomore standing in landscape architecture.

**301 Landscape Expression and Analysis (4)**

Focuses on existing landscape methodologies to examine the earth's surface: using topographical surveying, 3-D mapping, soils analysis, graphic depiction, land interpretation and land development drainage and associated environmental impacts. (Lec. 3, Studio 2) Pre: 244 and MTH 111. For LAR majors or with permission of instructor.

**302 Applied GIS for Landscape Architecture (3)**

GIS software, data, and orthophotos will be explored and used for site analysis and the creation of plans suitable for standing alone or being incorporated into CAD design/planning applications. (Lec. 2, Lab. 2) Pre: junior or senior landscape architecture major or permission of instructor.

**343 Landscape Architecture Studio I (4)**

Landscape concepts in graphic form. Emphasis on preparing landscape plans for small to intermediate scale properties. Students study in a professional studio environment. (Lec. 2, Studio 4) Pre: 201, 202, and 244. Intended for landscape architecture majors only.

**344 Landscape Architecture Studio II (4)**

Continuation of landscape concepts and graphics. Emphasis on drawing landscape plans for intermediate to larger scale properties. Advanced rendering. (Lec. 2, Studio 4) Pre: 301, 343, and 345; credit or concurrent enrollment in 346. Intended for landscape architecture majors only.

**345 Landscape Construction I (4)**

A comprehensive survey of construction materials and their uses in landscape construction. (Lec. 2, Studio 4) Pre: 244 and 300. Intended for landscape architecture majors only.

**346 Landscape Construction II (4)**

Reshaping of earth surfaces through the study of soil adjustment: grading, drainage, cut and fill. (Lec. 2, Studio 4) Pre: 300, 301, and 345. Intended for landscape architecture majors only.

**353 (or PLS 353) Landscape Plants I (3)**

Identification and description under fall conditions; classification and adaptation of the important trees and shrubs including broadleaf evergreens and their value in ornamental plantings. (Lec. 1, Lab. 4) Pre: BIO 102 or PLS 150.

**354 (or PLS 354) Landscape Plants II (3)**

Identification and description under winter and spring conditions; classification and adaptation of the coniferous evergreens, vines, and groundcovers and their value in ornamental plantings. (Lec. 2, Lab. 2) Pre: 353.

**399 Landscape Architecture Internship (1–6)**

Directed work experience program at landscape architecture offices, contracting firms, and related industries. (Practicum) Pre: permission of instructor.

**434 Introduction to Environmental Law**

See Community Planning 434.

**443 Planting Design (4)**

The use of plant materials in landscape composition. Combines spatial definition of various land uses with plant selection. Preparation of plans, details, and specifications. (Lec. 2, Studio 4) Pre: 344 and 354. Intended for landscape architecture majors only. Not for graduate credit.

**444 Landscape Architecture Studio III: Sustainable Design (4)**

Environmental analysis and sustainable design principles are emphasized in this studio which focuses on the preparation of ecologically based designs for individuals and communities. Sustainable concepts, public workshops and presentations. (Lec. 2, Studio 4) Service learning. Pre: 344 and 346. Intended for landscape architecture majors only. Not for graduate credit.

**445 Landscape Architecture Studio IV (4)**

Study of comprehensive landscape architectural projects. Coordination of research, preparation of contract documents, and office procedures. (Lec. 2, Studio 4) Service learning. Pre: 443 and 444. Intended for landscape architecture majors only. Not for graduate credit.

**447 Professional Landscape Architectural Practice (3)**

Professional practice, ethics, marketing design services, preparation of contract documents, and effective time management. (Lec. 3) Pre: senior standing in landscape architecture. Not for graduate credit.

**450 Landscape Architecture Portfolio Development (1)**

This senior level course will cover the strategy and skills necessary for constructing a professional portfolio and provide students with an opportunity to understand the full potential of the portfolio within the profession. (Lec. 1) Pre: 443 and 444. Not for graduate credit.

**491, 492 Special Projects and Independent Study (1–3 each)**

Special work to meet specialized needs in the landscape architecture profession. (Independent Study) Pre: permission of instructor. Not for graduate credit.

**Languages (LAN)**

*Chairperson:* Professor Hedderich

**191 Beginning Foreign Language I (3)**

Fundamentals of grammar and pronunciation; exercises in reading, writing, and conversation in a foreign language not included in regular departmental offerings. (Lec. 3) Pre: no prior experience in a specific language is required. May be repeated for credit for different languages. Choice of specific language to be taught subject to availability and student demand. (FC) [D]

**192 Beginning Foreign Language II (3)**

Continuation of 191. Students enrolling in this course should have taken 191 or equivalent in the same language. (Lec. 3). May be repeated for credit for different languages. Choice of specific language to be taught subject to availability and student demand. (FC) [D]

**193 Intermediate Foreign Language I (3)**

Development of facility in speaking, listening comprehension, writing, and reading texts of moderate difficulty in a language not included in regular departmental offerings. Students enrolling in this course should have taken 192 or equivalent in the same language. (Lec. 3) Choice of specific language to be taught subject to availability and student demand. (FC) [D]

**194 Intermediate Foreign Language II (3)**

Continuation of 193. Students enrolling in this course should have taken 193 or equivalent in the same language. (Lec. 3) Choice of specific language to be taught subject to availability and student demand. (FC) [D]

**205, 206 Advanced Foreign Language I and II (3)**

205: Further development of all language skills with emphasis on writing and reading. Students enrolling in this course should have taken HBW 104 or JPN 104 or LAN 194 or equivalent in the same language. 206: Continuation of 205. Students enrolling in this course should have taken 205 or equivalent in the same language. (Lec. 3) (FC) [D]

**Latin (LAT)**

*Chairperson:* Professor Hedderich

**101 Beginning Latin I (3)**

Latin grammar and syntax. Exercises in reading prose. (Lec. 3) Pre: no previous Latin is required. Will not count toward the language requirement if the student has studied Latin for more than one year within the last six years. (FC) [D]

**102 Beginning Latin II (3)**

Continuation of 101. Students enrolling in this course should have taken 101 or equivalent. (Lec. 3) (FC) [D]

**301 Intermediate Latin (3)**

Grammar review; readings such as Petronius' Satyricon. Students enrolling in this course should have taken 102 or equivalent. (Lec. 3) (FC) [D]

**302 Intermediate–Advanced Latin (3)**

Study of Latin texts from different time periods and different genres; syllabus changes on a four-year rotational basis. Students enrolling in this course should have taken 301 or equivalent. (Lec. 3) May be repeated for a maximum of 12 credits with different topics. May be taken once for general education credit. (FC) [D]

**310 Latin Across the Curriculum (1)**

Reading of original Latin texts and discussion in conjunction with courses throughout the University curriculum. Designed to maintain language skills and to enrich study of different subjects by using texts in the original language. (Lec. 1) Pre: 301 or permission of instructor.

**497 Directed Study (1–6)**

Individual readings and research. (Independent Study) Pre: acceptance of a project by a faculty member; approval of section head. May be repeated for credit with different topic.

**Latin American Studies (LAS)**

*Committee Chair:* Associate Professor Morin

**390 The Hispanic Caribbean: Study Abroad in the Dominican Republic (3)**

Emphasis on the Dominican Republic, Cuba, and Puerto Rico. Topics will include colonization and slavery, race, gender, religion, European and U.S. interventionism, migration, and development. (Lec. 3) Pre: SPA 104; HIS 180 is suggested.

**397 Directed Study for Senior Research Project (3)**

Research in a particular area of Latin American studies. Project must be approved by the LAS Committee. (Independent Study) Pre: approval of LAS Committee and instructor.

*The following are related courses offered by various departments of the University.*

**Anthropology**

303 New World Prehistory  
315 Cultures and Societies of Latin America  
415 Migration in the Americas  
470 Problems in Anthropology

**Communication Studies**

361 Intercultural Communication

**Economics**

338 International Economics  
363 Economic Growth and Development

**History**

180 Introduction to Latin American Civilization  
384 The Modern Caribbean  
382 History of Modern Latin America  
387 Latin American History at the Movies  
391 Directed Study or Research  
508 Seminar in Asian or Latin American History

**Political Science**

201 Introduction to Comparative Politics  
431 International Relations

**Portuguese**

335, 336 Topics in the Literature of the Portuguese-Speaking World  
497, 498 Directed Study

**Sociology**

329 Contemporary Mexican Society

**Spanish**

305 Early Spanish-American Literature and Culture  
306 Modern Spanish-American Literature and Culture  
393 Modern Hispanic-American Literature in Translation  
470 Topics in Hispanic Literature  
488 Spanish-American Poetry and Drama  
489 The Spanish-American Narrative  
497, 498 Directed Study  
570 Topics in Hispanic Literature and Culture  
572 Evolution of Spanish-American Culture and Thought  
574 Interpretations of Modern Spanish-American Thought  
590 The Hispanic Presence in the United States

**Letters (LET)**

*Coordinator:* Associate Dean Dvorak

**151 Topics in Letters (3)**

Study of the history of thought, of the search for values, of the attempt to define the human condition, as reflected in written texts, both past and present. (Seminar) May be repeated for credit with different topic. Approved topics: "Francophone Hip-Hop Culture (L) or (FC) [D]"; "Contemporary France (L) or (FC) [D]"; "The European Union (L) or (FC) [D]"; "Introduction to Native American History (L) [D]"; "Archaeology Frontiers (L) [D]"; "Jewish American

Literature and Culture from 'The Great Tide' of Immigration (1881–1924) to the Present (L) or (A) [D]; "Introduction to World Mythology (L) [D]"; "Social, Ethical and Political Issues in Disability (L) [D]." May be taken once for general education credit.

### 351 Topics in Letters (3)

Study of the history of thought, of the search for values, of the attempt to define the human condition, as reflected in written texts, both past and present, at an advanced level. (Seminar) Pre: junior standing. May be repeated for credit as often as the topic changes.

## Library (LIB)

Dean: Professor Maslyn

### 120 Introduction to Information Literacy (3)

In-depth exploration and practice of information literacy skills designed to support college-level research and lifelong learning. (Lec. 3/Online) (EC)

### 140 Special Topics in Information Literacy (1)

Introduction to core concepts of information literacy and essential skills in finding, analyzing, organizing, and presenting information. (Lec. 1) Must be taken concurrently with a course that requires information literacy skills.

### 220 Issues of the Information Age (3)

Critical current issues concerning the use of information are examined. Emphasis placed on the interdisciplinary nature of information and the use of research techniques as a foundation for informed citizenship. (Lec.3/Online) (EC) or (L)

### 508 Seminar in Biological Literature

See Biological Sciences 508.

## Library and Information Studies (LSC)

Director: Professor Eaton

Students in good standing may take up to 6 credits of graduate-level library and information studies courses in their senior year with the permission of the director of the Graduate School of Library and Information Studies.

### 502 Management of Library and Information Services (3)

Introduction to the process, principles, practices, theories, and case studies in the administration, management, and supervision of libraries and information services. Focus on management functions: planning, organizing, staffing, directing, and controlling. (Lec. 3)

### 503 Collection Management (3)

Introduction to the process of collection building and management of resources including various formats and subjects for libraries or information centers.

Community assessment, formulation of policies, procedures, and evaluation methods. (Lec. 3)

### 504 Reference and Information Services (3)

Practical experience in the use of basic electronic and print information sources with readings and discussion on the philosophy and administrative aspects of reference work. (Lec. 3)

### 505 Organization of Information (3)

Theory and practice of organizing information following national and international standards; focus on bibliographic information. Emphasizes the understanding and application of cataloging and classification principles, standards, tools, bibliographic utilities, and networks. (Lec. 3)

### 506 Technical Services (3)

Principles and policies in the acquisition, organization, conservation, and circulation of materials in libraries and information centers. Includes examination of automation of library processes. (Lec. 3)

### 508 Introduction to Information Science and Technology (3)

Introduction to information science through the exploration of fundamental information science theories and information technologies. Theory and technology are discussed and applied to practical purposes in library and information services. (Lec. 3)

### 510 History of Books and Printing (3)

The art and craft of book production through the ages; printers, methods, and materials with consideration given to the role of the book in cultural development. (Lec. 3)

### 514 Information Policy (3)

This course provides an opportunity to examine the large world of information policy and how changing technology, specifically the Internet, has affected our information policies. (Lec. 3)

### 515 Informational Ethics and Intellectual Freedom (3)

Examines the history, socially constructed norms, and legal context framing issues in LIS including privacy, censorship, and intellectual freedom; applies principles of ethical reasoning to professional decisions. (Lec. 3)

### 517 Community Relations for Libraries (3)

Includes public relations, advocacy, determining community needs, identifying potential partners, building partnerships, developing a community relations plan, and envisioning the library's future. Incorporates programs and strategies of core professional organizations. (Lec. 3) Pre: 502 or permission of instructor.

### 518 International and Comparative Librarianship (3)

Library developments on an international level. Application of comparative method to analysis of library

issues in the U.S.A. and foreign countries. Major international library and information organizations and their programs. (Lec. 3) Pre: 3 core courses or permission of the instructor.

### 520 School Library Media Services (3)

The role of the library media specialist as teacher, information specialist, instructional partner, and program manager, with emphasis on creating instructional programs in schools. Summer or fall semester prior to practicum. (Lec. 3) Pre: completion of 21 hours including core courses 502, 504, 505, and 508 or permission of instructor.

### 521 Public Library Service (3)

Planning, evaluation, and programming in public libraries, with an emphasis on community analysis and responsive services. Development of a grant proposal or equivalent project required. (Lec. 3) Pre: 502 or permission of instructor.

### 522 College and University Library Service (3)

Study of the functions, organization, management, and services of college and university libraries. (Lec. 3) Pre: 502 or permission of instructor..

### 523 Special Library Service (3)

A survey of some of the major categories of special libraries in academia, corporations, foundations, government agencies, and the military, typically including museums, conservatories, divinity schools, legal institutions, businesses, laboratories, industries, and health care organizations. (Lec. 3) Pre: 502 or permission of instructor.

### 524 Teaching About Information: Philosophy and Methodology (3)

An introduction to all aspects of instructing a diverse clientele in the effective use of information in all forms. Philosophy, cognitive aspects, methodologies, media, and the administration, coordination, and evaluation of information literacy instruction will be considered. (Lec. 3) Pre: 504 or permission of instructor.

### 525 Multiculturalism in Libraries (3)

Determining information needs and planning library collections, services, and programs for a diverse population. Historical, philosophical, and comparative aspects of multiculturalism in libraries will also be considered. (Lec. 3) Pre: 6 graduate credits in library and information studies or permission of instructor.

### 527 Information Literacy Instruction (3)

Design and teach research strategies to undergraduates in conjunction with academic courses to teach effective, efficient, and honest use of library and information resources. (Lec. 3) Pre: 504 or permission of instructor.

### 528 Instructional Technology in Library and Information Services (3)

Provides an introduction to instructional design, development, and motivation theories and their ap-

plication in producing instructional materials, including emerging technology in library and information environments. (Lec. 3)

### 529 Information Design (3)

Provides an introduction to the analysis, planning, presentation, and evaluation of effective communication through the use of tools and theories of communication, and message, instructional, and information design. (Lec. 3)

### 530 Reading Interests of Children (3)

Building, maintaining, evaluating, and promoting collections for children in public libraries and elementary school media centers. Fiction and nonfiction books emphasized; digital and other resources also discussed. (Lec. 3)

### 531 Reading Interests of Young Adults (3)

Building, maintaining, evaluating, and promoting collections to serve the special interests and information needs of adolescents in public and secondary school libraries. Focus on books; graphic novels, Internet, etc. included. (Lec. 3)

### 533 Digital Resources for Children and Teens (3)

Investigate informational, educational, and recreational resources, primarily on the Internet. Emphasis on selection, evaluation, promotion, and the development of information literacy. (Lec. 3) Pre: 530 or 531 or permission of instructor.

### 535 Public Library Youth Services (3)

Public library services to children and young adults, with emphasis on the development of programs to meet library goals and objectives. (Lec. 3) Pre: 502 or permission of instructor.

### 537 Health Sciences Librarianship (3)

Serves as an introduction to the field. Covers the literature, vocabulary, computer applications, reference tools, information retrieval, and environments relating to health sciences libraries. (Lec. 3) Pre: 502 and 504 or permission of instructor.

### 538 Law Librarianship (3)

Introduction to legal bibliography and research and to a broad range of problems involved in the administration and operation of various kinds of law libraries. (Lec. 3) Pre: 502 and 504 or permission of instructor.

### 539 Business Information (3)

An introduction to many aspects of business information services, as well as to business information in all formats. This course will emphasize services in business libraries and information centers, and the fields of corporate intelligence and knowledge management will also be considered and discussed. (Lec. 3) Pre: 504 or permission of instructor.

### 540 Humanities Information and Materials (3)

Information needs and services of all areas of the humanities. Unique aspects of library services and

materials in all formats will be considered. Pre: 504 or permission of instructor.

### 541 Social Science Information (3)

Information needs and services in all areas of the social sciences and the professions, including information in all formats. Pre: 504 or permission of instructor.

### 542 Library Materials in Science and Technology (3)

Library resources in science and technology, including the major works, serial publications, and reference and bibliographical materials. (Lec. 3) Pre: 503 and 504 or permission of instructor.

### 543 Government Publications (3)

Survey of the publishing activities and publications of national, state, and local governments with emphasis on the publications of the United States government. (Lec. 3) Pre: 504 or permission of instructor.

### 544 Visual Information Science (3)

An introduction to the interdisciplinary study of visual information science related to visual information (data) collection, analysis, processing, transmission, utilization, and communication in modern and digital libraries and information centers. (Lec. 3) Pre: 508 or permission of instructor.

### 545 Indexing and Abstracting (3)

Create and evaluate indexes for effective retrieval from books, periodicals, and electronic resources. Principles of traditional, automatic, and natural language indexing applied to searches. Abstracting, thesaurus construction, and software evaluation. (Lec. 3) Pre: 504 or permission of instructor.

### 547 Information Storage and Retrieval and Online Searching and Services (3)

Theory, methods, evaluation, and research of analyzing, storing, indexing languages, information storage media, information storage and retrieval systems, and information seeking and retrieving in libraries and information services. (Lec. 3) Pre: 504 or permission of instructor.

### 548 Information Architecture and Web Site Development (3)

Introduces principles of information architecture, library science, and information science to plan, design, develop, and evaluate cohesive Web sites and intranets that are attractive, navigable, manageable, and expandable. Pre: 508 or permission of instructor.

### 550 Organization of Digital and Nonbook Resources (3)

Using the most current international and national standards for organization of digital and nonbook resources, the course emphasizes not only bibliographic control of these resources for retrieval but also issues relating to subject analysis, standards, access, and other mark-up languages for better retrieval. (Lec. 3) Pre: 505 or permission of instructor.

### 557 Research and Evaluation in Library and Information Services (3)

Introduction to research methods for community analysis, information needs assessment, and evaluation of library and information services; critique of published research. Includes substantial paper involving significant independent study. (Lec. 3) Pre: completion of 15 credits or permission of instructor.

### 562 Administration of Special Collections, Archives, and Manuscripts (3)

Principles and techniques for administering manuscript and archival repositories, including acquisition policies, appraisal criteria, methodology, and preservation practices. (Lec. 3) Pre: core courses 502–508, or permission of instructor.

### 564 Introduction to Preservation of Library Materials (3)

Organization, management, principles, and techniques as they apply to the development and administration of a library preservation program. Includes causes of deterioration of materials, deacidification, and reformatting and selecting for preservation. (Lec. 3)

### 565 Rare Book Librarianship (3)

Organization, management, principles, and techniques as they apply to the development and administration of rare book collections. (Lec. 3) Pre: 510 or permission of instructor.

### 590 Introduction to Chinese Information Services (3)

The seminar will provide students and professionals with an opportunity to study the history of Chinese librarianship and libraries and information services from the ancient to the contemporary times. (Seminar)

### 593 Independent Work (1–6)

Supervised reading or investigation in areas of special interest. Student must obtain written approval prior to registration for the semester for which the study is proposed. (Independent Study) Pre: 18 hours of library science with B average and permission of instructor. 557 strongly recommended. 593 and 595 may be repeated for a combined total of 6 credits.

### 595 LIS Professional Field Experience (1–6)

Directed field experience in approved LIS placement; required capstone for MLIS. 45 hours on-site per credit hour. Guided online discussion; face-to-face orientation and final poster session. Reflective portfolio. (Practicum). 593 and 595 may be repeated for a combined total of 6 credits. Pre: 18 hours of LSC with a B average and permission of instructor.

### 596 Professional Field Experience: School Library Media Practicum and Seminar (9)

Directed field experience in two school library media centers (150 hours in elementary and 150 hours in secondary). Perform roles and demonstrate

competencies of a library media specialist. Bi-weekly seminars. (Lec./Lab. 9) Pre: 520 with a B or better and 30 credits of library science with a B average or permission of the instructor.

### 597 Selected Topics (1–3)

Selected topics of current and special interest in library and information studies not covered in existing course offerings. Topics and number of credit hours announced prior to each offering. May be repeated with different topics. (Lec. 1–3) Pre: permission of instructor.

## Linguistics (LIN)

Section Head: Professor Rogers

### 200 Language and Culture

See Anthropology 200.

### 220 (or APG 220) Introduction to the Study of Language (3)

Introduction to the analysis and description of a language's sounds, forms, syntax, and meaning; the relationship of linguistics to other disciplines; and a survey of major schools of linguistic thought. (Lec. 3) (S)

### 320 (or APG 320) Sociolinguistics (3)

Presentation of the major areas of micro- and macro-sociolinguistics: speech acts, registers, repertoires, language attitudes, social correlates of phonological and syntactic features and changes. (Lec. 3) Pre: 200 or 220.

### 408 The German Language: Past and Present

See German 408.

### 420 Second Language Acquisition (3)

An evaluation of current trends and developments in the understanding of second language learning; analysis of second language acquisition research and its practical implications. (Seminar) Pre: 200 or EDC 312 or 3 credits of language courses numbered 300 or above, or permission of section head. Next offered spring 2012.

### 431 Applied Linguistics in the Language Laboratory (1)

Principles of contrastive phonology and syntax and their application to the preparation, use, and evaluation of tape drills. Use of language laboratory equipment monitoring student exercises. Recommended for prospective teachers of language. (Lab. 2) Pre: 9 credits of language courses at the 300 level or above, or permission of section head.

### 497, 498 Directed Study (3 each)

Individual research and reports on problems of special interest. (Independent Study) Pre: 220 and acceptance of project by member and approval of section head.

*The following are related courses offered in the departments of Communicative Disorders, English, Modern and Classical Languages and Literatures, Philosophy, and Psychology.*

|         |                                       |
|---------|---------------------------------------|
| CMD 273 | Phonetics                             |
| CMD 375 | Language Development                  |
| ENG 330 | The Structure of American English     |
| ENG 332 | The Evolution of the English Language |
| ENG 336 | The Language of Children's Literature |
| ENG 337 | Varieties of American English         |
| ENG 530 | Studies in Language and Linguistics   |
| FRN 503 | History of the French Language        |
| PHL 440 | Philosophy of Language                |
| PSY 388 | The Psychology of Language            |

## Literature in English Translation

Coordinator: Professor Manteiga

*The following courses are offered in the Department of Modern and Classical Languages and Literatures and may be used for major credit in comparative literature studies. They may not be used for major credit in English or languages. (CLA 391, 395, 396, 397 may be used for major credit in classics.)*

### Classics

|     |  |
|-----|--|
| 391 | Ancient Laughter: The Comic Tradition in Greece and Rome |
| 395 | Greek Mythology: Gods, Heroes, and Humans                |
| 396 | Myths of Rome  |
| 397 | Greek Myth and Tragedy                                   |

### Comparative Literature Studies

|     |   |
|-----|---|
| 250 | Themes and Myths                                    |
| 335 | Interdisciplinary Studies in Comparative Literature |
| 350 | Literary Theory and Criticism                       |
| 450 | Studies in Comparative Literature                   |

### French

|     |  |
|-----|--|
| 391 | Literature to 1789 in Translation      |
| 392 | 19th-Century Literature in Translation |
| 393 | 20th-Century Literature in Translation |

### German

|     |                                   |
|-----|-----------------------------------|
| 392 | Masterpieces of German Literature |
|-----|-----------------------------------|

### Italian

|          |                                    |
|----------|------------------------------------|
| 391, 392 | Masterpieces of Italian Literature |
| 395      | Dante's Divine Comedy              |

### Russian

|          |                                    |
|----------|------------------------------------|
| 391, 392 | Masterpieces of Russian Literature |
|----------|------------------------------------|

*The following courses are offered in the Department of English and may be used for credit in comparative literature studies and in English. They may not be used for major credit in languages.*

### English

|     |   |
|-----|---|
| 160 | Literatures of the World                            |
| 335 | Interdisciplinary Studies in Comparative Literature |
| 350 | Literary Theory and Criticism                       |
| 366 | Greek and Roman Drama                               |
| 367 | The Epic  |
| 468 | Traditions of the Continental Novel                 |
| 560 | Studies in European Texts                           |

## Marine Affairs (MAF)

Chairperson: Professor Thompson

### 100 Human Use and Management of the Marine Environment (3)

Examination of uses and management efforts in the coastal and ocean environment. Assessment of problems arising from those uses and attempts to conserve resources, protect the environment, and minimize use conflicts in the context of changing technological capabilities, knowledge, and values. (Lec. 3) (S)

### 120 New England and the Sea (3)

An examination of the human and environmental impacts of the sea and its uses on the New England and Gulf of Maine region. Considers marine resource use and management from colonial to modern times. (Lec. 3)

### 220 Introduction to Marine and Coastal Law (3)

Basic principles of marine and coastal law in the United States. An integration of coastal zone, outer continental shelf, fisheries, marine pollution, and admiralty laws. (Lec. 3) (S) [D]

### 312 The Politics of the Ocean (3)

Survey of decision making with respect to the marine environment at the international, national, and local levels. Special emphasis on laws and treaties of the United States and the United Nations. (Lec. 3)

### 320 Shipping and Ports (3)

An introduction to waterborne movement of cargo. An examination of shipping and port operations, innovations in maritime transportation systems, and the interplay of the operators, shipping, and ports. (Lec. 3) Pre: 100.

### 330 World Fishing (3)

The role of marine fisheries and aquaculture in world food production. Social, economic, legal, and scientific issues in fisheries management. (Lec. 3) Pre: 100.

### 350 Caribbean Geography

See Geography 350.

### 410 Senior Seminar in Marine Affairs (3)

Advanced work in the management of the coastal and marine environment, with special emphasis on case studies and student projects. Seniors only. (Seminar) Required for seniors in marine affairs. Not for graduate credit in marine affairs.

### 413 Peoples of the Sea

See Anthropology 413.

### 415 Marine Pollution Policy (3)

Introduction to management techniques for marine pollutants (biodegradable materials, nutrients, petroleum, metals, synthetic organics, radioactive materials, plastics, heat, and dredge spoils) with

emphasis on strategies to limit environmental impacts. (Lec. 3) Pre: junior standing or above. Not for graduate credit.

#### 461 Coastal Zone Management (3)

Examination of activities and management efforts in the coastal zone of both developed and developing countries and their impacts on the environment. Resolution of use conflicts. (Lec. 3)

#### 465 GIS Applications in Coastal and Marine Management (3)

The use of geographical information systems (GIS) technology in coastal and marine settings. Database acquisition and management are emphasized. Case application in coastal zone management, artificial habitat, and fisheries management. (Lec. 3)

#### 471 Island Ecosystem Management (3)

An ecosystem approach to the sustainable development and environmental management of mid-oceanic islands in the Caribbean and the Pacific Ocean. Topics include tourism, reef fishery, cultural heritage, and marine conservation. Simulation game on island-wide management process. (Lec. 3)

#### 472 Marine Recreation and Tourism Management Seminar (3)

Analysis of domestic and international case studies emphasizing identification of and solutions to problems of coastal recreation and tourism. Use of experiential learning. Emphasis placed on presentation, leadership, and negotiation skills. (Seminar)

#### 475 Human Responses to Coastal Hazards and Disasters (3)

Examines the impact of hazards and disasters on human population inhabiting the coastal zone. Sets human adaptations to coastal hazards and disasters in an historical context. Extracts lessons learned for comparative analysis. (Lec. 3)

#### 482 Quantitative Methods in Marine Affairs (3)

Introduction to descriptive and inferential statistics in geography and marine affairs. Emphasis on the spatial application of statistical tests with particular utility to the geographer and marine affairs student. (Lec. 3) Pre: STA 220 or equivalent for undergraduate students.

#### 484 Environmental Analysis and Policy in Coastal Management (3)

Analysis of environmental policy strategies as applied in federal and state coastal management programs. Emphasis on coastal environmental assessment and program evaluation techniques, hazards management, regulatory frameworks, and environmental ethics. (Lec. 3)

#### 490 Field Experience in Marine Affairs (3–6)

Supervised undergraduate internship within an approved work setting designed to provide students with on-the-job experience relevant to their academic training and career goals. Students are responsible

for securing internship positions and learning contract. (Practicum) Pre: permission of instructor, senior standing recommended. Not for graduate credit.

#### 491, 492 Special Problems (3 each)

Individual guidance in major readings and methods of research. (Independent Study) Pre: permission of chairperson.

#### 494 Cases in Marine Policy (3)

A single, current problem drawn from areas such as coastal management, ports, or fisheries is examined through detailed analysis of alternatives and decision processes. (Seminar). Pre: permission of instructor or chairperson.

#### 499 Directed Study (1–3)

Individual research and reports on problems of special interest, including honors thesis research. (Independent Study) Pre: permission of instructor.

#### 502 Research Methods in Marine Affairs (3)

Emphasis on the application of alternative research methods utilized in a typical interdisciplinary study. Development of specific research projects. (Lec. 3) Pre: 482 or permission of chairperson.

#### 511 Ocean Uses and Marine Sciences (3)

Introduction to selected ocean uses focusing on the interplay of public policy and marine science. Emphasis on policy implications of uses such as resource and energy extraction. (Lec. 3)

#### 515 Marine Pollution Policy (3)

Introduction to management techniques for marine pollutants (biodegradable materials, nutrients, petroleum, metals, synthetic organics, radioactive materials, plastics, heat, and dredge spoils) with emphasis on strategies to limit environmental impacts. (Lec. 3) Pre: graduate standing only.

#### 516 (or CPL 516) Seminar on the Urban Waterfront (3)

The urban environment and its evolution, structure, and function as it pertains to metropolitan waterfronts and small recreational harbors. Emphasis on the permitting process, public participation, marine recreation, and management issues. Field trip and student project required. (Seminar)

#### 521 Coastal Zone Law (3)

Examination of the authority of different levels and agencies of government to make decisions affecting coastal regions. Survey of existing and proposed state and national legislation affecting coastal regions. (Lec. 3)

#### 523 Fisheries Law and Management (3)

Examination of the relationship between law and fisheries policy on the international and national levels, law relating to fisheries, jurisdictional levels, function of law in implementing fisheries management policy. (Lec. 3)

#### 526 Management of Marine Protected Areas (3)

Examination of ecological, political, legal, and social factors in establishing and managing marine protected areas. Case studies of MPA efforts highlight interrelationships among interest groups, institutions, and legislation. (Lec. 3)

#### 527 (or NRS 527) Marine Protected Areas: An Interdisciplinary Analysis (3)

Examination of the ecological, political, social, cultural, and economic factors influencing the use of MPAs. (Lec. 3) Pre: permission of instructor.

#### 563 Maritime Transportation (3)

Passenger and commodity transportation. Analysis of the relationship between transportation services and the spatial distribution of activities. Emphasis on multimodal transport and bulk commodities. (Lec. 3) Pre: senior or graduate standing or permission of instructor.

#### 564 Port Operations and Policy (3)

Analysis of coastal and international trade routes and the response of ports. Special emphasis on the container revolution, liquid natural gas transportation, and deep-water ports for supertankers. (Lec. 3)

#### 565 Cruise Ship Operations, Marketing, and Ports (3)

Explores the many facets of the cruise ship industry from the points of view of social, management, and policy science. Designed to familiarize the student, utilizing an interdisciplinary approach, with the genesis, current status, and future roles of this dynamic industry. (Seminar) Pre: graduate standing, or seniors with permission of instructor.

#### 577 (or PSC 577) International Ocean Law (3)

Principles of international law as they relate to ocean management problems. Jurisdiction in zones, such as territorial seas, exclusive economic zones, and the high seas will be examined, as well as the problems posed by zonal approaches to ocean-use management.

#### 578 International Ocean Organizations (3)

International organizations involved in marine-related activities, including their planning, management, regulatory, and assistance functions. Attention to the impact of organizations on ocean management efforts in the developed and developing world. (Lec. 3) Pre: 577 or permission of instructor.

#### 582 Coastal Ecosystem Governance (3)

This course links human impacts on coastal environments with existing or proposed governance solutions. Management regimes for individual sectors, coastal regions, and land/estuarine ecosystems are introduced and compared. (Seminar)

#### 589 Master's Project Research (3)

Preparation of a major research paper for M.A. students under the guidance of a graduate faculty

member. (Independent Study) Pre: graduate standing in the M.A.A. program. S/U credit.

### 591, 592 Directed Study or Research (3 each)

Areas of special research interest of graduate students. (Independent Study) Pre: permission of chairperson.

### 599 Master's Thesis Research

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

### 602 Federal Ocean Policy and Organization (3)

Ocean policy development and implementation by the executive and legislative branches of government. Allocation of powers and analysis of the decision-making process for the oceans. (Lec. 3)

### 651 Marine Affairs Seminar (3)

Interdisciplinary seminar conducted by marine affairs program faculty supplemented by guest speakers from industry and government. Focuses on problems of marine resources development and management at the local, state, national, and international policy levels. (Seminar)

### 699 Doctoral Dissertation Research

Number of credits is determined each semester in consultation with the major professor or program committee. Maximum of 6 credits of 699 may be taken prior to completing approved dissertation proposal. (Independent Study) S/U credit.

## Marine and Environmental Topics

### Animal and Veterinary Science (AVS)

- 101 Introduction to Animal Science
- 323, 324 Animal Management I, II
- 331 Anatomy and Physiology
- 333 Anatomy and Physiology Laboratory
- 412 Animal Nutrition
- 440 Seminar on Marine Mammals
- 472 Physiology of Reproduction
- 473 Physiology of Reproduction Laboratory

### Aquaculture and Fisheries Science (AFS)

- 101 Freshman Inquiry into Fisheries and Aquaculture
- 102 Introductory Aquaculture
- 104 Introductory Aquaculture Laboratory
- 201 Shellfish Aquaculture
- 202 Finfish Aquaculture
- 211 Introduction to the Marine Environment Laboratory
- 270 Basic Scuba Diving in Science and Technology
- 290 Small Boats: Their Equipment and Operation
- 300 Aquaculture Health Management
- 311 Exploration of Marine Bioresources
- 315 Living Aquatic Resources
- 316 Living Aquatic Resources Laboratory
- 321 World Fishing Methods
- 322 Laboratory for World Fishing Methods

- 332 Interactions between Fisheries and Protected Species

- 342 Marine Auxiliary Systems
- 343 Vessel Repair and Maintenance
- 362 Crustacean Aquaculture
- 380 Inshore and Coastal Navigation
- 381 Mid-Ocean Navigation
- 415 Fishery Science
- 416 Fishery Science Laboratory
- 421 Design of Fish Capture Systems
- 425 Aquaculture and the Environment
- 426 Ecological Aquaculture
- 432 Marine Finfish Aquaculture 433 Research Diving Methods
- 434 Aquatic Food Quality and Processing
- 435 Aquatic Food Product Development
- 481 Shellfish Aquaculture Laboratory
- 483 Salmonid Aquaculture
- 486 Fish Physiology
- 500 Diseases of Aquatic Origin
- 501, 502 Seminar
- 510 Application of Quantitative Methods to Marine Fisheries Ecology
- 508 Seminar in Biological Literature
- 516 Early Life History of Aquatic Animals
- 521 Evaluation of Fish Capture Systems
- 531 Fish Stock Assessment
- 532 Experimental Design
- 534 Animal Virology
- 536 Virology Laboratory
- 555, 556 Pathology Rotation
- 576 Seminar in Genetics of Aquatic Organisms
- 581 Current Topics in Molluscan Aquaculture
- 584 Advanced Aquaculture Systems
- 586 Fish Nutrition

### Biological Sciences (BIO)

- 101, 102 Principles of Biology I, II
- 130 Topics in Marine Biology
- 262 Introductory Ecology
- 286 Humans, Insects, and Disease
- 345 Marine Environmental Physiology
- 355 Marine Invertebrates of Southern New England
- 360 Marine Biology
- 412, 512 Evolution and Diversity of Fishes
- 418 Ecology of Marine Plants
- 441 Environmental Physiology of Animals
- 442 Mammalian Physiology
- 445, 545 Endocrinology I, II
- 455 Marine Ecology
- 457 Marine Ecology Laboratory
- 458 Freshwater Ecology
- 465 Biology of Algae
- 466 Vertebrate Biology
- 467 Animal Behavior
- 469 Tropical Marine Invertebrates
- 475 Coral Reef Ecology
- 480, 580 Community Ecology
- 495 Tropical Marine Biology Research
- 524 Methods in Plant Ecology
- 541 Comparative Physiology of Marine Animals

- 551 Seminar in Marine Ecology
- 560 Seminar in Plant Ecology
- 563 Biology and Ecology of Fishes
- 567 Natural Selection
- 568 Ornithology
- 664 Phytoplankton Ecology
- 675 Advanced Ecology Seminars
- Chemical Engineering (CHE)**
- 212 Chemical Process Calculations
- 403, 404 Introduction to Ocean Engineering Processes I, II
- 534 Corrosion and Corrosion Control
- 548 Separations for Biotechnology
- Civil and Environmental Engineering (CVE)**
- 374 Environmental Engineering
- 375 Environmental Engineering Laboratory
- 470, 471 Water and Wastewater Transport Systems I, II
- 474 Water Quality Sampling and Analysis
- 475 Water in the Environment
- 478 Hazardous Waste Disposal and Solid Waste Management
- 485 Environmental Engineering Geophysics
- 570 Water Chemistry for Engineers
- 572 Biosystems in Sanitary Engineering
- 573 Theory of Water Purification and Treatment
- 579 Soil Behavior
- 580 Consolidation, Seepage, and Clay Mineralogy
- 581 Experimental Geomechanics
- 583 Advanced Foundation Engineering
- 587 Groundwater Flow and Seepage Pressures
- 588 Groundwater Hydrology
- 672 Water Pollution Control and Treatment of Wastewater
- 677 Stream and Estuarine Analysis
- Community Planning (CPL)**
- 300 Introduction to Global Issues in Sustainable Development
- 434 Introduction to Environmental Law
- 483 Land Development Seminar
- 485 Planning and Natural Environmental Systems
- 487 International Development Internships
- 495 International Development Seminar
- 538 Site Planning
- 539 Environmental Law
- 549 Seminar in Ecological Planning
- Entomology (ENT)**
- 390 Wildlife and Human Disease
- 411, 511 Pesticides and the Environment
- 529 Systems Science for Ecologists
- 544 Insect Pest Management
- 561 Aquatic Entomology
- Environmental Economics (EEC)**
- 105 Introduction to Resource Economics
- 205 Resource Management and Conservation
- 310 Economics for Environmental Resource Management and Policy
- 345 Sustainable Development, Trade and the Environment
- 410 Fish and Wildlife Economics

- 432 Environmental Economics and Policy  
 435 Aquacultural Economics  
 440 Benefit-Cost Analysis  
 441 Markets, Trade, and Natural Resources  
 501 Graduate Seminar in Natural Resources Economics  
 502 Research Methodology in Environmental and Natural Resource Economics  
 514 Economics of Marine Resources  
 524 Quantitative Techniques in Natural Resources Research  
 528 Microeconomic Theory  
 529 Game Theory  
 534 Economics of Natural Resources  
 535 Environmental Economics  
 543 Economic Structure of the Fishing Industry  
 576 Econometrics  
 602 Research Methodology  
 624 Dynamic Economic Models  
 628 Advanced Microeconomic Theory I  
 630 Resource Analysis  
 634 Economics of Resource Development  
 676 Advanced Econometrics  
 677 Econometric Applications in Resource Economics
- Environmental Sciences (EVS)**  
 366 Communicating Environmental Research and Outreach  
 610 Multidisciplinary Problem Solving in Coastal Ecosystems  
 612 Leadership and Communication in Coastal Ecosystem and Management  
 614 White Papers in Integrated Coastal Science  
 616 Field Practicum in Coastal Science  
 618 Internship in Coastal Management
- Geosciences (GEO)**  
 100 Environmental Geology  
 103 Understanding the Earth  
 113 Natural Disasters  
 210 Landforms: Origin and Evolution  
 305 Global Warming  
 450 Introduction to Sedimentary Geology  
 483 Hydrogeology  
 484 Environmental Hydrogeology  
 515 Glacial Geology  
 568 Isotopes in Hydrogeology  
 577 Coastal Geologic Hazards  
 582 Innovative Subsurface Remediation Technologies  
 583 Groundwater Modeling  
 584 Environmental Hydrogeology
- History (HIS)**  
 389 Exploration, Commerce, and Conflict in the Atlantic World, 1415–1815  
 390 The Atlantic World in the Age of Iron, Steam and Steel  
 396 Maritime History/Underwater Archaeology Field School  
 490 Underwater Historical Archaeology
- Landscape Architecture (LAR)**  
 101 Freshman Inquiry into Landscape Architecture  
 343, 344 Landscape Architecture Studio I, II  
 444 Landscape Architecture Studio III: Sustainable Design  
 443 Planting Design  
 445 Landscape Architecture Studio IV
- Marine Affairs (MAF)**  
 100 Human Use and Management of the Marine Environment  
 120 New England and the Sea  
 220 Introduction to Marine and Coastal Law  
 312 The Politics of the Ocean  
 320 Shipping and Ports  
 330 World Fishing  
 410 Senior Seminar in Marine Affairs  
 413 Peoples of the Sea  
 415, 515 Marine Pollution Policy  
 461 Coastal Zone Management  
 465 GIS Applications in Coastal and Marine Management  
 472 Marine Recreation and Tourism Management Seminar  
 475 Human Responses to Coastal Hazards and Disasters  
 482 Quantitative Methods in Marine Affairs  
 484 Environmental Analysis and Policy in Coastal Management  
 494 Cases in Marine Policy  
 490 Field Experience in Marine Affairs  
 502 Research Methods in Marine Affairs  
 511 Ocean Uses and Marine Sciences  
 516 Seminar on the Urban Waterfront  
 521 Coastal Zone Law  
 523 Fisheries Law and Management  
 526 Management of Marine Protected Areas  
 527 Marine Protected Areas: An Interdisciplinary Analysis  
 551 Seminar in Marine Ecology  
 563 Maritime Transportation  
 564 Port Operations and Policy  
 565 Cruise Ship Operations, Marketing, and Ports  
 577 International Ocean Law  
 578 International Ocean Organizations  
 582 Coastal Ecosystem Governance  
 602 Federal Ocean Policy and Organization  
 651, 652 Marine Affairs Seminar
- Mechanical Engineering (MCE)**  
 354 Fluid Mechanics  
 415 Experimentation in Fluid Mechanics and Thermal Science  
 551 Fluid Mechanics I
- Microbiology (MIC)**  
 102 Exploring the Microbial World  
 201 Introductory Medical Microbiology  
 211 Introductory Microbiology  
 306 Eukaryotic Microbiology/Protistology  
 413–16 Advanced Microbiology
- Natural Resources Science (NRS)**  
 100 Natural Resource Conservation  
 101 Freshman Inquiry into Natural Resources
- 186 Analysis and Presentation of Environmental Data  
 200 Seminar in Natural Resources  
 212 Introduction to Soil Science  
 301 Introduction to Forest Science  
 302 Fundamentals of Forest Management  
 304 Field Ornithology  
 305 Principles of Wildlife Ecology and Management  
 309 Wildlife Management Techniques Laboratory  
 324 Biology of Mammals  
 351 Soil Morphology Practicum  
 361 Watershed Hydrology and Management  
 395 Research Apprenticeship in Natural Resources Science  
 397 Natural Resources Internship  
 401 Foundations of Restoration Ecology  
 402 Wildlife Biometrics  
 403 Wildlife Biometrics Field Investigations  
 406 Wetland Wildlife  
 407 Nongame and Endangered Species Management  
 408 Environmental Education: Theory and Experiential Learning  
 409 Concepts in GIS and Remote Sensing  
 410 Fundamentals of GIS  
 411 Population and Environmental Change  
 412 Soil-Water Chemistry  
 414 Climate Change Science and Policy  
 415 Remote Sensing of the Environment  
 423 Wetland Ecology  
 424 Wetlands and Land Use 425, 525 Wetland Field Investigations  
 426 Soil Microbiology  
 440 Ecosystem Processes in Land and Water Management  
 441 Methods in Ecosystem Analysis  
 445 Invasive Species Research, Management and Policy  
 450 Soil Conservation and Land Use Investigations  
 452 Soil, Water, and Land Investigations  
 471 Soil Morphology and Mapping  
 495 Advanced Natural Resources Apprenticeship  
 497 Natural Resources Cooperative Internship  
 498 Teaching Practicum in Natural Resources Science  
 499 Senior Thesis in Natural Resources Science  
 503 Wildlife Biometrics Field Investigations  
 505 Biology and Management of Migratory Birds  
 509 Concepts of GIS and Remote Sensing in Environmental Science  
 510 Soil-Water Relations  
 511 Population and Environmental Change  
 514 Climate Change Science and Policy  
 516 Advanced Remote Sensing  
 520 Quantitative Techniques in Natural Resource Research  
 522 Advanced GIS Analysis of Environmental Data  
 524 Application of Advanced Spatial Analysis  
 526 Microbial Ecology of Soils and Sediments  
 527 Marine Protected Areas: An Interdisciplinary Analysis

- 532 Conservation Biology and Resource Economics  
 533 Landscape Pattern and Change  
 534 Ecology of Fragmented Landscapes  
 538 Physiological Ecology of Wild Terrestrial Vertebrates  
 545 Invasive Species Research, Management and Policy  
 551 Seminar in Marine Ecology  
 555 Applied Coastal Ecology  
 567 Soil Genesis and Classification  
 568 Recent Advances in Natural Resources Science  
 600 Graduate Seminar in Natural Resources
- Ocean Engineering (OCE)**  
 101 Introduction to Ocean Engineering  
 205 Ocean Engineering Design Tools  
 206 Ocean Instrumentation  
 215, 216 Ocean Engineering Design I, II  
 301 Fundamentals of Ocean Mechanics  
 310 Basic Ocean Measurement  
 311 Coastal Measurements and Applications  
 360 Robotic Ocean Instrumentation Design  
 408 Introduction to Engineering Wave Mechanics and Littoral Processes  
 416 Ocean Engineering Professional Practice  
 421 Marine Structure Design  
 422 Offshore Structure and Foundation  
 425 Coastal Experiments  
 471 Underwater Acoustics  
 472 Sonar Systems Design  
 495, 496 Ocean Systems Design Project I, II  
 500 Ocean Engineering Design Studies  
 506 Numerical Models and Data Analysis in Ocean Sciences  
 510 Engineering Ocean Mechanics  
 514 Engineering Wave Mechanics and Nearshore Processes  
 515 Marine and Vehicle Hydrodynamics  
 522 Dynamics of Waves and Structures  
 550 Ocean Systems Engineering  
 560 Introduction to Data Collection Systems  
 561 Introduction to the Analysis of Oceanographic Data  
 565 Ocean Laboratory I  
 571, 672 Underwater Acoustics I, II  
 572 Underwater Acoustic Transducers  
 575 Marine Bioacoustics  
 582 Seabed Geotechnics  
 605, 606 Ocean Engineering Seminar  
 661 Analysis of Oceanographic Data Systems  
 673 Advanced Course in Underwater Acoustic Propagation
- Oceanography (OCG)**  
 110 The Ocean Planet  
 123 Oceans, Atmospheres, and Global Change  
 131 Volcanoes and the Environment  
 401 General Oceanography  
 451 Oceanographic Science  
 480 Introduction to Marine Pollution  
 491 Ocean Studies
- 501 Physical Oceanography  
 505 Marine Analytical Chemistry  
 506 Numerical Models and Data Analysis in Ocean Sciences  
 510 Descriptive Physical Oceanography  
 517 Foundations in Earth System Dynamics  
 521 Chemical Oceanography  
 523 Organic Geochemistry of Natural Waters  
 531 Synoptic and Dynamic Meteorology  
 533 Graduate Writing in Marine and Environmental Sciences  
 535 Climate, Radiation, Gases, and Aerosols  
 540 Geological Oceanography  
 561 Biological Oceanography  
 576 Marine Microbial Ecology  
 580 Introduction to Marine Pollution  
 605 Dynamical Oceanography  
 610, 611 Geophysical Fluid Dynamics I, II  
 613 Waves  
 614 Tides  
 620 Chemical Distributions  
 623 Physical Chemistry of Seawater  
 625 Organic Geochemistry of Sediments  
 628 High-Temperature Geochemistry  
 631 Seminar in Marine and Atmospheric Chemistry  
 643 Subduction Zones  
 645 Petrology of the Ocean Crust  
 652 Marine Geophysics  
 664 Phytoplankton Ecology  
 665 Marine Bio-Optics and Remote Sensing  
 668 Productivity of Ocean Margins  
 669 Marine Fish Ecology and Production  
 670 Fish Population Dynamics  
 689 Coastal Marine Ecosystems  
 695 Seminar in Oceanography
- Philosophy (PHL)**  
 454 Philosophy of the Natural Environment
- Physics (PHY)**  
 425 Acoustics  
 483, 484 Laboratory and Research Problems in Physics
- Plant Sciences (PLS)**  
 150 Plant Biology for Gardeners  
 200 Introduction to Plant Protection  
 205, 305 Population, Environment, and Plant Biology I, II  
 222 Ecology of the Home Landscape  
 306 Landscape Management and Arboriculture  
 361 Weed Science  
 401, 402 Plant Sciences Seminar  
 405 Propagation of Plant Materials  
 407 Environmental Education: Theory/Experiential Learning  
 415 Plant Plagues: Causes and Consequences  
 436 Floriculture and Greenhouse Crop Production  
 440 Diseases of Turfgrasses, Trees, Shrubs, and Ornamental Shrubs  
 441 Plant Disease Laboratory  
 442 Advanced Turf Management
- 475 Plant Nutrition and Soil Fertility  
 476 Environmental Plant Physiology  
 501, 502 Graduate Seminar in Plant Sciences  
 512 Plant Growth and Development  
 572 Plant Biochemistry  
 576 Environmental Plant Physiology
- Political Science (PSC)**  
 402 Environmental Policy and Politics Statistics (STA)  
 413 Data Analysis  
 550 Ecological Statistics
- Special Problems, Directed Study, Independent Study, Workshop, and/or Internships are also offered by most marine and environmental departments.*

## Master of Science in Accounting (MAC)

Director: Professor Schwarzbach

### 501 Current Accounting Theory (3)

Critical examination of accounting theory and practice to develop research techniques with emphasis on financial accounting. (Lec. 3) Pre: graduate standing in accounting or permission of M.S. in accounting director.

### 502 Current Accounting Theory (3)

Critical examination of accounting theory and practice with respect to cost and managerial accounting. (Lec. 3) Pre: graduate standing in accounting or permission of M.S. in accounting director.

### 503 Taxation of Business Entities (3)

Examination of the tax law, underlying theory, tax compliance requirements and tax planning for: corporations, flow-through entities and the transfer tax system. Pre: BUS 403 or permission of graduate advisor.

### Taxation of Corporations and Shareholders (3)

Examination of the tax laws affecting corporations and shareholders. Includes law governing corporate formation, liquidating and non-liquidating distributions, reorganizations, taxes on corporation accumulations, and planning of transactions for tax compliance and minimization. (Lec. 3) Pre: BUS 403 or permission of instructor.

### 504 Financial Statement Analysis and Reporting (3)

Development of accounting policy with respect to analysis of financial statements and the use of evaluation techniques, managerial planning and control. Emphasis on analytical evaluation of cases with major research project. (Lec. 3) Pre: graduate standing in accounting or permission of M.S. in accounting director.

**505 Advanced Problems in Accounting (3)**

Integrative and specialized accounting problems. (Lec. 3). Graduate standing in accounting or permission of M.S. in accounting director.

**506 Seminar in Tax Research, Policy, and Planning (3)**

Examination of the methodology of tax research, the principles and procedures involved in tax planning, and the procedures involved in dealing with the IRS. (Seminar) Pre: BUS 403 or MAC 510 or equivalent.

**507 International Accounting (3)**

Covers interpretation of international financial statements, focusing on foreign currency exchange, comparative accounting principles and disclosures, and audit reports. Uses actual financial statements in case analysis. (Lec. 3) Pre: MBA 503 or permission of instructor.

**508 Advanced Auditing (3)**

Statements on auditing standards, auditing electronic systems, auditors' reports, statistical sampling in auditing, regulations of SEC, and cases in auditing. (Lec. 3) Pre: BUS 404.

**509 Taxation of Flow Through Entities (3)**

Examines the federal income tax laws applicable to the flow through entities of partnerships and corporations. (Lec. 3) Pre: BUS 403.

**510 Federal Taxes and Business Decisions (3)**

The course focuses on tax law and its effect on business decisions. Cases are employed and primary emphasis is on income tax planning, although estate and gift taxes are explored. (Lec. 3) Pre: MBA 503.

**515 Law and Accounting (3)**

Introduction to C.P.A. law exam, question and answer techniques, coverage of most accounting-legal subjects currently included on the C.P.A. exam. (Lec. 3) Pre: MBA 530 or BUS 315 or BUS 317 or permission of dean.

**518, 519 Directed Study in Accounting (1–3 each)**

Advanced work under the supervision of a faculty member and arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor.

**520 Internship in Accounting (3)**

Participation in management and/or problem solving under the supervision and guidance of a sponsoring agency with evaluation by the College of Business Administration. (Practicum) Pre: proposal acceptance by the College of Business Administration, no previous internship credit, graduate standing. S/U credit.

**Master's in Business Administration (MBA)**

*Associate Deans:* Professors Chen and Rosen

**500 Statistical Methods for Management (3)**

Introductory statistical methods applied to business problems. Topics include descriptive statistics, probability, distributions, inference, regression analysis, chi-square analysis, and introduction to time series. (Lec. 3) Graduate credit for students matriculated in the M.B.A. and M.S. in accounting programs only.

**501 Computing for Management (2–3)**

Computer concepts and programming using spreadsheet, database, presentation, communication, and other software packages. Emphasis on PC computing as an administrative and analytic tool for applications in management. (Lec. 2–3)

**502 Organizational Behavior (3)**

Examination of the theory, research, and practice of organizational behavior in work settings, focusing on individual differences, communications, group dynamics, motivation, and leadership in the workplace. (Lec. 3)

**503 Financial Accounting (3)**

Covers basic accounting principles, accounting systems design, and financial reporting issues. Focusing on financial statement analysis techniques necessary to accurately assess a company's financial position and results of operations. (Lec. 3) Pre: 500

**504 Financial Management (3)**

Functions and responsibilities of financial managers. Examination of financial statement analysis, cost of capital, capital structure, valuation, markets, capital budgeting, working capital, mergers, bankruptcy, multinational finance. (Lec. 3) Pre: 500, 503, ECN 590.

**505 Managerial Marketing (3)**

Analysis of marketing problems and determination of marketing policies in product development, promotion, pricing, channel selection, legal aspects. (Lec. 3) Pre: 500 or permission of instructor.

**506 Mathematical Methods for Management (3)**

Fundamental mathematical methods applied to the understanding and solution of managerial problems. Topics include the solution of systems of linear equations, differential calculus, and related areas. (Lec. 3) Graduate credit for students matriculated in the M.B.A. and M.S. in accounting programs only.

**510 Managerial Accounting (3)**

Determination of accounting information for the purposes of decision making, control, and evaluation with emphasis on decision models using accounting information. (Lec. 3) Pre: 500, 503.

**520 Quantitative Methods for Management (3)**

Survey of principal operations research/management science models. Linear programming, network, and other mathematical programming models; simulation, decision analysis, and other probabilistic models. (Lec. 3) Pre: 500 or waiver examinations.

**530 Legal Environment of Business (3)**

Coverage includes both substantive and procedural rules of law in the civil and administrative law field with emphasis on business, regulation, societal, and ethical issues. (Lec. 3) Pre: graduate standing.

**540 Organizational Decision Making and Design (3)**

Theory and skills development in strategic thinking and organizational design; use of critical analysis in the diagnosis of organizational and management problems. (Lec. 3) Pre: graduate standing.

**550 Managing with Information Resources (3)**

Concepts of information technologies and systems as they relate to the information-age organization. Major focus is on how the various information resources can be managed to facilitate organizational effectiveness. Topics include information and communication technologies, decision support and information systems, technology-enabled process re-engineering, and information architecture. (Lec. 3) Pre: permission of instructor.

**555 Managerial Economics (3)**

The applications of economic theory and methodology to business problems. (Lec. 3) Pre: 504, 520, 550, and 560 or permission of instructor.

**560 Operations and Supply Chain Management (3)**

The management of manufacturing and service operations. Topics include flow processes, inventories, scheduling, capacity, and operations strategy. (Lec. 3) Pre: 500.

**562 Global Supply Chain Management (3)**

Examines the factors that impact the design and management of Global Supply Chains through strategic relationships and tactical activities. (Lec. 3) Pre: 560.

**565 Strategic Management (3)**

Case studies of management problems and evaluation of alternative solutions by integrating functional areas of business. Discussion of ethical, social, and regulatory environments in domestic and multinational firms. Includes the M.B.A. written comprehensive examination. (Lec. 3) Service learning. Pre: all MBA 500 first level courses or equivalent and a minimum of 21 MBA credits, which must include 502, 503, 504, and 505, or permission of instructor.

**566 Security and Investment Analysis (3)**

Analysis of the problems of investing funds and managing investments. Use of the latest investment theories and their implementation via quantitative techniques will be explored. (Lec. 3) Pre: 504 or equivalent.

**567 Advanced Portfolio Theory and Security Analysis (3)**

An examination of advanced theories and practices in portfolio building and maintenance. Issues related to security price behavior are also examined. (Seminar) Pre: 504 or equivalent.

**568 Advanced Financial Theory (3)**

Analysis of the theoretical framework for corporate decision making related to financial planning, capital budgeting decisions, dividend policy, and capital structure decisions. Emphasis on current research developments. (Seminar) Pre: 504 or equivalent.

**569 Advanced International Financial Management (3)**

Analysis of issues relevant to the international financial manager. The financial operations of multinational enterprises are examined through both the theoretical and the case approach. (Seminar) Pre: 504 or equivalent.

**571 Labor Relations and Human Resources**

See Labor Relations 500.

**572 Human Resource Strategy**

See Labor Relations 551

**573 Staffing Organizations (3)**

See Labor Studies 573

**574 Consulting and Management Practice (3)**

Review of the theory and practice of effective consulting and development of consultation skills. (Practicum) Pre: 502 or permission of instructor.

**575 Seminar in Management (3)**

Class discussion of typical cases, original research work in the field of management with discussion of data collected and analyzed by individual students. (Seminar) Pre: permission of dean.

**576 Advanced Topics in Management (3)**

Integrated approach to problems in major areas of business management with emphasis on administrative and executive viewpoint. (Seminar) Pre: permission of dean.

**577 Compensation Administration (3)**

Compensation and performance appraisal systems. Theory and techniques used to determine job worth. Special issues in compensation management, such as relating pay to performance through appraisal techniques and pay compression. (Lec. 3) Pre: MBA 502 or permission of instructor.

**578 Human Resource Development (3)**

Techniques used in procurement and development of human resource. Planning through recruitment, selection, and placement to training and development. Integration of HRD process with organizational strategic plans. (Lec. 3) Pre: 502 or permission of instructor.

**579 International Business Management (3)**

Examines the problems and characteristics of international management by focusing on the role of the multinational corporation in a cross-cultural setting. (Lec. 3) Pre: 502 or permission of instructor.

**580 Management Systems Analysis and Design (3)**

An overview of systems analysis and design, and its role in the development of information systems. Major focus is on the methodologies, techniques, and tools used to create successful information systems. (Lec. 3) Pre: 550 or permission of instructor.

**581 Database Management Systems (3)**

Design and analysis of complex multi-user databases used in real time business transaction processing. The class will contain discussion and examination of databases for strategic and tactical purposes. (Lec. 3)

**582 Applied Time Series Methods and Business Forecasting (3)**

Study of time series methods. Construction and use of autoregressive integrated moving averages (ARIMA) forecasting models. Applications to strategic decision actions. (Lec. 3) Pre: 500 or permission of instructor.

**583 Seminar in Operations and Supply Chain Management (3)**

Preparation and presentation of papers on selected topics in operations management and supply chain issues. (Seminar) Pre: 560.

**584 Buyer Behavior (3)**

Analysis of major factors influencing the behavior and demand of consumers. Emphasis on using these factors to identify and segment target markets and to assess the effects of these factors on markets. (Lec. 3) Pre: 505 or permission of instructor.

**585 Marketing Research (3)**

Marketing information needs and appropriate means of providing the requisite information are analyzed. Several major marketing decision areas and their research implications are examined in depth. (Lec. 3) Pre: 500, 505, 506, ECN 590, or permission of instructor.

**586 International Marketing Management (3)**

Marketing policy making for the multinational firm; organizing for international marketing; its opportunities, pricing, channels, promotion, and research. (Lec. 3) Pre: 505 or permission of instructor.

**587 Product Management (3)**

Development of product policies and strategies. Emphasis on organizing the marketing function to deal with various product-related activities including new product development, life cycle strategies, and product deletion. (Lec. 3) Pre: 505 or permission of instructor.

**588 Marketing Communications Management (3)**

Provides an in-depth knowledge base for developing effective and efficient strategic marketing communications. Covers communication objectives, strategies, and tactics, and explores when to use them. Pre: 505.

**591, 592 Directed Study in Business (1–3 each)**

Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor.

**593, 594 Internship in Business Administration (3)**

Participation in business administration under the field supervision of a sponsoring organization with evaluation by the College of Business Administration. (Independent Study) Pre: proposal approved by the College of Business Administration. S/U credit.

**Mathematics (MTH)**

*Chairperson:* Professor Eaton

**010 Basic Math (3)**

Real numbers; operation with fractions and decimals. Proportions and related problems. Basic algebra: solving first-degree equations and systems of equations. Applications. (Lec. 3) S/U only. Credits may not be used toward the minimum credits required for graduation or for general education.

**099 Basic Algebra and Trigonometry (3)**

Review of basic algebra and trigonometry: operations of real numbers and algebraic expressions, negative and fractional exponents, polynomials and fractional expressions, equations and systems of equations, inequalities, right triangle trigonometry and applications. (Lec. 3) For students not sufficiently prepared to take other mathematics courses. Credits may not be used toward the minimum credits required for graduation or for general education. S/U only.

**105 Elementary Mathematical Codebreaking (3)**

Use of technology to break codes, including those enciphered by substitution, polyalphabetic, polygraphic, and transposition ciphers. Mathematical topics include modular arithmetic, linear systems, probability. (Lec. 3) Only high school mathematics required. (MQ)

**106 Mathematics of Social Choice and Finance (3)**

Voting methods, apportionment problems, and mathematics of everyday finance. Emphasis on development of reasoning ability as well as manipulative techniques. (Lec. 3/Online) Not open to students with credit in 108 or 109 and not for major credit in mathematics. (MQ)

**107 Introduction to Finite Mathematics (3)**

Concepts and processes of modern mathematics concerned with sets, the theory of probability, and statistics. Role of these concepts in today's social and physical sciences. (Lec. 3) Pre: passing a placement test. Not open to mathematics majors. (MQ)

**108 Topics in Mathematics (3)**

Introduces the nonmathematics student to the spirit of mathematics and its applications. Presupposes no mathematical background beyond University admission requirements. Emphasis is on development of reasoning ability as well as manipulative techniques. (Lec. 3/Online) Pre: passing a placement test. Not open to students with credit in 106 or 109 and not for major credit in mathematics. (MQ)

**109 Politics and Mathematics (3)**

Elementary mathematical treatments of voting systems and voting paradoxes; models of escalation, conflict, and deterrence, measures of political power, etc. (Lec. 3) Not open for students with credit in 106 or 108 and not for major credit in mathematics. (MQ)

**110 Mathematical Foundations for Business Analysis (3)**

Equations of first and second degree. Inequalities. Exponential and logarithmic functions. Emphasis on business applications. Introduction to linear algebra and matrices. Introduction to spreadsheets. Designed for students who want to strengthen their background in math before BUS 111. (Lec. 3). Not for credit for mathematics majors and not for general education credit.

**111 Precalculus (3)**

Equations of first and second degree, systems of equations. Inequalities. Functions and graphs. Exponential, logarithmic, and trigonometric functions. Applications. Introduction to analytic geometry. Complex numbers. Designed for students who need to strengthen their background in mathematics below calculus. (Lec. 3) Pre: passing a placement test. Not for credit for mathematics majors. (MQ)

**131 Applied Calculus I (3)**

Basic topics in calculus for students who do not need all the topics in 141. Limits, derivatives, and integrals of algebraic, logarithmic, and exponential functions. Applications including graphing, maxima and minima problems, etc. (Lec. 3) Pre: passing a placement test. Not for major credit in mathematics. Not open to students with credit or concurrent enrollment in 141. (MQ)

**132 Applied Calculus II (3)**

Continuation of 131. Topics related to trigonometric functions, integration by parts and partial fractions, partial derivatives, infinite series. Applications to problems such as optimization, probability theory, simple differential equations. (Lec. 3) Pre: 131 or 141 or permission of chairperson. Not for major credit in mathematics. Not open to students with credit or concurrent enrollment in 142.

**141 Introductory Calculus with Analytic Geometry (4)**

Topics in analytic geometry, functions and their graphs, limits, the derivative, applications to finding rates of change and extrema and to graphing, the integral, and applications. (Lec. 3, Rec. 1) Completion of four units of high school mathematics, including trigonometry, recommended. Pre: passing a placement test. Not open to students with credit or concurrent enrollment in 131. (MQ)

**142 Intermediate Calculus with Analytic Geometry (4)**

Continues the study of calculus for the elementary algebraic and transcendental functions of one variable. Topics include the technique of integration, improper integrals, indeterminate forms, and calculus using polar coordinates. (Lec. 3, Rec. 1) Pre: 141 or permission of chairperson. Not open to students with credit or concurrent enrollment in 132. (MQ)

**208 Numeracy for Teachers (4)**

Conceptual understanding supporting mathematical ideas presented in current, standards-based elementary mathematics education. An in-depth look at problem solving, number systems, functions, relations, and geometry. This course is appropriate for elementary teachers and teachers in non-STEM fields. (Lec. 3, Rec. 1) A placement test is recommended. Not for major credit in mathematics. (MQ)

**215 Introduction to Linear Algebra (3)**

Detailed study of finite dimensional vector spaces, linear transformations, matrices, determinants, and systems of linear equations. (Lec. 3) Pre: 131, 141, or equivalent.

**243 Calculus for Functions of Several Variables (3)**

Topics include coordinates for space, vector geometry, partial derivatives, directional derivatives, extrema, Lagrange multipliers, and multiple integrals. (Lec. 3) Pre: 142.

**244 Differential Equations (3)**

Classification and solution of differential equations involving one independent variable. Applications to the physical sciences. Basics for further study in applied mathematics and for advanced work in physics and engineering. (Lec. 3) Pre: 142.

**307 Introduction to Mathematical Rigor (3)**

Introduction to the language of rigorous mathematics: logic, set theory, functions and relations, cardinality, induction, methods of proof. Emphasis on

precise written and oral presentation of mathematical arguments. (Lec. 3) Pre: 142.

**316 Algebra (3)**

Theory and structure of groups. Topics from ring theory, principal ideal domains, unique factorization domains, polynomial rings, field extensions, and Galois theory. (Lec. 3) Pre: 215 and 307.

**322 Concepts of Geometry (3)**

Survey of geometrical systems including non-Euclidean, affine, and projective spaces and finite geometries. A modern view of Euclidean geometry using both synthetic and analytic methods. (Lec. 3) Pre: 215 or permission of instructor. Offered fall semesters.

**362 Advanced Engineering Mathematics I (3)**

Algebra of complex numbers, matrices, determinants, quadratic forms. Linear differential equations with constant coefficients. Partial differential equations. (Lec. 3) Pre: 142. Not for major credit in mathematics.

**381 History of Mathematics (3)**

General survey course in development and philosophy of mathematics. Provides a cultural background and foundation for advanced study in various branches of the subject. (Lec. 3) Pre: 142 or equivalent. Offered spring semesters.

**382 Number Theory (3)**

Some of the arithmetic properties of the integers including number theoretic functions, congruences, diophantine equations, quadratic residues, and classically important problems. (Lec. 3) Pre: 141 or permission of instructor. Offered spring semesters.

**391 Special Problems (1–3)**

Advanced work under the supervision of a faculty member and arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of chairperson.

**393 Undergraduate Seminar (1)**

Preparation and presentation of selected topics in oral and written form. (Seminar) Pre: permission of chairperson.

**418 Matrix Analysis (3)**

Canonical forms, functions of matrices, characteristic roots, applications to problems in physics and engineering. (Lec. 3) Pre: 215 or 362 or permission of instructor.

**420 Re-examining Mathematical Foundations for Teachers (3)**

Connects ideas covered in upper level math courses to topics taught in secondary school. Designed for teachers. (Lec. 3) Pre: 316 or permission.

**425 Topology (3)**

Abstract topological spaces and continuous functions. Generalizations of some classical theorems of analysis. (Lec. 3) Pre: 243 and 307, or permission

of instructor or chairperson. Offered alternate fall semesters.

#### 435 Mathematical Analysis and Topology I (4)

The first of two courses providing rigorous introduction to mathematical analysis (theory of calculus) and metric space topology as a basis for advanced work in mathematics (Lec. 4) Pre: 215 and 243 and 307 or permission of the instructor

#### 436 Mathematical Analysis and Topology II (4)

The second of two courses providing rigorous introduction to mathematical analysis (theory of calculus) and metric space topology as a basis for advanced work in mathematics (Lec. 4) Pre: 435 or permission of the instructor.

#### 437, 438 Advanced Calculus and Application I, II (3 each)

Sequences, limits, continuity, differentiability, Riemann integrals, functions of several variables, multiple integrals, space curves, line integrals, surface integrals, Green's theorem, Stokes' theorem, series, improper integrals, uniform convergence, Fourier series, Laplace transforms. Applications to physics and engineering emphasized. (Lec. 3) Pre: (for 437) 243 and credit or concurrent enrollment in 215 or 362. Pre: (for 438) 437.

#### 441 Introduction to Partial Differential Equations (3)

One-dimensional wave equation. Linear second order partial differential equations in two variables. Separation of variables and Fourier series. Nonhomogeneous boundary value problems. Green's functions. (Lec. 3) Pre: 244 or 442. Offered alternate fall semesters.

#### 442 Introduction to Difference Equations (3)

Introduction to linear and nonlinear difference equations; basic theory, z-transforms, stability analysis, and applications. (Lec. 3) Pre: 243. Offered spring semesters.

#### 447 (or CSC 447) Discrete Mathematical Structures (3)

Concepts and techniques in discrete mathematics. Finite and infinite sets, graphs, techniques of counting, Boolean algebra and applied logic, recursion equations. (Lec. 3) Pre: junior standing or better in physical or mathematical sciences, or in engineering, or permission of instructor.

#### 451 Introduction to Probability and Statistics (3)

Theoretical basis and fundamental tools of probability and statistics. Probability spaces, properties of probability, distributions, expectations, some common distributions, and elementary limit theorems. (Lec. 3) Pre: 243 or equivalent.

#### 452 Mathematical Statistics (3)

Continuation of 451 in the direction of statistics. Basic principles of statistical testing and estimation,

linear regression and correlation. (Lec. 3) Pre: 451. Offered spring semesters.

#### 455 Introduction to Chaotic Dynamical Systems (3)

Introduction to nonlinear dynamical systems on the real line and/or the plane. (Lec. 3) Pre: 243 or permission of instructor.

#### 462 Functions of a Complex Variable (3)

First course in the theory of functions of a single complex variable, including analytic functions, power series, residues and poles, complex integration, conformal mapping, and applications. (Lec. 3) Pre: 243 or equivalent. Offered alternate fall semesters.

#### 471 Introduction to Numerical Analysis (3)

Computer arithmetic, interpolation, numerical approximation of derivatives, integral numerical ODE, and other topics. (Lec. 3). Pre: 243 or permission of instructor.

#### 472 Numerical Linear Algebra (3)

Systems of linear equations, least squares, approximation, eigenvalue problems. (Lec. 3) Pre: 243 and 215 or permission of instructor.

#### 492 Special Problems (1–3)

Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of chairperson.

#### 513 Linear Algebra (3)

Linear spaces and transformations, linear functionals, adjoints, projections, diagonalization, Jordan form of matrices, inner products; positive, normal, self-adjoint, and unitary operators; spectral theorem, bilinear and quadratic forms. (Lec. 3)

#### 515, 516 Algebra I, II (3 each)

Groups, rings, modules, commutative algebra. (Lec. 3) Pre: 316 for 515; 515 for 516. In alternate years.

#### 525 Topology (3)

Topological spaces, separation properties, connectedness, compactness, uniformities. Function spaces, spaces of continuous functions, and complete spaces. (Lec. 3) Pre: 435. In alternate years.

#### 535, 536 Measure Theory and Integration (3 each)

Elements of topology and linear analysis. Lebesgue measure and integration in  $\mathbb{R}$ , in  $\mathbb{R}^n$ , and in abstract spaces. Convergence theorems. Bounded variation, absolute continuity, and differentiation. Lebesgue-Stieltjes integral. Fubini and Tonelli theorems. The classical Banach spaces. (Lec. 3) Pre: 435 for 535; 535 for 536.

#### 542, 543 Global Character of Difference Equations I, II (3 each)

Global character, periodic behavior, and asymptotic nature of solutions of difference equations and

systems of difference equations with applications. Recent topics on rational equations and rational systems in higher dimensions. (Lec. 3) Pre: 435 and 436.

#### 545, 546 Ordinary Differential Equations I, II (3 each)

Existence and uniqueness theorems. Continuous dependence on parameters and initial conditions. Singularities of the first and second kinds, self-adjoint eigenvalue problems on a finite interval. Oscillation and comparison theorems. Introduction to delay and difference equations. Elements of stability theory of Lyapunov's second method. (Lec. 3) Pre: 435 for 545; 545 for 546. In alternate years.

#### 547 (or CSC 547) Combinatorics (3)

Enumeration: generation functions, recurrence relations, classical counting numbers, inclusion-exclusion, finite set systems and designs. Polya theory, coding theory, and Ramsey theory. Finite fields and algebraic methods. (Lec. 3) Pre: 316. Offered alternate fall semesters.

#### 548 (or CSC 548) Graph Theory (3)

Basic concepts and techniques of graph theory as well as some of their applications. Topics include: connectivity, matchings, colorings, extremal problems, Ramsey theory, planar graphs, algebraic techniques. (Lec. 3) Pre: 316. Offered alternate fall semesters.

#### 550 Probability and Stochastic Processes (3)

Review of probability theory. Generating functions, renewal theory, Markov chains and processes, Brownian motions, stationary processes. (Lec. 3) Pre: (435 or 437) and 451. Offered alternate fall semesters.

#### 551 Mathematical Statistics (3)

Theory of estimation and hypothesis testing. Large sample methods. Regression and analysis of variance. (Lec. 3) Pre: 550. Offered alternate spring semesters.

#### 555 Dynamical Systems (3)

The objective of this course is to develop the theory of Topological Dynamical Systems, that is the study of iterated continuous mappings from a topological space to itself. (Lec. 3). Pre: 435 or permission of instructor.

#### 562 Complex Function Theory (3)

Rigorous development of theory of functions. Topology of plane, complex integration, singularities, conformal mapping. (Lec. 3) Pre: (435 and 436) or (437 and 438). Offered alternate spring semesters.

#### 571 Numerical Analysis (3)

Computer arithmetic, interpolation, numerical approximation of derivatives and integrals, numerical ODE, and other topics. (Lec. 3) Pre: 243.

**572 Numerical Partial Differential Equations (3)**

Further numerical methods of solution of simultaneous equations, partial differential equations, integral equations. Error analysis. (Lec. 3)

**575 Approximation Theory and Applications to Signal Processing**

See Electrical Engineering 575.

**591, 592 Special Problems (1–3 each)**

Advanced work under the supervision of a member of the department arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of chairperson.

**599 Master's Thesis Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**629, 630 Functional Analysis I, II (3 each)**

Banach and Hilbert spaces, basic theory. Bounded linear operators, spectral theory. Applications to analysis. Application to a special topic such as differential operators, semigroups and abstract differential equations, theory of distributions, or ergodic theory. (Lec. 3) Pre: 436 for 629; 629 for 630. Offered in alternate years.

**691, 692 Special Topics I, II (3 each)**

Advanced topics of current research in mathematics will be presented with a view to expose the students to the frontiers of the subject. (Independent Study) Pre: permission of chairperson.

**699 Doctoral Dissertation Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**930 Workshop in Mathematics Topics for Teachers (0–3)**

Especially designed for teachers of mathematics. Basic topics of mathematics from an advanced or pedagogical perspective. (Workshop) Pre: teacher certification. Not for degree credit.

**Mechanical Engineering (MCE)**

*Chairperson:* Professor Taggart (Department of Mechanical, Industrial and Systems Engineering)

**201 Engineering Graphics (3)**

Introduction to the principles of graphic representation in engineering design, with emphasis on computer-aided drafting, orthographic projection, isometric and auxiliary views, sections, dimensioning, and rapid prototyping. (Lec. 2, Lab. 3)

**262 Statics (3)**

Newton's laws of force systems in equilibrium and their effects on particles, systems of particles, and rigid bodies. Both scalar and vector methods of analysis are developed. (Lec. 3) Pre: MTH 141 and credit

or concurrent enrollment in EGR 106 or permission of instructor.

**263 Dynamics (3)**

Kinematic and kinetic study of motion of particles, systems of particles, and rigid bodies, acted upon by unbalanced force systems, using both scalar and vector methods; development of methods of analysis based on the direct application of Newton's laws, work-energy, and impulse-momentum principles. (Lec. 3) Pre: 262.

**301 Application of Mechanics in Design (3)**

Concepts of engineering design, material selection, failure theories, fracture and fatigue, and finite-element analysis. Application to the design of mechanical components such as shafts, bolts, welded joints, and springs. (Lec. 3) Pre: CVE 220, credit or concurrent enrollment in ISE 240, and ((at least a 2.0 (C) average in PHY 203, MCE 262, CVE 220 and students must be admitted to the College of Engineering) or permission of instructor).

**302 Design of Machinery (3)**

Analysis and design of mechanisms and machine elements including linkages, gear trains, cam-follower systems, bearings, brakes and clutches, flexible mechanical elements, and intermittent and other devices. Graphical, analytical, and computer-aided synthesis techniques. (Lec. 3) Pre: (201 or permission of instructor) and 263 and 301.

**313 Introduction to Mechanical Engineering Experimentation (3)**

Report writing, computer-assisted data acquisition and control, statistical and other measures of data uncertainty, propagation of uncertainty, curve fitting. Introduces basic instrumentation for measuring pressure, temperature, velocity, and strain. (Lec. 2, Lab. 3) Pre: CVE 220 and concurrent registration in 341 and 354.

**341 Fundamentals of Thermodynamics (3)**

Basic principles and laws of thermodynamics and their relation to pure substances, ideal gases, and real gases. Use of thermodynamic property tables. Development of concepts of reversibility and availability. First and Second Law application to engineering systems; power and refrigeration cycles. (Lec. 3) Pre: 263 and MTH 243.

**348 (448) Heat and Mass Transfer (3)**

Transfer of heat by conduction, convection, and radiation in steady and unsteady states. Theory and application of dimensional analysis; heat and mass transfer in equipment such as heat exchangers and steam condensers. (Lec. 3) Pre: 341 and 354 and 372, or permission of instructor.

**354 Fluid Mechanics (3)**

Physical properties of fluids, development of continuity, energy, and momentum concepts using vector methods; application to problems involving viscous

and nonviscous fluids including boundary layer flows, flows in closed conduits and around immersed bodies. (Lec. 3) Pre: 263 and MTH 243 or permission of instructor.

**366 System Dynamics (3)**

Systems analysis emphasizing control and vibration. Time and frequency domain techniques. Modeling of typical mechanical, hydraulic, pneumatic, and thermal systems. Transfer functions and block diagram methods. Elementary control laws. (Lec. 3) Pre: 263 and MTH 244, and (students must be admitted to the College of Engineering or permission of instructor).

**372 Engineering Analysis (3)**

Application of advanced mathematical methods and computer software to solution of mechanical engineering problems with emphasis on the techniques of engineering analysis. (Lec. 3) Pre: EGR 106, MTH 243, 244, or permission of instructor.

**401 Mechanical Engineering Capstone Design I (3)**

Application of engineering skills using a team-based approach. Design process methodology and communication of solutions to real-world engineering problems. First of a two-course sequence. (Lec. 2, Lab. 3) Pre: 302 and 366 and 448 and concurrent registration in CHE 333 or permission of instructor. Must be taken in the semester prior to 402. Not for graduate credit.

**402 Mechanical Engineering Capstone Design II (3)**

Application of engineering skills using a team-based approach. Design process methodology and communication of solutions to real-world engineering problems. Second of a two course sequence. (Lec. 2, Lab. 3) Pre: 401. Must be taken in the semester following 401. Not for graduate credit.

**414 Mechanical Engineering Experimentation (3)**

Course aims to build on foundation from 313 and to apply experimental tools to topics from the two main emphasis areas in the undergraduate curriculum, mechanical systems and thermal systems. (Lec. 2, Lab. 3) Pre: 313 and concurrent registration in 448. Not for graduate credit.

**426 Advanced Mechanics of Materials (3)**

Introduction to continuum mechanics: stress, strain and deformation, constitutive equations. Theories of failure. Shear center and unsymmetrical bending of beam. Bending beams. Energy method. Torsion. (Lec. 3) Pre: 301 or permission of instructor.

**431 Computer Control of Mechanical Systems (3)**

Use of computers to control mechanical systems. Advanced control algorithms. Computer-aided design methods. Digital control algorithms and software implementation. Interfacing and digital controller hardware. (Lec. 3) Pre: 366 or permission of instructor.

**433 Mechatronics (3)**

Design of microprocessor-controlled electro-mechanical systems. Topics covered include: real-time programming, motion control elements, interfacing of sensors and actuators, basic electronics, and microprocessor architecture. Pre: 366 and ELE 220 or permission of instructor.

**434 Heating, Ventilation, and Air Conditioning (3)**

Application of the principles of thermodynamics and heat transfer to environmental problems. Topics will include thermal control of living spaces, solar heating and cooling, heat pumps, minimum energy consumption. (Lec. 3) Pre: 341 or permission of instructor.

**437 Turbomachinery Design (3)**

Application of the principles of thermodynamics and fluid mechanics to the design of rotating machinery such as turbines, compressors, centrifugal and axial flow pumps. (Lec. 3) Pre: 341 and 354 or permission of instructor.

**438 Internal Combustion Engines (3)**

Principles, design, and operation of internal combustion engines, including cycles, combustion, fuels, detonation, carburetion, cooling, supercharging, ignition, friction, and lubrication. Gasoline and diesel, two- and four-stroke cycles, and performance of various engines including the Wankel rotary. (Lec. 3) Pre: 341 or permission of instructor.

**440 Mechanics of Composite Materials (3)**

Introduction to the basic concepts of the mechanical behavior of composite materials. Analysis and performance of fiber-reinforced composites. Special design considerations and experimental characterization of composites. (Lec. 3) Pre: CVE 220 or permission of instructor.

**446 Metal Deformation Processes**

See Industrial and Systems Engineering 446.

**449 Product Design for Manufacture**

See Industrial and Systems Engineering 449.

**454 Tribology (3)**

Introductory course on the basic principles of tribology (friction, wear, lubrication); fundamentals of surface contact; friction theories; wear mechanisms; temperature considerations in sliding contacts; lubrication regimes; materials selection; design of bearings; advanced applications; experimental analysis. (Lec. 3) Pre: CVE 220 and MCE 354 or permission of instructor.

**455 Advanced Fluid Mechanics (3)**

Continuation of 354. Selected topics in advanced fluid mechanics including potential flows, compressible flow, fluid machinery, and electric and magnetic field effects. (Lec. 3) Pre: 354 or permission of instructor.

**464 Vibrations (3)**

Elementary theory of mechanical vibrations, including the one-degree-of-freedom system, multimas-

s systems, vibration isolation, torsional vibration, beam vibration, critical speeds, and vibration instruments. (Lec. 3) Pre: 366 or permission of instructor.

**466 Introduction to Finite Element Method (3)**

Application of the finite element method to problems in mechanical engineering including plane elasticity, heat transfer, and fluid mechanics. Basic concepts, matrix formulation, interpolation functions, basic element types, and implementation to problem solution. (Lec. 3) Pre: 301 and 372 or permission of instructor.

**471 (or CHE 471) Nuclear Reactor Engineering (3)**

Energy production from nuclear reactions, cross sections, number density, and binding energy. Fission process, neutron life cycle, criticality, neutron diffusion, reactor design, reactor kinetics and control, reactivity feedback, nuclear system design. (Lec. 3) Pre: MTH 244 and MCE 341 or CHE 313, or permission of instructor.

**472 (or CHE 472) Power Plant System Design and Safety Analysis (3)**

Energy production, power systems, energy conversion system design, safety engineering and design, phenomenological modeling and analysis, probabilistic risk assessment, risk-informed design, advanced power plant systems design. (Lec. 3) Pre: thermodynamics (MCE 341 or CHE 313) or permission of instructor. Not for graduate credit.

**473, 474****476 (or CHE 476) Mechanics of Materials in Nuclear Applications (3)**

Nuclear systems, material microstructure and mechanical properties, high temperature deformation mechanisms, radiation effects, reactor materials, materials selection for primary and secondary cycles. (Lec. 3) Pre: CVE 220 and (CHE 332 or 333), or permission of instructor.

**491, 492 Special Problems (1–6 each)**

Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of instructor. May be repeated for a maximum of 12 credits. Not for graduate credit.

**501, 502 Graduate Seminar (1 each)**

Seminars and discussions presented by faculty members of academia and industry. Attendance is required of all students in graduate residence. (Seminar) S/U credit.

**503 Linear Control Systems**

See Electrical Engineering 503.

**504 Optimal Control Theory**

See Electrical Engineering 504.

**523 Advanced Kinematics I (3)**

Analytical kinematic and dynamic analysis of planar mechanisms, graph theory, topological synthesis, topological analysis, Burmester theory, mechanism design software. (Lec. 3) Pre: 302 or equivalent.

**530 Real-Time Monitoring and Control (3)**

Fundamentals of the development of real-time software for monitoring and control. Mechanical systems computer interfacing, timing, cooperative and preemptive scheduling, distributed control, RTOS, and embedded control. Laboratory exercises. (Lec. 3) Pre: graduate standing or permission of instructor.

**538 Mechanical Engineering Systems (3)**

Modeling and simulation of typical mechanical, thermal, fluid and electromechanical elements found in mechanical engineering systems. Feedback control concepts. Control software structures, and software implementation of control systems. (Lec. 3) Pre: graduate standing or permission of instructor.

**541 Advanced Thermodynamics I (3)**

Advanced study of classical thermodynamics with emphasis on basic concepts, laws, and thermodynamic relationships. Selected topics of current interest including areas of irreversible thermodynamics, statistical mechanics, and the thermodynamics of solids. (Lec. 3) Pre: 341 or permission of instructor.

**545 Heat Transfer (3)**

Conduction in two and three dimensions and conducting systems with radiation and fluid motion. Solutions obtained by mathematics, computer-numerical methods, and analog devices. (Lec. 3) Pre: 448.

**546 Convection Heat Transfer (3)**

Relationship between heat transfer and fluid flow with emphasis on the solution of governing equations by exact methods, integral methods, and similarity techniques. (Lec. 3) Pre: 448.

**549 Advanced Product Design for Manufacture**

See Industrial and Systems Engineering 549.

**550 Theory of Continuous Media (3)**

Foundations for advanced studies in mechanical and thermal behavior of solids and fluids. Cartesian and general tensors, small and large deformation theory, Cauchy and Piola-Kirchhoff stress, conservation principles, constitutive laws with applications to materials of engineering interest. (Lec. 3) Pre: CVE 220, MCE 354, 372 or equivalent.

**551 Fluid Mechanics I (3)**

Basic treatment of real fluid flows using the continuum mechanics approach. Exact solutions of the governing equations. Laminar shear flows and boundary layer theory, turbulent transition. (Lec. 3) Pre: 354 or equivalent.

**552 Advanced Experimental Methods (3)**

Theory and application of various experimental techniques used in fluid mechanics, solid mechanics, and tribology. Emphasis on mechanical and chemical methods of wear detection, and strain and optical techniques of stress evaluation. (Lec. 2, Lab. 3) Pre: MCE 354 and CVE 220 or permission of instructor.

**561 Computational Methods in Solid Mechanics (3)**

Finite and boundary element methods based on variational and weighted residual concepts implementation to static and dynamic field problems in elasticity, plasticity, and heat conduction. Pre: 466 and 571 or permission of instructor.

**562 Computational Methods in Fluid Flow and Heat Transfer (3)**

Computational techniques and applications for practical problems concerning multidimensional fluid flow, heat and mass transfer, and chemical reactions. (Lec. 3) Pre: undergraduate work in fluid mechanics and heat transfer or permission of instructor.

**563 Advanced Dynamics (3)**

Newtonian mechanics, motion in rotating coordinate systems, Lagrangian Mechanics, Hamilton's principle. Variational methods, nonconservative and nonholonomic systems; matrix-tensor specifications of rigid body motions, normal coordinates. Hamilton's equation of motion, canonical transformation, Hamilton-Jacobi theory. (Lec. 3) Pre: 366 and 372 or equivalent.

**564 Advanced Vibrations (3)**

Theory of vibration of lumped-parameter multi-degree-of-freedom systems; distributed-parameter systems; exact and approximate solutions; nonlinear and random vibrations. Experimental methods and design procedures. (Lec. 3) Pre: 366 or 464 or equivalent.

**565 Wave Motion and Vibration of Continuous Media (3)**

Wave motion and vibrations of strings, rods, beams, plates, and membranes; dynamic elasticity theory; Rayleigh surface waves; solutions using separation of variables and integral transforms. (Lec. 3) Pre: CVE 220, MCE 372, 464, or equivalent.

**566 The Mechanics of Robot Manipulators (3)**

Detailed analysis of the kinematics, dynamics, and control of industrial-type robot manipulator systems. (Lec. 3) Pre: 302, 366, or permission of instructor.

**567 Experimental Nonlinear Dynamics (3)**

Fundamentals of the experimental analysis of nonlinear dynamical systems; mathematical concepts and algorithmic tools to characterize, analyze, model and predict dynamics of nonlinear systems. (Lec. 3) Pre: 366 or 464 or equivalent.

**568 Theory of Plates**

See Civil Engineering 568.

**571 Theory of Elasticity I (3)**

Development of the basic field equations; general concepts of stress and strain; generalized Hooke's law; plane problems; stress functions; Saint Venant torsion and flexure; introduction to three-dimensional problems. (Lec. 3) Pre: CVE 220, MCE 372 or equivalent.

**576 Fracture Mechanics (3)**

Fundamentals of linear and nonlinear materials behavior, linear elastic fracture mechanics, stress analysis and energy viewpoints, two- and three-dimensional problems, elastic-plastic considerations, dynamic and time-dependent fracture, fatigue crack growth, micro-mechanics of fracture processes, experimental techniques, application to design. (Lec. 3) Pre: 426 or 571 or permission of instructor.

**577, 578 Seminar in Sensors and Surface Technology (1)**

Students, faculty, and invited outside speakers present and discuss selected topics related to research interests of the Sensors and Surface Technology Partnership. (Seminar) Pre: permission of instructor. May be repeated. S/U credit.

**580 Micro/Nanoscale Energy Transport (3)**

Fundamentals and applications of energy transport at micro/nanoscale, including equilibrium statistics, Boltzmann transport equation, and nano/microscale heat conduction and radiation, with applications in contemporary technologies. (Lec. 3) Pre: 448 or equivalent, or permission of instructor.

**591, 592 Special Problems (1–6)**

Advanced work under the supervision of a faculty member arranged to suit individual requirements of the student. May be repeated for a maximum of 6 credits. Pre: permission of instructor.

**599 Master's Thesis Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**653 Fluid Mechanics II (3)**

Continuation of 551, including turbulent modeling, turbulent shear flows and boundary layers, incompressible irrotational flows, and selected topics such as an introduction to non-Newtonian fluid behavior, geophysical flows, or numerical methods. (Lec. 3) Pre: 551.

**663 Nonlinear Dynamics (3)**

Nonlinear dynamics theory and its applications to mechanical, chemical, electromagnetic or biological oscillators; stability, phase space analysis, limit cycles, bifurcations, perturbation methods, chaos, fractals, strange attractors, and other advanced topics. (Lec. 3) Pre: 563 or 564 or permission of instructor.

**671 Theory of Elasticity II (3)**

Continuation of 571; advanced topics selected from complex variable methods; anisotropic solutions; thermoelasticity; displacement potentials and stress functions for three-dimensional problems; micro-mechanics modeling; variational, approximate, and numerical methods. (Lec. 3) Pre: 571 or equivalent.

**678 Micromechanics (3)**

Mechanics of material behavior from the micro structural viewpoint; physical mechanisms of de-

formation and fracture; continuum mechanics and thermodynamics; rheological classification of solids; thermodynamics and viscoelasticity; plasticity and viscoplasticity; damage mechanisms; applications to metals, ceramics, and composites. (Lec. 3) Pre: 571, CHE 333 or equivalent.

**679 Theory of Plasticity (3)**

Uniaxial behavior of plasticity; perfect plasticity, plastic potential; work-hardening materials, loading surface and loading rules, flow rules; stress-strain relationships; nonlinear kinematic hardening models; foundation of state-variable approaches, viscoplasticity; applications to engineering materials. (Lec. 3) Pre: 571 or permission of instructor.

**680 Advanced Topics in Solid Mechanics (3)**

Advanced studies in the mechanics of solids with specific topics determined by current department interests. Designed for students with at least one year of previous graduate studies. (Lec. 3) Pre: permission of instructor. May not be repeated.

**691, 692 Special Problems (1–6 each)**

Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of chairperson. May be repeated for a maximum of 6 credits.

**699 Doctoral Dissertation Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**Medical Laboratory Science (MLS)**

*Director:* Clinical Professor Paquette

**102 Introduction to Clinical Laboratory Science (1)**

An introduction to the health care and medical laboratory fields including specialty areas of medical laboratory science, professional organizations, credentialing, and the health care team approach. (Lec. 1)

**195 Biotechnology Manufacturing Methods (5)**

Introduction to biotechnology manufacturing methods including cell culture separation, purification. (Lec. 3, Lab. 4) Pre: enrollment in biotechnology manufacturing option.

**199 Biotechnology Manufacturing Internship (1–12)**

Professional field experience in biotechnology manufacturing. The experience will be defined by a job description and learning contract arranged by the internship coordinator, student intern, and relevant agency. (Practicum) Pre: enrollment in the biotechnology manufacturing option. May be repeated for a maximum of 12 credits.

*The clinical courses in medical laboratory science (MLS 405–416) require senior standing and are open only to students who have been accepted into an affiliated hospital school of medical laboratory science.*

#### 405 Molecular Pathology (2)

An introduction to pathology. The correlation among pathological processes and clinical symptoms and the course of disease is studied. (Practicum)

#### 406 Clinical Immunology (2)

Formation, structure, and action of antigens and antibodies. Methods of immunization. The laboratory emphasizes serological procedures in the diagnosis of disease. (Practicum)

#### 409 Clinical Microbiology I (4)

The relationship of bacteria and bacterial diseases of humans, with emphasis on the application of procedures to medical diagnosis. Fungi, viruses, the rickettsias, and human parasites are also studied. (Practicum)

#### 410 Clinical Microbiology II (4)

Continuation of 409. (Practicum)

#### 411 Clinical Chemistry I (4)

The chemistry of body constituents and their relationship to diagnosis of human disease. Principles and methods of analysis are emphasized. (Practicum)

#### 412 Clinical Chemistry II (4)

Continuation of 411. (Practicum)

#### 413 Immunohematology I (2)

Instruction in drawing and processing blood and in ascertaining compatibility. Donor-recipient blood and tissue reactions are studied in detail. (Practicum)

#### 414 Immunohematology II (2)

Continuation of 413. (Practicum)

#### 415 Hematology I (3)

Morphology of the blood and blood-forming organs and the study of abnormalities associated with disease. The dynamics and diagnostic tests of hemostasis are also discussed. (Practicum)

#### 416 Hematology II (3)

Continuation of 415. (Practicum)

#### 450 (or BPS 450) Practical Tools for Molecular Sequence Analysis (3)

Introduction to practical ways to analyze DNA, protein and genome datasets. Students will be introduced to computing environments and publicly available software tools for analysis. (Lec. 2, Lab 2) Pre: BCH 311 or BIO 352 (or BCH 352) or BIO 341 or permission of instructor. Not for graduate credit.

#### 451 Professional Topics in Clinical Laboratory Science (2)

Professional topics in the medical laboratory sciences, including research methods, education, management, occupational health, public health, regulatory affairs, professionalism, and ethics. (Practicum)

#### 483 Introductory Diagnostic Microbiology

See Microbiology 483.

#### 501 (or MIC 501) Advanced Clinical Microbiology I (3)

Current methodology employed in the processing of clinical microbiology specimens, isolation and identification of pathogenic microorganisms, and determination of antimicrobial susceptibility. (Lec. 3) Pre: 409 or MIC 432 or equivalent.

#### 502 Advanced Clinical Chemistry I (3)

The pathophysiologic mechanisms as they correlate to clinical chemistry data. Topics include mechanisms of pathology and analytical techniques. (Lec. 3) Pre: 411 or equivalent.

#### 510 Clinical Laboratory Management (3)

Supervisory management principles applicable to the clinical laboratory. Includes the processes of supervision, decision making, job performance and evaluation, communications, organizational behavior, and labor relations in the modern laboratory. (Lec. 3) Pre: 400-level medical laboratory science internship or equivalent.

#### 512 Special Problems in Clinical Laboratory Science (3)

Assigned research on an advanced level. Students required to outline problem, conduct the necessary research or experimental work, and present observations and conclusions in a written and oral report. (Independent Study) Pre: 400-level medical laboratory science internship or equivalent.

#### 513 (or MIC 513) Advanced Clinical Immunology (3)

Theory, application, and techniques used in clinical immunology: immunochemistry, serology, immunohematology, immunopathology. (Lec. 3) Pre: 406 or MIC 533 or equivalent.

#### 520 Advanced Hematology (3)

Special problems, advanced techniques, and methodology in hematology; laboratory approach emphasized. (Lec. 3) Pre: 415 or equivalent.

#### 530 Recent Advances in Blood Banking and Transfusion Medicine (3)

Immunohematology, blood banking, and transfusion medicine with emphasis on recent advances. Techniques used for tissue typing and organ transplantation. (Lec. 3) Pre: 413 or equivalent.

#### 541 Advanced Clinical Microbiology II (3)

Current research and clinical methodology in clinical mycology, parasitology, mycobacteriology, epidemiology, and infectious disease serology. (Lec. 3) Pre: 409 or MIC 432 or equivalent.

#### 543 Advanced Clinical Chemistry II (3)

A comprehensive study of pathophysiologic mechanisms as they relate to clinical chemistry. Topics include immunochemistry, automation, enzymology,

pharmacology, and endocrinology. (Lec. 3) Pre: 411 or equivalent.

#### 551 Topics in Biochemistry for the Clinical Scientist

See Biochemistry 551.

*The clinical courses in cytopathology (MLS 561–566) require graduate standing and are open only to students who have been accepted into the Rhode Island School of Cyto-*

*technology.*

#### 561 Introduction to Cytotechnology (3)

A review of cell and tissue structure, principles of microscopy, and cytological staining methods; overview of organization and management of cytology labs. (Practicum)

#### 562 Special Topics in Cytotechnology (3)

Special projects in cytology, cytopathology, or cytotechnology. Students will investigate or review a topic and present a written and oral report. (Practicum)

#### 563 Cytopathology (3)

Cytopathology and clinical aspects of cervical dysplasia, carcinoma in situ, and invasive squamous cell carcinoma. Endometrial and endocervical carcinoma and other genital tract cancers will be considered. (Practicum)

#### 564 Medical Cytology (3)

Benign and malignant cytology of the gastrointestinal, respiratory, and urinary tracts; study of exfoliative cells in urine, serious effusions, cerebrospinal fluid, and breast secretions. (Practicum)

#### 565 Cytology Practicum I (6)

Microscopic evaluation and screening of benign cytological smears from cervical dysplasia, carcinoma in situ, and invasive malignant tumors of the female genital tract. (Practicum)

#### 566 Cytology Practicum II (6)

Microscopic evaluation and screening of cytological smears from the gastrointestinal, urinary, respiratory, and central nervous systems and from other body fluids. (Practicum)

#### 571 (or BPS 536) Biotechnology Product Evaluation and Development (3)

The process through which candidate products produced using recombinant DNA technology are evaluated for safety and efficacy, including conductance of clinical trials, economic issues, and regulatory affairs. (Lec. 3) Pre: graduate standing and permission of chairperson.

#### 590 Special Problems in Clinical Chemistry (1–6)

Intensive tutorial work, research, and readings in clinical chemistry. (Independent Study) Pre: graduate standing and permission of chairperson.

**591 (or MIC 591) Special Problems in Clinical Microbiology (1–6)**

Intensive tutorial work, research, and readings in clinical microbiology. (Independent Study) Pre: graduate standing and permission of chairperson.

**592 Special Problems in Hematology (1–6)**

Intensive tutorial work, research, and readings in hematology. (Independent Study) Pre: graduate standing or permission of chairperson.

**593 Special Problems in Immunohematology (1–6)**

Intensive tutorial work, research, and readings in immunohematology. (Independent Study) Pre: graduate standing and permission of chairperson.

**594 Special Problems in Biotechnology (1–3)**

Intensive tutorial work, research, and readings in biotechnology. (Independent Study) Pre: graduate standing and permission of chairperson.

**Microbiology (MIC)**

*Chairperson:* Professor Sperry (Cell and Molecular Biology)

**102 Exploring the Microbial World (3)**

A guided tour of aquatic and disease-causing microorganisms, emphasizing their impact on humans. The role of microorganisms in evolution, environmental and human health, biotechnology, and natural product prospecting. (Lec. 3)

**190 Issues in Biotechnology (3)**

See Aquaculture and Fisheries Science 190. (N)

**201 Introductory Medical Microbiology (4)**

Required of all students in nursing, dental hygiene, and pharmacy. Lecture and laboratory designed to illustrate microbiological principles and techniques. For students in allied health professions. (Lec. 3, Lab. 3) Pre: one semester of biology and one year of chemistry. Not open to students with credit in 211.

**211 Introductory Microbiology (4)**

Introduction to microorganisms. Morphology, structure, metabolism, genetics, growth, populations in natural habitats, and their effects on the environment. For biological sciences majors. (Lec. 3, Lab. 3) Pre: two semesters of biology, one semester of organic chemistry, which can be taken concurrently. Not open to students with credit in 201.

**306 Eukaryotic Microbiology/Protistology (3)**

Free-living and disease-causing eukaryotic microorganisms are examined in depth, with a focus on those causing human and animal diseases, inhabiting coastal/marine habitats, or used in research. (Lec. 3) Pre: two semesters of biology.

**333 Immunology and Serology (3)**

Introduction to the immune response; host resistance to infection; immunopathology; antibodies,

antigens, and use of serological techniques. (Lec. 3) Pre: 201 or 211.

**334 Virology (3)**

An introduction to the basic aspects of virus structure, classification, and replication as these relate to viruses as agents of infectious disease. (Lec. 3) Pre: 201 or 211.

**409 Marine Micrograzers (2)**

Practical experience with collection, cultivation, and identification of diverse marine and coastal heterotrophic protists of the phylum Ciliophora, using phase, fluorescence, and electron microscopy, digital still photography, videomicroscopy, genetic fingerprinting. (Lab. 4) Pre: two semesters of biology laboratory courses.

**413 Advanced Microbiology Lecture I (3)**

The physiology, genetics, developmental and molecular biology of microorganisms. (Lec. 3) Pre: 211, credit or concurrent enrollment in BCH 311 and BIO 352, or permission of instructor.

**414 Advanced Microbiology Lecture II (3)**

The structural, developmental, and physiological diversity of microorganisms; symbiotic relationships, molecular basis of ecology, and the role of microorganisms in the soil and water environment. (Lec. 3) Pre: 211, credit or concurrent enrollment in BCH 311, or permission of instructor.

**415 Advanced Microbiology Laboratory I (2)**

Introduction to techniques and methods for advanced study of microbial genetics, physiology, molecular and developmental biology of microorganisms. (Lab. 6) Pre: concurrent enrollment in 413 or permission of instructor.

**416 Advanced Microbiology Laboratory II (2)**

Techniques and methods for the advanced study of microorganisms with emphasis on the study of representative groups of microorganisms and the application of these techniques to soil and aquatic environments. (Lab. 6) Pre: concurrent enrollment in 414 or permission of instructor.

**422 Biotechnology of Industrial Microorganisms (3)**

Application of microorganisms to industrial processes. Culture handling and strain development. Regulation and control of fermentation products. (Lec. 3) Pre: BCH 311 and an advanced course in microbiology, or permission of instructor.

**432 Pathogenic Bacteriology (3)**

The more important microbial diseases, their etiology, transmission, diagnosis, and control. Laboratory, emphasis on methods of diagnosis. (Lec. 2, Lab. 3) Pre: 201 or 211 or one semester of organic chemistry.

**435 Introduction to the Biology and Genetics of Cancer**

See Biochemistry 435.

**447 Experimental Cell Biology (2)**

Use of eukaryotic microorganisms as humane experimental models to analyze cell physiological processes such as endocytosis, motility, and secretion, using immunocytochemistry, biological assays, fluorescent probes, digital still, and video imaging. (Lab. 4) Pre: two semesters of biology laboratory courses.

**451 Laboratory in Cell Biology**

See Biochemistry 451.

**453 Cell Biology**

See Biological Sciences 453.

**483 (or MLS 483) Introductory Diagnostic Microbiology (3)**

Diagnosis of infectious diseases by use of microbiology, immunology, and hemotologic and clinical chemical methods; organisms covered include viruses, bacteria, fungi, and parasites. (Lec. 2, Lab. 2) Pre: 201 or 211. Open only to clinical laboratory science or microbiology majors or permission of instructor.

**491, 492 Research in Microbiology (1–6 each)**

Special problems in microbiology. Student required to outline a problem, carry on experimental work, and present conclusions in a report. (Independent Study) Open only to seniors in microbiology. A maximum of 6 credits can be taken for major credit.

**495 Seminar in Microbiology (1)**

Preparation and presentation of papers on selected subject in microbiology. (Seminar) S/U credit.

**499 Biotechnology Internship (3–12)**

Professional field experience in biotechnology. The experience will be defined by a job description and learning contract arranged by the MIC internship coordinator, student intern, and relevant agency. (Practicum) Pre: junior or senior standing and approval by the MIC internship coordinator and department chairperson. A maximum of 12 credits can be taken as major credit. Not for graduate credit.

**501 Advanced Clinical Microbiology I**

See Medical Laboratory Science 501.

**502 (or BCH 502) Techniques of Molecular Biology (2)**

Basic techniques of molecular biology used in the study of gene structure and function including DNA/RNA and plasmid isolation, northern and southern blotting, PCR and gene cloning, among others. (Lab. 6) Pre: BIO 437 or permission of instructor.

**506 Biology of Eukaryotic Microorganisms/Protists (3)**

The biology of free-living and parasitic eukaryotic microorganisms is explored, with an emphasis on systematics, evolution, cell physiology, development,

reproduction, and molecular biology of those species most commonly used in research at the present time. (Lec. 3) Pre: two semesters of biology.

#### 508 Seminar in Biological Literature

See Biological Sciences 508.

#### 513 Advanced Clinical Immunology

See Medical Laboratory Science 513.

#### 521 (or BIO 521) Recent Advances in Cell and Molecular Biology (2)

Reading and discussion of current literature (original research papers and review articles) in the area of molecular cell biology, and presentation of oral reports. Final written report or exam. Emphasis on eukaryotic cells. (Lec. 2) Pre: at least one of the following courses or an equivalent course emphasizing cell structure and function – MIC 453; BCH 437, 453, 481; BIO 437, 453 or permission of instructor. May be repeated for a maximum of 4 credits.

#### 522 Bioinformatics I

See Biomedical and Pharmaceutical Science 542.

#### 533 Immunology (3)

Introduction to the cellular, molecular, and genetic basis of the immune system, and the role of the immune system in immunity to infection, tumor and transplantation immunobiology, and immunopathology. (Lec. 3) Pre: 201 or 211.

#### 534 Animal Virology

See Aquaculture and Fisheries Science 534.

#### 538 (or AFS 538 or AVS 538) Epidemiology of Infectious Diseases (3)

Principles of epidemiology, interrelationships of host, environment, and agent in infectious diseases. (Lec. 3)

#### 550 (or BPS 550) Practical Tools for Molecular Sequence Analysis (3)

Students will be introduced to practical ways to analyze DNA, protein and genome datasets. Students will be introduced to computing environments and publicly available software tools for analysis. Pre: BCH 311 or BIO/BCH 352 or BIO 341 or permission of instructor.

#### 552 (or BCH 552) Microbial Genetics (3)

Recent research on the mechanism of mutation, genetic recombination, the genetic code, transposons, regulations, genetic engineering, and regulation of DNA, RNA, and protein synthesis in microbial systems. (Lec. 3) Pre: 201, BIO 352, and BCH 311.

#### 561 Recent Advances in Molecular Cloning (1)

Reports of readings concerning the latest developments in techniques of molecular cloning and their applications in the study of various biological systems. (Lec. 1) Pre: 552 or permission of instructor. May be repeated.

#### 571 Insect Microbiology

See Entomology 571.

#### 576 Marine Microbiology

See Oceanography 576.

#### 591 Special Problems in Clinical Microbiology

See Medical Laboratory Science 591.

#### 593, 594 The Literature of Bacteriology (1 each)

Thorough study of original literature of some phase of bacteriology. Written abstracts or papers on assigned topics are discussed in weekly conferences with instructor. (Independent Study)

#### 599 Master's Thesis Research

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

#### 654 Advances in Immunology (2)

Reports on assigned readings concerning latest developments in the field of cellular and humoral immunity presented and discussed by students. Research paper and critical review of a scientific paper required. (Lec. 2) Pre: 533, BCH 311, or permission of instructor. May be repeated for a maximum of 4 credits. In alternate years.

#### 656 Mechanisms of Bacterial Pathogenesis (3)

Study of recent research on the molecular mechanisms of pathogenesis. Students expected to participate in roundtable discussions of recent pertinent literature. (Lec. 3) Pre: 432, 552, and BCH 311. In alternate years. Next offered spring 2013.

#### 691, 692 Special Problems in Microbiology (3 each)

Assigned research on an advanced level. Student required to outline problem, conduct the necessary literature and experimental work, and present observations and conclusions in a report. (Independent Study) Pre: graduate standing.

#### 695, 696 (or BCH 695, 696) Graduate Research Seminar (1 each)

Reports of research in progress or completed. (Seminar) Required of all graduate students in microbiology. S/U credit.

#### 699 Doctoral Dissertation Research

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

#### 930 Workshop in Microbiology Topics for Teachers (0–3 each)

Especially designed for teachers of biology. Basic topics of microbiology from an advanced or pedagogical perspective. (Workshop)

*Note: For virology, see aquaculture and fisheries science (AFS) and also plant sciences (PLS). For mycology, see biological sciences (BIO).*

## Military Science and Leadership (MSL)

*Chairperson:* Professor Wilson

#### 101 Introduction to Leadership I (1)

Introduction to leadership dimensions while presenting a big picture understanding of a leadership development program. Students may participate in events including rappelling and land navigation. No military obligation is associated with this course. Open to all levels. (Lec. 1)

#### 102 Introduction to Leadership II (1)

Overview of leadership fundamentals such as problem solving, public speaking, providing feedback, and using effective writing skills. Topics include skills such as first aid, marksmanship, survival, and orienteering. No military obligation is associated with this course. Open to all levels. (Lec. 1)

#### 105 Introduction to Military Physical Fitness (1)

A "Boot Camp" style fitness program for students with little or no previous experience. Students learn the fundamentals of physical fitness and how Physical Training is conducted in the US Army. (Practicum) No prior military experience is required. Pre: medical release signed by the student's physician. S/U

#### 201 Leadership and Military History (3)

Study of innovative leadership styles and Army tactics by examining key battles throughout history. Case studies provide context for learning ethical decision making and Warrior Ethos as they apply in the contemporary operating environment. Open to all levels. (Lec. 3)

#### 202 Leadership and Team Building (3)

Examines the challenges of leading teams in the complex contemporary operating environment (COE). Highlights dimensions of terrain analysis, patrolling, and operation orders in the context of military operations. Open to all levels. (Lec. 3)

#### 300 Leadership Training Internship (6)

Four-week paid summer internship held at Fort Knox, KY. Upon completion, the student will receive 6 credits and meet the requirements of the 100- and 200-level studies and qualify for continued studies in leadership development. (Practicum) Pre: permission of department.

#### 301 Advanced Leadership Management (3)

Integrates the principles and practices of leadership and personal development to prepare students for the U.S. Army's Leadership Development and Assessment program. (Lec.3) Pre: permission of department.

#### 302 Advanced Leadership Management II (3)

Builds on the foundation of 301. Focuses on developing students' situational leadership abilities to enable them to succeed in demanding, realistic, and stressful practical exercises requiring mental and

physical agility. (Lec. 3) Pre: permission of department.

#### 401 Adaptive Leadership (3)

Students experience opportunities in planning and leading student operations to develop as adaptive leaders. Classroom and situational leadership experiences designed to prepare for first workplace experience. Pre: 301 and 302 or permission of department. Not for graduate credit.

#### 402 Adaptive Leadership in a Complex World (3)

Explores the dynamics of leading in complex situations. Study differences in cultural customs and courtesies, law of land warfare, and rules of engagement in the face of international terrorism. (Lec. 3) Pre: 301 and 302 and 401 or permission of department. Not for graduate credit.

#### 403 Army Topics – Military History (3)

Development of an approved project under faculty supervision. (Independent Study/Online) Pre: permission of chairperson. Not for graduate credit.

## Music (MUS)

*Chairperson:* Professor Parillo

*Note: Applied music courses with an asterisk—MUS 110, 210, 310, 410, and 510 (except Composition)—require a supplementary fee: \$105 for 1 credit; \$200 for 2, 3, 4, or 6 credits.*

#### 101 Introduction to Music (3)

Fosters a better understanding and appreciation of the world's great music. Consideration of musical styles, techniques, and forms from the listener's standpoint. (Lec. 3/Online) (A) [D]

#### 106 History of Jazz (3)

The nature and origin of jazz and its development as an American folk idiom: European and African heritages, blues, ragtime, Dixieland, boogie-woogie, swing, bop, cool, funky, gospel, jazz-rock, free-form, and progressive. (Lec. 3) (A) [D]

#### 109 Basics of Singing (1)

Basic singing technique, tone production, interpretation, and introduction to song literature for those not enrolled in 110–510 Applied Music. (Lab. 2) Pre: must not be registered for 110, 210, 310, 410, or 510.

#### \*110 Applied Music (1–3)

Private instruction in performance at the freshman level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and recital performances. Music convocation performance is encouraged but not required. (Studio) Pre: audition and permission of chairperson. May be repeated for credit.

|               |               |                          |
|---------------|---------------|--------------------------|
| A Voice       | I Flute       | Q Euphonium/<br>Baritone |
| B Piano       | J Oboe        | R Tuba                   |
| C Organ       | K Clarinet    | S Percussion             |
| D Harpsichord | L Bassoon     | T Guitar                 |
| E Violin      | M Saxophone   | U Harp                   |
| F Viola       | N Trumpet     | V Composition            |
| G Violoncello | O French Horn | W Jazz                   |
| H Contra Bass | P Trombone    |                          |

#### 111 Basic Musicianship (3)

Use of folk, classical, and popular music to learn essentials of music reading and music theory. (Lec. 3/Online) (A)

#### 119 Introduction to the Music Profession (1)

Overview of the music profession. Development of an individualized plan for music study including articulation of learning and career goals. Introduction to skill areas including research and writing about music, basic musicianship, and appreciation of music literature. (Lec. 1) For music majors and minors. May be substituted for URI 101.

#### 120 Music Theory and Sight-singing I (2)

Development of basic music theory concepts as well as basic sight-singing, rhythmic, and ear training skills. Scales, modes, intervals, rhythmic notation, and triads." Pre: taken concurrently with 119. Permission of instructor or chairperson required if not taken concurrently with 119. For music majors and minors.

#### 121 Music Theory II (2)

Rhythmic, melodic, and harmonic elements of music. Part writing, analysis, and keyboard work involving primary triads. (Lec. 1.5, Lab. 1) Pre: 119 and 120 or permission of instructor. Concurrent or previous keyboard experience.

#### 122 Ear Training and Sight-singing II (2)

Sight-singing in major and minor keys, including outlines of tonic and dominant harmonies. Rhythmic reading, aural recognition, with notation of material of 121. (Lec. 1.5, Lab. 1) Pre: 121. May be taken concurrently.

#### 169 Percussion Class (1–2)

Basic principles in performance and pedagogy of percussion instruments. (Lab. 2) Open to music majors and other students who demonstrate ability to read music. Next offered spring 2013.

#### 170 Guitar Class (1–2)

Basic principles in performance and pedagogy of the guitar. (Lab. 2) Open to music majors and other students who demonstrate ability to read music. Next offered spring 2013.

#### 171 Piano Class I (1)

Development of basic techniques and musicianship for effective use of the piano. This course will emphasize proficiency I. (Lab. 2) Pre: credit or concurrent enrollment in 121 and 122.

#### 172 Piano Class II (1)

Further development of basic techniques and musicianship for effective use of the piano. Basic keyboard skills in transposition, sight-reading accompaniments, and melody harmonization with improvised accompaniment. This course will emphasize proficiencies 2 and 3. (Lab. 2) Pre: 171 or equivalent.

#### 173 Voice Class (1–2)

Basic principles and pedagogy of singing, physiology, breathing, tone production, diction. (Lab. 2) Open to music majors and other students who demonstrate ability to read music. Next offered fall 2012.

#### 175 String Class (1–2)

Basic principles in performance and pedagogy of string instruments. (Lab. 2) Open to music majors and other students who demonstrate ability to read music. Next offered spring 2013.

#### 177 Woodwind Class (1–2)

Basic principles in performance and pedagogy of woodwind instruments. (Lab. 2) Open to music majors and other students who demonstrate ability to read music. Next offered fall 2012.

#### 179 Brass Class (1–2)

Basic principles in performance and pedagogy of brass instruments. (Lab. 2) Open to music majors and other students who demonstrate ability to read music. Next offered fall 2012.

#### \*210 Applied Music (1–3)

Private instruction in performance at the sophomore level. One credit equals a half-hour lesson per week. Two or three credits equal an hour lesson per week and require additional preparation time, higher levels of performance, and music convocation performance. (Studio) Pre: 110 or equivalent. See 110 for areas of study (A–W). May be repeated for credit.

#### 221 History of Music I (1–3)

Historical development of classical and popular music in European and non-European cultures: world music, Medieval, and Renaissance eras. (Lec. 1–3) Pre: 121 or equivalent competency. May be taken for 1 or 2 credits only with permission of instructor prior to registration.

#### 222 History of Music II (1–3)

Continuation of 221: Baroque, Classical, and Romantic eras. (Lec. 1–3) Pre: 225 or equivalent competency and 221 or consent of instructor. May be taken for 1 or 2 credits only with permission of instructor prior to registration.

#### 225 Music Theory III (2)

Continuation of 121, covering all diatonic triads, dominant and supertonic seventh chords, and modulation to closely related keys. (Lec. 1.5, Lab. 1) Pre: 121 and 122.

**226 Ear Training and Sight-singing III (2)**

Continuation of 122. Covering all diatonic triads, dominant and supertonic seventh chords, and modulation to closely related keys. (Lec. 1.5, Lab. 1) Pre: 122 and 225; 225 may be taken concurrently.

**227 Music Theory IV (2)**

Advanced rhythmic, melodic, and harmonic practice approached through analysis, keyboard, and part writing, including original work. Covers extended chords, chromatic alteration, chromatic progression, and foreign modulation, set theory, tone rows. Pre: 225 or equivalent.

**228 Ear Training and Sight-singing IV (2)**

Advanced rhythmic, melodic, and harmonic practice approached through sight-singing and dictation including computer-aided instruction. (Lec. 1.5, Lab. 1) Pre: 226 or equivalent.

**235 Introduction to Music Teaching (2)**

Overview of music teaching in schools and studios. History, philosophy, curriculum, learning theory, and current topics in music teaching as they relate to the broader field of education. (Lec. 2) Pre: 110 or 119 or permission of instructor.

**238 General Music Methods and Materials (3)**

Teaching methods, instructional materials, and evaluation procedures for general music, grades K–12. Learner characteristics and development of children and adolescents. (Lec. 3) Pre: sophomore standing in music.

**271 Piano Class III (1)**

Further development of basic keyboard performance skills in sight-reading and harmonization. This course will emphasize proficiencies 4 and 5. (Lab. 2) Pre: 172 or equivalent. Open only to music majors.

**272 Piano Class IV (1)**

Continuation of 271. Further development of keyboard performance skills in sight-reading and harmonization. This course will emphasize proficiencies 6 and 7. (Lab. 2) Pre: 271 or equivalent. Open to music majors only.

**280 Mid-Program Portfolio in Music (0)**

Individual accomplishment of activities and experiences, demonstrating interest and competency in music at the midpoint in the student's program of studies as a music major. (Portfolio) Pre: sophomore standing in music.

**283 Vocal Diction (3)**

Basic phonetics (International Phonetic Alphabet). Enunciation in the foreign languages most frequently encountered in vocal and choral literature (Italian, French, German, and Latin). English diction in singing. (Lec. 3) In alternate years. Next offered spring 2013.

**290 University Pep Band (0–1)**

Rehearsal and performance of a wide variety of rock, jazz, rhythm and blues, marches, popular and other

contemporary music for home and away URI basketball games. (Rehearsal 2) May be repeated for credit. Pre: audition and permission of instructor.

**291 University Marching Band (0–2)**

Rehearsal and performance of music, drill, and shows for URI football games. (Rehearsal 8) May be repeated for credit.

**292 Concert Band (0–1)**

Study and performance of concert band music. Open to all students. (Rehearsal 3) May be repeated for a total of 3 credits for general education (A) [D]. S/U only for 0 credit.

**293 University Chorus (0–1)**

(Rehearsal 3) May be repeated for a total of 3 credits for general education (A) [D]. S/U only for 0 credit.

**300 Music Convocation (0–1)**

Study of repertory and techniques of concert presentation through attendance of student recitals and presentations by faculty and visiting artists. (Lab.) Attendance at 75 percent of events required. May be repeated.

**\*310 Applied Music (2–4)**

Private instruction in performance at junior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and junior recital or music convocation performance. (Studio) Pre: 210 or equivalent. See 110 for areas of study (A–W). May be repeated for credit.

**311 Basic Conducting (2)**

A course in elementary conducting techniques including baton techniques and score study as well as the organization of instrumental and choral rehearsals. Pre: credit or concurrent enrollment in 225 and 226.

**312 Advanced Conducting (3)**

A study of problems and approaches to instrumental and choral conducting based on advanced baton techniques. Principles of interpretation and the art of communication through practical experience with departmental organizations. Pre: 311.

**322 History of Music III (1–3)**

Continuation of 221 and 222: European, African-American, Hispanic, and other contributions to the classical and popular music of the 20th century. (Lec. 1–3) Pre: 121 or equivalent competency and 221 or consent of instructor. May be taken for 1 or 2 credits only with permission of instructor prior to registration.

**339 Choral Methods and Materials (3)**

Organization and administration of choral music programs in elementary and secondary schools, focusing on materials, procedures, policies, and teaching methods. (Lec. 3) Pre: EDC 250 or the equivalent.

**340 Instrumental Methods and Materials (3)**

Organization and administration of the instrumental music program in elementary and secondary schools, focusing on materials, procedures, policies, and teaching methods. (Lec. 3) Pre: EDC 250.

**341 Field Experiences in Music Education (1)**

Supervised field experience and seminar for students to observe music teaching practices in music-teaching settings and apply methodology. (Lab. 2) Pre: 235 and junior standing or permission of instructor.

**350 Junior Recital (0–1)**

Performance of a public program at least 20 minutes in duration after faculty examination. (Studio) Pre: concurrent enrollment in 310.

**371 Piano Accompanying (1)**

Development of sight-reading skills. Preparation and performance of accompaniments. (Lec. 1) Pre: permission of piano faculty. May be repeated.

**391 Jazz Studio Laboratory (1)**

Studies in jazz performance practices, pedagogy, and literature. Historical perspectives, stylistic concepts, and repertoire from 1917 to the present developed in the ensemble setting. (Lab. 3) Pre: 121, 122, 171.

**394 Symphonic Wind Ensemble (0–1)**

(Rehearsal 3) Pre: audition and permission of instructor. May be repeated for credit. S/U only for 0 credit.

**395 Concert Chorus (0–1)**

(Rehearsal 3) Pre: audition and permission of instructor. May be repeated for credit. S/U only for 0 credit.

**396 Jazz Studio Ensemble (0–1)**

Performance and study of jazz and studio music as related to professional experience. (Rehearsal 3) Pre: audition and permission of instructor. S/U only for 0 credit.

**397 University Symphony Orchestra (0–1)**

Study and performance of standard and modern repertoire for the orchestra. (Rehearsal 3) Pre: audition and permission of instructor. May be repeated for credit. S/U only for 0 credit.

**398 Chamber Music Ensembles (0–1)**

Chamber music ensembles are small performance ensembles normally restricted to one performer per part. Study and perform repertoire in the following areas, or combinations of these areas: keyboard, string, woodwind, brass, percussion, vocal, guitar, jazz, etc. (Rehearsal 2) Pre: audition and/or permission of chamber music coach.

**407 The Symphony (3)**

Study of the development of orchestration and of formal procedures such as the sonata, rondo, and variations. Includes works by composers such as Haydn, Beethoven, Brahms, and Tchaikovsky. (Lec. 3) Pre: 222. Offered every seventh semester. Next offered spring 2014.

**408 The Opera (3)**

History of opera from its beginnings in Italy in the 17th century to the present, including works by composers such as Monteverdi, Purcell, Mozart, Wagner, Verdi, and Puccini. Pre: credit or concurrent enrollment in 222 or the ability to read music. Offered every seventh semester. Next offered spring 2012.

**\*410 Applied Music (2–4)**

Private instruction in performance at the senior level. Two, three, or four credits equal an hour lesson per week. More credit requires additional preparation time, higher levels of performance, and senior recital or music convocation performance. (Studio) Pre: 310 or equivalent. See 110 for areas of study (A–W). May be repeated for credit. Not for graduate credit, except 410V (Composition).

**416 Form and Analysis (3)**

Critical study of the structure of tonal music. Works of various composers are analyzed with reference to motive and phrase as generative elements in design. (Lec. 3) Pre: 227 or equivalent. In alternate years. Next offered fall 2012.

**417 Instrumentation and Choral Arranging (3)**

Range, timbre, transpositions, and other characteristics of instruments, singly and in combination. Elements of choral arranging. Exercises with attention to part writing, harmony, and form. Setting of a small piece of music for orchestra, band, or chorus required. Pre: credit or concurrent enrollment in 227 or equivalent. In alternate years. Next offered fall 2011.

**420 Eighteenth-Century Counterpoint (3)**

Tonal polyphony in the style of J.S. Bach. Includes creative exercises in writing counterpoint in Baroque style and the study of representative compositions such as the inventions and fugues of Bach. (Lec. 3) Pre: 227 and 228. In alternate years. Next offered spring 2012.

**421 Aesthetics of Electro-Acoustic Music Composition (3)**

Study and application of electronic music composition, and exploration of aesthetic goals since 1945 through analysis of compositional and technological procedures, culminating in a major composition electro-acoustic project. (Lec. 2, Lab. 2) Pre: 235 or equivalent. In alternate years. Next offered spring 2013.

**424 Jazz Theory and Improvisation (3)**

An intensive study and practice of the formal elements of jazz improvisation. (Lec. 1, Lab. 4) Pre: 225, 226 and acceptance into 210. In alternate years. Next offered spring 2012.

**430 The Renaissance Era (3)**

Music at European courts and cathedrals (1400–1600), including vocal masses, motets, madrigals, and chansons, and instrumental canzonas, ricercars,

toccatas, and variations of Dufay, Josquin, Palestrina, Gabrieli, et al. (Lec. 3) Pre: 221 or the ability to read music. Offered every seventh semester. Next offered fall 2012.

**431 The Baroque Era (3)**

Music of 1600–1750, from the rise in Italy of opera, oratorio, idiomatic instrumental music, the sonata, and the concerto, through the works of German masters Bach and Handel. (Lec. 3) Pre: 222 or the ability to read music. Offered every seventh semester. Next offered fall 2014.

**432 The Classic Era (3)**

Music of 1750–1825, beginning with the founders of the Classical style, including D. Scarlatti, Gluck, and the sons of Bach, and culminating in the works of Haydn, Mozart, and Beethoven. (Lec. 3) Pre: 222. Offered every seventh semester. Next offered fall 2011.

**433 The Romantic Era (3)**

Music of 1825–1900, with emphasis on topics central to the era, including program music, nationalism, piano virtuosity, opera, lieder, the cyclic symphony, and turn-of-the-century Viennese post-Romanticism. (Lec. 3) Pre: 222 or the ability to read music. Offered every seventh semester. Next offered fall 2012.

**434 The Modern Era (3)**

Music of the modern era, with emphasis on changing aesthetics as revealed through the analysis of selected compositions. (Lec. 3) Pre: 227 or the ability to read music. Offered every seventh semester. Next offered spring 2012.

**442 Directed Study in Applied Music Pedagogy (2)**

Research in materials and approaches for studio teaching. Pre: 4 credits in 210. In alternate years. Next offered fall 2012.

**450 Senior Recital (0–1)**

Performance of a public program at least 20 minutes in duration after faculty examination. Pre: concurrent enrollment in 410. Not for graduate credit.

**470 Special Topics in Music (1–3)**

Exploration of advanced topics not covered by the standard curriculum but of interest to faculty and students in a particular semester. Topics in performance, music history, music theory or composition, music education. May be repeated for credit with a different topic.

**480 Graduation Portfolio (0–2)**

Seminar covering topics and the development of a graduation portfolio appropriate to the student's degree program. The portfolio shows accomplishments from throughout the degree program and achievement of competencies indicating potential success as a graduate. (Portfolio) Pre: 280 or permission of chairperson and senior standing in music. For music

education majors, concurrent enrollment in EDC 484 required. To be taken during the last semester of coursework in the major. May be repeated. Not for graduate credit.

**485 Opera Workshop (0–1)**

Coordination of music and drama. Singing, performing, and acting techniques on stage. Possible experience in conducting, coaching, directing, and stage management. Development of professional standards and attitudes. Preparation and presentation of scenes from various operas. Primarily for students in voice. (Rehearsal 2) Pre: audition and/or permission of instructor. May be repeated for credit.

**490 Independent Study (1–3)**

Preparation of a project under the guidance of a member of the appropriate faculty. (Independent Study) Pre: acceptance by faculty member who will be the project advisor and approval of chairperson. May be repeated for credit.

**\*510 Applied Music (2, 3, 4, or 6)**

Private instruction. One 60-minute lesson each week. Levels, master classes, and recital performance as prescribed in the applied music syllabi. (Studio 60 minutes) Pre: audition demonstrating proficiency appropriate to the selected M.M. degree. See 110 for areas of study (A–W), in addition to:

Y Choral Conducting

Z Instrumental Conducting

There is no fee for choral or instrumental conducting. May be repeated.

**540 Foundations of Music Education (3)**

Examination of the broad influences upon music education. Historical, philosophical, sociological, psychological, and curricular foundations. (Lec. 3) Pre: graduate standing in music. Offered every third semester. Next offered spring 2012.

**545 Musical Learning, Evaluation, and Assessment (3)**

A study of cognitive, psychomotor, and affective learning in music. The ways in which musical learning may be evaluated and assessed. The needs of special populations will be included. (Lec. 3) Pre: graduate standing in music. Offered every third semester. Next offered fall 2012.

**548 Research in Music (3)**

Study of research techniques as applied to the art of music. Major project procedures and data collection and examination in the following research categories: historical, philosophical, and empirical. (Lec. 3) Pre: graduate standing in music. Offered every third semester. Next offered spring 2012.

**550 Graduate Performance Recital (0–1)**

Performance of advanced repertoire of various styles in a public program at least 55 minutes in duration for the M.M. in performance and 45 minutes in duration for the M.M. in music education after faculty acceptance. (Studio) Pre: concurrent enrollment

in 510 and 6 or more credits in 510 for the M.M. in performance or 4 or more credits in 510 for the M.M. in music education.

### 552 Graduate Composition Recital (0–1)

A juried recital of at least 40 minutes of original compositions prepared by the composer. (Studio) Pre: concurrent enrollment in 510V and 3 or more credits in 510V.

### 567 Seminar in Performance and Pedagogy (2)

Study of performance literature, practice, and pedagogy. Research projects and supervised teaching experience appropriate to the major performance area. (Lec. 2) Pre: concurrent enrollment in 550. In alternate years. Next offered fall 2012.

### 570 Graduate Project (3)

Independent study resulting in a major essay, composition, or orchestration. (Independent Study) Pre: 548 and permission of chairperson.

### 571 Special Topics in Music (1–3)

Exploration of advanced topics not covered by the standard graduate curriculum but of interest to faculty and students in a particular semester. Possible topics include performance, music history, music theory, composition, and music education. (Lec. 1–3) May be repeated for credit with a different topic.

### 579 Experiential Learning in Music (2)

Developing competence through an individual and/or collaborative experiential activity involving music research, performance, service, and/or teaching in university and community settings. May include professional music studio or computer lab work. Student will work with his or her major professor or with the director of graduate studies. (Practicum) Pre: graduate standing and previous or concurrent enrollment in 580.

### 580 Master of Music Portfolio I (0)

Planning individual activities and experiences demonstrating competence in music at the graduate level. Should be taken in the first semester of matriculation. Student will work with his or her major professor or with the director of graduate studies. (3 common Seminars) Pre: graduate standing in music. Not required for students whose bachelor's degree is from URI. S/U only.

### 581 Master of Music Portfolio II (1)

Individual accomplishment of activities and experiences demonstrating competence at the graduate level of music. Achievement of professional behaviors indicating significant growth in areas of specialization. Oral presentation required. Should be taken in final semester of study. Student will work with his or her major professor or with the director of graduate studies. (3 common Seminars) Pre: graduate standing in music. S/U only.

### 583 Vocal Diction (3)

Phonetics (International Phonetic Alphabet). Enunciation in the foreign languages most encountered in vocal literature (French, Italian, and German). English diction in singing. (Lec. 3) In alternate years. Next offered spring 2013.

### 590 Piano Accompanying (1)

Development of sight-reading skills. Preparation and performance of accompaniments of major works. (Studio 1) Pre: permission of piano faculty. May be repeated for a maximum of 3 credits.

### 593 University Chorus (0–1)

(Rehearsal 3) Pre: audition at graduate level of performance. May be repeated.

### 594 Symphonic Wind Ensemble (0–1)

(Rehearsal 3) Pre: audition at graduate level of performance.

### 595 Concert Choir (0–1)

(Rehearsal 3) Pre: audition at graduate level of performance.

### 596 Jazz and Studio Ensemble (0–1)

Study and performance of jazz and studio music, with leadership roles in improvisation and performance. (Rehearsal 3) Pre: audition at graduate level of performance.

### 597 University Symphony (0–1)

(Rehearsal 3) Pre: audition at graduate level of performance. May be repeated.

### 598 Chamber Music Ensembles (0–1)

Chamber music ensembles are small performance ensembles normally restricted to one performer per part. Chamber music ensembles study and perform repertoire in the following areas, or combinations of areas: keyboard, string, woodwind, brass, percussion, vocal, guitar, jazz, etc. (Rehearsal 2) Pre: audition and/or permission of chamber music coach.

### 599 Master's Thesis Research

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) Pre: 548. May be repeated. S/U credit.

## Natural Resources Science (NRS)

*Chairperson:* Professor McWilliams

### 100 Natural Resource Conservation (3)

Introduction to humans' use and management of natural resources: land, food, forest, wildlife, water, minerals, and air, with a survey of contemporary resource-use problems in environmental pollution. (Lec. 3) (N)

### 101 Freshman Inquiry into Natural Resources Science (1)

Introduction for freshmen to the opportunities, careers, research activities, applied outreach, and

educational programs in the Department of Natural Resources Science. Interact weekly with faculty. Explore hands-on modules. (Lec. 1) S/U credit.

### 190 Issues in Biotechnology (3)

See Aquaculture and Fisheries Science 190. (N)

### 200 Seminar in Natural Resources (1)

Review and discussion of research, management, and other topics in natural resources. Speakers expose students to issues that natural resources professionals are concerned with and the work that they do. Pre: 100.

### 212 Introduction to Soil Science (3)

Physical, biological, and chemical properties of soils and their practical application to environmental science. Introduction to soil genesis, classification, and land-use and conservation issues. (Lec. 3/Online)

### 223 Conservation Biology (3)

Conservation of biological diversity in a world dominated by humans. Conservation biology theory, application; ecosystem conservation; landscape ecology principles. (Lec. 3) Pre: 100, BIO 101 or 102.

### 300 Introduction to Global Issues in Sustainable Development

See Community Planning 300.

### 301 Introduction to Forest Science (3)

Development and importance of forestry; forest regions; tree characteristics and identification with emphasis on Northeastern species; forest environment; tree growth and site productivity. (Lec. 2, Lab. 2) Pre: BIO 102.

### 302 Fundamentals of Forest Management (3)

Wood properties, timber harvesting, measurement and utilization of forest products; establishment, tending, and protection of forest stands; silvicultural systems; forest inventory procedures and management plans. (Lec. 2, Lab. 2) Pre: 301.

### 304 Field Ornithology (3)

Identification, field study techniques, habitats, and basic biology of birds. Emphasis on field identification of local species. (Lec. 2, Lab. 3) Pre: BIO 101 and permission of instructor.

### 305 Principles of Wildlife Ecology and Management (3)

Application of ecological knowledge to the management of wild vertebrate populations and the habitat upon which they depend. (Lec. 3) Pre: 223 and BIO 101 and 102, and 262.

### 309 Wildlife Management Techniques Laboratory (3)

Application of practical field techniques for quantification and evaluation of wildlife and habitats. Methods of field identification, sampling, and data analysis. (Lab. 4, Project 3) Service learning. Pre: 223 and 305.

**324 Biology of Mammals (3)**

Classification, distribution, field study techniques, and basic biology of mammals. Emphasis on New England species. (Lec. 2, Lab. 3) Pre: BIO 101 and permission of instructor. In alternate years. Next offered spring 2013.

**351 Soil Morphology Practicum (2)**

Seven weeks of practical experience in the description of soil profiles under field conditions. Field trips to observe, describe, and interpret morphological properties as utilized in soil judging. (Practicum) Pre: 212 or permission of instructor. May be repeated for credit with permission of chairperson.

**361 Watershed Hydrology and Management (4)**

Study of the processes that govern the hydrology and quality of surface runoff and groundwater. Emphasis on watershed management and the impact of land use on water quality. (Lec. 3, Lab. 2) Pre: 212 or HPR 109 and permission of instructor.

**395 Research Apprenticeship in Natural Resources Science (1–3)**

Supervised experience for qualified undergraduates who assist NRS faculty and graduate students in departmental research projects. Tasks may include literature review, research design, installation of sampling plots and equipment, laboratory analyses, data collection, and data analysis. (Practicum) Pre: sophomore to senior standing and permission of instructor. Limited to NRS majors. May be repeated for a maximum of 6 credits. S/U credit.

**397 Natural Resources Internship (1–6)**

Supervised work experience in forestry, wildlife management, soil science, water resources, environmental education, or related areas of natural resources management. (Practicum) Pre: 100, 212, and approval of chairperson. Open only to NRS majors. May be repeated for a maximum of 6 credits. S/U credit.

**401 Foundations of Restoration Ecology (4)**

Overview of factors involved with implementing an ecological restoration. Will synthesize the physical, biological and human factors that determine restoration success. Includes weekly field/lab sessions. (Lec. 3, Lab 3) Pre: 223 or BIO 262 or permission of instructor. Not for graduate credit.

**402 Wildlife Biometrics (3)**

Presentation of statistical design and analysis of ecological field measurements. Emphasis on quantitative measurements and data analyses used in wildlife population research. Capstone. (Lec. 2, Lab. 3) Pre: BIO 262, NRS 223, and STA 308 or 409 or permission of instructor. In alternate years. Next offered in spring 2012.

**403 Wildlife Biometrics Field Investigations (1)**

Independent field study of wildlife populations using modern quantitative measurements and data analyses. Emphasis on experimental design, data

collection and recording, statistical analysis, data interpretation, and reporting. (Practicum) Capstone. Pre: concurrent enrollment in 402. Not for graduate credit.

**406 Wetland Wildlife (3)**

Introduction to management of wetland wildlife. Emphasis on management techniques used for major wetland types, waterfowl, furbearers, and nongame wildlife. (Lec. 2, Lab. 3) Pre: BIO 262 and NRS 223 and permission of instructor.

**407 Nongame and Endangered Species Management (3)**

Management programs for nonhunted species, basic conservation biology, and techniques used for management of endangered species. (Lec. 3) Pre: past or concurrent enrollment in 305.

**409 Concepts in GIS and Remote Sensing (3)**

Discussion of the unique properties of geospatial data, geospatial data structures, accessing existing spatial data, and applications of GIS and remote sensing in the environmental sciences. (Lec. 3) Pre: BIO 262 or permission of instructor. Not for graduate credit.

**410 Fundamentals of GIS (3)**

Emphasis on using a geographic information system (GIS) to create a geographically referenced spatial database, spatial topology, data visualization, computer-assisted map making, and spatial data query and analysis. (Lab. 6) Pre: past or concurrent enrollment in 409 or 509.

**411 Population and Environmental Change (3)**

Overview and analysis of the major scientific and policy issues concerning human population growth and environmental change. (Lec. 3) Recommended for upper level undergraduates. Not for graduate credit.

**412 Soil-Water Chemistry (3)**

Biogeochemistry of soil-water interactions. Soil composition, the exchange and sorption of elements, trace element behavior, redox reactions, and control of these factors on availability and loss. (Lec. 3) Pre: 212 and CHM 124 and 126 or permission of instructor. In alternate years. Next offered fall 2011.

**414 Climate Change Science and Policy (3)**

Overview and analysis of the science and policy issues concerning climate change and global warming. (Lec. 3) Pre: GEO 305 or permission of instructor. Not for graduate credit.

**415 Remote Sensing of the Environment (3)**

Introduction to fundamentals of airborne and spaceborne remote sensing. Emphasis on remote sensing applications in terrestrial environmental and natural resources studies. (Lec. 2, Lab. 2)

**423 Wetland Ecology (4)**

Formation, development, and distinguishing features of inland and coastal wetlands. Topics include clas-

sification, geology, hydrology, soils, plant ecology, vegetation dynamics. Primary emphasis on wetlands of the glaciated Northeast. Capstone. (Lec. 2, Lab. 4) Pre: BIO 262, GEO 103, NRS 233, concurrent enrollment in NRS 425 or 525 and permission of instructor.

**424 Wetlands and Land Use (4)**

Survey of wetland values, exploitation, current status, and legal protection. Emphasis on critical issues including wetland evaluation, impact assessment, mitigation procedures. Field trips provide examples of wetland use conflicts. Capstone. (Lec. 2, Lab. 4) Pre: 423 or permission of instructor.

**425 Wetland Field Investigations (1)**

Independent field study of a diverse freshwater wetland ecosystem, with emphasis on aerial photo-interpretation, wetland classification, and in-depth examination of glacial geology, hydrology, plant ecology, and soils. (Practicum) Capstone. Pre: concurrent enrollment in 423. Not for graduate credit.

**426 Soil Microbiology (3)**

Occurrence, metabolism, and ecology of soil microorganisms, with emphasis on nutrient cycling, soil pathogens, transformation of organic and inorganic pollutants, and soil biotechnology. (Lec. 3) Pre: 212 or permission of instructor.

**440 Ecosystem Processes in Land and Water Management (3)**

Processes affecting the flows of energy, water, mass, and nutrients in terrestrial and aquatic ecosystems, with emphasis on linkages between ecosystems and management implications. (Lec. 3) Pre: 212 and BIO 262 and CHM 101 or 103 or permission of instructor.

**445 Invasive Species Research, Management and Policy (4)**

Overview of the major invasive alien species issues in the research, management and policy arenas. Includes weekly field/lab sessions. (Lec. 3, Lab 3) Pre: BIO 262 or NRS 223, or permission of instructor. Not for graduate credit.

**450 Soil Conservation and Land Use (3)**

Application of soil survey interpretation as a tool in soil and water conservation and land use planning. Implications of soil properties and problems for land use considered with emphasis on urbanizing situations. Capstone. (Lec. 3) Pre: 212 or permission of instructor.

**452 Soil, Water, and Land Use Investigations (1)**

Independent field and laboratory study of soil and water topics related to land use issues. (Practicum) Capstone. Pre: concurrent enrollment in 450.

**471 Soil Morphology and Mapping (3)**

A detailed study of the morphological properties of soils and their distribution on the landscape. Practical experience in describing soil profiles and preparing

soil maps. (Lec. 1, Lab. 4) Pre: 212 or permission of instructor.

#### 480 Colloquium (2)

Student-directed projects for reflection on educational accomplishments, exploration of post-graduate opportunities, and formulation of long-term professional goals. Requires completion of four major projects. (Seminar) Pre: junior standing. Not for graduate credit.

#### 482 Innovative Subsurface Remediation Technologies

See Geosciences 482.

#### 484 Environmental Hydrogeology

See Geosciences 484.

#### 487 International Development Internship

See Community Planning 487.

#### 491, 492 Special Projects (1–3 each)

Special work to meet the needs of individual students in natural resources. (Independent Study) Pre: permission of chairperson.

#### 495 Advanced Natural Resources Apprenticeship (3)

Collaboration with faculty and graduate students in departmental research, including supervision and mentoring of students enrolled in 395. Emphasis on independent decision making and leadership of undergraduate research teams. Limited to majors. May be repeated for a maximum of 6 credits. (Practicum) Pre: 395 and permission of instructor. S/U only. Not for graduate credit.

#### 496 International Development Seminar

See Community Planning 495.

#### 497 Natural Resources Cooperative Internship (6–12)

Supervised work experience with a governmental agency, nongovernmental organization, or private company in the environmental field. (Practicum) Capstone. Pre: senior standing and permission of department. Not for graduate credit.

#### 498 Teaching Practicum in Natural Resources Science (1–3)

Teaching experience for qualified undergraduates through actual involvement in planning and assisting in NRS courses. May include supervised participation in a discussion group, assisting in a laboratory or field course, or tutoring. (Practicum) Pre: senior standing, previous enrollment in the course to be taught, and permission of instructor. Limited to NRS majors. May be repeated for a maximum of 3 credits. Not for graduate credit. S/U only.

#### 499 Senior Thesis in Natural Resources Science (6)

In-depth research or outreach effort reviewed by a faculty committee and culminating in a thesis written in scientific journal format. Oral presentation to the committee required. Capstone. (Independent

Study) Pre: GPA of at least 3.25, successful completion of 491 or 492, and permission of department chairperson. Not for graduate credit.

#### 501 Foundations of Restoration Ecology (4)

Overview of factors involved with implementing an ecological restoration. Will synthesize the physical, biological and human factors that determine restoration success. Includes weekly field/lab sessions. (Lec. 3, Lab 3) Pre: 223 or BIO 262, or permission of instructor.

#### 503 Wildlife Biometrics Field Investigations (1)

Independent field study of wildlife populations using modern quantitative measurements and data analyses. Emphasis on experimental design, data collection and recording, statistical analysis, data interpretation, and reporting. (Practicum) Pre: concurrent enrollment in 402.

#### 505 Biology and Management of Migratory Birds (2)

Current programs, problems, and techniques for managing migratory game and nongame birds. Emphasis on basic biology of the species, habitat management, and harvest management. (Seminar) Pre: 305 or permission of instructor. In alternate years. Next offered spring 2013.

#### 508 Seminar in Biological Literature

See Biological Sciences 508.

#### 509 Concepts of GIS and Remote Sensing in Environmental Science (3)

Unique properties of geospatial data, accessing existing GIS and remote sensing data, and applications of GIS and remote sensing in the environmental sciences. Uses in ecology, conservation, soil science, geohydrology, and conservation biology. (Lec. 3) Pre: BIO 262 or permission of instructor.

#### 510 Soil-Water Relations (3)

Processes governing water flow and availability in unsaturated and saturated soil. Emphasis on soil-water-plant relationships with applications to watershed management and hydrology. (Lec. 2, Lab. 3) Pre: 212, 361, or permission of instructor.

#### 511 Population and Environment Change (3)

Overview and analysis of the major scientific and policy issues concerning human population growth and environmental change. (Lec. 3).

#### 514 Climate Change Science and Policy (3)

Overview and analysis of the science and policy issues concerning climate change and global warming. (Lec. 3) Pre: for graduate students, none; for undergraduates, GEO 305 or permission of instructor.

#### 516 Remote Sensing in Natural Resources Mapping (3)

Digital remote sensing in environmental and natural resource studies. Emphasis on satellite remote sensing image rectification, georeferencing, classification,

and integration with GIS. (Lec. 2, Lab. 2) Pre: 415 or permission of instructor.

#### 520 (or EEC 524) Quantitative Techniques in Natural Resource Research (3)

Research design, database management, and analysis and interpretation of natural resource data. Emphasis on hands-on experience of quantitative and computerized techniques commonly used by natural resource scientists. (Lec. 2, Lab. 2) Pre: STA 308 and permission of instructor.

#### 522 Advanced GIS Analysis of Environmental Data (3)

Discussion and application of terrain modeling, spatial statistics, proximity analysis, remote sensing/GIS linkages, and environmental data integration. Emphasis on ecological data at watershed/landscape scales. (Lec. 1, Lab. 6) Capstone. Pre: 410 or permission of instructor.

#### 524 Application of Advanced Spatial Analysis (1)

Independent application of spatial data analysis to derive solutions to environmental problems, with emphasis on GIS data integration, vector and raster modeling, and visualization of analytical and quantitative results. (Practicum) Pre: concurrent enrollment in 522. Capstone.

#### 525 Wetland Field Investigations (1)

Independent field study of a diverse freshwater wetland ecosystem, with emphasis on aerial photo-interpretation, wetland classification, and in-depth examination of glacial geology, hydrology, plant ecology, and soils. (Practicum) Pre: concurrent enrollment in 423.

#### 526 Microbial Ecology of Soils and Sediments (3)

Occurrence and activity of microorganisms in soils and sediments, including wetlands. Environmental physiology of microbes; habitat interactions; methods of study; importance of microbial processes to ecosystem productivity, pollutant degradation, and atmospheric chemistry. (Lec. 3) Pre: 212, MIC 211, or permission of instructor.

#### 527 Marine Protected Areas: An Interdisciplinary Analysis

See Marine Affairs 527.

#### 532 (or EEC 542) Conservation Biology and Resource Economics (2)

Examination of different components of conservation of biological diversity. Topics include minimum viable populations, ecology and economics of reserve design, reintroductions, causes of extinction, and the ecosystem conservation strategies. (Seminar) Pre: BIO 262, EEC 105 or permission of instructor. In alternate years. Next offered spring 2012.

#### 533 Landscape Pattern and Change (3)

Remote sensing perspective of landscape characterization; landscape dynamics; spatiotemporal land-use and land-cover change; modeling and analysis

of landscape by integration of remote sensing, GIS, GPS, and in situ data. (Lec. 2, Lab. 2) Pre: 415 or permission of instructor.

### 534 Ecology of Fragmented Landscapes (2)

Presentation of the concepts of landscape ecology with emphasis on populations of plants and animals in fragmented habitats. Topics discussed include habitat corridors, fluxes of energy and species along habitat edges, shape analysis, and stability of populations in habitat patches. (Lec. 2) Pre: BIO 262 or permission of instructor. In alternate years. Next offered spring 2013.

### 538 Physiological Ecology of Wild Terrestrial Vertebrates (3)

Relationships between animal physiology and the ecology and dynamics of wild vertebrate populations, including birds, mammals, reptiles, and amphibians. (Lec. 3) Pre: 305 or permission of instructor.

### 545 Invasive Species Research, Management and Policy (4)

Overview of the major invasive alien species issues in the research, management and policy arenas. Includes weekly field/lab sessions. (Lec. 3, Lab 3) Pre: BIO 262 or NRS 223, or permission of instructor.

### 551 Seminar in Marine Ecology (1)

See Biological Sciences 551.

### 555 Applied Coastal Ecology (2)

Resource management problems in coastal national parks. Topics include air and water pollution, barrier island erosion, deer overpopulation, Lyme disease, and ecosystem restoration. Examples of conflicting land-management mandates and research needs discussed. Optional field trips. (Lec. 2) Pre: advanced course work or experience in topical fields or permission of instructor. Offered in fall of even-numbered years.

### 563 Biology and Ecology of Fishes

See Biological Sciences 563.

### 567 Soil Genesis and Classification (3)

Development of soils as influenced by physical, chemical, biological, and climatic factors. Processes of soil formation presented relative to soil taxonomy and geographic distribution. (Lec. 3) Pre: 471 or permission of instructor. Next offered spring 2013.

### 568 Recent Advances in Natural Resources Science (3)

Critical analysis and presentation of technical reports on recent advances in natural resources science. Topics will vary according to instructor and background of students. (Lec. 3) Pre: graduate standing or permission of instructor.

### 583 Innovative Subsurface Remediation Technologies

See Geosciences 582.

### 584 Environmental Hydrogeology

See Geosciences 584.

### 591, 592 Special Problems (1–3 each)

Advanced independent research projects supervised by members of the research staff and unrelated to Master's or Doctoral research. Projects developed to meet individual needs (Independent Study) Pre: permission of chairperson.

### 600 Graduate Seminar in Natural Resources (1)

Presentation of proposed, ongoing, or completed research by NRS graduate students. Discussion among graduate students, faculty, and staff, with emphasis on research design, methods, and interpretation of results. (Seminar) Pre: graduate standing in NRS. All graduate students must enroll at least twice; full-time students are expected to enroll each spring. S/U credit.

## New England Studies (NES)

*Coordinator:* Professor Oronato (Art and Art History)

### 400 Special Topics in New England Studies (1–3)

Specialized topics in the study of New England offered by specialists in the field. (Seminar) May be repeated for credit with different topics.

## Nonviolence and Peace Studies (NVP)

*Coordinator:* Professor Collyer (Psychology)

### 200 Nonviolence and Peace Studies Colloquium (1)

A series of speakers introduce a range of issues in nonviolence and peace studies. (Lec. 1)

### 425 Peace Psychology

See Psychology 425.

### 500 (or PSY 500) Theory and Research on Nonviolence and Peace (3)

Surveys selected issues in the interdisciplinary field of Nonviolence and Peace Studies. It focuses on human problem solving in potentially violent situations, and the creation of conditions for peace. (Online)

## Nursing (NUR)

*Dean:* Professor Joseph

### 103 Professional Practice in Health and Illness (3)

Introduction to the concept of professional helping including problem management, communication, the teaching process, and critical decision making. Analysis of ecosystem influences and cultural variability in health, illness, and health care. (Lec. 3/Online) Pre: NUR code or WNUR code or permission of instructor.

### 114 Responsible Health Care (3)

See Pharmacy Practice 114. (S) [D]

### 143 Sustainable Solutions for Global Health Problems

See Pharmacy Practice 143. (N) or (S) [D]

### 150 Human Sexuality (3)

Interdisciplinary approach to the study of individual and societal determinants in the development, integration, and expression of human sexuality and a code of sexual behavior. (Lec. 3/Online) (S) [D]

### 160 Exploring Global Health (3)

Introduction to major global health problems including their distribution, web of causation, and effective strategies for addressing these problems at individual, community, societal, and global levels. (Lec. 3) Intended for freshmen. (S) [D]

### 203 Comprehensive Health Assessment (3)

Introduces the techniques of history taking and systematic health assessment of individuals across the life span. Recognition of normal findings is emphasized. (Lec. 2, Lab. 3) Pre: BIO 242 and 244 and NUR 103 and CHM 124 or MIC 201 and any WRT course (104, 105, 106, or higher if the student tests out) and PSY 113.

### 213 Pathophysiology (3)

Examination of basic concepts of pathophysiology and the related levels of prevention, etiology, pathogenesis, and clinical manifestations underlying alterations according to biological processes across the life span. (Lec. 3) Pre: MIC 201, NUR 203.

### 233 Foundations of Nursing Practice with Older Adults (3)

Foundational concepts of professional nursing practice emphasizing levels of prevention and nursing care focusing on the older adult in wellness and illness. (Lec. 3) Pre: 203, NFS 207, PSY 232, MIC 201 and credit or concurrent enrollment in NUR 213.

### 234 Practicum in Foundations of Nursing with Older Adults (3)

Practicum emphasizing foundational concepts of basic nursing and levels of prevention focusing on the older adult client in wellness and illness. (Lab. 9) Pre: previous or concurrent enrollment in 233.

### 246 Conceptual Bases of Professional Nursing (3)

Overview and synthesis of concepts essential to development of the professional nursing role. Primary emphasis on expanding and refining the theoretical bases for decision making and nursing strategies in client care. (Lec. 3) For R.N. students only.

### 253 Nursing Research (3)

Introduction to principles of scientific inquiry and analytical thinking common to problem solving in nursing. Research process and implications to knowledge development, utilization, and evidence-based practice are explored. (Lec. 3) Pre: 203 and STA 220 or PSY 300 or permission of instructor.

**323 Medical-Surgical Nursing (6)**

Concepts of medical-surgical nursing with emphasis on nursing strategies and utilizing levels of prevention in management of adults with acute and chronic illness, including the impact of illness on their families. (Lec. 6) Pre: 213, 233, 234 and 253; credit or concurrent enrollment in 324.

**324 Medical-Surgical Nursing Practicum (3)**

Application of clinical practice strategies in the management of adults with acute and chronic illness and the impact on their families. (Lab. 9) Service learning. Pre: credit or concurrent enrollment in 323.

**333 Psychiatric Mental Health Nursing (3)**

Nursing strategies to support and care for persons with limitations in psychosocial functioning in the context of family and community; psychiatric and/or mental health. (Lec. 3) Pre: BPS 333, NUR 323 and 324; credit or concurrent enrollment in 334, 343 and 344.

**334 Practicum in Psychiatric Mental Health Nursing (3)**

Application of the nursing process and the use of self as the therapeutic agent with individuals and groups of clients. Emphasis on developing nursing strategies for psychiatric and/or mental health care. (Lab. 9) Service learning. Pre: credit or concurrent enrollment in 333.

**343 Nursing in Childbearing and Reproductive Health (3)**

Emphasis on the nursing management of childbearing families and reproductive health issues across the life span. (Lec. 3) Pre: BPS 333 and credit or concurrent enrollment in NUR 333, 334, and 344.

**344 Practicum in Childbearing and Reproductive Health Nursing (3)**

Application of the nursing process in the care of individuals and families with childbearing and reproductive experiences. (Lab. 9) Service learning. Pre: credit or concurrent enrollment in 343.

**346 Practicum in Nursing Management of Clients (3)**

Practicum in development of leadership and management strategies for registered nurses in selected clinical settings. Emphasis on role development and analysis of issues related to client care and nursing practice. (Practicum) Service learning. Pre: 246 and 253.

**360 (or THN 360) Impact of Death on Behavior (3)**

Seminar to explore the human experience of dying and the issue of quality of life. Group discussion focuses on the effect that individual and social values and medical and social structures have on one's grief response and bereavement process. (Lec. 3) (L) [D]

**390 (or THN 390) Directed Study (1–3)**

Research study or individual scholarly project relating to the nursing major. Faculty guidance in problem delineation and in development, implementation, and evaluation of the project. (Independent Study) Pre: admission to the College of Nursing and prior faculty approval. S/U credit.

**433 Nursing of Children (3)**

Examines theories and strategies that promote or restore health and prevent or manage illness in infants, children, and adolescents; includes family-centered concepts and supportive management during end-of-life care. (Lec. 3) Pre: 333, 334, 343, 344; credit or concurrent enrollment in 434.

**434 Practicum in Nursing of Children (3)**

Synthesis of pediatric knowledge and the application of the nursing process in the care of children and their families. (Lab. 9) Pre: credit or concurrent enrollment in 433. Service learning.

**443 Community Health Nursing (3)**

Analysis of concepts related to public health and nursing care of clients in the home and the community with emphasis on vulnerable and high-risk populations. (Lec. 3) Pre: credit or concurrent enrollment in 433 and 434 (246 and 253 for R.N. students).

**444 Practicum in Community Health Nursing (3)**

Application of the nursing process in the home and community with emphasis on vulnerable and high-risk populations. In-depth analysis of a selected population, including utilization of epidemiological and public health principles. (Lab. 9) Pre: credit or concurrent enrollment in 433, 434, and 443 (246 and 253 for R.N. students). Service learning.

**446 Directed Study for Registered Nurse Students (1–4)**

Clinical advanced study or individual scholarly project related to the nursing major. Faculty guidance in problem delineation and in development, implementation, and evaluation of the project. (Independent Study) Pre: 246 and 253. Not for graduate credit.

**459 Perspectives on Male and Female Sexuality (3)**

Examination of the multifaceted perspectives (somatic, emotional, ethical, cultural) on male and female sexuality. Topics include history and recent developments in sexology research, therapy, role and gender issues. (Lec. 3) Pre: 150 or permission of instructor.

**463 Advanced Medical-Surgical Nursing (3)**

Study of nursing care problems and nursing management of adults with acute and chronic complex illnesses, including the impact on their families. (Lec. 3) Pre: 433, 434, 443, 444; credit or concurrent enrollment in 464.

**464 Practicum in Advanced Medical-Surgical Nursing (3)**

Application of the nursing process to adults across the life span with acute and chronic complex illnesses including the impact on their families in selected clinical situations. (Lab. 9) Pre: credit or concurrent enrollment in 463.

**467 Independent Study in Human Sexuality (2–6)**

A specifically designed learning experience for the theoretical study of human sexuality and related practice strategies. (Independent Study) Pre: 150 or equivalent; permission of instructor.

**468 Practicum in Theories of Human Sexuality (2–6)**

A specifically designed practicum involving the application of theory and development of practice strategies in specific areas within the field of human sexuality. (Practicum) Pre: 150 and 467 or equivalent; permission of instructor.

**474 Leadership in Contemporary Nursing Practice (3)**

Examination of theories, issues, and concepts related to contemporary nursing practice. Emphasis on the application of principles of leadership and professionalism in a clinical experience. (Lec. 1, Lab. 6) Pre: credit or concurrent enrollment in 464.

**500 General Study of Nursing Knowledge for Nursing Practice (4)**

Introduction to the essential features of nursing knowledge and its development in relation to nursing practice. Study of approaches to nursing knowledge development, and major conceptual/theoretical knowledge in nursing. (Lec. 3, Lab. 2) Pre: graduate standing.

**503 Advanced Adult Physical Assessment (4)**

Expansion of basic nursing health assessment skills, including: comprehensive health history, physical examination and psychological and social assessment. Pre: admission to the graduate nursing program and permission of the instructor; other students may be admitted with permission of instructor.

**504 Advanced Pediatric Physical Assessment (1)**

Application of advanced physical and health assessment skills to children. Includes assessment of growth and development, psychosocial, cognitive and physical well being of children of all age groups. Pre: admission to the family nurse practitioner program, previous or concurrent enrollment in 503, and permission of instructor.

**505 Nursing Research (3)**

An overview and analysis of current research in nursing with special focus on patient care. Students will design a research project. (Seminar) Pre: a course in statistics, credit or concurrent enrollment in 500, or permission of instructor.

**506 (or THN 506) Independent Study (1–6)**

Intensive study of a specific area of interest, a problem or issue in nursing under guidance of the faculty. (Independent Study) Pre: permission of graduate faculty or coordinator of thanatology.

**507 Theories of Practice for Nursing (3)**

Analysis of general theories of practice for nursing and their applicability to various areas of clinical practice. (Seminar) Pre: 500 or permission of instructor.

**508 Physical Assessment of Older Adults (1)**

Applying a developmental framework, expands and refines history taking and physical exam techniques learned in 503 and utilizes additional assessment tools to conduct a comprehensive evaluation of older adult clients. (Lec. 1) Pre: concurrent or prior completion of 503 and permission of instructor.

**509 Advanced Assessment for Acute Care NP Practice (2)**

Expands and refines history taking, physical assessment and documentation techniques for comprehensive evaluations of acutely and critically ill adults. Pre: Admission to the Nurse Practitioner program, 503 and permission of the instructor.

**510 Nursing Leadership in the Health Policy Process (3)**

Study of nurses' participation in the health policy process. Focus on theories for the development of nursing leaders. Analysis and application of creative nursing strategies for the enhancement of health care. (Seminar) Pre: enrollment in the M.S. program in nursing.

**511 Advanced Mental Health Nursing I (3)**

Investigation of theories of healthy and psychopathological patterns of individual behavior from a mental health perspective. (Seminar) Pre: 500 and credit or concurrent enrollment in 512.

**512 Practicum in Advanced Mental Health Nursing I (3)**

Field experience to develop competence in the practice of advanced mental health nursing. Emphasis on application of relevant theories in solving individuals' mental health problems. (Practicum) Pre: 500 and concurrent enrollment in 511.

**515 Practicum in Advanced Psychiatric Mental Health Nursing (3)**

Field experience to further develop clinical competence in the practice of mental health nursing. Emphasis is placed on the utilization of intervention strategies based on knowledge of psychiatric illness. (Practicum) Pre: 511, 512.

**516 Advanced Mental Health Nursing II (3)**

Theoretical analysis of current modes of advanced mental health intervention in order to explain strategies for solution of family, group, and community

problems. (Seminar) Pre: 511, 512, and concurrent enrollment in 514.

**517 Practicum in Advanced Psychiatric Mental Health Nursing III (3)**

Field experience to develop clinical competence in the practice of advanced mental health nursing in providing client care, consultation, education, and research. (Practicum) Pre: 515.

**519 Psychopharmacotherapeutics for Advanced Practice Nursing (3)**

Integration of psychopharmacotherapeutics and decision making with human pathophysiology utilizing case management approach to prescription of medications. Discussion of legal, ethical, and professional issues related to advanced practice role. (Seminar) Pre: graduate standing in nursing or permission of instructor.

**520 Graduate Study Seminar (1)**

A seminar designed to facilitate the synthesis and examination of information learned in the master's program about nursing knowledge development, advancement of nursing practice, and leadership role development. (Seminar) Pre: completion of 30 graduate program credits and concurrent enrollment in the final sequence of concentration courses. S/U credit.

**523 (or THN 523) Contemporary Thanatology (3)**

Interdisciplinary approach to trends, problems, theories, and strategies in thanatology. Explores effects of professional's personal beliefs and attitudes on care provided to dying clients across the life span and their families. (Seminar) Pre: baccalaureate degree or senior standing with permission of instructor.

**524 (or THN 524) Exploring Loss Through Creative Arts Therapy (3)**

Exploration and assessment of the merits of incorporating creative arts processes (imagery, story, metaphor, music, and movement) with individuals who are experiencing loss, grief, and dying. (Seminar) Pre: baccalaureate degree or senior standing with permission of instructor.

**525 (or THN 525) Spirituality of Loss and Death for the Helping Professions (3)**

Examination of major belief systems and spirituality during loss, death, and grief. Emphasis on spiritual issues and ethnicity, culture, gender, and developmental stage. Role of professional dealing with spiritual concerns. (Seminar) Pre: baccalaureate degree or senior standing with permission of instructor.

**526 (or THN 526) Loss Across the Life Span (3)**

Content provides a basis both for personal development and professional growth. Personal experience, selected readings, and personal reflections will provide direction for examining the multidimensional aspects of loss. (Seminar) Pre: baccalaureate degree or senior standing with permission of instructor.

**527 Symptom Management in End-of-Life Care (3)**

Principles of nursing care at the end-of-life. Strategies for assessing and managing symptoms along with complementary therapies across age groups. (Lec. 3) Pre: senior standing in nursing or registered nurse (others by permission of instructor).

**529 (or THN 529) Special Topics in Nursing (1–3)**

Selected areas of study pertinent to loss, dying, and grief. Instruction may be offered in class seminar or clinical settings according to specific needs and purposes. May be repeated for credit with a change in topic. (Seminar) Pre: baccalaureate degree or senior standing with permission of instructor.

**531 Primary Health Care Nursing I (3)**

Theoretical knowledge and skills for the development of nursing strategies in analyzing, managing, and preventing health-related problems common to primary health care clients. (Seminar) Pre: 500, 503, and 504.

**532 Practicum in Primary Health Care Nursing I (3)**

Clinical application of theoretical knowledge and skills as presented in 531. Service learning. (Practicum) Pre: concurrent enrollment in 531.

**533 Primary Health Care Nursing II (3)**

Theoretical study for the development of increased nursing competency in primary care practice. Emphasis on health care strategies to assist individuals and families in coping with health-related problems. (Seminar) Pre: 531, 532, and concurrent enrollment in 534.

**534 Practicum in Primary Health Care Nursing II (6)**

Application of theoretical knowledge and skills for the development of nursing strategies for health promotion and management of health-related problems common to families. (Practicum) Pre: 531, 532, and concurrent enrollment in 533.

**535 (or PHT 535) Advanced Pathophysiology (3)**

An in-depth study of pathophysiological phenomena across the life span from the biological life processes perspective. Clinical decision making based on the synthesis of this knowledge and current research findings will be explored. (Lec. 3) Pre for nursing students: admission to graduate program in nursing or permission of instructor; PHT 500 and 1st year standing in the D.P.T. program for physical therapy students.

**538 Learning Theories and Strategies for Health Professionals (3)**

The study of selected learning theories and strategies and their application in health professions. Emphasis will be on expanding the scope of teaching as professionals. (Lec. 3) Pre: 500 or permission of instructor. In alternate years. Next offered spring 2013.

**539 Application of Learning Theories in Professional Practice (3)**

Field project in the application of learning theories and strategies in professional practice. Emphasis on gaining knowledge of the application of strategies and outcome evaluation in practice and educational settings. (Practicum) Pre: credit or concurrent enrollment in 538 or permission of instructor. In alternate years. Next offered spring 2013.

**541 Advanced Study of Teaching in Nursing Education and Practice (3)**

Advanced study of educational theories and strategies having application in nursing education and practice. Emphasis will be on role development, instructional design, methods, and evaluation. (Lec. 3) Pre: 507, 539, or permission of instructor. In alternate years. Next offered 2011–12.

**542 Practicum in Nursing Education and Practice (6)**

A field experience designed to develop competence in teaching. Emphasis is placed on the instructional design component and the utilization of strategies based on theoretical knowledge. (Practicum) Pre: permission of instructor or credit or concurrent enrollment in 541. In alternate years. Next offered 2011–12.

**549 Evidence-Based Strategies in Health Care Program Evaluation (3)**

Analysis and application of evidenced-based methods, translation of research into practice, and evaluation of practice to improve health care outcomes. (Lec. 3)

**550 Theoretical Study of the Clinical Nurse Leader Role (3)**

In-depth study of concepts of leadership central to hospital-based, unit level practice of the CNL: advanced organizational communication, horizontal leadership, lateral integration of care, role analysis and implementation. (Seminar) Pre: 505, 507, 510 or permission of instructor.

**551 Theoretical Study of Nursing Administration/Leadership (3)**

Study of concepts, theories and strategies underpinning planning, decision-making and quality improvement activities in health care administration/leadership. Emphasis on theories, concepts, and issues that explain and advance strategies in nursing administration. (Seminar) Pre: 505, 507, two restricted electives, or permission of instructor. In alternate years. Next offered 2011–12.

**552 Practicum in Nursing Administration (6)**

Field experience in nursing administration. Emphasis on role development and the examination, development, and implementation of strategies in nursing administration. (Practicum) Pre: credit or concurrent enrollment in 551. In alternate years. Next offered 2011–12.

**555 Advanced Gerontological Nursing I (3)**

Study of the theories of aging, age-related changes, and health needs of healthy older adults and those with minimal functional limitations using problem-strategy-theory approaches to nursing knowledge. (Seminar) Pre: 500 or permission of instructor. In alternate years. Next offered 2011–12.

**556 Practicum in Advanced Gerontological Nursing I (3)**

Study of major problems and issues in advanced gerontological nursing through provision of nursing care to healthy older adults and those with minimal functional limitations. (Practicum) Pre: credit or concurrent enrollment in 555. In alternate years. Next offered 2011–12.

**557 Advanced Gerontological Nursing II (3)**

Analysis of theoretical and empirical knowledge necessary for care of frail older adults and those with complex health problems and functional limitations within acute and long-term care settings. (Seminar) Pre: 505, 507, 556. In alternate years. Next offered 2012–13.

**558 Practicum in Advanced Gerontological Nursing II (6)**

Development, evaluation, and revision of theory-based strategies for selected nursing problems through provision of nursing care to older adults with multiple chronic and acute illnesses and functional limitations. (Practicum) Pre: previous or concurrent enrollment in 557. In alternate years. Next offered 2012–13.

**561 Gerontological Nurse Practitioner I (3)**

Theories of aging, age-related changes, and health problems of older adults focusing on assessment, diagnosis, therapeutic and preventive strategies with healthy older adults and those with minimal functional limitations. (Lec. 3) Pre: 500, 508, and permission of instructor.

**562 Gerontological Nurse Practitioner I Practicum (3)**

Application of theoretical knowledge and skills for development of gerontological nurse practitioner strategies emphasizing health promotion and illness management of healthy older adults, those with minimal functional limitations, and families. (Practicum). Pre: credit or concurrent enrollment in 561 or permission of instructor.

**563 Gerontological Nurse Practitioner II (3)**

Theoretical knowledge and skills for development of strategies for care of older adults with complex health problems and functional limitations, at the individual, family, group, organization, and community level. (Lec. 3) Pre: 562.

**564 Gerontological Nurse Practitioner II Practicum (6)**

Development of gerontological nurse practitioner competency in care of older adults with complex

health problems and functional limitations focusing on strategies at the individual, family, group, organization, and community level. (Practicum) Pre: previous or concurrent enrollment in 563.

**565 Acute Care Nurse Practitioner I: Adult (3)**

Didactic knowledge and clinical decision-making skills necessary to manage health conditions common to the acutely or critically ill adult in emergency departments, acute and critical care units. Pre: admission to the acute care area of emphasis within the nurse practitioner program; 509 and permission of instructor. Must be taken concurrently with 566.

**566 Acute Care Nurse Practitioner Practicum I: Adult (3)**

Application of clinical decision-making skills necessary to the management of adults who are acutely or critically ill in hospital emergency, acute, and critical care units. Pre: 509 and permission of instructor. Must be taken concurrently with 565.

**567 Acute Care Nurse Practitioner II: Adult (3)**

This course builds on the principles learned in ACNP I. The focus is on the management of chronic illness exacerbations in adults who require care in a sub-acute, acute or critical care setting, using principles of family-centered care. Pre: 566 and permission of instructor. Must be taken concurrently with 568.

**568 Acute Care Nurse Practitioner Practicum II: Adult (6)**

Individually precepted clinical experiences with the focus on developing management skills in the care of adults with exacerbations of chronic illnesses who are hospitalized in acute care facilities. Pre: 566 and permission of instructor. Must be taken concurrently with 567.

**571 Theoretical Study of Well Women's Health Care (3)**

A study of major theories, client issues, and nurse-midwifery strategies used in the care of well women seeking gynecological health care. (Seminar) Pre: 500.

**572 Practicum: Theoretical Study of Well Women's Health Care (3)**

Clinical application of the theoretical knowledge and interventions in the care of well women in ambulatory health care settings. (Practicum) Pre: credit or concurrent enrollment in 571.

**573 Theoretical Study of the Childbearing Woman and Her Family (3)**

Within a systems perspective, theories are utilized to examine client issues related to the normal childbirth experience. Knowledge and skills relevant to nurse-midwifery strategies of normal childbirth are emphasized. (Seminar) Pre: credit or concurrent enrollment in 571, 572; concurrent enrollment in 574.

**574 Practicum: Theoretical Study of the Child-bearing Woman and Her Family (3)**

Theoretical application of nurse-midwifery strategies during the normal childbirth experience. Knowledge and skills relevant to patient care are emphasized. (Practicum) Pre: concurrent enrollment in 573.

**575 Advanced Practice: Collaborative Nurse-Midwifery (3)**

Within a systems perspective, theories are utilized to examine client issues of the at-risk childbirth experience. Expanded nurse-midwifery strategies related to collaborative practice within the community are emphasized. (Seminar) Pre: concurrent enrollment in 576.

**576 Advanced Practice: Collaborative Nurse-Midwifery Practicum (6)**

Field study of the clinical application of theoretical knowledge and skills in the at-risk childbirth experience. Use of collaborative practice and the management process within communities is emphasized. (Practicum) Pre: concurrent enrollment in 575.

**577 Practice and Integration of Nurse-Midwifery (5)**

Comprehensive and practical application of clinical skills and theoretical knowledge in nurse-midwifery. Complete integration of the nurse-midwifery role with the client, family, and community. (Practicum) Pre: 575 and 576.

**582 Pharmacotherapeutics in Advanced Practice Nursing (3)**

Integration of pharmacotherapeutic and decision-making theories with human pathophysiology. Case management approach to the prescription of medications in primary health care across the life span. (Lec. 3) Pre: matriculation into master's program in nursing or permission of instructor.

**584 Psychopharmacotherapeutics for Child/Adolescent APRNs (3)**

Integration of psychopharmacotherapeutics and decision-making theories with human pathophysiology utilizing case management approach to prescription of medications. Discussion of ethical, legal, professional issues related to APRN role. (Lec. 3) Pre: graduate standing or permission of instructor.

**585 Advanced Child/Adolescent Psychiatric Mental Health Nursing I (3)**

Theoretical knowledge and skills for assessing, preventing, and diagnosing common clinical problems emergent in the practice of child and adolescent advanced psychiatric mental health nursing. (Lec. 3) Pre: 500 and 584; 586 must be taken concurrently.

**586 Practicum in Advanced Child/Adolescent Psychiatric Mental Health Nursing I (3)**

Clinical practicum to develop competence in the assessment and diagnosis of children and adolescents with psychiatric mental health problems. (Lab. 9) 585 must be taken concurrently.

**587 Advanced Child/Adolescent Psychiatric Mental Health Nursing II (3)**

Analysis and evaluation of theories and concepts that serve as the basis for psychiatric mental health nursing strategies for children and adolescents who present with complex psychiatric mental health problems. (Lec. 3) Pre: 586; 588 must be taken concurrently.

**588 Practicum in Advanced Child/Adolescent Psychiatric Mental Health Nursing II (6)**

A clinical practicum to develop competence in the treatment of children and adolescents with complex psychiatric mental health problems. (Lab. 9) 587 must be taken concurrently.

**590 Directed Study/Practice in Advanced Clinical Nursing (1–6)**

In-depth and supervised clinical practice in a specialized area of nursing. (Independent Study) Service learning. May be repeated with different topic. Pre: graduate standing and permission of graduate faculty.

**601 Foundations of Nursing Science (3)**

Analysis of the nature of nursing knowledge from the historical and epistemological perspectives. Focus on examination of theoretical, ethical, and methodological foundations of the development of nursing science and nursing practice. (Seminar) Pre: enrollment in Ph.D. or D.N.P. program in nursing.

**602 Construction of Nursing Theory I: Inductive Process (4)**

Study of inductive approaches to generating theory relevant to nursing science. Examination of multidisciplinary strategies for generation of theory from field data. (Seminar) Pre: enrollment in the Ph.D. program in nursing, 601, or permission of instructor.

**603 Construction of Nursing Theory II: Deductive Process (3)**

Study of deductive theory-building as applied to nursing science. Focus on the nature of deductive theories and the application of deductive process to nursing theory construction. (Seminar) Pre: enrollment in the Ph.D. program in nursing, 601, or permission of instructor.

**621 Nursing Theory and Research in the Client Domain (3)**

In-depth, comparative analysis of existing nursing theories and research relevant to the client domain. Development of a research proposal for validation of a selected nursing theory. (Seminar) Pre: doctoral standing in nursing and completion of core courses in nursing.

**631 Nursing Theory and Research in the Client-Nurse Domain (3)**

Study of theoretical and research work in the client-nurse domain. Formulation and testing of hypoth-

eses dealing with client-nurse phenomena. (Seminar) Pre: doctoral standing in nursing and completion of core courses in nursing.

**641 Nursing Theory and Research in the Practice Domain (3)**

In-depth analysis of theoretical and research work in the nursing domain of practice. The expansion and refinement of knowledge for nurse-system phenomena of the practice domain. (Seminar) Pre: doctoral standing in nursing and completion of core courses in nursing.

**651 Advanced Methods in Nursing Research I (3)**

In-depth study of approaches used in qualitative research including philosophical underpinnings and research design, and their potential application to knowledge development in nursing practice. (Seminar) Pre: enrollment in Ph.D. or D.N.P. program in nursing, advanced statistics course, or permission of instructor.

**652 Advanced Methods in Nursing Research II (3)**

In-depth study of application of theories and methods in sampling, research design, data collection, and data analysis for quantitative and evaluative research in nursing. (Seminar) Pre: enrollment in Ph.D. or D.N.P. program in nursing, 651, or permission of instructor.

**653 Measurement and Instrument Development in Nursing Research (3)**

In-depth study of theories and methods relevant to measurement and instrument development for nursing and health sciences. Emphasis on measurement as an ongoing process of successive approximation, refinement, and validation. (Seminar) Pre: completion of 652 or permission of instructor.

**660 Philosophical Foundations for Health Care Research (3)**

Presentation of the historical and philosophical basis of contemporary health care research. (Seminar) Pre: enrollment in Ph.D. or D.N.P. program in nursing, or permission of instructor.

**671 Role Development in Nursing Research (3)**

In-depth examination of the role of the nurse researcher as a member of a multidisciplinary team and in academia. Emphasis on theories and issues related to researcher role development. (Seminar) Pre: doctoral standing in nursing, 601, 602 or 603, and 660.

**680 Informatics in Health Care Settings (3)**

Theory and application of nursing science, computer science and information science for decision making, practice management and communication in health care settings. (Lec. 3) Pre: D.N.P. enrollment or permission of instructor.

**686 Doctor of Nursing Practice Role Development (1–6)**

Implement the role of the doctorally prepared advanced practice nurse in selected clinical settings. Practicum experiences will be related to research, informatics, leadership, evidence-based practice, and health care policy. Pre: enrollment in D.N.P. program and concurrent enrollment in NUR 549, 651, 652, 680, 688 or HDF 527, or permission of instructor. May be repeated with a different focus for a maximum of 6 credits.

**688 D.N.P. Capstone Practicum and Project (7)**

A synthesis of prior practicums in the student's area of interest, applying theoretical knowledge and research findings at the individual, professional, organizational, and societal levels culminating in a final written and defendable capstone project. Pre: MBA 540, HDF 527, and 5 credits of NUR 686; concurrent enrollment in NUR 686.

**699 Doctoral Dissertation Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**995 Reading and Research in Nursing (1–6)**

Advanced work by individual student on a selected issue in nursing under the direction of a faculty member. (Independent Study) Pre: graduate standing. S/U credit.

**Nutrition and Food Sciences (NFS)**

*Chairperson:* Professor Greene

**110 Introduction to Nutrition and Dietetics (1)**

Description of the educational and experiential requirements of a registered dietitian and a nutritionist. Career opportunities discussed. Designed for students entering the nutrition and dietetics major. (Lec. 1)

**207 General Nutrition (3)**

Fundamental concepts of the science of nutrition with application to the individual, community, and world. Proficiency test available. (Lec. 3) Not open to students with credit in 210 (N)

**210 Applied General Nutrition (4)**

Fundamental concepts of the science of nutrition with application to the individual, community, and world. Weekly laboratory experience collecting and interpreting dietary intake, anthropometric measures, and clinical values. (Lec. 3, Lab 2) Not open to students with credit in 207. (N)

**227 Scientific Principles of Food I (3 or 4)**

Chemical, physical, sensory, and nutritional properties of food related to processes used in food preparation. Emphasis on water, carbohydrates, lipids, and the sensory evaluation of food. (Lec. 2 or 3, Lab. 2

or 3) Pre: 207 or 210, CHM 124. (Final offering for 3 credits 2011–2012)

**236 Computer Applications in Nutrition and Food Science (1)**

Basic computer operation and the use and comparison of microcomputer software programs in food science and nutrition. (Lab. 2) Pre: 207. Final offering fall 2011.

**276 Food, Nutrition, and People (3)**

Practical applications of nutrition policy. Current issues in the socioeconomic, cultural, and psychological influences on food and nutrition behavior. (Lec. 3) Pre: 207 or 210.

**337 Scientific Principles of Food II (3 or 4)**

Chemical, physical, sensory, and nutritional properties of food related to processes used in food preparation. Emphasis on proteins, scientific principles of baked goods, and research applications. (Lec. 3, Lab. 3) Pre: 227. (Final offering for 3 credits 2011–12)

**360 Nutrition in Exercise and Sport (3)**

Relationships among diet, physical activity, health, and performance. Metabolism and requirements of nutrients in physically active individuals. Applications to energy balance, body composition, various population groups, fitness levels, and conditions. (Lec. 3) Pre: 207 or 210, KIN 275 and/or BIO 242.

**375 Food-Service Management I (3)**

Administrative responsibilities in planning, organizing, staffing, leading, and evaluating food-service systems. Emphasis on menu planning, purchasing, and food cost control. (Lec. 3) Pre: 207 or 210 and 276 or permission of instructor.

**376 Food-Service Management II (4)**

Administrative responsibilities in planning, organizing, staffing, leading, and evaluating food-service systems. Emphasis on food production and labor cost control. Experience in a food-service facility. (Lec. 3, Lab. 2) Pre: 375.

**394 Nutrition in the Life Cycle I (3)**

Current issues in maternal, child, and adolescent nutrition with emphasis on nutrient requirements and food habit development; delivery of cost-effective nutrition services and the application of the principles of menu planning. (Lec. 3) Pre: 276. Service learning.

**395 Nutrition in the Life Cycle II (3)**

Current issues in nutrition for the adult and older adult with emphasis on nutrient requirements related to physiological changes; screening initiatives; program development to reduce risk of nutrition-related diseases. (Lec.3) Pre: 276, 394. Service learning.

**410 Professional Issues in Nutrition and Dietetics (1)**

Professional issues in the field of nutrition and dietetics. Topics include career choices; evaluation of

journal articles; and registration, licensing, and certification. (Lec. 1) Pre: 395 and senior standing. Not for graduate credit.

**431 Chemistry of Food and Nutraceuticals (3)**

Chemical and functional properties of major food components, changes in nutritional properties during processing and storage, and nutraceuticals and functional foods. (Lec. 3) Pre: CHM 124 and 227 or permission of instructor.

**434 (or AFS 434) Aquatic Food Quality and Processing (4)**

Physicochemical and nutritional characteristics of aquatic fish and shellfish; quality assessment and control; principles and applications in handling and processing fish from harvesting to production; and discussion of current issues. (Lec. 3, Lab. 3)

**440 Macronutrient Metabolism (3)**

Chemistry and metabolism of carbohydrate, protein, and fat. Advanced study of the impact of macronutrients on human metabolism, health, and disease. Pre: 207 or 210, BIO 242, BCH 211 or 311, or permission of instructor.

**441 Micronutrient Nutrition (3)**

Utilization and requirements for micronutrients in human nutrition. Micronutrients covered will include vitamins, minerals, phytochemicals, and herbal supplements. (Lec. 3) Pre: 207 or 210, BIO 242, BCH 211, or permission of instructor.

**443 Nutrition Assessment (3 or 4)**

Evaluation of nutritional status by dietary assessment, anthropometric measures, and nutrition-related health indicators. Practice in body composition assessment, interpreting dietary and laboratory data, and nutrition counseling. (Lec. 3, Lab. 2) Pre: 207 or 210, 395 or permission of instructor. (Final offering for 3 credits 2011–12)

**444 Nutrition and Disease (3)**

Effects of disease on metabolism and nutritional requirements; implications for dietary change, and factors affecting acceptance of such change. (Lec. 3) Pre: 441, 443 or enrollment in Pharm.D. program.

**451 Field Experience in Nutrition and Food Science (1–3)**

Individual supervised field experience and seminar in community, educational, government, health-oriented, and commercial activities and services related to food science and nutrition. (Practicum) Pre: 394, 395 or permission of instructor. May be repeated for a maximum of 6 credits. Not for graduate credit in food science and nutrition.

**458 Nutrition Education (3)**

Principles and practices of teaching individuals and groups to translate nutrition knowledge into action. Emphasis on research in and evaluation of nutrition education. (Lec. 3) Pre: 395, 440, or permission of instructor.

**491 Special Projects (1–3)**

Advanced work under supervision of a staff member. Arranged to suit individual requirements of student. (Independent Study) Pre: senior standing and permission of instructor. May be repeated for up to 6 credits. Not for graduate credit.

**495 Applied Nutrition Practicum (3)**

Supervised experience in the Applied Nutrition laboratory. Mentor students enrolled in 210 to gain experience and practice basic nutrition assessment skills including dietary analysis, anthropometric measures, and clinical laboratory values. (Practicum) Not for graduate credit.

**504 (or AVS 504) Food Systems, Sustainability, and Health (3)**

Scientific analysis of animal and human health and nutrition in various food systems. Interdisciplinary discussion on food systems and sustainability. (Lec. 3) Pre: graduate student in good standing or permission of instructor.

**505 Methods in Nutrition Research (3)**

Theory and laboratory experience in research methodology related to nutrition. Critical review of articles, completion of laboratory projects, and preparation of a research proposal. (Lec. 2, Lab. 2) Pre: 444 and STA 308 or permission of instructor.

**506 Nutrition in the Community (3)**

Exploration of the role of the nutrition professional in community needs assessment, intervention development and evaluation, and in forming domestic nutrition policy. (Lec. 3) Pre: graduate standing or permission of instructor.

**507 Applied Nutrition I (1)**

Selected topics in applied nutrition with an emphasis on medical nutrition therapy. (Lec. 1) Pre: 444 or permission of instructor.

**508 Applied Nutrition II (1)**

Selected topics in applied nutrition with an emphasis on community nutrition and food service management. (Lec. 1) Pre: 506 or permission of instructor.

**511 Seminar in Nutrition and Food Science I (1)**

Reports and discussions of current topics in food science and nutrition, as well as oral reports of theses and dissertation research topics in progress. (Seminar) Pre: graduate standing or permission of chairperson.

**512 Seminar in Nutrition and Food Science II (1)**

Critical review of oral presentations given in 511. Provides student with experience in communicative skills necessary to evaluate and critique scientific presentations. Attendance is required of all graduate students in residence when not enrolled in 511. (Seminar) Pre: graduate standing. S/U credit.

**528 Lipoprotein Metabolism in Health and Disease (3)**

Chemistry and metabolism of sterols and lipoproteins in health and disease including heart disease and inborn errors of metabolism; dietary and drug treatments on cholesterol and lipoprotein metabolism. (Lec. 3) Pre: graduate standing in Nutrition and Food Science, or permission of instructor.

**551 Macronutrients in Human Nutrition (3)**

Digestion, absorption, and metabolic role of macronutrients and their interrelationships. Influence of environmental and physiological factors on nutrient use and energy balance. Critical review of the literature. (Lec. 3) Pre: 440, 441, BIO 242, and BCH 211 or BCH 311, or permission of instructor.

**552 Micronutrients in Human Nutrition (3)**

Absorption, metabolism, and role of micronutrients and their interrelationships. Critical review of the literature and implications for public policy. (Lec. 3) Pre: 440, 441, BIO 242, and BCH 211 or BCH 311, or permission of instructor.

**580 Experiential Learning in Nutrition and Food Sciences (1–6)**

Supervised learning in a nutrition-related setting. (Practicum 1–6) Pre: acceptance into the M.S. nutrition program.

**581 Internship in General Medical Nutrition Therapy (1–3)**

Supervised practice in medical nutrition therapy in a hospital setting. (Practicum) Pre: acceptance into the combined nutrition dietetic internship program.

**582 Internship in Advanced Medical Nutrition Therapy (1–3)**

Supervised advanced practice in medical nutrition therapy in a hospital setting. (Practicum) Pre: acceptance into the combined nutrition dietetic internship program.

**583 Internship in Food Service Management (1–3)**

Supervised practice in food service management in a hospital setting. (Practicum) Pre: acceptance into the combined nutrition dietetic internship program.

**584 Internship in Community Nutrition (1–3)**

Supervised practice in community nutrition in a variety of community settings. (Practicum) Pre: acceptance into the combined nutrition dietetic internship program.

**591 Research Problems (1–4)**

Advanced work under supervision of a staff member. Arranged to suit individual requirements of students. (Independent Study) Pre: permission of chairperson. May be repeated for up to 6 credits.

**599 Master's Thesis Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**691 Research in Nutrition and Food Sciences (1–3)**

Assigned research on an advanced level. Students are required to outline the problem, conduct the necessary literature survey and experimental work, and present their observations and conclusions in a report. (Independent Study) May be repeated for up to 6 credits.

**699 Doctoral Dissertation Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**Ocean Engineering (OCE)**

*Chairperson:* Associate Professor Baxter

**101 Introduction to Ocean Engineering (1)**

Overview of ocean engineering topics pointing out the common areas with other engineering branches but emphasizing specific ocean applications. (Seminar) S/U only.

**205 Ocean Engineering Design Tools (4)**

An introduction to design and analysis tools for ocean engineering including computer-aided design (CAD) in two- and three-dimensions, circuit layout and analysis, hydrodynamic modeling, mathematical computation, visualization, and algorithm development. (Lec. 4) Pre: EGR 106 and concurrent enrollment in OCE 215 or permission of instructor.

**206 Ocean Instrumentation (3)**

Introductory course in ocean instrumentation covering theory, design, and implementation of basic circuits through electronic subsystems used in robotic ocean instruments and autonomous underwater vehicles (AUVs). (Lec. 3) Pre: 205 and concurrent enrollment in 216 or permission of instructor.

**215 Ocean Engineering Design I (1)**

Introduction to the design of systems in ocean engineering featuring team-based, hands-on projects. Integrated approach includes socioeconomic, environmental, operational, and professional development aspects. (Lec. 1, Lab. 1) Pre: concurrent enrollment in 205.

**216 Ocean Engineering Design II (1)**

Continuation of 215 with increased project complexity and team independence. (Lec. 1, Lab. 1) Pre: 215 and concurrent enrollment in 206.

**301 Fundamentals of Ocean Mechanics (4)**

Mathematical methods for the analysis of ocean phenomena; Fourier analysis; partial differential equations for modeling water wave and underwater acoustics; vector calculus in wave mechanics; fundamental probability theory and applied statistics. (Lec. 3) Pre: MTH 244 and OCE 205 or permission of instructor.

**310 Basic Ocean Measurement (3)**

Basic ocean measurement and instrumentation exercises using boats and laboratories. Includes cruise design, navigation and mapping systems, sonar systems, water quality sensors, wave spectra, computer data acquisition, and signal processing. (Lec. 1, Lab. 2) Pre: 206 or permission of instructor.

**311 Coastal Measurements and Applications (4)**

Exercises in basic coastal measurement from vessels, in situ, and in the laboratory. Experiments in measuring currents, surface elevation, wave and wave forces, geotechnical properties and applications, and acoustic propagation. (Lec. 2, Lab. 4) Pre: 310 or permission of instructor.

**360 Robotic Ocean Instrumentation Design (3)**

Design of robotic ocean instrumentation systems featuring team-based, hands-on projects. Includes power, sensor, communication, propulsion, and control system design for remotely operated and autonomous ocean instruments and underwater vehicles. (Lec. 2, Lab. 3) Pre: 216 or permission of instructor.

**408 Introduction to Engineering Wave Mechanics and Littoral Processes (4)**

Sediment transport and beach dynamics. Coastal protection methods. Coastal engineering problem solving with Matlab. Linear wave theory and applications. (Lec. 4) Pre: MCE 354 and OCE 301, or permission of instructor of coastal area.

**416 Ocean Engineering Professional Practice (2)**

Introduction to professional practice in ocean engineering, including contemporary issues in the field, career planning and placement, lifelong learning strategies, professional licensure process, publication and presentation, and project management. (Lec. 2)

**421 Marine Structure Design (3)**

Review of wave mechanics; design breaker; probability and random variables; probabilistic wave elevation height models; short-term and long-term wave statistics; probability distribution models for extreme events; selection of design waves and water levels; wave run-up and overtopping; design of rubble mound structures; design of vertical breakwaters/seawalls; wave forces on vertical piles. (Lec. 3) Pre: 408 or permission of instructor.

**422 (or CVE 422) Offshore Structure Design (3)**

Introduction to offshore structures, structural modeling, structural dynamic analysis, structural design for storms, structural design against fatigue failure. (Lec. 3) Pre: 421. Not for graduate credit.

**425 Coastal Experiments (4)**

Basic coastal measurement techniques for coastal management. Experimental (field and laboratory) measurements of physical and geological parameters. Major student-designed, operated, and re-

ported experiment addressing a practical problem. (Lec. 2, Lab. 4) Not for credit in ocean engineering. Pre: MTH 107 or 108 or equivalent.

**471 Underwater Acoustics (4)**

Vibrations, the acoustic wave equation, duct acoustics, and sound pressure levels and spectra. Underwater acoustics including transducers, arrays, surface and bottom scattering, and ray propagation. (Lec. 4) Pre: 301. Not for graduate credit.

**472 Sonar Systems Design (3)**

Fundamentals of design of sonar systems. Effects of sound propagation in deep and shallow oceans, noise, scattering on system performance. Array, transducer, and signal design. Passive and active sonar applications. (Lec. 3) Pre: 471.

**483 Foundation Engineering**

See Civil and Environmental Engineering 483.

**491, 492 Special Problems I, II (1–6 each)**

Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of chairperson. Not for graduate credit.

**495 Ocean Systems Design Project I (3)**

Capstone design of an ocean system under the direction of a faculty advisor. Project must include engineering, economic, environmental, safety, and societal considerations. This is first of a two-course ocean engineering design sequence. Pre: senior standing and permission of instructor. Not for graduate credit.

**496 Ocean Systems Design Project II (3)**

Capstone design of an ocean system under the direction of a faculty advisor. Project must include engineering, economic, environmental, safety, and societal considerations. This is second of a two-course ocean engineering design sequence. Pre: permission of instructor. Not for graduate credit.

**500 Ocean Engineering Design Studies (1–6)**

Off-campus ocean engineering design studies. Must include significant hands-on (laboratory or field) experience, use of engineering design tools, and the design, development, test and evaluation of hardware/software systems. Pre: junior standing in Ocean Engineering and permission of department chair

**506 Numerical Models and Data Analysis in Ocean Sciences**

See Oceanography 506.

**510 Engineering Ocean Mechanics (3)**

Fundamental equations of estuarine and coastal hydrodynamics. Scaling of governing equations. Long period waves including seiches, tides, storm surges, and tsunamis. Wind- and estuarine-induced circulation. Pollutant and sediment transport. (Lec. 3) Pre: MCE 354 or equivalent.

**514 Engineering Wave Mechanics and Nearshore Processes (3)**

Linear water wave boundary value problem. Engineering wave properties. Nonlinear waves (long waves, Stokes waves, stream function waves). Nearshore hydrodynamics and wave breaking. Fully nonlinear transient waves. (Lec. 3) Pre: MCE 455 or equivalent.

**515 Marine and Vehicle Hydrodynamics (3)**

Hydrodynamics of fixed and floating ocean structures (vehicles). Viscous, inviscid, and ideal fluid flows; and linear water waves involving bodies in unbounded fluid, floating bodies (in still water and in waves); ship waves; lifting surfaces. (Lec. 3) Pre: MCE 354 or equivalent or OCE 510 or 514; 307, 514 or equivalent.

**522 Dynamics of Waves and Structures (3)**

Deterministic analysis for SADOFF structures; MDOF dynamic analysis; distributed-parameter systems; linear and second-order Stokes wave theories; wave forces on cylinders; chaotic vibration of marine structures. (Lec. 3) Pre: MCE 464 or permission of instructor.

**534 Corrosion and Corrosion Control**

See Chemical Engineering 534.

**550 (or ELE 550) Ocean Systems Engineering (3)**

Introduction to the design of systems for use in the ocean environment with emphasis on interaction of various subsystem disciplines to achieve total system performance characteristics. Introduction to detection, localization, classification, and time measurement strategies including global positioning system, underwater acoustics positioning and control, wireless acoustic and electromagnetic communication, and remote time transfer. Examples will include mobile, fixed, autonomous, distributed, and networked sensors. Pre: MTH 451 or equivalent.

**560 Introduction to Data Collection Systems (3)**

Practical problems of data collection. Probes and sensors, interfaces, signal conditioning, and storage. Examples found among the current research areas within ocean engineering will be emphasized. (Lec. 3) Pre: graduate standing in engineering or permission of instructor. In alternate years. Next offered fall 2011.

**561 Introduction to the Analysis of Oceanographic Data (3)**

Design of oceanic experiments to determine spatial and temporal sampling rate, precision, accuracy, signal-to-noise ratio, etc. Description of typical ocean data collection and analysis systems. Development of relevant techniques. (Lec. 3) Pre: ISE 411, MTH 451, or equivalent.

**565 Ocean Laboratory I (3)**

Measurements, experiments, operation of apparatus in the ocean and in the laboratory. Statistical theory,

planning multivariable experiments, checking of data, etc. (Lec. 1, Lab. 6) Pre: graduate standing in engineering or oceanography, or permission of instructor.

**571 (or ELE 571) Underwater Acoustics I (3)**  
Introduction to sound generation, transmission, and reception, including vibration of mechanical systems, acoustic waves in fluids, acoustic transducers and arrays, acoustic propagation in the ocean, and sonar systems. (Lec. 3)

**572 Underwater Acoustic Transducers (3)**  
Theory, design, and calibration of electroacoustical transducers, including dynamical analogies and equivalent circuits, piezoelectric and magnetostrictive materials, transmitting and receiving responses, reciprocity and acoustic measurements. (Lec. 3) Pre: 471 or equivalent.

**575 Marine Bioacoustics (3)**  
Introduction to marine mammal hearing, sound production, and the uses of sound for communication and echolocation; dolphin sonars; analysis and processing of marine mammal signals including passive tracking; the effects of noise on marine mammals. (Lec. 3) Pre: 471 or permission of instructor.

**581 Experimental Geomechanics**  
See Civil and Environmental Engineering 581.

**582 (or CVE 582) Seabed Geotechnics (3)**  
Geotechnical engineering principles as applied to submarine slope stability, bearing capacity, anchoring; emphasis on effective stress principle, compressibility, and shear strength of marine sediments. (Lec. 3) Pre: CVE 381 or equivalent or OCE 311, or permission of instructor.

**583 Deep Foundations**  
See Civil and Environmental Engineering 583.

**591, 592 Special Problems (1–6 each)**  
Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of chairperson.

**599 Master's Thesis Research (1–9)**  
Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**605, 606 Ocean Engineering Seminar (1 each)**  
Seminar discussions including presentation of papers based on research or literature survey. (Seminar) Required of all resident graduate students. May be repeated for a maximum of 2 nonprogram credits. S/U credit.

**661 Analysis of Oceanographic Data Systems (3)**  
Design of systems for deep-ocean and estuarine data collection and processing. Space-time sampling, multivariate analysis, and convergence of moments as applied to ocean data estimation and system de-

sign. Current topics in ocean data systems. (Lec. 3) Pre: 560 or ELE 506 or equivalent.

**672 (or ELE 672) Underwater Acoustics II (3)**  
Sound transmission in ocean, transducers, active signal design for range and Doppler resolution, ambient and platform noise, classical and wave vector-frequency methods of beamforming, adaptive beamforming, characteristics of targets, and active/passive sonar systems. (Lec. 3) Pre: 571.

**673 Advanced Course in Underwater Acoustic Propagation (3)**  
Analysis of propagation from a concentrated acoustic source in the ocean by methods such as advanced normal mode theory, numerical integration, and Fast Fourier Transforms. Applications to ocean features such as surface ducts, shadow zones, deep-sound channel, etc. (Lec. 3) Pre: 571 or equivalent.

**676 Acoustic Radiation from Underwater Vibrators (3)**  
Fundamentals of acoustic radiation from submerged structures. Radiation from planar, cylindrical, and spherical surfaces. In-vacuo and in-fluid vibration of elastic bodies. Acoustic coincidence and fluid-loading effects on radiation from elastic bodies. (Lec. 3) Pre: 571 or permission of instructor.

**677 Statistical Sonar Signal Processing**  
See Electrical Engineering 677.

**688 (or CVE 688) Marine Geomechanics (3)**  
Integrated study of marine geotechnics and marine geology. Topics include sedimentary processes, acoustic characteristics, slope stability, consolidation and stress history, engineering properties, and other subjects related to seabed utilization. (Lec. 3) Pre: CVE 381 or permission of instructor.

**691, 692 Special Problems (1–6 each)**  
Advanced work under supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study) Pre: permission of chairperson.

**699 Doctoral Dissertation Research**  
Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## Oceanography (OCG)

*Interim Dean:* Professor D'Hondt

**110 (or GEO 110) The Ocean Planet (3)**  
Introduces the origin and structure of the solar system; interaction of earth's solid interior, oceans' atmosphere and biosphere with emphasis on earth science; energy resources and present environment on earth. (Lec. 3) (N)

**123 Oceans, Atmospheres, and Global Change (4)**  
The impact of human activities on the oceans, atmospheric composition, and climate set against a

background of natural processes in and history of global changes in climate and ecosystems. (Lec. 3, Lab. 3) (N)

**131 Volcanoes and the Environment (3)**  
General introduction to volcanic eruptions and their impact on the global environment and on human activity. Basic principles of the generation of magmas and their eruption at the earth's surface. (Lec. 3) (N)

**200 Weather for Daily Living (4)**  
Introduction to the observations, theories and forecasts of weather phenomena that influence daily living. Learn the vocabulary and specifics of weather, put these facts together to understand key weather principles and then apply those principles to decision making. (Lec. 3, Lab 2) (N)

**301 (401) General Oceanography (3)**  
Oceanography for undergraduate marine biology majors. General survey of the major disciplines including geological, physical, chemical, and biological oceanography integrated into a study of the earth's ocean system. (Lec. 3) Pre: at least one year of biological or physical science with laboratory.

**420 Deep-Sea Biology (3)**  
Overview of the biology and ecology of the deep sea, including organisms and habitats, spatial and temporal patterns, physiology and adaptations, energetics, evolution, and hydrothermal vent ecology. (Lec. 3) Pre: one semester general biology (BIO 100, 101, 102, 103, 104, 130, 141) and one semester general chemistry (CHM 101, 103) required. One semester ecology or oceanography recommended (OCG 123, 401, 451, BIO 455).

**440 Geological Oceanography (4)**  
Origin and evolution of the ocean basin and its margin: morphology, structure, plate tectonics, volcanism, geochemistry, stratigraphy, sedimentation, and paleoceanography. (Lec. 3, Lab 2) Pre: GEO 103 or permission of instructor. Not for graduate credit.

**451 Oceanographic Science (3)**  
Oceanography for undergraduate science majors. The approach used is to present and apply basic physical, chemical, geological, and biological principles to the integrated study of the world ocean system. (Lec. 3) Pre: two semesters of MTH 131 and 132 or 141 and 142, one semester of CHM 101 and 102 or 191, one semester of PHY 111 and 185 or 203 and 273 or 213 and 285. A second semester of CHM 112 and 114 or 192 is recommended. Not for graduate credit in oceanography.

**480 Introduction to Marine Pollution (3)**  
An introductory course in marine pollution emphasizing geochemical aspects of the sources, transport, and fate of pollutants in the coastal marine environment. (Lec. 3) Pre: one semester of general chemistry (CHM 101 or 103). One semester of general geosciences (GEO 100 or 103) is recommended. Not for graduate credit.

**483, 484 Laboratory and Research Problems in Physics**

See Physics 483, 484.

**491 Ocean Studies (15)**

Full-time intensive work experience with Graduate School of Oceanography research at Narragansett Bay Campus. Student expected to participate in research program, seminars, and other activities of Bay Campus. (Independent Study) Pre: junior standing in natural sciences, natural resources, or engineering, and permission of supervising faculty member. Not for graduate credit in oceanography. S/U only.

**493, 494 Special Problems and Independent Study in Oceanography (1–6 each)**

Research in oceanography conducted as supervised individual study. (Independent Study) Pre: junior or senior standing in natural science, natural resources, or engineering, and permission of instructor. S/U only.

**501 Physical Oceanography (3)**

Basic course covering physical properties of seawater, heat budget, distribution of variables, dynamics, water masses and general circulation, waves and tides. (Lec. 3) Pre: PHY 203.

**505 Marine Analytical Chemistry (3)**

Application of analytical methods to marine problems with emphasis on understanding basic methods and instruments. Combines general principles with practical experience. Students conduct analytical projects in the laboratory. (Lec. 1, Lab. 2).

**506 (or OCE 506) Numerical Models and Data Analysis in Ocean Sciences (3)**

An introduction to numerical methods in all disciplines of oceanography and ocean engineering. Topics include model formulation, analysis, and simulation; data analysis and parameter estimation. Problem solving with Matlab and C in the weekly computer laboratory. (Lec. 2, Lab. 3)

**507 Oceanography for Educators (3)**

Survey of ocean science concepts. Investigation of marine issues that affect the environment. Ten hours in the field. Integration of national science education standards and inquiry-based pedagogy. (Lec. 3) Pre: CHM 100 and BIO 113 (or equivalent). A semester of general geology (GEO 100 or 103) and at least one college level math course are recommended.

**508 Global Environmental Change Education (3)**

Survey of global environmental change issues focusing on environmental systems, related ocean science topics, and local marine and coastal environments. Integration of national science education standards and inquiry-based pedagogy. (Lec. 3) Pre: CHM 100 and BIO 113 (or equivalent). A semester of general geology (GEO 100 or 103) is recommended.

**510 Descriptive Physical Oceanography (3)**

Observed distributions of temperature, salinity, currents; methods of deducing deep flow; physical properties of seawater; flow in estuaries; practical work in the analysis of oceanographic data; study of recent literature. (Lec. 3) Pre: 501.

**517 Foundations of Earth System Dynamics (3)**

Introduction to the fundamental principals underlying fluid dynamics as applied to the study of specific problems and processes in earth, marine, and environmental sciences. Basics of numerical modeling are covered. (Lec. 3) Pre: MTH 141 and 142, or equivalent.

**521 Chemical Oceanography (3)**

Processes regulating the composition of seawater and the distribution of chemical species. The interaction of marine chemistry with the ocean floor, atmosphere, and marine organisms. (Lec. 2, Lab. 2) Pre: CHM 101 and 112 and PHY 213.

**523 Organic Geochemistry of Natural Waters (3)**

Chemistry of organic matter in natural waters with emphasis on the marine environment. Topics include a consideration of the origin, nature, and biogeochemical reactions of organic matter in aquatic environments. (Lec. 3) Pre: CHM 228 or permission of instructor.

**524 Atmospheric Pollution and the Upper Ocean (3)**

Gas and aerosol chemistry and physics; land-air-sea transfer of N, S, C, halogen, and metal compounds; effects of air pollution on the marine atmosphere and upper ocean. (Lec. 3) Pre: BCH 435 or CHE 313 or CHM 431 or MCE 341 or PHY 420 or permission of instructor.

**525 (or GEO 525) Chemistry of the Earth (3)**

Analysis of the solid earth, ocean, and atmosphere as a geological/chemical/biological system. Fundamentals of geochemistry will be developed within the context of broad earth science questions: earth formation, differentiation, evolution, and human impacts. Pre: graduate or advanced undergraduate standing in a science major or permission of instructor.

**533 Graduate Writing in Marine and Environmental Sciences (3)**

Graduate writing in marine and environmental sciences; writing and editing journal articles and abstracts; principles and practice in scientific writing. Pre: graduate standing and WRT 104, 105, or 106, or permission of instructor.

**535 Climate, Radiation, Gases, and Aerosols (3)**

Role of short- and long-wave radiation in climate. Occurrence and consequences of natural and enhanced concentrations of radiatively-active gases. Role of aerosols and associated forcings and feedbacks. (Lec. 3) Pre: PHY 205 or 214, CHM 192 or permission of instructor.

**540 Geological Oceanography (4)**

Origin and evolution of the ocean basin and its margin: morphology, structure, plate tectonics, volcanism, geochemistry, stratigraphy, sedimentation, and paleoceanography. (Lec. 3, Lab. 2) Pre: GEO 103 or permission of instructor.

**545 Volcaniclastic Sedimentation (3)**

Generation of volcanic particles by explosive volcanism, the processes by which they are dispersed on land and in the sea, and physical characteristics of their deposits in different volcanic environments. (Lec. 3) Pre: 540 or permission of instructor.

**552 Marine Geophysics (3)**

Survey of basic subdisciplines of marine geophysics including plate tectonics, gravity, magnetics, heat flow, reflection and refraction seismology. Basic theory and methods of data collection and interpretation emphasized. (Lec. 3) Pre: 540 or permission of instructor.

**555 Modern Oceanographic Imaging and Mapping Techniques (3)**

Overview of current imaging and mapping techniques used in oceanography and ocean engineering including; photographic and laser imaging, side scan and multibeam sonar; underwater vehicle navigation and map making. Pre: undergraduates—OCE 471 or permission of instructor; graduate students—none.

**561 Biological Oceanography (4)**

Dynamics of marine ecosystems; patterns of production and distribution of plankton, benthos, and nekton in relationship to their environment. (Lec. 3, Lab. 2) Pre: general ecology.

**569 Oceanographic Processes (3)**

Broad survey of general oceanography. The approach is to present and apply basic geological, physical, chemical, and biological principles to the integrated study of the world ocean system. (Lec. 3) Pre: permission of instructor.

**576 (or MIC 576) Marine Microbial Ecology (4)**

Examines role of microbes in the oceans and their impact on oceanographic processes and biogeochemical cycles. Emphasis is on bacteria and their interactions with other marine organisms and the marine environment. Laboratory exercises make use of modern techniques to study metabolic rates and community structure. (Lec. 3, Lab. 3) Pre: permission of instructor.

**580 Introduction to Marine Pollution (3)**

An introductory course in marine pollution emphasizing geochemical aspects of the sources, transport and fate of pollutants in the coastal marine environment. Review papers or research proposals will be required. (Lec. 3) Pre: one semester of general chemistry (CHM 101 or 103). One semester of general geosciences (GEO 100 or 103) is recommended.

**591, 592 Individual Study (1–6)**

Individual study of assigned topics or special problems involving literature search and/or original investigation under one or more members of the faculty. (Independent Study)

**593, 594 Special Studies (1–4 each)**

Studies of specialized topics in the marine sciences. (Independent Study)

**599 Master's Thesis Research**

Number of credits is determined each semester in consultation with the major professor. (Independent Study) S/U credit.

**605 Dynamical Oceanography (3)**

Simple steady-state theories applied to ocean motion. Review of well-known force balances in oceanography, wind-driven circulation, thermohaline circulation, the thermocline, oceanic boundary layers, nearshore circulation, diffusion. (Lec. 3) Pre: 501.

**610 Geophysical Fluid Dynamics I (3)**

Natural world fluid dynamics emphasizing ocean circulation. Classical fluid dynamics; GFD fundamentals (rotation and stratification); Taylor-Proudman theorem; potential vorticity; planetary waves; geostrophic contours; shallow water quasi-geostrophic theory; frictional layers. (Lec. 3) Pre: 605 or permission of instructor.

**611 Geophysical Fluid Dynamics II (3)**

Continuously stratified quasi-geostrophic theory; classical and modern theories of the wind-driven ocean circulation; stability theory; oceanic convection; wave-mean flow interactions; ageostrophic dynamics; topographical effects. (Lec. 3) Pre: 610 or permission of instructor.

**613 Waves (3)**

Generation, propagation, and decay of surface waves, internal waves, and Rossby waves in the ocean. (Lec. 3) Pre: MCE 550 or permission of instructor.

**614 Tides (2)**

Generation, propagation, and dissipation of ocean tides. Earth tides. Relation between theory and observation. Tidal analysis. (Lec. 2) Pre: 501.

**620 Chemical Distributions (3)**

Interdisciplinary study of the processes responsible for oceanic chemical distributions with emphasis on conservative properties, biologically active constituents, and radionuclides. Includes projects involving data-processing analysis. (Lec. 3) Pre: 501, 521, 540, and 561 or permission of instructor.

**623 Physical Chemistry of Seawater (3)**

Characterization of dissociation, solubility, and redox equilibria in seawater. Partial molar volumes, conductivity, and diffusion of ions in seawater. Kinetic studies in seawater; effects of temperature, salinity,

and pressure on physicochemical properties in seawater. (Lec. 3) Pre: 521 and CHM 432 or permission of instructor.

**625 Organic Geochemistry of Sediments (3)**

Chemistry of organic matter in recent to ancient sediments. Topics include the source, characterization, significance, and fate of sedimentary organic compounds with emphasis on the marine environment. (Lec. 3) Pre: 523 or permission of instructor.

**628 High-Temperature Geochemistry (3)**

Principles and factors governing the distribution of trace elements in volcanic processes. Applications to the study of rock genesis, mantle dynamics, oceanic crust formation, and hotspots. (Lec. 3) Pre: CHM 431 or equivalent, or permission of instructor.

**631 Seminar in Marine and Atmospheric Chemistry (1)**

Discussion of problems of current interest in marine chemistry. (Seminar) Pre: 521 or permission of instructor. S/U credit.

**643 Subduction Zones (3)**

Structure, petrology, and geochemistry of subduction zones, island arcs, and other magmatic arcs at convergent plate margins. Petrogenesis of andesites and related magmas. (Lec. 3) Pre: 540 or permission of instructor.

**645 Petrology of the Oceanic Crust (3)**

Nature and origin of igneous and metamorphic rocks of the oceanic crust of the earth; mineralogy, petrology, and petrogenesis of seafloor rocks; metamorphism of the ocean crust. (Lec. 3) Pre: graduate standing or permission of instructor.

**648 Paleooceanography (3)**

Paleooceanography (3) Earth history and its relation to global climate. Tools, data, and concepts related to past climate change as observed in the oceanic, ice, and terrestrial records (Lec. 3). Pre: 540.

**651 Marine Stratigraphy (3)**

Concepts and methods of biostratigraphy, lithostratigraphy, and chronostratigraphy. Stratigraphic nomenclature. Stratigraphic correlation and completeness. Special focus will be placed on the integration of multiple stratigraphic techniques and their application to the Cretaceous and Cenozoic marine record. Class discussion of advances and problems in recent research articles. (Seminar) Pre: permission of instructor.

**664 (or BIO 664) Phytoplankton Ecology (3)**

Biology and ecology of the pelagic marine microscopic algae with emphasis on their adaptations, physiological ecology, distribution, succession, production, and regional and seasonal dynamics. (Lec. 3) Pre: permission of instructor.

**665 Marine Bio-Optics and Remote Sensing (3)**

Bio-optical properties of ocean waters. Major focus is on basic principles of visible-band ocean remote sensing and its application to determining phytoplankton pigment and production at regional to global scales. (Lec. 2, Lab. 2) Pre: 561. Offered in odd-numbered years.

**669 Marine Fish Ecology and Production (3)**

Functioning of fishes in major world ecosystems is explored through comparison of feeding ecology, bioenergetics, and production rates. (Lec. 3) Pre: 561 or permission of instructor.

**670 Fish Population Dynamics (3)**

Methods for estimating vital statistics of fish populations, stock assessment theory and methods, analytical and empirical model development, and fisheries forecasting. (Lec. 3) Pre: graduate standing or permission of instructor.

**673 Fisheries Oceanography (3)**

Physical and biological processes acting at the egg, larval, juvenile, and adult stages of commercially important fish and shellfish. Topics include: growth, survival, and recruitment dynamics; larval dispersal and fish distributions; changes in long-term abundance in relation to climate. (Lec. 3) Pre: graduate standing or permission of instructor. 501, 561 recommended.

**689 Coastal Marine Ecosystems (3)**

Basic principles of estuarine and coastal ecology. Offered spring semester only. Two 1-hour lecture-discussion sessions per week. (Lec. 3) Pre: undergraduate or graduate science major, basic ecology course.

**691, 692 Individual Study (1–6 each)**

Individual study of assigned topics or special problems involving literature search and/or original investigation under one or more members of the faculty. (Independent Study)

**693, 694 Special Studies (1–4 each)**

Studies of specialized topics in the marine sciences. (Independent Study)

**695 Seminar in Oceanography (1 each)**

Students give seminar reports on problems and current research in various areas of oceanography. (Seminar) Attendance and registration are required of all graduate students in residence, but no more than 2 credits are allowed for a program of study. S/U credit.

**699 Doctoral Dissertation Research**

Number of credits is determined each semester in consultation with the major professor or doctoral committee. (Independent Study) S/U credit.

**930 Workshop in Oceanography Topics for Teachers (0–3)**

Especially designed for teachers of physical sciences. Basic topics in oceanography from an advanced or pedagogical perspective. (Workshop) Pre: teacher certification.

*Note: Graduate students in oceanography may choose from supporting courses in other departments in consultation with their major advisor.*

**Pharmacy (PHC)**

*Associate Dean:* Professor Lausier

**327 Interactive Learning Session II (1)**

Small group active learning designed to reinforce progressively the basic science curriculum, promote communication and problem-solving skills, and enhance patient assessment and the delivery of pharmaceutical care. (Seminar) Pre: first-year Doctor of Pharmacy professional student or permission of instructor.

**417 Interactive Learning Session III (1)**

Small group active learning designed to reinforce progressively the basic science curriculum, promote communication and problem-solving skills, and enhance patient assessment and the delivery of pharmaceutical care. (Seminar) Pre: second-year Doctor of Pharmacy professional student or permission of instructor.

**427 Interactive Learning Session IV (1)**

Small group active learning designed to reinforce progressively the basic science curriculum, promote communication and problem-solving skills, and enhance patient assessment and the delivery of pharmaceutical care. (Seminar) Pre: second-year Doctor of Pharmacy professional student or permission of instructor.

**502 Drug Development (3)**

Scientific and regulatory aspects of drug development from discovery to market, exemplified by URI research. (Lec. 3) Pre: graduate standing in pharmacy. Open to CHE students in pharmaceutical track.

**517 Interactive Learning Session V (1)**

Small group active learning designed to reinforce progressively the basic science curriculum, promote problem-solving skills, and enhance patient assessment and the delivery of pharmaceutical care. (Seminar) Pre: third-year Doctor of Pharmacy professional student or permission of instructor.

**520 Pharmaceutical Sciences Journal Club (1)**

Critical reviews of current research reports in the field of pharmaceutical sciences. The students will be evaluated on the basis of their effectiveness in organization, interpretation, and oral presentation, according to criteria already established in the department. (Lec.) Pre: Graduate standing or in

good standing in the P1–P4 years of the Pharm.D. curriculum.

**527 Interactive Learning Session VI (1)**

Small group active learning designed to reinforce progressively the basic science curriculum, promote communication and problem-solving skills, and enhance patient assessment and the delivery of pharmaceutical care. (Seminar) Pre: third-year Doctor of Pharmacy professional student or permission of instructor.

**599 (BPS/PHP) Master's Thesis Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**693, 694 (BPS/PHP) Seminar I, II (1 each)**

Seminar discussions including presentation of papers on selected topics in pharmacy. (Seminar) Required of all graduate students, with a maximum of 1 credit allowed per year. May be repeated for a maximum of 2 credits for M.S. candidates. May be repeated for a maximum of 5 credits for Ph.D. candidates.

**699 (BPS/PHP) Doctoral Dissertation Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**Pharmacy Practice (PHP)**

*Chairperson:* Professor Barbour

**114 (or NUR 114) Responsible Health Care (3)**

This course will explore contemporary health care issues from various societal viewpoints through collaborative group work. Using a problem-based learning approach, student will pose solutions to an actual health-related issue. (Lec. 3) (S) [D]

**143 (or NUR 143 or PLS 143) Sustainable Solutions for Global Health Problems (3)**

Teams of students will study a global health problem and research, write, and present a sustainable solution that integrates human innovation with existing technology. (Lec. 3) (N) or (S) [D]

**305 Drug Information and the Analysis of Literature (3)**

Students will evaluate drug information questions using drug information sources and will explore study design and methodology of drug trials to interpret results in the care of patients. (Lec. 3) Pre: first-year Doctor of Pharmacy professional student in good standing or permission of instructor.

**310 (or BPS 310) Foundations of Human Disease: Renal and Cardiovascular Diseases (2)**

The etiology, pathogenesis, epidemiology, and symptomatology, and diagnosis of renal and cardiovascular diseases. (Lec. 2) Pre: first-year Doctor of Pharmacy professional student in good standing or permission of instructor.

**311 Foundations of Human Disease I: Immunoinflammatory Disease**

See Biomedical and Pharmaceutical Sciences 311.

**316 Pharmacy Law and Ethics (3)**

Basic principles of law and ethics as applied to federal, state, and local acts, regulation, and practices encountered in professional practice. Specific attention to liabilities of pharmacists in decisions; actions involving sale of medicinals, poisons, narcotics. (Lec. 2. Rec. 1) Pre: first-year Doctor of Pharmacy professional student or permission of instructor.

**317 Pharmacy Practice in Contemporary Health Care (2)**

Introduction to the role and responsibilities of pharmacists in contemporary health care. Provides the foundation necessary for early experiential learning in clinical practice settings. (Lec. 2) Pre: admission to the first professional year of the Doctor of Pharmacy program; or permission of the instructor.

**332 Pharmacotherapy of Renal and Cardiovascular Disorders (3)**

The appropriate use of medications in the treatment of human disease. Interpretation of clinical data to design, monitor, and modify drug therapy in renal and cardiovascular disease. (Lec. 3) Pre: Doctor of Pharmacy professional student in good standing or permission of instructor.

**340 IPPE I: A Health Care Service Learning Experience (1)**

Structured practical experiences in a healthcare setting or community outreach program. Develops social responsibility and professionalism while providing needed assistance to the community. (Practicum) Pre: successful completion of the 1st professional year, including PHP 317; a valid and updated HIPAA certificate and RI intern license. Service learning.

**360 Hospital Pharmacy (3)**

Introduction to practice of pharmacy in hospitals, including both professional and administrative activities. Field trips to representative hospital pharmacies. (Lec. 3) Pre: first year Doctor of Pharmacy professional student.

**401 Pharmacy Resources for Practice (3)**

Introduces pharmacy management skills to assist students in understanding the effective use of the human, technological, and fiscal resources to manage a positive work environment and maximize their patient interaction time. (Lec. 3) Pre: Doctor of Pharmacy professional student in good standing; or permission of the instructor.

**405 Epidemiology in Health Care (4)**

Basic principles of epidemiology as they apply to health care delivery, research and activities; emphasizing the practical application of epidemiological knowledge to literature evaluation. (Lec. 4) Pre: STA 307, PSY 300 or PHP 305. Not for graduate credit.

**409 Foundations of Human Disease III: Infectious and Pulmonary Processes**

See Biomedical and Pharmaceutical Sciences 409.

**410 (or BPS 410) Foundations for Human Disease V: GI, Endocrine (2)**

The etiology, pathogenesis, symptomatology, and diagnosis of endocrine and gastrointestinal diseases. (Lec. 2) Pre: P3 standing in the Doctor of Pharmacy program.

**411 Biostatistics II**

See Statistics 411.

**412 (or BPS 412) Foundations of Human Diseases: CNS (2)**

The etiology, pathogenesis, epidemiology, symptomatology, and diagnosis of diseases of the central nervous and musculoskeletal system. (Lec. 2) Doctor of Pharmacy student in good standing or permission of the instructor. Not for graduate credit.

**413 Pharmacotherapy of Infectious Diseases and Pulmonary Disorders (3)**

The appropriate use of medications in the treatment of human infectious and pulmonary disorders. Interpretation of patient data to design, monitor, and modify drug therapy in infectious and pulmonary diseases. (Lec. 3) Pre: second year Doctor of Pharmacy student in good standing; or permission of the instructor.

**414 Pharmacotherapy of Gastrointestinal and Endocrine Diseases (3)**

The appropriate use of medications in the treatment of human disease. Interpretation of clinical data to design, monitor, and modify drug therapy in endocrine and gastrointestinal disease. (Lec. 3) Pre: fourth-year standing or permission of instructor.

**418 (or BPS 418) Self-Care I (3)**

An overview of alternative therapies and over the counter medicines with an emphasis on self-care and natural medicine. Basic information as well as case studies (Lec. 3) Pre: P2 standing in the Doctor of Pharmacy Program or permission of the instructor.

**420 Biotechnology Products in Pharmacy**

See Biomedical and Pharmaceutical Sciences 420.

**424 (324) Pharmacotherapy of CNS and Musculoskeletal Disorders—Therapeutics I (2)**

The appropriate use of medications in the treatment of human disease. Interpretation of data to design, monitor, and modify drug therapy in psychiatric, neurologic, and musculoskeletal diseases. (Lec. 2) Pre: Doctor of Pharmacy student in good standing or permission of instructor. Not for graduate credit.

**430 Advanced Infectious Diseases and Pulmonary Pharmacotherapy (3)**

Advanced topics in infectious diseases and pulmonary pharmacotherapy through literature review, data interpretation, and case scenarios. Content

will be delivered through the perspective of clinical pharmacists. (Lec. 3) Pre: 413, Doctor of Pharmacy professional student or permission of instructor. Not for graduate credit.

**440 Advanced Pediatric Pharmacotherapy (3)**

Pharmacotherapeutic needs of infants, children, and adolescents with a focus on pharmacokinetic, pharmacodynamic, and other developmental-associated physiological changes. (Lec. 3) Pre: second year Doctor of Pharmacy professional student or permission of instructor.

**450, 451 Introductory Practice Experience I and II (0)**

Structured practical experience in institutional and community pharmacy settings. (Practicum) Pre: second year Doctor of Pharmacy professional student or permission of instructor. Not for graduate credit.

**460 Palliative Care (3)**

Principles of palliative care including control of pain and other symptoms, and psychological, social, and spiritual issues. (Lec.3) Pre: second or third year Doctor of Pharmacy professional student or permission of instructor. Not for graduate credit.

**497, 498 Special Problems (1–3 each)**

Methods of carrying out a specific research project. Literature search, planning, laboratory work, writing an acceptable report. (Independent Study) Pre: permission of chairperson.

**503 Health Systems I (2)**

Introduction to the U.S. public health system and the roles of pharmacists in promoting wellness and drug safety, and reducing health disparities as they relate to pharmacy practice. (Lec. 2) Pre: third year Doctor of Pharmacy professional student or permission of instructor.

**504 Health Systems II (3)**

Analysis and interpretation of the U.S. health care system, including care delivery, and economic, finance, payment and policy perspectives, with emphasis on the role of the pharmacist. (Lec. 3) Pre: third year Doctor of Pharmacy professional student or permission of instructor.

**505 Advanced Pharmacotherapy in Geriatrics (3)**

Broad issues in pharmacotherapy for older persons including age-related physiologic changes, pharmacokinetics and pharmacodynamics, assessment, and the importance of interdisciplinary teams in the management of complex drug therapy. (Lec. 3) Pre: Doctor of Pharmacy professional student in good standing or permission of the instructor.

**513 Pharmacotherapy of Oncology and Toxicology—Therapeutics IV (2)**

The appropriate use of medications in the treatment of human disease. Interpretation of clinical data to design, monitor, and modify drug therapy in cancer, blood disorders, and overdose conditions. (Lec. 2)

Pre: Doctor of Pharmacy student in good standing or permission of instructor.

**515 Pharmacy Practice Laboratory I**

See Biomedical and Pharmaceutical Sciences 515.

**516 Pharmacy Practice Laboratory II**

See Biomedical and Pharmaceutical Sciences 516.

**519 (or BPS 519) Self-Care II (3)**

Expansion of nonprescription and complementary medicine therapeutics. Explore the implementation of pharmaceutical care programs in community pharmacy practice. (Lec. 3) Pre: 418 (or BPS 418); third year Doctor of Pharmacy professional student.

**520 Advanced Gastrointestinal and Endocrine Pharmacotherapy (3)**

Provides students with an expanded knowledge base in the area of GI and endocrine pharmacotherapy, emphasizing active learning, literature evaluation, data interpretation. (Lec. 3) Pre: third year Doctor of Pharmacy professional student or permission of instructor. Not for graduate credit.

**526 (or BPS 526) Foundations of Human Disease VI: Hematology-Oncology (2)**

The etiology, pathogenesis, symptomatology, and diagnosis of hematology and oncology diseases in people. Introduction to pharmacogenomics, gene-drug interactions, and genetic therapy in human disease. (Lec. 2) Pre: third-year Doctor of Pharmacy professional student standing. Taken concurrently with BPS 521 and PHP 513. Not for graduate credit.

**540 Principles, Methods, and Applications of Epidemiology (3)**

An introduction to epidemiology, the study of health and disease in populations. Epidemiologic methods and research design for conducting and interpreting health research. (Lec. 3) Pre: STA 307 or permission of instructor.

**542 Evaluation of Controversies in Drug Literature (3)**

Through critical review of literature, controversies in drug therapy and drug-associated illness will be evaluated to improve students' knowledge and analytical skills. (Lec. 3) Pre: second or third year Doctor of Pharmacy professional student or permission of instructor.

**550 Pharmacoepidemiology (3)**

The application of epidemiologic principles to the study of drug effects in human populations. (Lec. 3) Pre: 540 or permission of instructor.

**555 Advanced Neuropsychiatric Pharmacotherapy (3)**

Comprehensive and advanced course on the pharmacotherapy of psychiatric and neurological diseases. Use of clinical case studies, evaluation of the primary literature, and other forms of interactive teaching will be emphasized. (Lec) Pre: 324, 312 or BPS 312, BPS 322 or permission of the instructor.

**560 Advanced Cardiovascular and Renal Pharmacotherapy (3)**

Advanced assessment and pharmacotherapeutic management of patients with cardiovascular and renal disease through the application of evidence-based medicine and critical evaluation of literature. (Lec. 3) Pre: third year Doctor of Pharmacy professional student or permission of instructor. Not for graduate credit.

**580 Pharmacoeconomic Analysis (3)**

Introduction to methodologic approaches utilized in economic evaluation of drug use and therapy in community and managed care settings, and clinical trials, including the FDA approval process and liability issues. (Lec. 3) Pre: STA 307 or equivalent, or permission of instructor. In alternate years.

**591 Advanced Pharmacy Practice Experience: Community (6)**

Students will develop and learn clinical skills to provide pharmaceutical care for patients in either the community or outpatient setting through direct patient contact, use of physical assessment findings, and the design and implementation of patient-specific pharmacotherapy. (Practicum) Pre: fourth year Doctor of Pharmacy professional student or permission of instructor and completion of all required courses.

**592 Advanced Pharmacy Practice Experience: Inpatient (6)**

Through collaboration with other health care professionals including the medical team, and application of evidence-based medicine, students will develop clinical skills to provide pharmaceutical care for patients in the inpatient setting. (Practicum) Pre: fourth-year professional standing in the Doctor of Pharmacy Program and completion of all required didactic courses in the program.

**593 Advanced Pharmacy Practice Experience: Elective (6)**

Experiential courses in a wide variety of settings in clinical, industry, and managed care sites. Students learn and practice the core concepts of pharmaceutical care through interaction with faculty, health care professionals, and patients. (Practicum) Pre: fourth-year professional standing in the Doctor of Pharmacy Program and completion of all required didactic courses in the program.

**594 Advanced Pharmacy Practice Experience: Institutional (6)**

An advanced practice experience designed to integrate institutional pharmacy practice with innovative patient-oriented and distributive services in a variety of sites such as hospital pharmacies and other institutions. (Practicum) Pre: fourth-year professional standing in the Doctor of Pharmacy Program and completion of all required didactic courses in the program.

**595 Advanced Pharmacy Practice Experience: Ambulatory (6)**

In collaboration with health care professionals, students will provide pharmaceutical care to individuals in ambulatory care sites using patient-specific information to modify, create, and monitor pharmacotherapy regimens. (Practicum) Pre: fourth-year professional standing in the Doctor of Pharmacy Program and completion of all required didactic courses in the program.

**640 Epidemiologic Methods for the Health Sciences (2)**

A focus on quantitative methods used in epidemiologic and health-related research. Students will learn to analyze and interpret data from large-scale observational studies and will be exposed to problematic situations in research design and data analysis. (Lec. 3) Pre: 540, STA 412, or permission of instructor.

**680 The Legal Environment in Health Administration (3)**

Application of specialized statutory and regulatory provisions in federal and state law to the delivery of health care. (Lec. 3) Pre: graduate standing.

**697, 698 Research (1–3 each)**

Literature survey, laboratory work, and a detailed research report on one or more assigned topics in pharmacy. (Independent Study)

**900 Physical Assessment (0)**

Provides students with an introduction to core patient assessment skills. Further develops students' patient interviewing and documentation skills. (Workshop) Pre: Doctor of Pharmacy professional student. S/U only.

**Philosophy (PHL)**

*Chairperson:* Professor Foster

**101 Critical Thinking (3)**

Identification, formulation, and evaluation of both inductive and deductive patterns of reasoning. Consideration of topics such as probability, reasoning about causes, fallacies, foundations of argument, and the issues in logical theory. (Lec. 3) (EC) or (L)

**103 Introduction to Philosophy (3)**

Pursues such basic questions as: What is a person? What is knowledge? Are we free? What is moral right and wrong? Does God exist? What is the meaning of death? (Lec. 3) Not open to students with 9 or more credits in philosophy. (L)

**204 Theories of Human Nature (3)**

An introduction to philosophical inquiry by critical examination of some major traditional and contemporary views of human nature as expressed in a variety of religious, literary, scientific, and philosophical writings. (Lec. 3) (L)

**205 Philosophical Topics (3)**

An intensive study of one or more problems, issues, or topics of classical or current interest in philosophy. Emphasis on the analysis and construction of arguments relevant to the topic(s). Small class format. (Lec. 3)

**210 Women and Moral Rights (3)**

An introduction to the philosophical problems raised by reproduction, affirmative action, pornography, gender roles, and sexism in language through a critical examination of these issues. (Lec. 3) (L) [D]

**212 Ethics (3)**

Evaluation of major ethical theories. Application of moral reasoning to topics such as virtues and vices, human dignity, conscience, responsibility, moral dilemmas, and reasons to be moral. (Lec. 3) (L) [D]

**215 Science and Inquiry (3)**

The objective is to survey both the influence of philosophy on science and the influence of science on philosophy, all from a Western historical perspective. (Lec. 3) (L)

**217 Social Philosophy (3)**

A systematic introduction to the philosophical problems of contemporary social relations: models of community, sources of alienation, property and ownership, the meaning of work and technology, human rights and freedom. (Lec. 3) (L) [D]

**235 Modern Thought: Philosophy and Literature (3)**

Introduction to recent thought in philosophy and literature. Emphasis on Kierkegaard, Marx, Nietzsche, Freud, Sartre, and complementary literary texts. (Lec. 3) (L)

**314 Ethical Problems in Society and Medicine (3)**

Ethical analysis of topics such as war, capital punishment, sexual morality, suicide, animal rights, honesty and deception, world hunger, discrimination, abortion. (Lec. 3) Pre: 101 or 103 or one 200-level PHL course or permission of instructor. (L)

**316 Engineering Ethics**

See Engineering 316. (L) [D]

**318 Power/Justice: Contemporary Critical Philosophies (3)**

Study of contemporary critical philosophies in the traditions of Marxism, existentialism, postmodernism, and feminism, with emphasis on philosophers such as Habermas and Foucault. (Lec. 3) Pre: 101 or 103 or one 200-level PHL course or permission of instructor.

**321 Ancient Philosophy (3)**

Survey of major thinkers and schools of thought in Ancient Greece, including selected pre-Socratics, Plato, and Aristotle. (Lec. 3) Pre: 101 or 103 or one 200-level PHL course or permission of instructor. (L)

**322 Medieval Philosophy (3)**

Survey of major thinkers and schools of thought in the Middle Ages, including Augustine, Anselm, Aquinas, and Ockham. (Lec. 3) (L)

**323 Modern Philosophy: Descartes to Kant (3)**

Survey of 17th- and 18th-century European philosophy. Includes, but is not limited to, empiricism, rationalism, and Kant's critical philosophy. (Lec. 3) Pre: 101 or 103 or one 200-level PHL course or permission of instructor. (L) [D]

**324 Recent European Philosophy (3)**

19th- and 20-century British and European continental developments. Discussion of movements such as idealism, utilitarianism, existentialism, and phenomenology and of philosophers such as Hegel, Kierkegaard, Mill, Husserl, Sartre, and Heidegger. (Lec. 3) Pre: 101 or 103 or one 200-level PHL course or permission of instructor.

**325 American Philosophy (3)**

A study of American philosophy including such movements as puritanism, transcendentalism, pragmatism, naturalism, process-philosophy, realism, and philosophical analysis. (Lec. 3) Pre: 101 or 103 or one 200-level PHL course or permission of instructor. (L) [D]

**328 The Philosophy of Religion (3)**

A systematic and critical consideration of such topics as the existence and nature of God, the problem of evil, the relation of faith to reason, religious language, miracles, and immortality. (Lec. 3) Pre: 101 or 103 or one 200-level PHL course or permission of instructor. (L) [D]

**331 East Asian Thought (3)**

A study of the important philosophical and religious systems of China, Korea, and Japan; emphasis on Chinese traditions. (Lec. 3) Pre: 101 or 103 or one 200-level PHL course or RLS 131 or permission of instructor. (FC) or (L) [D]

**341 Introduction to Metaphysics (3)**

Analyzes topics such as person, mind-body, human action, freedom and determinism, causation, time, space, essence and existence, universals, and types of beings. (Lec. 3) Pre: 101 or 103 or one 200-level PHL course or permission of instructor.

**342 Knowledge, Belief, and Truth (3)**

Analysis of topics such as knowledge, belief, certainty, doubt, skepticism, faith, the ethics of belief, truth, error, perception, a priori knowledge, subjectivity and objectivity, and memory. (Lec. 3) Pre: 101 or 103 or one 200-level PHL course or permission of instructor.

**346 Existential Problems in Human Life (3)**

Discussion of ultimate questions of human existence such as meaning in life, personal commitment, human relations, suffering, despair, hope, freedom,

authenticity, self-deception, death, God, and immortality. (Lec. 3) Pre: 101 or 103 or one 200-level PHL course or permission of instructor. (L)

**355 Philosophy of Art (3)**

Systematic problems arising from reflection on the creation and perception of works of art. (Lec. 3) Pre: 101 or 103 or one 200-level PHL course or permission of instructor. (L)

**401, 402 Special Problems (3 each)**

Course may vary from year to year, allowing one or more advanced students to pursue problems of special interest with guidance of instructor in conferences. One or more written papers. (Independent Study) Pre: 3 credits in philosophy and permission of instructor. May be repeated for credit.

**430 Philosophy of Law (3)**

Critical evaluation of the basis of legal authority and legal decision making, covering topics in the areas of analytic and ethical jurisprudence as well as professional ethics for lawyers. (Lec. 3) Pre: 101 or 103 or one 200-level PHL course, and one 300-level PHL course, or permission of instructor.

**451 Symbolic Logic (3)**

Selected topics in modern symbolic logic including calculus of propositions, predicate calculus, and modal logics. Philosophical and mathematical aspects of the subject. (Lec. 3) Pre: 101 or MTH 131 or higher or permission of instructor.

**452 Philosophy of Science (3)**

Analysis of the nature and structure of scientific thought. Consideration of issues such as structure and types of scientific explanation, verification and falsification, and unity of the sciences. (Seminar) Pre: 101, 215, or 451, one 300-level PHL course, and 6 credits of natural science; or permission of instructor.

**453 Philosophy of the Social Sciences (3)**

Examination of philosophical problems raised by contemporary social sciences: the meaning of scientific knowledge, the nature of understanding of other persons and cultures, the relation of theory and practice. (Seminar) Pre: 101 or 103 or 204 or permission of instructor.

**454 Philosophy of the Natural Environment (3)**

An exploration of our problematic relationship to the natural environment: nature's ontological status, the epistemological encounter with nature through science and art, and the ethical obligations emerging from these considerations. (Seminar) Pre: 101 or 103 or one 200-level and one 300-level course in philosophy, or permission of instructor.

**490 Senior Seminar in Philosophy (3)**

In-depth study of the major works of a significant Western philosopher or of a major philosophical topic. (Seminar) Pre: senior standing in philosophy or permission of instructor. May be repeated for credit.

**499 Senior Thesis (3)**

Independent research. Student works in close conjunction with a faculty member on a mutually agreeable topic. Written thesis required. (Independent Study) Pre: senior standing and permission of instructor. Not for graduate credit.

**Physical Therapy (PHT)**

*Chairperson:* Professor Marcoux

**440 (or CMD 440) Advanced Head and Neck Anatomy (3)**

Study of structure and function of human head and neck anatomy, supplemented by dissection laboratory. Emphasis on the musculoskeletal, visceral, nervous, and vascular systems related to communicative disorders. (Lec. 2, Lab. 2) Pre: BIO 121 or equivalent.

**500 Human Anatomy and Histology (5)**

Structure and function of human anatomy as related to physical therapy. Emphasis on musculoskeletal, visceral, nervous, and vascular systems and tissue histology. Functional changes after injury also will be emphasized. (Lec. 4, Lab. 2) Pre: first-year standing or permission of chairperson.

**501 Applied Human Anatomy Laboratory (3)**

Surface anatomy, palpation, introduction to forces and torques, stretching and strengthening. (Lab. 6) Pre: 500 and first-year standing in D.P.T., or permission of chairperson.

**505 Introduction to Physical Therapy (2)**

Introduction to the profession of physical therapy including concepts related to disability, rehabilitation, evidence based practice, models of care and introduction to the Guide to Physical Therapist Practice. Characteristics and history of the profession and professional expectations for practitioners will be included. Pre: admission to the D.P.T. program.

**508 Psychosocial Issues in Physical Therapy (2)**

Behavioral and psychosocial issues relevant in physical therapy practice. Patient's perception of care and interactions in the health care environment. (Lec. 2) Pre: first-year standing or permission of chairperson.

**510 Biomechanics and Pathokinesiology (5)**

Principles, theories, and recent investigations of the biomechanics of human motion and posture are presented to develop analytical skills for normal and abnormal movement evaluation. (Lec. 5) Pre: 500 and first-year standing, or permission of chairperson.

**511 Human Neuroscience and Neurology (5)**

Anatomy, physiology, dysfunction, and evaluation of the human nervous system as a basis of therapeutic intervention. Gross and microscopic structure of the nervous system and the neurological examination (Lec. 4, Lab. 2) Pre: second-year standing in D.P.T. or permission of chairperson.

**512 Physical Examination and Evaluation I (3)**

Provides students with basic skills for physical examination and evaluation in the provision of physical therapy. Focus will be on strength testing, range of motion, and sensation. (Lec. 3) Pre: 500 and first-year standing in the D.P.T. program.

**513 Directed Study in Physical Therapy (1–3)**

Subject matter arranged to meet the individual needs of graduate students in physical therapy under the supervision of. (Independent Study) Pre: permission of instructor.

**518 Communication and Education in Physical Therapy (3)**

Topics include teaching in classroom and clinic, psychomotor skills and home exercise programs; increasing patient adherence; and community health. Communication development focuses on verbal/non-verbal, conflict management, assertiveness. (Lec. 3) Pre: second-year standing in D.P.T. or permission of chairperson.

**519 Pathophysiology in Physical Therapy (1)**

Physical Therapy cases will be used to facilitate the application of pathophysiological concepts in the examination, evaluation, and interventions in physical therapy. Pre: first-year standing in D.P.T.

**520 Medical Management of Disease I (2)**

Physiological systems, methods of diagnosis and rationale for physical therapists interventions. Topics include physiology of pain, inflammation, healing, impact of exercise and common conditions on the vascular, musculoskeletal, metabolic, and endocrine systems. (Lec. 2) Pre: 500 and first-year standing in D.P.T., or permission of chairperson.

**521 Medical Management of Diseases II (2)**

Pathophysiologic mechanisms, methods of diagnosis, and rationale for interventions which entry-level physical therapists need to understand. Common conditions of the gastrointestinal, genitourinary, integumentary and nervous systems discussed. Pre: 520 and second-year standing in D.P.T., or permission of chairperson.

**522 Physical Examination and Evaluation II (4)**

A continuum of 512, this course will cover posture, functional mobility, gait, balance, assistive devices, wheelchair fitting, and home evaluation. Practice of basic skills through course content using role modeling and patient cases. Pre: 512 and first-year standing in the D.P.T. program.

**528 Ethical, Legal, and Professional Issues in Clinical Practice (3)**

Practice standards, interdisciplinary issues, ethical considerations, and legal implications of physical therapy practice. Professional development, expert practice, doctoring professions, informed consent, patient rights, standards of practice, advanced direc-

tives, malpractice, domestic violence, child and elder abuse. (Lec. 3) Pre: second-year standing, or permission of chairperson.

**532 Physical Agents I (2)**

Theory, practice, and current research regarding application of physical agents. Diagnostic methods, interventions, and personnel supervision and administration of mechanical, thermal, and hydrotherapeutic agents. (Lec. 2) Pre: first-year standing in D.P.T. or permission of chairperson.

**533 Physical Agents II (2)**

Theory, practice, and current research on physical agents in PT. Electrotherapeutic agents including ultraviolet, primary forms of electrical stimulation, laser and others. Pre: 532 and first-year standing in D.P.T., or permission of chairperson.

**535 Advanced Pathophysiology**

See Nursing 535.

**537 Management Theory in Physical Therapy (2)**

An overview of health policy and management theory and its relationship to health care settings. Competent managers need to have a comprehensive understanding of how health care delivery is regulated. This topic will be covered in relationship to third party reimbursement, state regulations, health policy formulation roles of government and politics in health care. Pre: second-year standing in the D.P.T. program or permission of the chairperson.

**538 Management and Administration in Physical Therapy (2)**

Practical managerial and supervisory techniques and theory in physical therapy settings with emphasis on application in a variety of settings are presented. Topics: strategic planning, consultation, performance improvement, professional development planning, resumes and interviews, management, and performance appraisal, the health care continuum, budgeting, productivity, outcomes and patient satisfaction. Pre: third-year standing in D.P.T. or permission of the chairperson.

**544 Health Promotion in Physical Therapy (4)**

Presents physical therapists' role in wellness and health promotion across gender, systems, and the lifespan. (Lec. 4) Pre: third-year standing or permission of chairperson.

**550 Musculoskeletal Therapeutics I: The Extremities (5)**

Physical therapy management of individuals with, and the prevention of, impaired joint mobility, motor function, muscle performance, range of motion, and reflex integrity associated with musculoskeletal dysfunction in the extremities. (Lec. 5) Pre: 510 and second-year standing, or permission of chairperson.

**552 Musculoskeletal Therapeutics II: The Spine (5)**

Physical therapy management of individuals with, and the prevention of, impaired joint mobility, motor function, muscle performance, range of motion, and reflex integrity associated with musculoskeletal dysfunction in the spine. (Lec. 5) Pre: 550 and second-year standing, or permission of chairperson.

**560 Neuromuscular Therapeutics (5)**

Physical therapy management of individuals with, and the prevention of, impaired motor function and sensory integrity associated with neuromuscular dysfunction. (Lec. 5) Pre: second-year standing in D.P.T. or permission of chairperson.

**570 Cardiopulmonary Physical Therapy (4)**

Physiological basis, testing and evaluation, treatment, and administration of programs for cardiac and pulmonary-diseased patients requiring physical therapy. (Lec. 4) Pre: second-year standing in D.P.T., or permission of chairperson.

**574 Sports Physical Therapy (2)**

Advanced knowledge and competency in sports injury evaluation and treatment are developed. Additional coverage of sports injury prevention, athletic screening, medical intervention, interdisciplinary coordination, and patient or public education is provided. (Lec. 1, Lab. 3) Pre: 550 or permission of instructor.

**575 Physical Therapy Internship I (4)**

Assignment to various clinical settings that provide supervised experiences with practicing physical therapists and support personnel. Specific setting and rotational time schedule are determined by the student, academic clinical coordinator, and clinical site. (Practicum) Pre: second-year standing in D.P.T. or permission of chairperson. S/U credit.

**576 Broadening Experiences in Physical Therapy (2)**

Provision of physical therapy service in a non-traditional setting or with a unique population. Preparatory work and two-week hands-on experience. (Lec. 1, Practicum in approved setting) Pre: enrolled in D.P.T. program and with permission of the instructor. May be repeated for credit.

**580 Pediatric Physical Therapy (2)**

Physical Therapy assessment, care planning, and treatment of the pediatric population in diverse practice settings. Some hands-on experience with infants and children with a variety of diagnoses. (Lec. 2) Pre: 511 and third-year standing in D.P.T., or permission of chairperson.

**585 Physical Therapy Internship II (4 or 5)**

Assignment to various clinical settings that provide supervised experiences with practicing physical therapists and support personnel. Specific setting and

rotational time schedule are determined by the student, academic clinical coordinator, and clinical site. (Practicum) Pre: permission of instructor. S/U credit. Offered for 4 credits beginning spring 2012.

**586 Physical Therapy in Geriatric Populations (2)**  
Geriatric and aging issues related to physical therapy practice. Evaluation and treatment strategies for disorders affecting adults, including biology, cognition, and motor function. Exposure to geriatric populations. (Lec. 2) Pre: second-year standing or permission of chairperson.

**592 Comprehensive Cases in Physical Therapy (4)**  
Cross-curricular integration of physical therapy evaluation, diagnosis, prognosis, intervention and outcome assessment applied to complex cases. Consideration of modifications necessary for different stages of development/age, different cultures, and across the continuum of care. Pre: third-year standing in D.P.T. program.

**595 Physical Therapy Internship III (4 or 5)**  
Assignment to various clinical settings that provide supervised experiences with practicing physical therapists and support personnel. Selection of clinical specialty area of student's interest is considered in determination of the setting. (Practicum) Pre: permission of instructor. S/U credit. Offered for 4 credits beginning spring 2012.

**600 Foundations of Evidence-Based Practice (3)**  
Presentation and application of principles of evidence-based practice as related to current physical therapy practice, theory development, and scientific literature. Preparation of proposal through literature review. (Lec. 3) Pre: first-year standing or permission of chairperson.

**605 Special Topics and Professional Preparation in Physical Therapy (2)**

Integration of the art and science of physical therapy with the delivery of services. Comprehensive review of systems, including evaluation and interventions as they relate to physical therapy. (Lec. 2) Pre: third-year standing, or permission of chairperson.

**610 Evidence-Based Inquiry I (1–3)**  
Introduces the student to the concept of evidence-based inquiry and its importance in the physical therapy profession. Initial stages of an evidence-based inquiry project formulated with the guidance of a faculty advisor. (Independent Study) Pre: 600 or permission of chairperson.

**620 Evidence-Based Inquiry II (1–3)**  
Guides the student through the refinement and focusing of a previously identified multi-phase inquiry project in which evidence is the critical feature. Identification of target audience, delineation of scope of

evidence to be gathered occurs along with initial evidence collection. (Independent. Study) Pre: 610 and second-year standing, or permission of chairperson.

**630 Evidence-Based Inquiry III (1–3)**  
Final data gathering, analysis/synthesis, and documentation aspects of a multi-phase inquiry project in which evidence is the critical feature. Statistical analysis and literature synthesis are potential techniques to be utilized. (Independent. Study) Pre: 620 or permission of chairperson.

**640 Evidence-Based Inquiry IV (1–3)**  
Formal dissemination of a multi-phase inquiry project in which evidence is the critical feature. The form this dissemination takes will be individual to the specific project, but may include a research poster, scholarly publication, newsletters or other professional scholarly sources. (Independent Study) Pre: 630 or permission of chairperson.

**655 Diagnostic Imaging (2)**  
Referral and interpretation of diagnostic images relevant in musculoskeletal assessment and management. Radiologic anatomy, normal variants, and pathological and traumatic conditions reviewed. CT scan, magnetic resonance imaging, ultrasonography, angiography addressed. (Lec. 2) Pre: 500 and first-year standing in D.P.T. or permission of chairperson.

**672 Pharmacological Considerations in Physical Therapy (2)**  
Pharmacological actions, interventions, and interactions that physical therapists encounter in their treatment of patients undergoing physical rehabilitation. Drug administration appropriate to physical therapy practice. (Lec. 2) Pre: second-year standing in D.P.T. or permission of chairperson.

## Physics (PHY)

*Chairperson:* Professor Northby

**109 Introduction to Physics (3)**  
Appreciation of the physical environment and an introduction to the principles and theories of contemporary physics. Recommended for elementary education majors. (Lec. 3) Pre: concurrent enrollment in 110. Not open to students with credit in 111 or 112 or 203 or 204 or 205. (N)

**110 Laboratory for Introduction to Physics (1)**  
Demonstrations and laboratory exercises related to 109. (Lab. 2) Pre: concurrent enrollment in 109.

**111, 112 General Physics I, II (3 each)**  
111: Mechanics, heat, and sound. 112: Optics, electricity, magnetism, and modern physics. Noncalculus presentation of fundamental physics. (Lec. 3) Pre: concurrent enrollment in 185 for 111 and 186 for 112. (N)

**185, 186 Laboratory for General Physics I, II (1 each)**  
Selected laboratory exercises applicable to materials in 111, 112. (Lab. 2) Pre: concurrent enrollment in 111 for 185 and 112 for 186. (N)

**203 Elementary Physics I (3)**  
Introduction to Newtonian mechanics. Kinematics and dynamics of particles and systems of particles. Motion of rigid bodies and oscillatory motion. Conservation principles. (Lec. 3) Pre: credit or concurrent enrollment in MTH 141 and concurrent enrollment in 273. Intended for science or engineering majors. (N)

**204 Elementary Physics II (3)**  
Introduction to electricity and magnetism, leading to Maxwell's equations. Electric fields and Gauss' law; magnetic fields and Ampere's law. Capacitance and inductance, DC and AC circuits. Electromagnetic waves. (Lec. 3) Pre: 203, credit or concurrent enrollment in MTH 142, and concurrent enrollment in 274. Intended for science or engineering majors. (N)

**205 Elementary Physics III (3)**  
Introduction to topics of thermodynamics, kinetic theory, wave motion, acoustics, and optics. (Lec. 3) Pre: 203; credit or concurrent enrollment in MTH 243 or 362; concurrent enrollment in PHY 275. Intended for science or engineering majors. (N)

**210 Radiation Safety (1)**  
Radiation safety instruction sufficient to qualify students as radiation workers under state and federal regulations. (Lec. 1)

**273, 274, 275 Elementary Physics Laboratory I, II, III (1 each)**  
Laboratory exercises and recitation sessions related to topics in 203, 204, and 205. (Lab. 3) Pre: concurrent enrollment in 203, 204, and 205. (N)

**306 Elementary Modern Physics (3)**  
Introduction to relativistic and quantum physics: special relativity theory, structure of atoms, molecules, nuclei, and solids including semiconductor devices; wave and particle properties (Lec. 3) Pre: 204 and 205.

**322 Mechanics (3)**  
Introduction to Newtonian statics and dynamics using vector analysis; particle motion, Lagrange's equations; rigid body motion. Application to various topics in physical mechanics. (Lec. 3) Pre: 204 and MTH 244.

**331 Electricity and Magnetism (3)**  
Electrostatic fields and dielectric materials; magnetic fields, magnetic induction, and magnetic materials; introduction to Maxwell's equations. (Lec. 3) Pre: 204 and MTH 243.

**334 (or AST 334) Optics (3)**

Geometrical and physical optics; thick lens optics, interference, diffraction, polarization. (Lec. 3) Pre: 112 or 205.

**381, 382 Advanced Laboratory Physics (3 each)**

Key experiments covering a wide range of disciplines including nuclear physics, properties of the electron, magnetism thermodynamics, and optics. Quantitative analysis is stressed, including statistics and curve fitting. Technical skills are developed. (Lab. 6) Pre: 204 and 205.

**401, 402 Seminar in Physics (1 each)**

Preparation and presentation of papers on selected topics in physics. (Seminar) Required of all undergraduate and graduate students in physics; one semester required for all senior physics majors.

**410 Computational Physics (3)**

Development and application of computer techniques to classical and quantum physics problems. Emphasis will be on approximation techniques and numerical methods for solving matrix, integral, and differential equations arising in physics. (Lec. 2, Lab. 3) Pre: MTH 215 and CSC 200 or CSC 201 or CSC 211; credit or concurrent enrollment in MTH 244 and PHY 306.

**420 Introduction to Thermodynamics and Statistical Mechanics (3)**

Emphasis on laws of thermodynamics and properties of thermodynamic systems, kinetic theory of gases, molecular velocity distributions, transport phenomena, Maxwell-Boltzmann statistics. (Lec. 3) Pre: 205 and MTH 243.

**430 Modern Biological Physics (3)**

Quantitative representation of the structure and organization of biological molecules (DNA, RNA, proteins, membranes), the forces that stabilize biomolecules, cooperative transitions, protein folding, membrane physics, energy transduction in biological systems, molecular motors, and ratchet models. Pre: MTH 244. Not for graduate credit.

**451 Introduction to Quantum Mechanics (3)**

Particle-wave duality, uncertainty principle; Schrödinger equation: eigenvalues, wavefunctions, time dependence; Dirac notation; Heisenberg representation: operators, matrices, eigenvectors; angular momentum: spin and polarization, Pauli matrices, hydrogen atom, application to quantum computation; symmetries: conservation laws, fermions and bosons. (Lec. 3) Pre: 306, and 322, and MTH 215, and 244.

**452 Quantum Mechanics: Techniques and Applications (3)**

Approximation techniques including time-dependent and time-independent perturbation theory, WKB, variational method, Born, Hartree, and computational techniques. Applications to atomic and molecular

structure, model potentials, radiative transitions, and scattering. (Lec. 3) Pre: 451 and MTH 461.

**455 Introduction to Solid-State Physics (3)**

Crystal structure, thermal, electrical, and magnetic properties of solids. Electron gas theory of metals, band theory of solids. Semiconductors. (Lec. 3) Pre: 451 and MTH 243.

**483, 484 (or AST 483, 484 or OCG 483, 484) Laboratory and Research Problems in Physics (3 each)**

Research in current areas of physics. Students perform research projects with individual faculty members. Students in physics and physical oceanography may coordinate their research project with a faculty member of the Graduate School of Oceanography. (Lec. 1, Lab. 6) Pre: 381 and 382.

**491, 492 (or AST 491, 492) Special Problems (1–6 each)**

Advanced work under the supervision of a faculty member arranged to suit the individual requirements of the student. (Independent Study)

**510 Mathematical Methods of Physics I (3)**

Topics designed to include applications in physics. Vector and tensor analysis; linear algebra; coordinate systems. Determinants, matrices; introductory group theory. Infinite series, complex analysis, analytic properties, conformal mapping, calculus of residues. Fourier analysis and Laplace transforms. (Lec. 3) Pre: permission of chairperson.

**520 Classical Dynamics (3)**

Newton's laws. Conservation theorems and symmetry properties. Lagrangian mechanics. Central force motion. Dynamics of rigid bodies. Hamiltonian mechanics. Canonical transformations. Action-angle coordinates. Hamilton-Jacobi theory. Deterministic chaos. Relativistic mechanics. (Lec. 3) Pre: credit or concurrent enrollment in 510.

**525 Statistical Physics I (3)**

Equilibrium thermodynamics. Thermodynamics of phase transitions. Elements of kinetic theory. Statistical ensembles and partition functions. Classical and quantum equilibrium statistical mechanics. (Lec. 3) Pre: 420 or equivalent, 510.

**530 Electromagnetism I (3)**

Electrostatics, including boundary value problem. Multipoles, electrostatics of macroscopic media, dielectrics. Magnetostatics. Time-varying fields, Maxwell equations, conservation laws. Plane electromagnetic waves, wave propagation. Wave guides, resonant cavities. Magnetic materials. (Lec. 3) Pre: credit or concurrent enrollment in 510 and 520.

**540 Modern Biological Physics (3)**

Quantitative representation of biological molecules (DNA, RNA, proteins, membrane) structure and organization, forces stabilized biomolecules, cooperative transitions, protein folding, membrane physics,

energy transduction in biological systems, molecular motors, ratchet models. Pre: MTH 244.

**545 Nanotechnology in Imaging and Therapy (3)**

Nanomaterials: physical properties, application in drug delivery and diagnostics, nanodevices, nanoncology. Pre: MTH 244.

**550 Introduction to Radiation Physics and Dosimetry (3)**

Basic principles of radiation physics: radioactivity, the physics of ionizing radiation, radiation dosimetry, imaging equipment, radiation therapy equipment, and radiation detectors. Pre: 210 or permission of instructor.

**552 Radiobiology (3)**

Basic principles of radiation biology: factors that modify radiation response; linear energy transfer; relative biological effectiveness; tissue radiosensitivity; time-dose and fractionation; radiobiological modeling. Pre: 210 or permission of the instructor.

**555 Radiation Oncology (3)**

Practical aspects of radiation oncology medical physics: operation of radiotherapy equipment and dose measuring devices; radiation beam measurement techniques; commissioning and quality assurance for clinical radiation equipment. Pre: 550 and 552.

**560 Experimental Methods in Condensed Matter Science (3)**

Fundamental experiments on topics related to departmental research. Experimental methodology. (Lec. 2, Lab. 3) Pre: 484 or equivalent.

**565 Photomedicine (3)**

Interaction of light with matter, use of light in the diagnosis and treatment of diseases, physical principles of optical imaging with biomedical applications, photodynamic therapy. Pre: PHY 322 and PHY 331 or permission of instructor.

**570 Quantum Mechanics I (3)**

Dirac notation. Matrix representations, observables, uncertainty relations. Time evolution; Schroedinger and Heisenberg pictures. Schroedinger equation applications. Propagators and Feynman path integrals. Aharonov-Bohm effect. Angular momentum; Wigner-Eckart theorem. (Lec. 3) Pre: credit or concurrent enrollment in 510 and 520.

**578 Seminar in Sensors and Surface Technology (1)**

Students, faculty, and invited outside speakers present and discuss selected topics related to research interests of the Sensors and Surface Technology Partnership. (Seminar) Pre: permission of instructor. May be repeated. S/U credit.

**580 Condensed Matter Physics I (3)**

Drude and Sommerfeld theories. Crystal lattices and symmetries. Bragg scattering. Properties and calculation of electron spectra. Fermi surfaces of metals.

Electrons in magnetic field. De Haas – van Alphen effect and Phonons. Electron-phonon interaction. Defects in solids. (Lec. 3) Pre: 525, 570 or permission of chair.

### 590 Faculty Project (1–6)

A special project directly related to the research program of an individual faculty member. (Independent Study). Pre: permission of chairperson. Not to exceed 6 credits.

### 591 Special Problems (1–6)

Advanced study under the supervision of a faculty member arranged to suit the individual needs of the student. (Independent Study) Pre: permission of chairperson. Not to exceed 6 credits.

### 599 Master's Thesis Research

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

### 610 Mathematical Methods of Physics II (3)

Topics designed to include applications in physics. Ordinary and partial differential equations; Sturm-Liouville theory. Numerical methods and computational techniques. Probability and statistics. Integral transforms. Integral equations; Green's functions. Special functions of mathematical physics. (Lec. 3) Pre: 510.

### 625 Statistical Physics II (3)

Equilibrium critical phenomena (critical exponents, scaling relations, multicritical phenomena). Exact solutions. Renormalization group theory and other approximate methods. Critical behavior of magnets, fluids, and surfaces. (Lec. 3) Pre: 525 and 670.

### 626 Statistical Physics III (3)

Stochastic processes. Markov condition. Master equation. Fokker-Planck equation. Brownian motion. Langevin equation. Transport phenomena. Onsager theory of irreversible processes near equilibrium. Boltzmann equation. Linear response theory, fluctuation dissipation theorem. (Lec. 3) Pre: 525.

### 630 Electromagnetism II (3)

Radiating systems, scattering, and diffraction. Special theory of relativity. Dynamics of relativistic particles and electromagnetic fields. Collisions between charged particles, energy loss and scattering. Radiation by moving charges. Multipole fields. (Lec. 3) Pre: 530.

### 670 Quantum Mechanics II (3)

Symmetry (parity, translation, time-reversal). Time-independent (dependent) perturbation theory, variational methods. Identical particles. Scattering theory (Lippman-Schwinger equation, Born series, partial waves, resonances, optical theorem, inelastic scattering). Applications. Relativistic quantum mechanics. (Lec. 3) Pre: 570 or permission of chairperson.

### 680 Condensed Matter Physics II (3)

Interacting systems. Green's functions. Diagrammatic methods. Applications to superconductivity. Fluctuations. Functional integration. Generalized susceptibility and dielectric response. Fluctuation-dissipation theorem. Structure function. (Lec. 3) Pre: 530 and 580 or permission of chair.

### 690 Topics in Physics (3)

Advanced topics in areas of research specializations: a) neutron physics; b) quantum fluids; c) magnetism; d) surface physics; e) nonlinear phenomena; f) advanced quantum physics; g) nuclear physics; h) low-temperature physics. (Lec. 3) Pre: permission of chairperson.

### 691 Advanced Special Topics (1–6)

Special topics related to current developments by visiting or permanent faculty. (Lec. 1–6) Pre: permission of instructor.

### 699 Doctoral Dissertation Research

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

### 930 Workshop in Physics Topics for Teachers (0–3 each)

Especially designed for teachers of physical sciences. Basic topics in physics from an advanced or pedagogical perspective. (Workshop) Pre: teacher certification.

## Plant Sciences (PLS)

*Chairperson:* Professor Maynard

### 101 Freshman Inquiry into Plant Sciences (1)

Introduction for freshmen to the opportunities, careers, research activities, applied outreach, and educational programs in the Department of Plant Sciences. Interact weekly with faculty. Explore hands-on modules. (Lec. 1) S/U credit.

### 107 (or BIO 107) Plant Biology Seminar (1)

A seminar series offered by faculty, graduate students, and visiting professionals for the purpose of acquainting students with career opportunities provided by the plant biology program. (Seminar)

### 143 Sustainable Solutions for Global Health Problems

See Pharmacy Practice 143. (N) or (S) [D]

### 150 Plant Biology for Gardeners (3)

Fundamentals of plant biology, emphasizing the structure, physiology, and ecology of vascular plants common to gardens and landscaped environments. (Lec. 3) (N)

### 190 Issues in Biotechnology (3)

See Aquaculture and Fisheries Science 190. (N)

### 200 Introduction to Plant Protection (4)

Basic study of weeds, insects, and disease agents, and the problems they cause. Recognition of important plant pests and application of integrated cultural, chemical, and biological pest management procedures. (Lec. 4) Pre: BIO 102 or PLS 150 or permission of instructor.

### 210 Plant Protection Practicum (2)

Introduction to practical aspects of plant protection, concentrating on field diagnostic techniques and development of analytical and observation skills. Diagnostics are primarily an interactive field activity, supplemented by microscopy, report writing, and oral presentations. (Practicum) Pre: credit or concurrent enrollment in 200 or permission of instructor.

### 215 Propagation of Plant Materials (4)

Theory and practice of the propagation of ornamental plants by seed, cuttings, grafting, and tissue culture. (Lec. 2 Lab. 4) Pre: BIO 102 or PLS 150 or permission of instructor.

### 233 Floral Art (3)

Theory and practice in the art of flower and plant arrangement for the home, show, and special occasions. History, elements, and principles of design and color. (Lec. 1, Lab. 4) (A) or (N)

### 250 Plant Breeding and Genetics (4)

Introduction to the general principles of plant breeding, with emphasis on the application of genetic principles in plant improvement strategies. (Lec. 3, Lab. 2) Pre: BIO 102 or PLS 150 or permission of instructor.

### 255 Horticultural Plant Science (3)

Fundamental concepts underlying life functions in plants and their horticultural implications and relevancy. Emphasis on plant physiology, plant nutrition, and plant reproduction and how they relate to horticultural plant production. (Lec. 3) Pre: BIO 102 or PLS 150 and CHM 103 or 124 or permission of instructor.

### 301 Nursery Crop Production and Management (4)

Foundation of nursery management and woody plant production practices. History and organization of the nursery industry, land selection and management, plant culture, growing structures and equipment, and recent innovations. (Lec. 3, Lab. 3) Pre: BIO 102 or PLS 150 or permission of instructor. In alternate years. Next offered spring 2013.

### 306 Landscape Management and Arboriculture (4)

Culture of new and established trees, shrubs, and vines in the landscape. Practical exposure to planting, pruning, fertilization, and plant protection. Prepares the student for Arborist's Certification Examination. (Lec. 3, Lab. 3) Pre: BIO 102 or PLS 150 or permission of instructor.

**311 Fruit Culture (3)**

Principles of fruit production with emphasis on home gardens. Topics include propagation, planting, soils, fertilization, cultural practices, pruning and storage of tree and small fruits and dwarfs or semi-dwarf stocks. (Lec. 2, Lab. 2) Pre: BIO 102 or PLS 150 or permission of instructor. In alternate years. Next offered spring 2013.

**320 Landscape Design (3)**

Examination of landscape design principles and practices including introduction to landscape graphics, preliminary design, and planting design. (Lec. 3) Not open to landscape architecture majors.

**322 Power Units (3)**

Principles of operation, maintenance, and adjustment of power units including gasoline and diesel engines and electric motors. Emphasis on tractors and other power units important in farm, nursery, greenhouse, and grounds maintenance operations. (Lec. 2, Lab. 2)

**324 Vegetable Crops (4)**

Study of vegetable crops including the botany and systematics of the vegetables commonly grown in the United States. Includes organic and conventional production techniques for home gardeners and market farmers. (Lec. 3, Lab. 2) Pre: 150 or BIO 102 or permission of instructor.

**331 Floriculture and Greenhouse Management (4)**

The greenhouse environment and its relation to the culture of specific plants. Principles governing the production and culture of plants under controlled temperature, humidity, light, and modified atmospheres. Greenhouse construction and environmental control. (Lec. 3, Lab. 3) Pre: BIO 102 or PLS 150 or permission of instructor. In alternate years. Next offered spring 2012.

**332 Plant Pathology: Introduction to Plant Diseases**

See Biological Sciences 332.

**335 Commercial Floral Design and Flower Shop Practices (3)**

Advanced floral design including wedding, funeral, church, and holiday arrangements. Flower shop practices, buying, selling, and handling cut flowers and potted plants. (Lec. 1, Lab. 4) Pre: 233 or permission of instructor. (A) [D]

**341 Introduction to Turf Management (3)**

Fundamental aspects of turfgrass science including identification, propagation, fertilization, pest control, and other soil-plant relationships. (Lec. 2, Lab. 2) Pre: BIO 102 or PLS 150 or permission of instructor.

**350 Herbaceous Garden Plants (3)**

Identification and use of annual and perennial herbaceous ornamental plants in the landscape. Emphasis on sustainable landscaping and the use of native

plants. (Lec. 2, Lab. 2) Pre: BIO 102 or PLS 150 or permission of instructor.

**353 Landscape Plants I**

See Landscape Architecture 353.

**354 Landscape Plants II**

See Landscape Architecture 354.

**361 Weed Science (3)**

Ecological and cultural aspects of weed problems, physiology of herbicide action, selected problem areas in weed control and plant identification. (Lec. 2, Lab. 2) Pre: BIO 102 or PLS 150 or permission of instructor. In alternate years. Next offered fall 2011.

**390 Irrigation Technology (3)**

A study of the science and technology of obtaining, applying, and managing water as it relates to the culture of field, forage, vegetable, turf, and ornamental crops. (Lec. 2, Lab. 2) Service learning. Pre: MTH 107 or 108 or 111 or permission of instructor. In alternate years. Next offered fall 2012.

**393, 394 Plant Protection Clinic (3 each)**

Practical experience in plant pest detection and identification, pest management techniques and equipment. (Lec. 1, Lab. 4) Pre: ENT 305 or 387 and PLS 332 or 440 and permission of instructor.

**399 Plant Sciences Internship (1–6)**

Directed work experience programs at nurseries, turf farms, greenhouses, plant breeding farms, arboreta, research farms, or laboratories. (Practicum) Pre: BIO 102 or PLS 150 or permission of instructor. May be repeated for a maximum of 6 credits. S/U credit.

**401, 402 Plant Sciences Seminar (1 each)**

Presentations and discussions of current topics of concern to producers and consumers of plants and plant products, including plant protection. (Seminar)

**415 Plant Plagues: Causes and Consequences (2)**

Events and decisions leading to major plant epidemics, historical and current. Emphasizes causative organisms and their characteristic biology, with subsequent consideration from diverse social-political-economic viewpoints. Extensive student preparation/participation required. (Lec. 2) Pre: 200 or BIO 102 or permission of instructor.

**440 Diseases of Turf and Ornamentals (3)**

Diagnosis, epidemiology, and control measures of common turf and ornamental plant diseases found in the Northeast United States. (Lec. 3) Pre: 200 or 332. Not for graduate credit.

**441 Plant Disease Laboratory (1)**

Laboratory and field diagnosis of turf diseases and diseases of trees and ornamental shrubs. (Lab. 2) Pre: concurrent enrollment in 440.

**442 Advanced Turf Management (3)**

Establishment and maintenance practices for specialty turfgrass areas (golf courses, athletic fields, and parks) including design and construction specifica-

tions and budget management. (Lec. 3) Pre: 341 and 440 or permission of instructor. Not for graduate credit.

**471 Plant Improvement (4)**

Traditional breeding techniques and methods used for germplasm development and enhancement. Plant cell and tissue culture methodologies as they relate to the improvement of plant varieties through biotechnology. (Lec. 3, Lab. 2) Pre: 250 and 215 or permission of instructor. Not for graduate credit. Offered in alternate years.

**491, 492 Special Projects and Independent Study (1–3 each)**

Special work to meet individual needs of students in various fields of plant nutrition, propagation, growth and development, garden design, site planning, plant pathology, entomology, and related subjects. (Independent Study) Pre: permission of instructor by override only.

**501, 502 Graduate Seminar in Plant Sciences (1 each)**

Presentation of technical reports and discussion of current research papers in crop science, landscape ecology, growth and development of economic plants, and production, protection, and management of economic crops. (Seminar)

**508 Seminar in Biological Literature**

See Biological Sciences 508.

**540 Diseases of Turf and Ornamentals (3)**

Disease diagnosis, epidemiology, and control measures of common turf and ornamental diseases found in the Northeast United States. (Lec. 3) Pre: 200 or 332.

**542 Advanced Turf Management (3)**

Establishment and maintenance practices for specialty turfgrass areas (golf course, athletic fields, and parks) including design and construction specifications and budget management. (Lec. 3) Pre: 341, 440.

**571 Plant Improvement (4)**

Traditional breeding techniques and methods used for germplasm development and enhancement. Plant cell and tissue culture methodologies as they relate to the improvement of plant varieties through biotechnology. (Lec. 3, Lab. 1) Pre: 250 and 215 or permission of instructor. Offered alternate years.

**591, 592 Nonthesis Research in Plant Sciences (1–3 each)**

Advanced work under the supervision of researchers to expand research experience into areas other than those related to thesis research. Arranged to suit individual requirements. (Independent Study) Pre: permission of instructor.

*Note: For other related courses, see BIO 311, 321, 323, 432, 437, 447, 453, 515, 521, 522, 524, 534, 536, 554, 571, 572 and MIC 521, 552.*

## Political Science (PSC)

*Chairperson:* Professor Rothstein

### 113 Introduction to American Politics (4)

Basic principles of the government of the United States: constitutionalism, separation of powers, federalism, civil liberties; politics; legislative, executive, and judicial organization; functions of government. (Lec. 3, Rec. 1) (S) [D]

### 116 Introduction to International Politics (4)

Nature of the state system, foundations of national power, means of exercising power. Cooperative interactions between states. Current international problems. (Lec. 3, Rec. 1) (S) [D]

### 201 Introduction to Comparative Politics (4)

An examination of different governmental systems and political institutions. Illustrations and comparisons from the Americas, Europe, and the developing nations. (Lec. 4) Pre: 116 or 211. (S) [D]

### 210 American Politics: Theories and Applications (4)

The core course for political science majors pursuing the American politics track. Students identify, apply and criticize the major theories used to interpret American politics. (Lec. 4)

### 211 World Politics: Theories and Applications (4)

The core course for political science majors pursuing the world politics track. Students identify, apply, and criticize the major theories used in world politics. (Lec. 4)

### 240 Major Political Ideologies (3)

Introduction to and analysis of fascism, communism, socialism, and capitalism. An examination of the contemporary meaning of liberalism, radicalism, and conservatism. (Lec. 3)

### 274 Criminal Justice System

See Sociology 274.

### 288 The American Legal System (4)

Political and social analysis of the American legal system, particularly at trial court and street levels, roles of participants in that system with court observation. (Lec. 4/Online) Pre: 113 or 210. (S)

### 300 Challenge of Nuclear Arms (3)

Nuclear weapons addressed from a range of perspectives. Emphasis on the strategic, political, social, and moral issues and controversies raised by the potential for nuclear war. (Lec. 3/Online) Pre: 3 credits in the social sciences recommended or permission of instructor.

### 303 The Politics of the Vietnam War (4)

The politics of the Vietnam War addressed from a range of perspectives. Emphasis on the political, social, strategic, legal, and moral issues raised by the Vietnam War and its aftermath. (Lec. 3, Practicum

2) Pre: 113 or 210 or 116 or 211 or permission of instructor.

### 305 Politics in Rhode Island (4)

An exploration of the political process in Rhode Island in an age of New Federalism. Examination of the political development of the state and the character of contemporary politics and policymaking. (Lec. 3, Practicum 2) Pre: 113 or 210.

### 310 (212) Introduction to Political Science Research (4)

The core scope and methodology course for all political science majors. Topics covered include: history of political science, evaluation of its current character, and the extent to which politics can be studied scientifically. (Lec. 3, Rec. 1)

### 312 Topics in Political Science (3)

Critical study of selected topics. Subject will vary according to the expertise and availability of instructors. (Lec. 3) Open to any major. May be repeated for a total of 9 credits.

### 320 Comparative European Politics (4)

Introduces students to the major political, economic and social systems of Europe through a detailed examination of the United Kingdom, France, Germany, Italy, and Russia. (Lec. 3, Online 1)

### 321 Politics and Problems of Israel (3)

Analysis of the evolution of political institutions and the dynamics of public policy in Israel. Emphasis on contemporary political problems. (Lec. 3) Pre: 113 or 210 or 116 or 210 or permission of instructor.

### 330 (221) State and Local Politics and Policy (4)

Examination of the politics, institutions, and policy processes of state and local governments. (Lec. 3, Practicum 2) Pre: 113 or 210.

### 341 Political Theory: Plato to Machiavelli (4)

Major political philosophies from Plato to Machiavelli and their influence on such key concepts as justice, equality, and political obligation. (Lec. 3, Practicum 2) (L)

### 342 Political Theory: Modern and Contemporary (4)

Continuation of 341. Rousseau to the present. (Lec. 3, Practicum 2) Pre: 113 or 210 and 116 or 211. (L)

### 344 International Financial Economics

See Economics 344.

### 350 From Cold War to Cold Peace (4)

Provides essential political and historical background to understanding the evolution of U.S. and Soviet/Russian relations over the past 60 years. (Lec. 3, Practicum 2) Pre: 116 or 211.

### 365 Political Parties and Practical Politics (4)

Analysis of the American party process with some attention to comparative party systems. History, or-

ganization, functions, methods, problems, and prospects for reform. Focus on interpersonal interactions with party leaders and activists. (Lec. 3, Practicum 2) Pre: 113 or 210.

### 367 American Political Campaigns and Elections (4)

Examines the most recent political science research on American political campaigns and elections. Emphasis is also on experiencing real world electoral politics. (Lec. 3, Practicum 2) Pre: 113 or 210.

### 368 Public Opinion (4)

Examination of public opinion and formative influences upon it. Role and implications of public opinion in governmental process. Focus on the practical analysis of public opinion data. (Lec. 3, Online 1) Pre: 113 or 210.

### 369 Legislative Process and Public Policy (4)

Analysis of American legislative bodies, particularly Congress, some attention to comparative legislatures. Structure, organization, functions of Congress analyzed in relation to its role in determining public policy. (Lec. 3, Online 1) Pre: 113 or 210.

### 370 Politics and Media (4)

Analysis of the relationship between the mass media in the United States and the political process. Emphasis on the impact of the media on both domestic and foreign policy processes. (Lec. 3, Practicum 2) Pre: 113 or 210 or 116 or 211, or permission of instructor.

### 371 The Constitution and the Supreme Court (4)

The historical role of the Constitution and the Supreme Court in American democracy. Analysis of leading constitutional decisions regarding governmental powers and civil rights and liberties. (Lec. 3, Online 1)

### 375, 376 Field Experience in Practical Politics (1-3 each)

Supervised experience in local, state, and national units of government, political organizations, private and public community agencies. Students must have placement description, faculty supervisor, and outline of academic component of experience prior to registration. (Practicum) Pre: 12 credits in the social sciences including 6 credits in political science and permission of instructor. May be repeated for a maximum of 6 credits. S/U credit.

### 377 Politics of China (4)

Institutions of the Chinese system including the Communist Party, the state system, the bureaucracy, and the army. Emphasis on China's economic and social progress and relations with other nations. (Lec. 3, Practicum 2) Pre: 116 or 211 or equivalent recommended.

### 380 Civil Rights Movement

See African and African American Studies 380.

**402 Environmental Policy and Politics (4)**

Seminar in the politics and public policy associated with environmental pollution. (Lec. 3, Project 3) Pre: 113 or 210 and junior or senior standing. Not for graduate credit.

**403 Global Ecopolitics (4)**

Seminar focuses on the international politics of global pollution, marine pollution, atmospheric pollution, tropical deforestation, and conservation. (Lec. 3, Project 3) Pre: 212 or 310. Not for graduate credit.

**408 (or AAF 408) African Governments and Politics (4)**

Political developments in the new nations of sub-Saharan Africa. Main stress is functional: role of parties as integrative forces, democratic centralism, one-party states, African political thought, and common developmental problems. (Lec. 3, Project 3) Pre: 113 or 210 and 116 or 211.

**410 Issues in African Development**

See African and African-American Studies 410.

**415 Dynamics of Social Change in the Caribbean**

See African and African American Studies 415.

**416 Russian Politics and Society (4)**

An upper-level introduction to the politics and society of Russia and the Commonwealth of Independent States. (Lec. 3, Project 3) Pre: sophomore standing or permission of instructor. Not for graduate credit. Offered in alternate years.

**417 Russian Foreign Policy (4)**

An upper-level introduction to the issues of Russian foreign policy, including relations with newly formed states of the CIS. (Lec. 3, Project 3) Pre: sophomore standing or permission of instructor. Not for graduate credit. Offered in alternate years.

**420 Nonviolence and Change in the Nuclear Age (3)**

Focuses on the philosophies and political participation of individuals and movements working non-violently for social change and conflict resolution from M. Gandhi and M.L. King to the present within America and globally. (Lec. 3) Pre: 113 or 210 or 116 or 211.

**422 International Political Economy (4)**

Examines the impact of political and economic influences on interactions between and within states. (Lec. 3, Project 3) Pre: 212 or 310 or permission of the instructor. Not for graduate credit.

**431 International Relations (4)**

Analysis of the various theories of international relations and study of the major factors influencing the politics of international conflict, trade, organizations, and other interactions between international actors. (Lec. 3, Project 3) Pre: 212 or 310 or permission of the instructor. Not for graduate credit.

**434 American Foreign Policy (4)**

Analysis of the institutions, techniques, and instruments of policy making and the execution of foreign policy. (Lec. 3, Project 3) Pre: 212 or 310 or permission of the instructor. Not for graduate credit.

**435 Theories of International Conflict (4)**

Analysis of the various theories of international conflict. Topics include interstate war, international disputes, interstate rivalry, and democratic peace theory. (Lec. 3, Project 3) Pre: 212 or 310 or permission of the instructor. Not for graduate credit.

**440 The Politics of Being Mortal (4)**

Seminar on how attitudes toward death affect political values and priorities, especially in regard to capitalism and the threat of nuclear war. (Seminar 3, Project 3) Pre: 341, 342, or permission of instructor. Not for graduate credit.

**443 Twenty-first Century Political Theory (4)**

Important political theorists of this century, particularly as they interpret the basis of political obligation and weigh the question of violent political change. (Lec. 3, Project 3) Pre: 240 or 341 or 342 or any 300 level philosophy course or permission of instructor. Not for graduate credit. Offered every third year.

**455, 456 Directed Study or Research (3 each)**

Special work arranged to meet the needs of individual students who desire advanced work in political science. (Independent Study) Pre: permission of chairperson.

**461 The American Presidency (4)**

Presidential leadership and decision making, with emphasis on growth in power and prestige of the presidency, exercise of presidential influence in conduct of government, and presidential initiative in formulating and developing national policies and priorities. (Lec. 3, Project 3) Pre: 113 or 210 and 212 or 310 or permission of instructor. Not for graduate credit.

**466 (or AAF 466) Urban Problems (3)**

Contemporary and emerging problems of urban affairs. Discussion, reading, and assignments on the interaction among urban change, development of social institutions, and formation of public policy. (Lec. 3/Online) Pre: 113 or 210.

**471 Constitutional Law (3)**

The Supreme Court as a political institution in American democracy. Analysis of leading constitutional decisions exploring adaptation of governmental powers to changed conditions of society, development and function of judicial review, and dynamics of decision making in the Supreme Court. (Lec. 3) Pre: 113 or 210.

**472 Civil Liberties (4)**

The problem of human freedom examined in the context of the fundamental rights guaranteed to individuals by the American Constitution. Emphasis on

religious liberty, freedom of expression, racial equality, fair criminal procedures, and the protection of personality and privacy. (Lec. 3, Project 3) Pre: 371 or permission of instructor. Not for graduate credit.

**476 Policy Issues in Criminal Justice**

See Sociology 476.

**481, 482 Political Science Seminar (3 each)**

Intensive studies in various important fields in political science. Class discussion of assigned readings and student reports. Emphasis on independent research. (Seminar) Pre: 6 credits in political science beyond 113 or 210 and 116 or 310.

**485 The Politics of Children's Rights (3)**

Explores the political aspects and their relationship to socioeconomic and cultural factors of major issues that affect children's lives. Focuses on individual and societal rights and responsibilities in America and internationally. (Seminar) Pre: six credits in social sciences recommended or permission of instructor.

**491 Principles of Public Administration (3)**

Principles of public administration, structure and organization, financial management, administrative responsibility, and the relation between the administration and other branches of government. (Lec. 3) Pre: 113 or 210.

**501 Administrative Theory (3)**

Theoretical constructs and models in fields of public administration; theories of Weber, Riggs, Dorsey, Simon, Presthus. Lower-level models in subfields of organization, communications, and decision making. Task-oriented subject matter such as personnel, budget, and program administration related to theoretical formulations that seek to explain them. (Lec. 3) Pre: 491 or permission of instructor.

**503 (or LRS 503) Problems in Public Personnel Administration (3)**

Development of personnel administration, including problems of recruitment, examination, promotion, and staffing within public service. Emphasis on evaluation of employee performance and collective bargaining in public service. (Lec. 3) Pre: graduate standing or permission of instructor.

**504 Ethics in Public Administration (3)**

This course explores through case studies, class discussion, films, and readings how ethical deliberation in the public sector is an essential commitment and skill for public administrators. (Seminar) Pre: graduate standing or permission of instructor.

505 (or SOC 505) Public Program Evaluation (3) Research design and methodologies associated with the evaluation of governmental programs and activities. (Lec. 3) Pre: STA 308 or equivalent or permission of instructor.

**506 Seminar in Budgetary Politics (3)**

Examination of federal, state, and local fiscal and budgetary processes, focusing on the politics of the

budgetary process and models of budgeting, with emphasis on contemporary issues. (Seminar)

### 507 Government Financial Administration (3)

Political, administrative, and technical elements of government financial management in public policy settings are examined. Special emphasis is placed on local and state governments and public authorities. (Seminar) Pre: graduate standing or permission of instructor.

### 521 International and Comparative Trade Unions and Labor Relations

See Labor and Industrial Relations 521.

### 524 Seminar in Public Policy Problems (3)

In-depth exploration of selected problems of policy formulation: intergovernmental relations, regionalization, citizen participation and control, priority setting for public sector programs. (Seminar) Pre: 491, 501, or permission of instructor.

### 544 Democracy and Its Critics (3)

Seminar examining the roots of modern democracy in the social contract theories and analyzing the quality and limits of self-determination in these theories in the light of contemporary politics. (Lec. 3) Pre: 341, 342, or permission of instructor.

### 546 Peace and World Order Studies (3)

This seminar explores various approaches globally to peace-building, world order, and community. Emphasizes conflict resolution, from local to transnational levels, and the search for social justice and human unity. (Seminar) Pre: 420 or permission of instructor.

### 553 Scope and Methods of Political Science (3)

Study of political science as a discipline, its development in relation to other social sciences, and survey of political theories, concepts, and analytic models. (Seminar) Pre: graduate standing.

### 555, 556 Directed Study or Research (3 each)

Special work arranged to meet the individual needs of graduate students in political science. (Independent Study) Pre: permission of chairperson.

### 573 Administrative Law (3)

Legal aspects of interaction among government agencies, individuals, and public interest groups. Systematic analysis of leading cases, evaluating the courts as an instrument for protecting the individual's rights in administrative action. (Lec. 3) Pre: 113.

### 577 International Ocean Law

See Marine Affairs 577.

### 580 Seminar in International Relations Theory (3)

A critical treatment of major international relations theories beginning with an analysis of core theoretical concepts. (Seminar) Pre: honors seniors with permission of instructor or graduate standing.

### 581, 582 Special Topics Seminar (3 each)

Master's-level seminar on special topics in political science not regularly covered in other courses. (Seminar) Pre: graduate or senior standing in political science or permission of instructor. May be repeated up to five times for a total of 15 credits with different topic.

### 583 Seminar in American Politics (3)

Critical consideration of central issues in American political institutions, behavior, and policy making. (Seminar) Pre: honors seniors with permission of instructor or graduate standing.

### 584 Seminar in Advanced Comparative Theory (3)

A critical treatment of the major methodological approaches used in comparative politics beginning with an analysis of core theoretical concepts. (Seminar) Pre: graduate standing; undergraduates only with permission of instructor.

### 590 Internship in Public Administration (3–6)

Participation at an administrative agency under supervision of agency head and a faculty member. Planning, personnel management, research organization, budgeting, interdepartmental relations, informal liaisons that are the hallmark of effective administration. (Practicum) Pre: permission of M.P.A. director. May be taken as one 6-credit unit or two 3-credit units.

### 595 Environment and Development Economics

See Environmental Economics 595.

### 599 Master's Thesis Research

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

## Portuguese (POR)

*Chairperson:* Professor Hedderich (Languages)

### 101 Beginning Portuguese I (3)

Fundamentals of modern European Portuguese. Emphasis on standard pronunciation, development of familiarity with most common grammar structures, and acquisition of working vocabulary. (Lec. 3) Pre: no prior Portuguese is required. Will not count toward the language requirement if the student has studied Portuguese for more than one year within the last six years. (FC) [D]

### 102 Beginning Portuguese II (3)

Continuation of 101. Students enrolling in this course should have taken 101 or equivalent. (Lec. 3) (FC) [D]

### 103 Intermediate Portuguese I (3)

Intensive and extensive reading of moderately difficult Portuguese prose, review of grammar structures, idiomatic expressions, conversation practice based on readings. Students enrolling in this course should have taken 102 or equivalent. (Lec. 3) (FC) [D]

### 104 Intermediate Portuguese II (3)

Continuation of 103. Readings of more difficult texts. Class discussion and reports on supplementary readings. Students enrolling in this course should have taken 103 or equivalent. (Lec. 3) (FC) [D]

### 335 Topics in the Literature of the Portuguese-Speaking World (3)

Selected topics in the literatures of continental Portugal and the adjacent islands, Brazil, Cape Verde, Angola, Mozambique. (Lec. 3) Pre: 206 or equivalent or permission of instructor. 205 or 206 may be taken concurrently with permission of instructor. May be repeated for credit as often as topic changes.

### 497 Directed Study (3)

For the advanced student. Individual study and reports on problems of special interest. (Independent Study) Pre: one 300-level course in Portuguese, acceptance of project by faculty member, and approval of chair. Not for graduate credit.

## Prior Learning Assessment (PLA)

### 100 Prior Learning Assessment Portfolio Development (1)

Identification through self-assessment of student prior learning and appropriate methods for seeking credit. Analysis and application of the process for developing a prior learning portfolio. (Seminar) Pre: matriculated status and permission of the student's academic dean. Offered through the Alan Shawn Feinstein College of Continuing Education. S/U only.

## Psychology (PSY)

*Chairperson:* Professor Morokoff

### 103 Towards Self-Understanding (3)

Individual and social problems of normal persons. Personality development, social behavior, and adjustment reactions with emphasis on increasing awareness of personal and interpersonal functioning. (Lec. 3/Online) (S) [D]

### 113 General Psychology (3)

Introductory survey course of the major facts and principles of human behavior. Prerequisite for students interested in professional work in psychology or academic fields in which an extended knowledge of psychology is basic. (Lec. 2, Rec. 1) (S) [D]

### 130 The Problem of Hunger in the U.S.

See Human Science and Services 130 (S) [D]

### 200 (300) Quantitative Methods in Psychology (4)

Basic concepts and techniques of quantification in psychology. Emphasis on application of certain descriptive and inferential statistical tools in the analysis of psychological measurement of behavior. Practical applications using computer programs may be undertaken and/or other lab exercises. (Lec 3, Lab 2) Pre: 113, at least one college-level mathematics course, and sophomore standing.

**232 Developmental Psychology (3)**

Comprehensive understanding of human development and growth from birth to senescence. (Lec. 3) Pre: 113. (S) [D]

**235 Theories of Personality (3)**

Critical survey of the major theories of personality. Emphasis will be placed on the "normal" personality. (Lec. 3) Pre: 113. (S) [D]

**254 Behavior Problems and Personality Disorders (3)**

Evaluation of the more serious behavioral disorders as found in the major forms of character disorders, psychoneuroses, and psychoses. Theories of causation, development and effects of anxiety and defense mechanisms, and interpretation of symptoms and methods of treatment. (Lec. 3) Pre: 113. (S) [D]

**255 Health Psychology (3)**

Investigates the relationship between behavior and health; emphasizes the theory and science of health behavior change; explores specific behaviors and behavior change strategies from an individual and public health perspective. (Lec. 3/Online) (S) [D]

**261 The Alcohol-Troubled Person: Introductory Concepts (3)**

Introductory and basic concepts in alcohol trouble: prevention, identification, early intervention, treatment, education. (Lec. 3)

**275 Alcohol Use and Misuse (3)**

Examination of biological, psychological, and social determinants of alcohol use and misuse. Prevention, early intervention, and treatment approaches also covered. (Lec. 3) Pre: 113.

**301 Introduction to Experimental Psychology (4)**

Lectures, demonstrations, and laboratory experiments introduce the student to basic methodological principles and experimental techniques applied in psychological research. (Lec. 3, Lab. 2) Pre: 200 (300).

**305 Field Experience in Psychology (3)**

Direct contact with settings and populations served by psychologists. Emphasis on understanding models and theories in relation to practical problems. Topical sections may include: a) pre-clinical, b) community, c) laboratory, and d) organizational applications. (Practicum) Pre: 113 and permission of instructor. May be repeated for a maximum of 6 credits.

**310 History and Systems of Psychology (3)**

Origins of psychological inquiry and theories of psychology. Transformations of theories and methods of inquiry through the history of our culture including contemporary systems and models of psychological functioning. (Lec. 3/Online) Pre: 113. (L)

**334 Introduction to Clinical Psychology (3)**

Emphasis on scope of the field, functions of the clinical psychologist, methods used, and problems encountered, both scientific and professional. (Lec. 3) Pre: 254.

**335 The Psychology of Social Behavior (3)**

Conceptual and empirical analyses of individual behavior in social contexts; attention to social motivation, attitude development and change, liking, conformity, aggression, altruism. (Lec. 3) Pre: 113 and junior standing or permission of instructor.

**361 Learning (3)**

Learning process in humans and non-humans, focusing on principles and methods. This course features operant-learning and behavior-modification principles and examples from real life. (Lec. 3) Pre: 301 or permission of instructor.

**381 Physiological Psychology (3)**

Physiological mechanisms operative in human behavior. Sensory, neural, endocrine, and response systems as related to sensation, perception, attention, emotions, motivations, and learning. (Lec. 3) Pre: junior standing.

**384 Cognitive Psychology (3)**

An examination of contemporary research and theories on mental activities. Topics will include perception, pattern recognition, attention, memory, problem solving, language, consciousness, and artificial intelligence. (Lec. 3) Pre: 113 and 301 or equivalent. In alternate years.

**385 Perception (3)**

Sensory function, development of perception, perception of space, color, sound, and complex events. (Lec. 3) Pre: 113 and 200 (300), or equivalent. In alternate years.

**399 (or AAF 399) Introduction to Multicultural Psychology (3)**

Introductory course focusing on multiculturalism as a major paradigm. Emphasizes the meaning of multiculturalism and associated principles, concepts, and sociocultural factors as related to assessment, intervention, and research. (Lec. 3/Online) Pre: 113 or 103.

**405 Psychological Anthropology**

See Anthropology 405.

**425 (or NVS 425) Peace Psychology (3)**

Peace Psychology combines aspects of cognitive, social, clinical and cross-cultural psychology that bear on the prevention of violence and the promotion of constructive nonviolent behavior. Pre: Prior coursework in Psychology, or permission of instructor. Prior coursework in another social science is recommended.

**430 Intimate Relationships**

See Sociology 430.

**432 Advanced Developmental Psychology (3)**

Major issues in developmental psychology. Emphasis on research in Piaget, Erikson, Bruner, Kagan, and Moss. Includes effects of infant care, sex typing, parental discipline, and developmental aspects of intellectual and perceptual growth. (Lec. 3) Pre: 232.

**434 Psychological Testing (3)**

Measurement procedures employed in the measurement of intelligence, aptitudes, abilities, attitudes, interests, and personality. Focus on psychometric principles associated with the various tests. (Lec. 3) Pre: 200 (300) or equivalent.

**436 Psychotropic Drugs and Therapy**

See Biomedical and Pharmaceutical Sciences 436.

**442 Psychology of Exceptionality (3)**

Survey of the major issues underlying the classification, institutionalization, and treatment of persons with mental, physical, psychological, and educational disabilities. Specific topics include social attitudes toward exceptionalities, past and current legislation, special education services, and transitions into community life and the workplace. (Lec. 3). Pre: junior or senior standing.

**460 The Substance-Troubled Person (3)**

Presents theoretical and applied material on alcohol and other mood-altering substances of abuse. Relevant for alcohol and substance abuse counselors, personnel administrators, and other social service workers. (Lec. 3) Offered through the Alan Shawn Feinstein College of Continuing Education.

**464 Humanistic Psychology (3)**

Discussion of humanistic approaches to the understanding and direction of behavior. Emphasis on contemporary writers such as Rogers, Maslow, May, Moustakas. Discussions of phenomenology and existentialism. (Lec. 3) Pre: 235 and junior standing. In alternate years.

**465 Introduction to Crisis Intervention (3)**

Interventions for various types of emergencies including substance abuse and functional or organic disorders. (Lec. 3) Pre: 254 and permission of instructor.

**466 Child Sexual Abuse (3)**

Current theorizing regarding the causes of sexual abuse of children will be presented, as well as the short- and long-term effects of such abuse. Management of problems will be followed, from disclosure through current state-of-the-art practices in treatment. Issues in prevention, court cases, and investigation will be reviewed. (Lec. 3) Pre: senior status and permission of instructor. Not for graduate credit.

**470 Topics in Social Psychology (3)**

Empirical and conceptual approaches to a major topic in contemporary social psychology. Topics will vary from semester to semester. (Seminar) Pre: 113 and 335.

**471 Applied Behavioral Analysis and Remediation (3)**

Study and application of behavioral approaches used to analyze and remediate behavioral problems of children and adults in educational and human service settings and everyday life. (Lec. 3) Pre: 361 or permission of instructor. Offered through the Alan Shawn Feinstein College of Continuing Education only.

**473 Practicum in Behavioral Psychology (3)**

Supervised, on-site field experience in applications of behavioral approaches in an educational or human service setting. (Practicum) Pre: 471 or permission of instructor.

**477 Preparation for Careers in Psychology (1)**

Designed to assist students as they explore career options in the field of psychology. Students will prepare materials for job/graduate school applications, and practice interview skills. (Lec. 1) Pre: sophomore standing or above. Not for graduate credit.

**478 Applications of Psychology (1–3)**

Applications of psychological research and theory to contemporary problems, with an emphasis on scholarly bases. (Seminar) Some topics may be offered online. May be repeated for a maximum of 12 credits.

**479 Topics in Psychology (1–3)**

Central issues in the field of psychology, allowing in-depth study of contemporary or historical topics. (Seminar) Some topics may be offered online. Pre: 113 or permission of instructor. May be repeated with a change in topic for a maximum of 12 credits.

**480 Psychology of Women (3)**

Discussion of psychological research and theories on the psychology of girls and women from a multicultural perspective. Topics include personality theories, gender similarities and differences, biological aspects of sex and gender, cultural images of women, sexuality, relationships, motherhood, work and achievement, physical and mental health. (Lec. 3/ Online) Pre: 113 and at least one 200-level psychology course.

**487 Seminar for Psychology Teaching Assistants (1)**

Students will learn pedagogies and engage in activities designed to enhance teaching skills (Seminar) Pre: junior or senior standing. Not for graduate credit.

**488 Undergraduate Teaching Experience in Psychology (1–3)**

Students will acquire experience in psychology working under the supervision of course instructors and/or faculty members. (Practicum) Pre: permission of instructor. May be repeated for a total of 3 credits. Not for graduate credit.

**489 Problems in Psychology (3)**

Advanced work in psychology. Course will be conducted as seminar or as supervised individual project. Pre: permission of instructor. May be repeated once.

**499 Psychology Practicum (1–6)**

Individual and group projects applying psychology in clinical or laboratory settings. (Practicum) Pre: permission of instructor. May be repeated for a maximum of 12 credits. No more than 6 credits may be taken in one semester. Not for major credit in psychology. S/U only.

**500 Theory and Research on Nonviolence and Peace**

See Nonviolence and Peace Studies 500.

**505 Community Psychology (3)**

Introduction to community psychology; study and change of individual's interaction with community systems; theoretical and empirical models, intervention strategies, and research methods relevant to community psychology. (Lec. 3)

**517 (or STA 517) Small N Designs (3)**

A survey of Small N experimental methodology appropriate for repeated observations on a single unit or individual. Methods include quasi-experimental designs, interrupted time series, and multivariate time series. Applications in applied research, particularly behavioral intervention. (Seminar) Pre: 532 and 533. In alternate years.

**527 Language Study for Teachers of Reading**

See Education 527.

**532 Experimental Design**

See Statistics 532.

**533 Advanced Quantitative Methods in Psychology (3)**

Advanced quantitative methods applied to psychology. Survey of methods such as multiple regression, multivariate analysis of variance, discriminant analysis, canonical correlation, principal component analysis, and factor analysis. Applications involve practice with computer programs. (Lec. 2, Lab. 2) Pre: 532.

**540 (or EDC 540) Learning Disabilities: Assessment and Intervention (3)**

Applications of early screening batteries; remedial programs for various disabilities, including behavioral programs and methods for older children and adolescents. Emphasis on pragmatic application of skills for detection and treatment. (Lec. 3) Pre: permission of instructor. May be repeated for a maximum of 6 credits.

**544 (or EDC 544) Reading Acquisition and Reading Disability: Research and Implications for Practice (3)**

Examination of research on the language, cognitive, and reading characteristics of children who success-

fully learn to read and of those who encounter difficulty. Additional focus on the implications and use of the research for assessment and instruction. (Lec. 3) Pre: graduate standing or permission of instructor.

**550 Behavior Analysis and Change (3)**

Introduction to the principles of operant conditioning with emphasis on the use of these principles in the analysis and change of behavior in real-life settings such as schools and families. (Lec. 3)

**554 Alternative Therapies (3)**

Theory and practice of a variety of individual and group techniques that can be integrated into one's present style of helping. (Lec. 2, Lab. 2) Pre: professional and/or graduate standing.

**581 Psychological Aspects of a Healthy Lifestyle**

See Kinesiology 581.

**599 Master's Thesis Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**600 Multicultural Issues in Psychology: Theory, Research, and Practice (3)**

Focus is on general issues and concepts relevant to a psychology that is concerned with multicultural populations as sources of enrichment for theory, research, and practice. Counts as a "core course" for graduate study in psychology and includes an historical perspective. (Seminar) Pre: graduate standing.

**601 Physiological Psychology (3)**

An advanced consideration of physiological research on neural, endocrine, and response systems as they relate to attention, motivation, emotion, memory, and psychological disorders. Counts as a "core course" for graduate study in psychology and includes an historical perspective. (Lec. 2, Lab. 2)

**602 Learning and Motivation (3)**

Empirical and theoretical analysis of the basic principles of acquisition and loss of habits. Typically organized to deal with respondent and operant conditioning, and their relationship to reinforcement and motivation. Counts as a "core course" for graduate study in psychology and includes an historical perspective. (Lec. 3) Pre: undergraduate learning course.

**603 Development (3)**

Theoretical, methodological, and applied issues in life span development, including cognitive, perceptual, psychomotor, affective, and social development. Typically organized. Counts as a "core course" for graduate study in psychology and includes an historical perspective. (Lec. 3)

**604 Cognitive Psychology (3)**

A survey of the theoretical and methodological issues in human cognition. Topics include pattern recognition, attention, memory, language, problem solving.

Counts as a “core course” for graduate study in psychology and includes an historical perspective. (Lec. 3)

### 605 Personality (3)

Reading of primary source materials from major personality theorists relevant to a particular topical emphasis. Application and comparative evaluation of the theories studied. Counts as a “core course” for graduate study in psychology and includes an historical perspective. (Lec. 3)

### 606 Social Psychology (3)

Intensive exploration of the methods, theory, and database of contemporary social psychology focusing on salient issues that clarify significant topics in this area. Counts as a “core course” for graduate study in psychology and includes an historical perspective. (Lec. 3)

### 607 Advanced Psychopathology (3)

A review of the multicultural, theoretical, clinical, and empirical literature related to the development, classification, and diagnosis of psychopathology. Counts as a “core course” for graduate study in psychology and includes an historical perspective. (Lec. 3)

### 608 Theories and Systems (3)

An in-depth analysis of the origin and logical structure of major systematic approaches to psychology. Emphasis on significant recurrent controversies. Counts as a “core course” for graduate study in psychology and includes an historical perspective. (Lec. 3) Pre: graduate standing.

### 609 Perception (3)

A survey of topics in the psychology of perception, including sensory function; psychophysical models, measurement, and scaling; visual perception; and methods for analyzing perceptually guided behavior. Counts as a “core course” for graduate study in psychology and includes an historical perspective. (Lec. 3)

### 610 (or STA 610) Parsimony Methods (3)

Multivariate procedures designed to reduce the dimensionality and help in the interpretation of complex data sets. Methods include principal components analysis, common factor analysis, and image analysis. Related methods: cluster analysis and multidimensional scaling. Applications involve the use of existing computer programs. (Lec. 3) Pre: 533 or STA 541 or equivalent. In alternate years.

### 611 Methods of Psychological Research and Experimental Design (3)

Provides the student of psychology with a knowledge of research methodology and the techniques of experimental designs. It prepares for the development of thesis problems of graduate students in psychology and related disciplines. (Lec. 3) Pre: 532 and 533.

### 612 (or STA 612) Structural Modeling (3)

Theory and methodology of path analysis with latent variables. Discussion of “causation” and correlation, confirmatory factor analysis, measurement and structural equation models. Practical applications using current computer programs (e.g. EQS). (Lec. 3) Pre: 533 or 610.

### 613 Qualitative Research and Analysis in Psychology (3)

Introduction to qualitative methods and analyses with a focus on interviews, focus groups, and visual data methods. Counts as a “core” methodology course for graduate study in psychology and includes historical and contemporary perspectives in psychology. (Lec. 2, Lab. 2) In alternate years. Pre: graduate standing.

### 614 Evaluation Research Seminar (3)

Introduction to application of research and consultation methods to program and policy evaluation; emphasizes quantitative methods and utilization focus. Assumes background in social science research methods. (Seminar) Pre: graduate standing.

### 615 Collaborative Research in Psychology (1–3)

Collaborative approaches to methods of psychological inquiry. Special emphasis on topics that can involve students at varying levels of research skill. Format includes weekly seminars and colloquia. (Seminar) May be repeated for a maximum of 24 credits. S/U credit.

### 625 Seminar: Social Psychology (3)

Emphasis on a major area in contemporary social psychology. Empirical studies analyzed for their relevance to theoretical and applied issues: students will design an original investigation. (Seminar) Pre: graduate standing or permission of instructor. May be repeated for a maximum of 12 credits with different topic.

### 626 Psychology of Sex and Gender (3)

Examines theory and research relevant to sex and gender from social, psychological, multicultural, and interdisciplinary perspectives. Focuses on topics relevant to men, women, transgendered people, transsexuals, and intersexuals. In alternate years.

### 635 Transtheoretical Model Applied to Health Psychology (3)

The transtheoretical model is an influential comprehensive model of behavior change that has been extensively employed in health psychology. Applications include smoking cessation, exercise, diet, dress, and medication adherence. (Seminar) Pre: graduate standing.

### 641 Introduction to Psychotherapy (3)

An analysis of the major systems of psychotherapy. Developing an integrative, eclectic model through identifying the processes of change that are the core of effective therapy. (Lec. 3)

### 642 Introduction to Psychotherapy Practice (3)

Instruction and practice in the basic interviewing skills and clinical techniques necessary for practicum courses in psychotherapy. Seminar format with some lecture material, role playing, structured experiential exercises, case presentation, and discussion and videotape illustration. (Seminar) Pre: 641. S/U credit.

### 644 Family Therapy (3)

Introduction to theories and techniques of family assessment and family therapy. Seminar format with videotape illustrations, case presentation and discussion, lecture, and selected experiential exercises. (Lec. 3) Pre: permission of instructor. Not offered every year.

### 647 Child Therapy (3)

Seminar discusses issues, techniques, and research related to behavior changes in children and their families. Aspects of therapy, the role of behavioral approaches, and the participation of parents will be explored. Direct, supervised experience is included in this course. (Lec. 3) Pre: participation in the Psychological Consultation Center.

### 660 Clinical Assessment and Decision Making (3)

Covers basic principles and methods for decreasing error and increasing accuracy in applied clinical work, such as clinical versus actuarial judgment and use of base rates. (Lec. 3) Pre: course in psychological testing.

### 661 Psychological Services I: Administration and Interpretation of Cognitive Tests (3)

Instruction and practice in administration and interpretation of contemporary cognitive tests; individual intelligence tests of both general and specific abilities. Rationale, research evidence, clinical applications. (Lec. 3) Pre: 660.

### 662 Psychological Services II: Administration and Interpretation of Personality Tests (3)

Instruction and practice in the administration and interpretation of instruments used in the assessment of personality. Emphasis on tests such as the MMPI, Rorschach, TAT. Rationale, research evidence, and clinical application. (Lec. 2, Lab. 2) Pre: 661.

### 663 Child and Adolescent Personality Assessment and Intervention (3)

Psychological assessment and intervention with children and adolescents, focused on personality functioning, behavioral, social, and emotional problems. Emphasis on assessment theory and methods as linked to empirically supported intervention approaches. (Lec. 2, Lab. 2) Pre: graduate standing in psychology and 665, 661 or permission of instructor.

### 665 Developmental Psychopathology (3)

Child and adolescent psychological disorders are conceptualized through a developmental perspective, and contemporary research on etiology, diagnosis, course, prognosis, and treatment/management is examined. (Lec. 3) Pre: 603 or equivalent.

**666 Seminar: Ethical and Legal Issues in Psychology (3)**

Ethical, legal, and professional issues as they relate to the provision of psychological services and psychological research. Emphasis is on the study of ethical issues and the examination of the development of professional standards as they relate to the areas of clinical psychology practice, school psychology practice, and applied research practice. (Seminar)

**668 School Psychological Consultation (3)**

Historical and contemporary perspectives on consultation are reviewed. Theory, research, and practice are discussed from various consultation models including mental-health, behavioral, and organizational. The focus is on content and process of consultation in various clinical and educational settings. (Lec. 3) Pre: 661 and 663 or equivalent.

**670 Field Experience in Psychological Services (1–12)**

Practicum placements and internships are available in a variety of agencies, clinical and school settings, under supervision. (Practicum) S/U credit.

**672 Individual Clinical Practicum (3–9)**

Introductory experience in dealing with clinical problems in a variety of clinical settings under supervision. (Practicum) Pre: 661, 662. May be repeated for a maximum of 9 credits. S/U credit.

**674 Clinical Practices: Therapy (1–12)**

Specialized techniques of clinical interviewing, counseling, and psychotherapy. Critical discussions of student's own supervised therapy sessions. (Practicum) Pre: 607 and 641. May be repeated for a maximum of 12 credits.

**681 Ethical, Historical, Legal, and Professional Issues in School Psychology (3)**

Introduction to school psychology with focus on ethical, historical, legal, and professional issues. Roles and functions of school psychologists in schools and other settings will be explored. (Seminar) May be repeated for a maximum of 9 credits.

**683 (or EDC 683) Psychology of the Exceptional Child (3)**

Social, psychological, and educational factors that constitute the matrix of concerns with the exceptional individual in the school and community. Recent innovations in public and private education and habilitation. Research issues and legislation discussed evolve into student studies. (Lec. 3)

**687 (or EDC 687) Seminar: Topics in the Psychology of the Exceptional Individual (3)**

Survey of topics and current issues in the treatment, needs, and understanding of the psychology of specific exceptionalities. (Seminar) May be repeated for a maximum of 9 credits with different topics.

**690 Seminar: Contemporary Issues in Psychology (3–12)**

Recent developments and current issues. Rigorous exploration of experimental, applied, and theoretical literature. (Seminar) May be repeated for a maximum of 12 credits.

**692, 693 Directed Readings and Research Problems (3–12 each)**

Directed readings and advanced research work under the supervision of a faculty member arranged to suit the individual requirements of the students. (Independent Study)

**695 Seminar: Teaching Psychology (3)**

Primarily a seminar in the teaching of psychology at the undergraduate level. Includes a consideration of general issues in college teaching, preparation of a course proposal, and sample presentation. (Seminar)

**696 Practicum: Teaching Psychology (1–3)**

Practicum for students teaching a college-level psychology course. Supervision of course preparation, presentation, and evaluation. (Practicum) Pre: 695 or permission of the department. May be repeated for a total of 6 credits with permission of the department. S/U credit.

**699 Doctoral Dissertation Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**Public Relations (PRS)**

*Coordinator:* Regina Bell, Communication Studies

**100 Introduction to Public Relations (3)**

Examine and explore public relations principles, concepts and emerging trends associated with the role of the PR practitioner. Explore career paths, such as investor relations, community relations, public affairs and event management. (Lec. 3) For freshmen and sophomores only.

**200 Introduction to Event Management (3)**

Explore principles, concepts and emerging trends pertinent to event management, a significant aspect of public relations. Gain an understanding of the synergy that develops between public relations and marketing. (Lec. 3) Pre: sophomore standing or above and public relations major/minor or planning to major/minor in public relations.

**340 (or JOR 340) Public Relations (3)**

Principles and procedures in public relations: emphasis on role of the public relations practitioner as a specialist in communication; analysis of publications produced as a part of public relations. (Lec. 3) Pre: junior standing and JOR 220 with a grade of C or better.

**441 (or JOR 441) Public Relations Practices (3)**

Practical application of traditional PR methods in solving problems in a variety of markets. Explores fundamental agency operations, client-agency relationships. Combines practical experience with individual projects, programs, and campaigns. (Practicum) Pre: 340. Not for graduate credit.

**442 (or JOR 443 or WRT 442 or COM 442) Strategic Media Communication (3)**

Introduces strategic media relation tactics when responding to the media, specifically crisis communication situations. Students gain practical experience in various writing and speaking opportunities to effectively work with the media. (Lec. 3) Pre: PRS 340. Open only to majors in Communication Studies, Public Relations, Journalism and Writing. Not for graduate credit.

**491 Public Relations Internship (3 or 6)**

Supervised experience in public relations. Requires a minimum of 120 hours (3 credits) or 240 hours (6 credits). Weekly class meeting. May be repeated; maximum of 6 credits allowed toward graduation. Pre: public relations majors only; 340, 441, COM 306, and JOR 341. Permission of instructor and application required. Not for graduate credit.

**Religious Studies (RLS)**

*Chairperson:* Professor Foster (Philosophy)

**111 Judaism, Christianity, and Islam (3)**

Comparative study of the teachings, the histories, and the practices of the three religions of Abraham; emphasis on their teachings. (Lec. 3) (L) [D]

**125 Biblical Thought (3)**

Selected portions of the Old and New Testaments with emphasis on their positive contribution to the philosophy of the Jewish and Christian religions. (Lec. 3) (L)

**126 The Development of Christian Thought (3)**

History of religious and philosophical ideas, development of the teachings of Christianity. Emphasis to meet needs and interests of students. Historical nature of material suitable for liberal education without regard to student's religious affiliation. (Lec. 3) (L)

**131 Introduction to Asian Philosophies and Religions (3)**

Introductory study of the main philosophical and religious ideas in Asia, with emphasis on Hinduism, Buddhism, Confucianism, and Taoism. (FC) or (L)

## Resource Development Education (RDE)

Coordinator: Professor Mallilo

### 486 Internship in Agricultural and Extension Education (1–6)

Provides experiential learning opportunities related to agricultural education and/or Cooperative Extension education. (Practicum) May be repeated for a maximum of 6 credits. Not for graduate credit.

## Russian (RUS)

Chairperson: Professor Hedderich

### 101 Beginning Russian I (3)

Introduction to fundamentals of grammar; exercises in speaking, reading, and writing. Emphasis on pronunciation, intonation, and aural comprehension of contemporary spoken Russian. Language laboratory required. (Lec. 3) Pre: no prior Russian is required. Will not count toward the language requirement if the student has studied Russian for more than one year within the last six years. (FC) [D]

### 102 Beginning Russian II (3)

Continuation of 101. Students enrolling in this course should have taken 101 or equivalent. (Lec. 3) (FC) [D]

### 103 Intermediate Russian I (3)

Completion of fundamentals of grammar; exercises in speaking and writing, reading of contemporary texts; emphasis on distinction between spoken and written language. Language laboratory required. Students enrolling in this course should have taken 102 or equivalent. (Lec. 3) (FC) [D]

### 104 Intermediate Russian II (3)

Continuation of 103. Students enrolling in this course should have taken 103 or equivalent. (Lec. 3) (FC) [D]

### 391, 392 Masterpieces of Russian Literature (3 each)

Prose, poetry, and drama from late 18th through 20th centuries in translation. Emphasis on literary movements through textual analysis. Authors range from Pushkin to Pasternak, including Dostoevsky and Tolstoy. (Lec. 3) (A) [D]

### 498 Directed Study (3)

For the advanced student. Individual research and reports on problems of special interest. (Independent Study) Pre: acceptance of project by member and approval of section head.

## Service Learning

*The Feinstein Center for Service Learning recognizes the following courses as having a service learning component. Service learning is an alternative way of both teaching and learning about concepts or theories. All first-year students are introduced to service learning through their required URI 101, Traditions and Transformations course. The purpose of these courses is to help students make meaningful connections between academic course work and societal issues and needs within the community. The service work is profoundly connected to and enhanced by the specific course of study. Depending on the instructor, the service learning component may be an optional or required part of the course content.*

### Community Service (CSV)

101 Introduction to Cultural Competence

102 Cultural Competence Experiences

301 Course-Cased Community Service

### Education (EDC)

456 Mathematics Methods in Elementary Teaching

### Human Development and Family Studies (HDF)

203 Introduction to Work with Children

301 Curriculum in Early Childhood (3)

303 Early Childhood Practicum

434 Children and Families in Poverty

### Landscape Architecture (LAR)

244 Basic Landscape Architecture Design

444 Landscape Architecture Studio III: Sustainable Design

445 Landscape Architecture Studio IV

### Natural Resources Science (NRS)

309 Wildlife Management Techniques

Laboratory

### Nursing (NUR)

324 Medical-Surgical Nursing Practicum

344 Practicum in Childbearing and Reproductive

Health Nursing

346 Practicum in Care of Clients and Families

434 Practicum in Nursing of Children

444 Practicum in Community Health Nursing

532 Practicum in Primary Health Care Nursing I

590 Directed Study and Practice in Advanced Clinical Nursing

### Nutrition and Food Sciences Science (NFS)

394 Nutrition in the Life Cycle I

### Pharmacy Practice (PHT)

340 IPPE I: A Health Care Service Learning

Experience

### Plant Sciences (PLS)

390 Irrigation Technology

### Sociology (SOC)

497 Field Experience in Sociology

### Women's Studies (WMS)

150 Introduction to Women's Studies (some sections)

300 Field Experience in Women's Studies

### Writing (WRT)

304 Writing for Community Service

*In addition to the courses listed above, specific topics in other courses and some temporary courses may also carry the Service Learning designation.*

## Sociology (SOC)

Chairperson: Professor Peters (Sociology and Anthropology)

### 100 General Sociology (3)

Introductory description and analysis of the structure and dynamics of human society. Social norms, groups, intergroup relations, social change, stratification, and institutions. (Lec. 3) (S) [D]

### 204 Social Psychology (3)

Examination of the social basis of self and behavior; emphasis on identity, motivation, attitude, social role, and the symbolic in social life. (Lec. 3)

### 212 Families in Society (3)

Examines the role of families in maintaining and changing society. Emphasis on demographic and historical changes in family life, the diversity of family structures, and connections between the family and the political economy. (Lec. 3/Online) (S) [D]

### 214 Urban Sociology (3)

Introduction to major theories of urbanization; examination of the social, political, and cultural aspects of urbanization and contemporary urban problems such as the population explosion, pollution, class inequality and alienation; emphasis on a global and comparative cross-national perspective. (Lec. 3)

### 216 Deviant Behavior (3)

Examination and analysis of major theories of deviant behavior. Application of these theories to particular types of deviant behavior. (Lec. 3)

### 224 Health, Illness, and Medical Care (3)

Introduction to social factors in the occurrence, distribution, and treatment of illness in society; critical analysis of the social organization of medicine in contemporary American society. (Lec. 3)

### 230 Crime and Delinquency (3)

Survey of the extent, distribution, trends, and costs of delinquency and crime in the United States; examination of selected types of crime and delinquency; policy implications. (Lec. 3/Online) (S) [D]

### 240 (or AAF 240) Race and Ethnic Relations (3)

Relations among the various ethnic, religious, racial, and political minorities and majorities, with special reference to the United States. (Lec. 3) (S) [D] Professor Cunnigen's section is writing intensive [WI].

### 242 Sex and Gender (3)

Current research exploring issues of sex and gender. Socialization, gender role playing, and personal rela-

tionships. Institutional costs of sexism. Prospects for human liberation. (Lec. 3/Online) (S) [D]

### 274 (or PSC 274) Criminal Justice System

The American system of criminal justice, general processing of cases, principal actors, study of theories of criminal law, and pretrial detention and sentencing. (Lec. 3)

### 300 Topics in Sociology (3)

Critical study of selected topics. Subject will vary according to the expertise and availability of instructors. (Lec. 3) Pre: one 100- or 200-level sociology course. May be repeated for credit with different topic.

### 301 Sociological Research Methods (3)

Scientific method in sociological research; emphasis on the development of the ability to construct and evaluate data-based arguments; topics include the nature of evidence, research design, principles and techniques of sampling, data collection and interpretation. (Lec. 3) Pre: 9 credits in SOC. Open only to sociology majors.

### 318 Social Movements and Social Change (3)

Analysis of theoretical perspectives, directions, patterns, and consequences of social change in relationship to social movements. Case studies of social movements with special emphasis on the civil rights movement. (Lec. 3) Pre: 6 credits in sociology.

### 320 Organizations (3)

Explores both formal and informal aspects of organizations from a sociological perspective. Topics include bureaucracy and its consequences; post-bureaucratic and postmodern forms of organization; modern and contemporary theories of organizing and organizations. (Lec. 3) Pre: one 100- or 200-level sociology course. Offered in the spring of even-numbered years.

### 322 The Arts and Social Order (3)

Consideration of the relationship between the arts and socially established meanings, social structure, and societal myths, with special attention to consonant and dissonant functions of the arts for social cohesion. (Lec. 3) Pre: 6 credits in sociology or permission of instructor.

### 326 Madness and Society (3)

Phenomenon of mental disorder considered in light of recent research findings and developments in sociological theory. Mental disorder discussed as an outgrowth of societal processes. (Lec. 3) Pre: 6 credits in sociology or permission of instructor.

### 329 (or APG 329) Contemporary Mexican Society (3)

Examines the social, political, economic, and cultural dimensions of contemporary Mexico. Demographic composition, economic and political development, civil society and women's political participation, indigenous issues and rights, U.S.-Mexico relations and

bilateral issues, and human rights. (Lec. 3) Pre: SOC course at the 200-level or APG 203.

### 330 Police in Democratic Societies (3)

Examines the development of policing, its structures and functions, police discretion and accountability, and current innovations. Focus on the United States with comparisons to other countries. (Lec. 3) Pre: SOC major, junior or senior standing or permission of instructor.

### 331 Punishment and Corrections (3)

An overview and analysis of societal reactions to crime with emphasis on American society. Purposes of criminal sanctions, probation and parole, jails and prisons, capital punishment and its effect. (Lec. 3) Pre: SOC major, junior or senior standing or permission of instructor.

### 336 (or AAF 336) Social Inequality (3)

Dimensions and dynamics of inequality in society; concepts of class and status; processes of social mobility. (Lec. 3) Pre: one 100- or 200-level sociology course. Professor Cunnigen's section is writing intensive [WI].

### 350 Work and Family Life (3)

Linkages between economic and family institutions. Effects of work on family and of family on work. Historical development of the linkages. Contemporary effects due to men's decreasing and women's increasing labor force participation. (Lec. 3) Pre: 100 or 212 or HDF 230.

### 370 Theories of Crime and Delinquency (3)

Historical development of criminological theory; examination of the major sociological and social psychological theories of crime, criminality, and delinquency; evaluation of competing theories. (Lec. 3) Pre: SOC major, junior or senior standing or permission of instructor.

### 401 History of Sociological Thought (3)

Examination of the basic questions and issues that have been the focus of sociological thought; critical analysis of theoretical sociology with an emphasis on the contributions of sociological theory to understanding the structures and problems of modern society. (Lec. 3) Pre: 100 and 6 credits in sociology. Open only to sociology majors.

### 403 Gender, Crime, and Justice (3)

Gender differences in the extent and nature of crime and delinquency; sociological explanations of the gender difference in crime and delinquency; gender differences in formal and informal social control. (Seminar) Pre: 370. Not for graduate credit.

### 408 Individual Life and Social Order (3)

Sociology of the individual as a creative participant in social order. Emphasis on cultural symbolism in the development of personal idiom, social structure, and social change. (Lec. 3) Pre: 9 credits in sociology or permission of instructor.

### 410 Race, Crime, and Criminal Justice (3)

Examination of the involvement of selected racial and ethnic groups in crime, both as victims and offenders; disparity and discrimination in the criminal justice system. (Lec. 3) Pre: SOC major, junior or senior standing or permission of instructor.

### 413 Gender Inequality (3)

Development of gender inequality. Critique of various theories explaining inequality. Sociological interpretation of theories of gender. (Seminar) Pre: 242 or permission of instructor.

### 415 Migration in the Americas

See Anthropology 415.

### 420 Family Violence (3)

Surveys the extent, distribution, trends, and costs of physical, emotional, and economic forms of family violence at individual, dyadic, and cultural levels. (Seminar) Pre: SOC major, junior or senior standing or permission of instructor. Approved for graduate credit.

### 428 (or AAF 428) Institutional Racism (3)

Consideration of varying models of race and ethnic relations; examination of recent research on issues such as residential segregation, school desegregation, affirmative action, and racial disorders; comparisons of United States with other societies. (Seminar) Pre: one 300-level sociology course or permission of instructor. In alternate years.

### 430 (or PSY 430) Intimate Relationships (3)

Examination of the effects of cultural, social, and psychological processes on the development, maintenance, and dissolution of intimate relationships. Emphasis on friendship patterns, dating and marital relationships, intimacy in nontraditional relationships. Emphasis on research. (Lec. 3) Pre: any 100- or 200-level course in sociology or PSY 113 or permission of instructor. Not for graduate credit.

### 432 (or LRS 432) Work, Employment, and Society (3)

Explores the workplace and employment relations from a sociological perspective. Topics include work systems, worker alienation and organization, occupational identity, and the impacts of immigration, feminization, and globalization on the workplace. (Lec. 3) Pre: 100 or permission of the instructor. Offered in the spring of odd-numbered years.

### 437 Law and Families in the United States

See Human Development and Family Studies 437.

### 438 Aging in Society (3)

Analysis of the use of age in assigning roles, age changes over the life course, and the implications of demographic changes for societies. Emphasis upon theories of aging, the status and power of the aged, and relations between age groups. (Lec. 3) Pre: one 300-level course in sociology or permission of instructor.

**444 The Sociology of Religion (3)**

Sociological theory and research in the analysis of interrelationships among religious culture, secular culture, the social structure of religious groups, and general social structure. (Lec. 3) Pre: one 100- or 200-level sociology course.

**446 Sociology of Knowledge (3)**

Theories and research on the social bases of ideas. Emphasis on the works of Durkheim, Mannheim, and Marx and their influences on “common sense” interpretations of social life. (Seminar) Pre: one 100- or 200-level sociology course.

**452 Class and Power (3)**

Class structures and patterns of power in advanced societies; comparisons of inequality in capitalist and socialist societies; theories of the relation between class and power; class consciousness, conflict, and accommodation. (Lec. 3) Pre: 6 credits in sociology.

**476 (or PSC 476) Policy Issues in Criminal Justice (3)**

Examination of current and proposed criminal justice policies in light of social science theory and research, including capital punishment, community policing, gun control, intermediate sanctions, legalization of drugs, mandatory sentencing, privatization of prisons, restorative justice. (Seminar) Pre: SOC major, junior or senior standing or permission of instructor.

**495 Senior Seminar in Sociology (3)**

Critical examination of selected topics in sociology. Particular topics for examination will be selected by the course instructor. Required for students in the B.A. program in sociology. (Seminar) Pre: senior standing; open only to sociology majors. Not for graduate credit.

**497 Field Experience in Sociology (3–6)**

Field experience in an approved government agency or nonprofit organization; practice in applying sociological concepts and methods to the analysis of problems faced by the agency and/or its clients, exploration of career opportunities. (Practicum) Service learning. Pre: junior or senior standing and 6 credits in sociology beyond 100. May be taken for 3 or 6 credits. A maximum of 6 credits may be earned. Not for graduate credit. Open only to sociology majors or with permission of instructor.

**498, 499 Independent Study (3 each)**

Areas of special research not covered in other courses. May be taken as honors courses. (Independent Study) Pre: one 300-level sociology course and permission of instructor.

**505 Public Program Evaluation**

See Political Science 505.

**Spanish (SPA)**

*Section Head:* Professor Manteiga

**101 Beginning Spanish I (3)**

Introduction to Spanish for beginners. (Lec. 3) Pre: no prior Spanish is required. Will not count toward the language requirement if the student has studied Spanish for more than one year within the last six years. (FC) [D]

**102 Beginning Spanish II (3)**

Continuation of 101. Students enrolling in this course should have taken 101 or equivalent. (Lec. 3) (FC) [D]

**103 Intermediate Spanish I (3)**

Reading and discussion of representative authors, grammar review, and continued practice in language skills to broaden understanding of Hispanic culture. Students enrolling in this course should have taken 102 or equivalent. (Lec. 3) (FC) [D]

**104 Intermediate Spanish II (3)**

Continuation of 103. Students enrolling in this course should have taken 103 or equivalent. (Lec. 3) (FC) [D]

**111 Accelerated Elementary Spanish (6)**

Accelerated elementary Spanish equivalent to 101 and 102. Develops basic communication skills in Spanish. Explores the products, practices, and perspectives of Hispanic culture. (Lec. 6) (FC) [D]

**113 Accelerated Intermediate Spanish (6)**

Accelerated intermediate Spanish equivalent to 103 and 104. Develops intermediate communication skills in Spanish. Explores the products, practices, and perspectives of Hispanic culture. (Lec. 6) Pre: 102 or 111 or permission of instructor. (FC) [D]

**205 Spanish Language and Style I (3)**

Advanced-intermediate course for non-heritage speakers of Spanish. Development and refinement of all Spanish language skills, with emphasis on writing, through structured practice using Hispanic cultural and literary material. Students enrolling in this course should have taken 104 or equivalent. Note: Not open to heritage speakers of Spanish. (Lec. 3) (FC) [D]

**206 Spanish Language and Style II (3)**

Continuation of 205. Students enrolling in this course should have taken 205 or equivalent. (Lec. 3) (FC) [D]

**207 Oral Expression in Spanish (3)**

Development of oral skills in Spanish through discussion, interpretation, and reports on topics of personal, practical, and cultural interest. Students enrolling in this course should have taken 205 or equivalent. May be taken concurrently with 206. Note: Not open to native speakers of Spanish (FC) [D]

**210 Spanish for Heritage Speakers (3)**

Fundamentals of Spanish grammar, spelling, and writing designed to address the specific needs of heritage speakers with insufficient academic background in Spanish. Note: Not open to non-native students. (Lec. 3) Offered every semester. (FC) [D]

**305 Early Spanish-American Literature and Culture (3)**

Study of the early development of Spanish-American culture through its literature, from Conquest to Independence. (Lec. 3) Pre: 206 or permission of instructor.

**306 Modern Spanish-American Literature and Culture (3)**

Significant figures and developments in literature, the arts, and society, from Independence to the present. (Lec. 3) Pre: 206 or permission of instructor.

**307 Hispanic Culture Through the 17th Century (3)**

Significant contributions in literature and the arts, from the unique period of coexistence of Christians, Jews, and Muslims through the Golden Age of the 16th and 17th centuries. (Lec. 3) Pre: 206.

**308 Literature and Culture of Modern Spain (3)**

Major figures and developments in Spanish literature, the arts, and society from the 18th century to the present. (Lec. 3) Pre: 206 or permission of instructor.

**310 Field Workshop (1–6)**

Cultural visit to Spain or Hispanic America. Significant monuments and places of interest to the student of literature and civilization will be studied. Lectures supplemented by assigned readings. (Workshop) Pre: 104 or permission of instructor.

**312 Advanced Spanish (3)**

Problematic aspects of Spanish grammar; proper syntax and word usage in speaking, translation, and writing at sophisticated levels; correct reproduction of sounds and intonation patterns. (Lec. 3) Pre: 206 or permission of instructor.

**313 Introduction to Spanish Linguistics (3)**

Introduction to Spanish linguistics with focus on what human languages are and how they are used. Analysis of Spanish phonetics, phonology, morphology, and syntax, along with issues of language variation and bilingualism in Spanish-speaking communities. (Lec. 3) Pre: 312.

**316, 317 Spanish Internship Abroad (3–6)**

Supervised work experience in Spanish-speaking country for advanced language students. (Independent Study) Pre: 321. For credit for the B.A. in Spanish only for students also completing a B.S. in engineering.

**320 Critical Studies in Spanish Cinema (3)**  
Study of major Spanish film genres and of prominent Spanish film directors. Emphasis will vary. Course taught in English. Students counting the course for a major or minor in Spanish are required to do all written work in Spanish and must have credit for 206. (Lec. 3) FLM 101 or equivalent recommended. May be repeated with different topics for a total of 6 credits. (A) (FC) [D]

**321 Spanish for Business and Technology (3)**  
Study of the concepts and terminology of the Spanish language common to the realm of international business and engineering. (Lec. 3) Pre: 206 or equivalent. For credit for the B.A. in Spanish only for students also completing a B.S. in engineering.

**325 Introduction to Literary Genres (3)**  
Presentation of the novel, poetry, drama, and essay as literary genres. Textual commentary and methods of criticism. (Lec. 3) Pre: 206 or permission of instructor. Required for Spanish majors. (A)

**401 Oral and Dramatic Presentation of Hispanic Literature (3)**  
Practice in effective oral communication in Spanish and appreciation of Hispanic literature through analysis and class presentation of drama, poetry, and prose. (Lec. 3) Pre: 325 or permission of instructor.

**413 Spanish Sociolinguistics and Pragmatics (3)**  
Study of Spanish sociolinguistics and pragmatics. Analysis of speech variants or dialects and the factors that determine them. Examination of the use of language in context and the ways in which speakers interpret discourse. (Lec. 3) Pre: any 300-level SPA course or permission of the instructor.

**421 Business Spanish (3)**  
Study of concepts and terminology in the Spanish-speaking business world. (Lec. 3) Pre: credit or concurrent enrollment in a 300-level Spanish course. Not for graduate credit in Spanish.

**430 Castilian Prose of the 16th and 17th Centuries (3)**  
Literary significance of the Renaissance and Baroque periods and an analysis and critical examination of the prose works of the principal writers of this Golden Age of Castilian Literature. (Lec. 3) Pre: 325 or permission of instructor.

**431 Drama and Poetry of the 16th and 17th Centuries (3)**  
Spanish poetry and drama from the early Renaissance through the Baroque. (Lec. 3) Pre: 325 or permission of instructor.

**471 Topics in Latin American Literature and Culture (3)**  
Latin American topics or author not emphasized in other courses. (Seminar) Pre: 325 or permission of

instructor. May be repeated with a change in topic for a maximum of 6 credits.

**472 Topics in Hispanic Literature (3)**  
Topics in Hispanic linguistics not emphasized in other courses. (Seminar) Pre: 325 or permission of instructor. May be repeated with a change in topic for a maximum of 6 credits.

**473 Topics in Spanish Literature and Culture (3)**  
Spanish topics or authors not emphasized in other courses. (Seminar) Pre: 325 or permission of instructor. May be repeated with a change in topic for a maximum of 6 credits.

**481 Don Quijote (3)**  
Life and times of Miguel de Cervantes Saavedra and the reading and critical interpretation of his work, *El ingenioso hidalgo Don Quijote de la Mancha*. (Lec. 3) Pre: 325 or permission of instructor.

**485 Modern Spanish Narrative (3)**  
Representative narrative works by Spain's major authors from the Generation of 1898 to the present. (Lec. 3) Pre: 325 or permission of instructor.

**486 Modern Spanish Poetry and Drama (3)**  
Selected poetry and plays from the 19th century through the present. (Lec. 3) Pre: 325 or permission of instructor.

**488 Spanish-American Poetry and Drama (3)**  
Traces the development of poetic expression and drama from the 17th century to modern times as a reflection of the evolution of Spanish-American identity. (Lec. 3) Pre: 325 or permission of instructor.

**489 The Spanish-American Narrative (3)**  
Traces the development of fictional prose in Spanish America from the colonial period to modern times as a reflection of cultural and societal changes. (Lec. 3) Pre: 325 or permission of instructor.

**497, 498 Directed Study (1–3 each)**  
For the advanced student. Individual research and reports on problems of special interest. (Independent Study) Pre: 325, acceptance of project by faculty member, and approval of section head.

**510 Contemporary Spanish Workshop (3–6)**  
New developments in all areas of Hispanic studies including pedagogical matters and classroom techniques. (Workshop) Pre: graduate standing or permission of instructor.

**511 The Spanish of the Americas (3)**  
Examines linguistic dialect variation within Spanish and the factors that determine it. Individual and social bilingualism and its educational implications are also discussed. (Seminar) Pre: graduate standing or permission of instructor.

**513 Bilingualism in Spanish-speaking Communities (3)**  
Study of bilingualism from perspective of psycholinguistics. Study of different bilingual educational models and programs in the Spanish-speaking world and in the U.S.

**561 Seminar in Medieval Poetry and Prose (3)**  
Examination and analysis of the epic, lyrical, and narrative medieval literature of Spain and its impact on subsequent literature. (Seminar) Pre: graduate standing or permission of instructor.

**570 Topics in Hispanic Literature and Culture (3)**  
Special topics or authors not emphasized in other courses. (Seminar) Pre: graduate standing or permission of instructor.

**572 Evolution of Spanish-American Culture and Thought (3)**  
Development of Spanish-American thought and cultural trends, as portrayed in major works of artists and thinkers. (Lec. 3) Pre: graduate standing or permission of instructor.

**574 Interpretations of Modern Spanish-American Thought (3)**  
Topics of interest in the development of modern Spanish-American thought as represented in the essay from the period of independence to the present. (Seminar) Pre: graduate standing or permission of instructor.

**580 Seminar in 19th-Century Spanish Literature (3)**  
Selected authors and topics from the Spanish Romantic movement through realism and naturalism. (Seminar) Pre: graduate standing or permission of instructor. May be repeated with different topic and permission of instructor.

**584 Interpretations of Modern Spain (3)**  
Development of Spanish thought particularly with respect to sociological and cultural problems from the 18th century to the contemporary period as seen through the writings of significant essayists. (Lec. 3) Pre: graduate standing or permission of instructor. In alternate years.

**585 Seminar in 20th and 21st Century Spanish Literature (3)**  
Topics of aesthetic, cultural, and linguistic concern in 20th century and 21st century peninsular literature. (Seminar) Pre: graduate standing or permission of instructor. May be repeated with different topic and permission of instructor.

**587 Seminar in Renaissance and Baroque Literature (3)**  
Aesthetic analysis of works representative of the period and their influence on subsequent literatures. (Seminar) Pre: graduate standing or permission of instructor. May be repeated with different topic and permission of instructor.

**588 Seminar in Colonial Spanish-American Literature and Culture (3)**

Topics of interest dealing with the development of Spanish-American cultural identity and literature from the period of discovery and colonization to independence. (Seminar) Pre: graduate standing or permission of instructor.

**589 Seminar in Modern Spanish-American Literature and Culture (3)**

Topics of interest dealing with the development of Spanish-American literature and culture from the period of independence to the present. (Seminar) Pre: graduate standing or permission of instructor. May be repeated with different topic.

**590 The Hispanic Presence in the United States (3)**

A study of the establishment of the Hispanic presence and its heritage in the art, folklore, and language of the United States, and an analysis of the literature of the Spanish-speaking peoples. (Lec. 3) Pre: graduate standing or permission of instructor. In alternate years.

**597, 598 Directed Study (3 each)**

Individual research and reports on problems of special interest. (Independent Study) Pre: graduate standing and approval of the director of graduate studies. May be repeated with different topic.

**599 Master's Thesis Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**Statistics (STA)**

*Section Head:* Associate Professor Gonzales

**220 Statistics in Modern Society (3)**

Elementary concepts in sampling, polls, surveys, random samples. Foundations of statistical inference; estimation, comparison prediction. Statistics for the consumer, quality of data, credibility of statistical evidence. Environmental measurements and experiments. (Lec. 2, Rec. 1) (MQ)

**307 Introductory Biostatistics (3)**

Statistical methods applicable to health sciences. Data presentation. Vital statistics and life tables. Fitting models to health data. Testing, estimation, analysis of cross-classifications, regression, correlation. (Lec. 2, Rec. 1) Pre: MTH 107 or 108 or 131 or 141 or permission. Not open to students with credit in 308 or 409.

**308 Introductory Statistics (3)**

Descriptive statistics, presentation of data, averages, measures of variation, skewness, kurtosis. Elementary probability, binomial and normal distributions. Sampling distributions. Statistical inference, estimation, confidence intervals, testing hypotheses, linear

regression, and correlation. (Lec. 2, Rec. 1) Pre: MTH 107 or 110 or 111 or 131 or 141 or BUS 111 or permission. Not open to students with credit in 307 or 409.

**409 Statistical Methods in Research I (3)**

Same as 308 but is for students who have better mathematical preparation. (Lec. 3) Pre: MTH 131 or 141. Not open to students with credit in 307 or 308.

**411 (or PHP 411 or BPS 411) Biostatistics II (3)**

An overview of statistical methods used in performing research in pharmacotherapeutics and pharmacoepidemiology. Emphasis will be on understanding both common study designs and the output from statistical analysis of data obtained from these studies. (Lec. 3) Pre: an introductory statistics course (i.e., 307) or permission of instructor.

**412 Statistical Methods in Research II (3)**

Multiple linear regression and correlation analysis, curvilinear regression. Analysis of variance and covariance. Analysis of enumerative data. Some nonparametric methods. (Lec. 3) Pre: 307 or 308 or 409.

**491 Directed Study in Statistics (1–3)**

Advanced work in statistics. Conducted as supervised individual projects. (Independent Study) Pre: permission of chairperson. S/U credit.

**492 Special Topics in Statistics (3)**

Advanced topics of current interest in statistics. (Lec. 3) Pre: permission of chairperson.

**500 Nonparametric Statistical Methods (3)**

Rank and sign tests, permutation tests and randomization, run test, tests of goodness of fit, order statistics, estimation, and comparison with parametric procedures. Examples illustrating the applications of nonparametric techniques. (Lec. 3) Pre: 409.

**501 Analysis of Variance and Variance Components (3)**

Analysis of variance and covariance, experimental design models, factorial experiments, random and mixed models, estimation of variance components, unbalanced data. (Lec. 3) Pre: 412.

**502 Applied Regression Analysis (3)**

Topics in regression analysis including subset selection, biased estimation, ridge regression, and nonlinear estimation. (Lec. 3) Pre: 412.

**513 Statistical Quality Assurance**

See Industrial and Systems Engineering 513.

**515 Spatial Data Analysis (3)**

Analysis of point patterns: visualizing, exploring and modeling, space time clustering, correcting for spatial variation, clustering around a specific point source. Analysis of spatially continuous data: variogram analysis and Kriging methods. (Lec. 3) Pre: 412 or permission of instructor.

**517 Small N Designs**

See Psychology 517.

**520 Fundamentals of Sampling and Applications (3)**

Simple random sampling; properties of estimates, confidence limits. Sample size. Stratified random sampling; optimum allocation, effects of errors, and quota sampling. Regression and ratio estimates; systematic and multistage sampling. (Lec. 3) Pre: 308 or 409.

**522 Bioinformatics I (3–4)**

See Computer Science 522.

**532 (or ASP 532 or PSY 532) Experimental Design (3)**

Application of statistical methods to biological and psychological research and experimentation. Experimental situations for which various ANOVA and ANCOVA designs are most suitable. (Lec. 3) Pre: 409 or equivalent.

**535 Statistical Methodology in Clinical Trials (3)**

Bioavailability, dose response models, crossover and parallel designs, group sequential designs, survival analysis, meta analysis. (Lec. 3) Pre: 409, 411, or 412 or permission of instructor.

**536 Applied Longitudinal Analysis**

Longitudinal data, linear mixed effects models, repeated measures ANOVA, generalized linear models for correlated data. (Lec. 3) Pre: 411 or 412 or permission of the instructor.

**541 Multivariate Statistical Methods (3)**

Review of matrix analysis. Multivariate normal distribution. Tests of hypotheses on means, Hotelling's  $T^2$ , discriminate functions. Multivariate regression analysis. Canonical correlations. Principal components. Factor analysis. (Lec. 3) Pre: 412.

**542 Categorical Data Analysis Methods (3)**

Analysis of multidimensional categorical data by use of log-linear and logit models. Discussion of methods to estimate and select models followed by examples from several areas. (Lec. 3) Pre: 412.

**545 Bayesian Statistics (3)**

Introduces Bayesian methods for a variety of statistical problems. Topics include Bayesian inference, model selection, Bayesian computation, hierarchical models and Gibbs sampling. Open-source software will be utilized for Bayesian data analyses. Pre: 411 or 412 or permission of instructor.

**550 Ecological Statistics (3)**

Application of statistical methodology to the following topics: population growth, interactions of populations, sampling and modeling of ecological populations, spatial patterns, species abundance relations, and ecological diversity and measurement. (Lec. 3) Pre: 409 or permission of instructor.

**576 Econometrics**

See Environmental Economics 576.

**584 Pattern Recognition**

See Electrical Engineering 584.

**591 Directed Study in Statistics (1–3)**

Advanced work in experimental statistics conducted as supervised individual projects. (Independent Study) Pre: permission of chairperson. S/U credit.

**592 Special Topics in Statistics (3)**

Advanced topics of current interest in statistics. (Lec. 3) Pre: permission of chairperson. May be taken more than once.

**599 Master's Thesis Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**610 Parsimony Methods**

See Psychology 610.

**612 Structural Modeling**

See Psychology 612.

*In addition to statistics courses offered by the Department of Computer Science and Statistics under the STA code, there are a number of statistics-oriented courses offered by other departments:*

**Business**

210 Managerial Statistics I

212 Managerial Statistics II

461 Forecasting

**Industrial and Systems Engineering**

411 Probability and Statistics for Engineers

412 Statistical Methods for Engineers

533 Advanced Statistical Methods for Research and Industry

634 Design and Analysis of Industrial Experiments

**Master of Business Administration**

500 Statistical Methods for Management

582 Applied Time Series Methods and Business Forecasting

**Mathematics**

451 Introduction to Probability and Statistics

452 Mathematical Statistics

550 Probability and Stochastic Processes

551 Mathematical Statistics

**Psychology**

300 Quantitative Methods in Psychology

533 Advanced Quantitative Methods in Psychology

**Sustainability (SUS)**

*Coordinator:* Professor Swift

**108 Spaceship Earth: An Introduction to Systems**

See Communication Studies 108. (EC) or (S)

**315 Environmental Dimensions of Communication**

See Communication Studies 315.

**Textiles, Fashion Merchandising, and Design (TMD)**

*Chairperson:* Professor Bide

**103 Textile Products (3)**

Product knowledge in design, manufacturing, and merchandising within the textile complex. Emphasis on domestic and international issues. Survey of careers in business, industry, government, and research. (Lec. 3)

**113 Color Science (3)**

The science of color: light and its interaction with objects and color vision. Color explained, mixed, measured, described, and reproduced (paints, dyes, photography, TV). Color in the natural world. (Lec. 3) (N)

**126 Introduction to Design (3)**

Elements and principles of design as applied to textiles, apparel, and interiors. Overview of historical design movements. Design vocabulary. (Lec. 3)

**222 Apparel Production (3)**

Analysis of apparel construction and production; current industrial and technological developments. Discussion of sizing and quality standards with emphasis on identification of fabrics, garment styles, findings, and trims. (Lec. 3/Online) Pre: 103.

**224 Culture, Dress, and Appearance (3)**

Analysis of social, psychological, and cultural factors in the creation, maintenance, and use of human appearance. Focus on dress and appearance as a communication system from cross-cultural and international perspectives. (Lec. 3) (FC) or (S) [D]

**226 Interior Design (3)**

Fundamentals of interior design: color, lighting, and design of residential and commercial spaces. (Lec. 3) Pre: ART 101 or 207 or ARH 120 or 251 or 252, TMD 103 and 126. 126 is not required until spring 2012.

**232 Fashion Retailing (3)**

A comprehensive study of fashion retailing as an operating system. Examination of the strategies and the organizational structure that support the fashion retail system. (Lec. 3/Online)

**240 Development of Contemporary Fashion (3)**

History of contemporary fashion from the beginning of the 20th century to the present. Influence of designers, buyers, consumers, and technology on fashion in the marketplace. (Lec. 3) Pre: 103, 126, and sophomore standing. 126 is not required until fall 2012.

**303 Textile Science (3)**

The primary textile industry: fiber to finished fabric. Textile fibers and their properties; yarns, fabric construction, dyeing, finishing, and printing. (Lec. 3) Pre: TM or TMD majors admitted to the College of

Human Science and Services with junior standing and credit in CHM 105. TMD 313 must be taken concurrently.

**313 Textile Science Laboratory (1)**

Laboratory exercises in fiber identification, fabric analysis, and fabric performance testing, dyeing, and finishing. (Lab. 2) Students must be admitted to the degree-granting college (HSS) as TMD or TM majors, and concurrently enrolled in 303.

**325 Apparel I (4)**

Principles of garment production as related to construction, fit, performance, quality, and cost. Construction techniques, sizing, material evaluation, and assembly management. Quality analysis and introduction to computer-aided design. (Lec. 2, Lab. 4) Pre: 103.

**327 Apparel Design (3)**

Design principles as applied to contemporary clothing with emphasis on various age groups and special populations. Laboratory experiences concentrate on the creative process and development of illustrative techniques. (Lec. 2, Lab. 2) Pre: ART 101 or 207 or ARH 120 or 251 or 252 and TMD 126, 222 or 325. 126 is not required until fall 2012.

**332 Fashion Merchandise Buying (3)**

The theory of fashion merchandising and its application to basic retailing procedures, the responsibility of the buyer, and procedures used to determine consumer demand, merchandise selection, and pricing. (Lec. 3) Pre: 103, 224, and 232.

**335 Apparel II (3)**

Application of flat pattern design. Special emphasis on sloper development and pattern drafting. Creative laboratory processes from design to finished product. (Lec. 2, Lab. 2) Pre: 325 or permission of instructor.

**342 Fashion Study Tour (1)**

Students spend two weeks overseas during intersession studying the apparel and/or interior furnishings market in London and Paris. Lectures and tours by designers, manufacturers, and retailers. Students may register once in apparel and once in interior furnishings. Travel costs are extra. (Practicum) Pre: 126, junior standing or permission of instructor. 126 is not required until fall 2012.

**345 CAD Apparel Design (3)**

Application of flat pattern design using computer-aided design techniques as related to sloper development, sizing, and pattern manipulation. Creative laboratory processes from design to finished product. (Lec. 2, Lab. 2) Pre: 335 or permission of instructor.

**346 Computer-Aided Textile and Apparel Design (3)**

Development and production of textile and apparel designs and patterns using selected computer software packages. Implications for use in the apparel

industry. (Lec. 1, Lab. 4/ Online) Pre: 327 or permission of instructor.

### 355 Draping for Apparel (3)

Application of draping techniques for apparel pattern making and design. Includes sloper development and draping in fashion fabric. Creative laboratory processes from design to finished product. (Lec. 2, Lab. 2) Pre: 335 or permission of instructor.

### 358 Weaving (3)

Introduction to hand weaving including on-loom and off-loom techniques. Designing, drafting, warping, and finishing of various types of weaves. Students complete samplers and projects. (Lec. 1, Lab. 4)

### 361, 362 Special Problems (1–4 each)

Open to qualified juniors and seniors who wish to do advanced work. (Independent Study) Pre: approval of application by instructor and chairperson. May be repeated for a maximum of 6 credits.

### 402 Seminar in Textiles and Clothing (1–2)

Recent developments in manufacturing, marketing, and retailing of textile products. Discussion of fashion issues and impact on consumer. Lectures by speakers from business, industry, and government. (Lec. 1–2) Pre: TM or TMD majors admitted to the College of Human Science and Services with junior or senior standing or permission of instructor. May be repeated once.

### 403 Textile Performance (3)

Analysis of textiles using test methods and standards adopted by government, industry, and buyers to insure consumer satisfaction. Interpretation of test data in relation to consumer expectations and performance claims. (Lec. 2, Lab. 2) Pre: 103 and 303 or permission of instructor.

### 413 Dyeing and Finishing of Textiles (3)

Study of chemical and physical interactions of dyes and finishes with textile fiber/fabric systems. Evaluation of application techniques. Detection and evaluation of problems resulting from dyeing and finishing. (Lec. 2, Lab. 2) Pre: 303 or permission of instructor.

### 424 Fashion Theory and Analysis (3)

Principles, theories, and recent investigations of the fashion process are presented to develop analytical skills for evaluating consumer behavior, as related to clothing and adornment. Application to contemporary trends. (Lec. 3) Pre: senior or graduate standing.

### 426 Historic and Contemporary Furniture (3)

Review of major historical styles of furniture and their influence on contemporary furniture design. Materials, styles, and construction of contemporary furniture. In-depth study of upholstery fabrics. (Lec. 3) Pre: 103, 226.

### 427 Portfolios and Presentations (3)

Students create design portfolios using traditional media and digital techniques. Development of

original ideas in sketches and technical flats. (Lec. 2, Lab. 2) Pre: 327 or permission of instructor. Not for graduate credit.

### 432 Fashion Retail Supply Chain Management (3)

Comprehensive understanding and analysis of fashion retail organization management including financial merchandising management, product development and supply chain management in the fashion industry. Emphasis on implications for retail organization management. (Lec. 3) Pre: 232 and 332.

### 433 Textile Markets (3)

Study of social, economic, and political issues that affect the development, production, and marketing of textile products. Study of the textile needs of the apparel, home furnishings, industrial, and medical industries. (Lec. 3/Online) Pre: 303 and ECN 201 and 202.

### 440 Historic Textiles (3)

Chronological study of textiles, emphasizing socio-economic, religious, and political influences. Contribution of designers, inventors, trade groups, and industrialists. (Lec. 3) Pre: 303 and 313 or permission of instructor.

### 441 History of Western Dress (3)

Study of western dress from earliest civilizations to early 20th century and factors that affect design, production, and use; material culture analysis of a pre-20th century garment or accessory. (Lec. 3) Pre: 303 and 313 or permission of instructor.

### 442 Fashion Promotion (3)

Emphasis on understanding and applying the principles of fashion retailing communication. Evaluation and application of effective promotional activities such as visual merchandising and fashion shows to trade and retail levels of fashion merchandising. (Lec. 3) Pre: 126, 232 and 332 or permission of instructor. 126 is not required until fall 2013.

### 452 Consumer Behavior in Fashion Retailing (3)

Use by fashion retailing management of explanatory and predictive models of consumer behavior relating to fashion merchandising in establishing retail policy and strategy. (Lec. 3) Pre: 232 and 332 or permission of instructor.

### 461, 462 Internship (1–6)

Structured internship in textiles, apparel, or interior design supervised by a faculty advisor. Juniors and seniors work in business, industry, or other agencies under supervision of qualified personnel. (Minimum of 45 hours per semester per credit) May be repeated for a maximum of 12 credits. Pre: completion of 60 credits, minimum GPA of 2.50, and permission of instructor and chairperson. Not for graduate credit.

### 500 Ethnic Dress and Textiles (3)

Survey of regional styles of dress and textiles from all areas of the world, excluding fashionable dress. Influence of social, economic, technological, and aesthet-

ic factors. (Lec. 3) Pre: 224 or equivalent, 440, 441 or permission of instructor. In alternate years.

### 503 Topics in Textile Science (3)

Advanced study in a particular area of textile science. One topic will be studied from a list that includes dyeing, finishing, printing, polymer and fiber chemistry, dyestuff chemistry, and color science. (Lec. 2, Lab. 2) Pre: graduate standing, 303 or equivalent, or permission of instructor. May be repeated up to three times with different topics.

### 510 Research Methods in Textiles (3)

Application of research methodology to the study of textiles and clothing. Approach is multidisciplinary in that experimental, social science, and historic methods are covered. (Lec. 3) Pre: graduate standing or permission of instructor.

### 513 Detergency (3)

Study of composition and function of surfactants and additives in laundry detergents for home, industrial, and institutional applications; effect of fabric, water, and soil on cleaning; evaluation of laundry products. (Lec. 2, Lab. 2) Pre: graduate standing, 303 or equivalent, or permission of instructor. In alternate years.

### 518 Introduction to Textile Conservation (3)

Survey of methods used to analyze, clean, repair, store, and exhibit historic textiles and apparel. Laboratory experience in conservation practices. (Lec. 2, Lab. 2) Pre: a textile science course and historic textiles or costume course, or permission of instructor.

### 524 Cultural Aspects of Dress (3)

Seminar in social, psychological, and cultural aspects of dress. Symbolic interaction and other dress-relevant theories concerning individual motivation and group interaction. (Seminar) Pre: 224 or permission of instructor.

### 528 Cleaning Historic Textiles (1)

Application of aqueous and solvent cleaning treatments used by textile conservators on historic and ethnographic textiles and apparel. (Lab. 2) Pre: 518 and concurrent enrollment in 513, or permission of instructor. In alternate years.

### 530 Historic Textile Internship (2–4)

Supervised internship designed to introduce the student to management of textile and costume collections in a museum or historical society setting. Individually designed to suit student needs: conservation, education, and research. (Practicum) Pre: 510, 518, graduate standing in textiles, fashion merchandising, and design, or permission of chairperson.

### 538 Repair and Stabilization (3)

Study of repair and stabilization practices used by textile conservators; evaluation of materials and techniques for treating damaged objects. (Lec. 2, Lab. 2) Pre: 518, experience in textile conservation, or permission of instructor. In alternate years.

**540 Special Problems in Textiles and Clothing (3)**

Supervised independent study in specific areas of textiles and clothing. (Independent Study) Pre: permission of chairperson. May be repeated once.

**548 Exhibition and Storage of Historic Textiles (3)**

Study of how light, temperature, humidity, and stress affect textiles and apparel; review of exhibition and storage techniques and materials; preparation of an exhibition for the Textile Gallery. (Lec. 2, Lab. 2) Pre: 518, experience in textile conservation and exhibition, or permission of instructor. In alternate years.

**558 Topics in Textile Conservation (1–3)**

Investigation of textile conservation theory and methodology. Some topics will include laboratory assignments. (Lec. 1–3) Pre: 518 or experience in textile conservation, and permission of instructor. May be repeated with different topic.

**568 Special Problems in Textile Conservation (1–3)**

Supervised independent studies on specific textile conservation projects or research. (Independent Study) Pre: 518 or experience in textile conservation, and permission of instructor. May be repeated for a maximum of 6 credits.

**570 Topics in Historic Textiles or Costume (3)**

Advanced study in a particular area of historic textiles or costume using artifactual and documentary primary sources. Use of historic textile and costume collection. (Lec. 3) Pre: 440, 441 or equivalent. May be repeated for a maximum of 6 credits.

**580 Curatorship (3)**

Supervised experience planning and mounting an exhibition in URI Textile Gallery. Student identifies a theme, selects artifacts, writes proposal, prepares objects, writes labels and promotional materials, and helps install exhibit. (Practicum) Pre: 518 and permission of instructor, 548 recommended.

**599 Master's Thesis Research**

Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

**Thanatology (THN)**

*Coordinator:* Associate Professor Hames (College of Nursing)

**360 Impact of Death on Behavior**

See Nursing 360.

**390 Directed Study**

See Nursing 390.

**421 Death, Dying, and Bereavement**

See Human Development and Family Studies 421.

**471 Responding to Grief**

See Human Development and Family Studies 471.

**506 Independent Study (2–6)**

See Nursing 506.

**523 Contemporary Thanatology (3)**

See Nursing 523.

**524 Exploring Loss Through Creative Arts Therapy**

See Nursing 524.

**525 Spirituality of Loss and Death for the Helping Professions**

See Nursing 525.

**526 Loss Across the Life Span**

See Nursing 526.

**529 Special Topics in Thanatology**

See Nursing 529.

*In addition, special courses, topics and directed studies in thanatology may be offered by the Departments of Human Development and Family Studies, Writing, Political Science, and Philosophy, the College of Nursing, and the Honors Program.*

**Theatre (THE)**

*Chairperson:* Associate Professor McGlasson

*Courses in theatre offer theory, production, design, and performance training in various areas of dramatic arts, and many are open to nonmajors. The Theatre Department conducts open auditions and makes performance and production work available to all members of the URI community.*

**100 Introduction to Theatre (3)**

Designed to provide students with a theoretical and practical understanding of the theatrical process as well as to develop critical standards and increase the enjoyment of theatre as an art. (Lec. 2, Lab. 4) Not open to theatre majors. (A)

**111 Introduction to Acting (3)**

Designed to initiate students to theatre as a collaborative art through systematic exposure to the principles and techniques of acting. (Studio 6)

**112 Introduction to Acting II (3)**

To expand the work of 111 (exercise for relaxation, concentration, imagination) with character work on a monologue and scene complemented by intense work on voice, text, and movement. (Lec. 2, Lab. 2) Pre: 111.

**161 Introduction to Stagecraft (3)**

Stage carpentry, rigging, properties, scene painting, and lighting mechanics with practical experience working on productions. (Lec. 2, Lab. 2)

**181 Script Analysis (3)**

Analysis of plays from varying perspectives of the actor, director, and designer. Course emphasizes theatre terminology and develops a working vocabulary. (Lec. 3) (A)

**182 Script Analysis for Film Media (3)**

Understanding scripts through analysis of structure, character, language, genre, and style and their evolution from page to film. Scripts, videos, and DVDs will be studied. (Lec. 3)

**211, 212 Basic Acting I, II (3 each)**

Introduction to the theory and basic techniques of acting. Includes moment-to-moment improvisation, the reality of doing, fantasy work, and voice and movement. (Studio 6) Pre: (for 211) 111, 112, and concurrent enrollment in 213. 212: Continuation of 211. Pre: 211.

**213 Acting Workshop (1)**

A voice-movement workshop to be taken concurrently with 211. (Studio 2) Pre: concurrent enrollment in 211.

**214 Acting Workshop (1)**

A voice-movement workshop to be taken concurrently with 212. (Studio 2) Pre: concurrent enrollment in 212.

**217 The Role of Music in Theatre (3)**

Perspectives on music and its relationship and application to the theatre for theatre students. Musical vocabulary, performance techniques, and conventions related to the theatre. Emphasis on relationship of music and musical performance to all aspects of theatrical production. (Studio 6) Pre: permission of instructor. May be repeated for a maximum of 6 credits with permission of instructor.

**221 Stage Management (3)**

Theoretical and practical study of the basic methods and procedures of the production with emphasis on the director-stage manager relationship and the role of each. Participation in productions required. (Lec. 2, Lab. 2)

**227 Dance for Musical Theatre (3)**

Orientation and instruction in beginning dance for the musical stage. Dance vocabulary in jazz, ballet, tap; performance techniques and conventions related to the American musical. (Studio 6) Pre: theatre major or permission of instructor. May be repeated once with permission of instructor.

**237 Stage Combat (3)**

Fundamental principles of safety, form, choreographic conception, and execution. Unarmed combat included. Eventual application in a performance environment geared to beginning and advanced students. (Studio) Pre: permission of instructor.

**250 Costume Laboratory (3)**

Practical experience in the principles of costuming including construction and finishing techniques, and experience working on a theatrical production. (Lec. 1, Lab. 4)

**261 Introduction to Theatre Design (3)**

Introduction to theatre production design with emphasis on development of capabilities for expression in conceptual and graphic terms. Projects in stage scenery, costumes, and lighting. (Lec. 2, Lab. 2)

**291 Production Laboratory (1)**

Orientation and instruction in theatre through tutored participation in crews and production assignments or projects for departmental productions. (Independent Study) May be repeated for credit.

**300 Individual Problems in Theatre Studies (1–3)**

Individual theatre work on an approved project under supervision of a faculty member. (Independent Study) May be repeated for a maximum of 6 credits.

**301 Special Group Studies (1–3)**

Group theatre work in approved production projects under supervision of a faculty member. (Independent Study) May be repeated for a maximum of 6 credits.

**307 Creative Dramatics (3)**

Explores purposes, techniques, and benefits of drama in the K–12 classroom. Theory and practice of creative dramatics, methodologies, and activities. Teaching practicum in and out of the class to develop utilization of creative drama to teach a variety of skills. (Lec. 2, Lab. 2)

**311, 312 Intermediate Acting I, II (3 each)**

311: Continuation of Basic Acting with emphasis on approaches to characterization through improvisation and through the analysis and performance of assigned scenes. (Studio 6) Pre: 212; concurrent enrollment in 313. 312: Continuation of 311. (Studio 6) Pre: 311; concurrent enrollment in 314.

**313 Acting Workshop (1)**

A voice-movement workshop to be taken concurrently with 311. (Studio 2) Pre: concurrent enrollment in 311.

**314 Acting Workshop (1)**

A voice-movement workshop to be taken concurrently with 312. (Studio 2) Pre: concurrent enrollment in 312.

**321 Orientation to Play Direction (3)**

Director's role in the process of theatre production. Emphasis on development of production concepts and rehearsal techniques. (Lec. 2, Lab. 2)

**322 Play Direction (3)**

Practical course in play direction. Class functions as a production unit and mounts a season of one-act plays. (Practicum: minimum of 6 hours per week) Pre: 321 and permission of instructor.

**331 Playwriting (3)**

Analysis and evaluation of written material supplemented by play readings and workshop tryouts of students' plays. (Lec. 2, Lab. 2)

**341 Theatre Management (3)**

Principles, terminology, and practical technique of theatre administration. Assignments will be made to departmental productions. (Lec. 2, Lab. 2)

**350 Makeup (1)**

Principles and techniques of stage makeup. Practical experience in application through a number of projects in developing character makeups with prosthetics, wigs, and facial hair. (Studio 2) Open to senior theatre majors only. Others by permission of instructor.

**351, 352 Principles and Theories of Theatrical Costuming I, II (3 each)**

351: Analytical study of fashions, modes, and manners in Western civilization as required for modern theatrical production; early recorded history to the Renaissance. (Lec. 3) 352: Continuation of 351; the Renaissance to the present. (Lec. 3) (A) [D]

**355 Stage Costume Design (3)**

Costume design theories and techniques for modern and period plays in a wide variety of styles. (Studio 6) Pre: 261 and 351 or 352 or permission of instructor.

**362 Scene Painting (3)**

Problems in scene painting, including use of color, basic techniques in scenic art such as texturing, trompe l'oeil, work from design elevations, carving, and some work in plastics. (Studio 3)

**365 Scene Design (3)**

Theories and techniques of scenic design, emphasizing conceptualization and development of stage setting through project designs for various stage forms, production styles, and periods. (Studio 6) Pre: 261 or permission of instructor.

**371 Stage Lighting (3)**

Theories and techniques of lighting for the stage. A series of design projects and lab work introduces students to script analysis and conceptualization for lighting, instrumentation, and the use of color in stage lighting. (Lec. 2, Lab. 2)

**381 History of Theatre to 1642 (3)**

General history of the theatre from its origins through the Renaissance. Introduction to non-Western drama of the period. Course focuses on the actor, staging, and the audience as they have influenced the development of the theatre and dramatic literature. (Lec. 3) (A)

**382 History of Theatre: Neoclassical Through the 19th Century (3)**

Course includes non-Western drama of China, Japan, and Korea. Continuation of 381. (Lec. 3) (A)

**383 History of the Modern Theatre (3)**

Modern theatre and drama from 1880 to the present. Course includes new European stagecraft and its influence on the development of modernist and

postmodernist drama, and contemporary non-Western drama. (Lec. 3) (A)

**384 American Theatre History (3)**

Origins and development of American theatre from the wilderness to the contemporary Broadway and off-Broadway stage, including the evolution of the musical play. Analysis of special contributions made by the grassroots movement, the university theatres, the Federal Theatre Project, and the regional theatre movement. (Lec. 3)

**391 Advanced Production Laboratory (1–2)**

Advanced instruction in theatre through tutored participation in crews and production assignments or projects for departmental productions. (Independent Study) May be repeated for credit.

**400 Advanced Individual Problems in Theatre Studies (1–3)**

Advanced individual theatre work on an approved project under supervision of a faculty member. (Independent Study) May be repeated for a maximum of 6 credits. Not for graduate credit.

**401 Advanced Special Group Studies (1–3)**

Advanced group theatre work in approved production projects under supervision of a faculty member. (Independent Study) May be repeated for a maximum of 6 credits. Not for graduate credit.

**411, 412 Scene Study (3 each)**

Emphasis on the analysis and interpretation of assigned scenes representative of the major theatrical genres and styles. (Studio 6) Pre: for 411, 312, and permission of instructor and concurrent enrollment in 417; for 412, 411 and concurrent enrollment in 418. Not for graduate credit.

**413 Special Workshop in Acting (3)**

Techniques related to a specific aspect or style of performance; e.g., masks, puppetry, verse-speaking, and improvisation. The study is normally related to a departmental production or special project. (Studio 6) Pre: permission of instructor. May be repeated for a maximum of 6 credits. Not for graduate credit.

**415 Professional Internship (6–12)**

Designed for junior and first-semester senior theatre majors who desire a professional experience. This program provides instruction and practical experience in cooperation with a faculty advisor and a professional theatre. (Practicum) Pre: permission of chairperson. Not for graduate credit.

**417 Acting Workshop (1)**

A voice-movement workshop to be taken concurrently with 411. (Studio 2) Pre: concurrent enrollment in 411. Not for graduate credit.

**418 Acting Workshop (1)**

A voice-movement workshop to be taken concurrently with 412. (Studio 2) Pre: concurrent enrollment in 412. Not for graduate credit.

**420 Advanced Directing Practice (1–3)**

Special projects for the advanced directing student. Student directors will assume production responsibilities for all aspects of their projects, including a critical analysis upon completion. Weekly tutorial required. (Independent Study) Pre: 321, 322, or equivalent and permission of instructor. Not for graduate credit.

**441 Advanced Theatre Management (3)**

Individual projects of theatre management in a major departmental production or project. (Practicum) Pre: 341. Not for graduate credit.

**451 Stage Costume Technology (3)**

Construction methods and techniques appropriate to stage costuming with emphasis on major theatrical periods and productions. (Studio 6) Pre: 351 or 352 or permission of instructor. May be repeated for a maximum of 6 credits. Not for graduate credit.

**455 Advanced Costuming (1–3)**

Individual projects in costume design for studio or major productions. Styles and theory related to projects; costume sketches and construction. (Independent Study) Pre: 355 or permission of instructor. Not for graduate credit.

**463 Special Workshop in Design and Technical Theatre (3)**

Techniques related to a specific aspect or style of production; e.g., masks, puppetry, wig making, sound effects, projections, properties. Normally related to a departmental production or special project. (Lab. 6) May be repeated for a maximum of 6 credits. Not for graduate credit.

**465 Advanced Scene Design (1–3)**

Individual projects in designing scenery for studio and major productions. (Studio 2–6) Pre: 365 and permission of instructor. Not for graduate credit.

**475 Advanced Stage Lighting (1–3)**

Individual projects in lighting design and control for studio and major productions. (Studio 2–6) Pre: 371 and permission of instructor. Not for graduate credit.

**481 Topics in Theatre (3)**

Selected topics in theatre. (Seminar) May be repeated for credit with different topic.

**484 Special Research Project (3)**

An in-depth study of a single critical or historical aspect of theatre. The subject is normally related to a departmental production. (Independent Study) Pre: upper-division standing. May be repeated for a maximum of 6 credits. Not for graduate credit.

**499 Senior Seminar (1)**

A capstone seminar for the graduating Theatre Major. Content will be developed to assist in the transition from the educational realm to the professional world with Portfolio development and assessment as integral experience. (Seminar) Pre: senior standing and major or minor in theater.

**University of Rhode Island  
Freshman Seminar (URI)**

*Coordinator:* Dean Richmond

**101 Traditions and Transformations: A Freshman Seminar (1)**

Introduces first-year students to the traditions of higher education and academic culture and to significant societal and personal issues that bear on developing goals for the undergraduate years. Required of all new freshmen and new transfer students with less than 24 credits. May not be repeated for credit.

**101B Traditions and Transformations**

[for B.G.S. students] may be taught online.

*Note: The community service component of URI 101 is part of the Feinstein Enriching America Program.*

**Women's Studies (WMS)**

*Director:* Assistant Professor Lisberger

**150 Introduction to Women's Studies (3)**

Images of women, the theories and processes of socialization, historical perspectives, and implications for social change. (Lec. 3/Online) Service learning in some sections. (S) [D]

**220 Women and the Natural Sciences (3)**

An interdisciplinary perspective on women as practitioners and subjects of the natural sciences; history of women in science; science as a gendered discourse. (Lec. 3) (L) [D]

**300 Field Experience in Women's Studies (2–6)**

Supervised field work allowing students to learn through direct personal experience about the background, problems, and concerns of particular populations of women. (Practicum) Service learning. Pre: 150 or 315 or permission of instructor. May be taken or repeated for a maximum of 6 credits.

**301 Women's Professional Development and Leadership (3)**

Theory, data, and skill development for career building and leadership. Gender issues in organizational settings, developing professional skills and responses to challenges in the workplace, and strategies for positive change. (Lec. 3/Online)

**305 Current Issues in Women's Studies (1)**

Research and analysis of one issue such as job discrimination or sex trafficking. Class plans a project addressing the issue. (Lec. 1) Pre: 150. May be repeated once if topic changes.

**306 Practicum in Women's Studies (1)**

Practicum. Students work alone or in groups to conduct a project developed in 305. May be repeated once if topic changes. (Lec. 1) Pre: 305.

**310 Race, Class, and Sexuality in Women's Lives (3)**

Interconnections among race, ethnicity, class, and sexuality and the impact of sexism, racism, classism, and heterosexism on women's lives are investigated. Alliance building among women is explored. (Lec. 3) Pre: 150 or 315 or permission of instructor.

**315 Introduction to Feminist Theories and Methodologies (3)**

Development of feminist thought, exploration of contemporary feminist theories and research methods, including African-American, lesbian, Western and non-Western perspectives, and the future role of feminist theories and methodologies. (Lec.3/Online) Pre: 150 or permission of instructor. (L) [D]

**317 (or ENG 317) Contemporary Women Novelists of the Americas (3)**

Novels by contemporary women writers from the American continents. Topics include construction of the female body, sexuality and desire, motherhood, exile and immigration, women and work. (Lec. 3) (A) or (L) [D]

**320 Feminist Thought into Action (3)**

Analysis and discussion of how feminist thought has been transformed into action for social change. Women's civil and human rights. Political thought, analysis, and activism in campaigns for women's rights. Pre: 150 or permission of instructor. (L) or (S) [D]

**325 International Women's Issues (3)**

Focuses on women's rights in a global context, ideologies and practices that deny women equal status in society, including violence against women, freedom and democracy movements, and women's rights. (Lec. 3) Pre: 150 or permission of instructor. (L)

**350, 351 Special Topics in Women's Studies (3)**

Selected areas of study pertinent to women's studies. Instruction may be offered in class seminar or tutorial environments according to specific needs and purposes. (Lec. 3/Online) 350, 351 topics include "Media Images of Women," "Narrative of the Witch," "Women and Aging," "Women and Health," "Women and the Law," "Women and Music," "Women and Religion," "Women and Business Culture," "Ecofeminism," "Latin American Women," "Native American Women," "Women and Film," "Women, Violence and Non-violence," "Women and Mental Health" and "Violence Prevention Training." Some topics may be offered online. May be repeated with different topic.

**360 Men and Masculinities (3)**

Examines from a feminist perspective the values, beliefs, myths, realities, research, and writings about men and masculinities in contemporary United States life. (Seminar/Online). Pre: 150.

**361 Women's Lives in New England, 1790–1930**  
See History 361.

**365 Sexual Victimization (3)**

Analysis of a range of victimizations, based on gender and sexualities. Consideration of heterosexist and homophobic reactions through such acts as bullying, harassment, abuse, and assault; intersections with age, race, and gender. (Seminar) Pre: 150 or permission of instructor.

**370 Sex Trafficking (3)**

Focuses on the commercial sexual exploitation and slavery of women and girls and the impact on their health, rights, and status in society. (Lec. 3/Online) Pre: 150 or permission of instructor.

**385 Women Writers**

See English 385.

**386 The Economics of Race, Gender, and Class**

See Economics 386.

**387 Latin American History at the Movies**

See History 387.

**400 Critical Issues and Feminist Scholarship (3)**

Theoretical and value questions in women's studies; impact of feminist scholarship on traditional disciplines; feminist theory and research methods in selected fields; the future of feminism. (Seminar) Pre: 315 or 310 or 320 and senior standing or permission of instructor.

**401 Human Trafficking and Contemporary Slavery (3)**

Focuses on contemporary human trafficking and slavery, including sex trafficking, bonded labor, forced labor, child soldiers, and domestic servant slavery. (Lec. 3) Pre: junior standing or permission of the instructor. Not for graduate credit.

**402 Campaigns and Services for Victims of Trafficking and Slavery (3)**

Focuses on historical and contemporary campaigns for ending human trafficking and slavery and on providing services to contemporary victims of human trafficking and slavery. (Lec. 3/Online) Pre: junior standing or permission of instructor. Not for graduate credit.

**410 Portfolio in Women's Studies (1)**

Portfolio of student papers and projects as culmination of women's studies course work. (Lec. 1) Pre: WMS majors and minors in senior year. Not for graduate credit.

**430 Women and Human Rights Policy (3)**

Focus on women and human rights around the world and human rights policy in the U.S. The human rights movement from the 1970s to the present will be discussed. (Lec. 3/Online) Pre: junior standing.

**450 Independent Study (3)**

Advanced work in women's studies under the direction of a faculty member affiliated with the women's studies program. (Independent Study) Pre: junior or

senior standing. May be repeated for a maximum of 6 credits.

**490 Advanced Topics in Women's Studies (1–3)**

Advanced study in topics of special interest in women's studies. This course will be conducted as a seminar for juniors, seniors, and graduate students. Pre: 315 or 310 or 320 and senior standing or permission of instructor. (Seminar) Some topics may be offered online. May be repeated with different topic.

**500 Colloquium in Women's Studies (2–3)**

Discussion of research methods in women's studies; presentations on current research and issues relevant to women's and gender studies.

**501 Human Trafficking and Contemporary Slavery (3)**

Focuses on contemporary human trafficking and slavery, including sex trafficking, bonded labor, forced labor, child soldiers, and domestic servant slavery. (Lec. 3) Pre: graduate standing or permission of instructor.

**502 Campaigns and Services for Victims of Trafficking and Slavery (3)**

Focuses on historical and contemporary campaigns for ending human trafficking and slavery and on providing services to contemporary victims of human trafficking and slavery. (Lec. 3) Pre: 501 or permission of instructor.

*Following are related courses offered by various departments of the University.*

**African and African-American Studies**

290 African-American Women: Service, Community, and Self

**Anthropology**

310 Gender and Culture

**Art History**

385 Women in Art

**Business Administration**

346 Women in Business and Management

**Communication Studies**

345 Gender and Communication

**Community Service**

303 Service in the Community

**English**

260 Women and Literature

**History**

118 Women in European History

145 Women in the North American Colonies and the United States, 1500–1890

146 Women in the United States, 1890–Present

308 Between Eve and Mary: Women in the Middle Ages

351 Historical Perspectives on Women and Health

352 Topics in the History of Women and Gender

355 Black Women in the U.S.: Colonial Times to the Present

376 Women in Muslim Societies

391 Directed Study or Research (when the topic is women)

**Human Development and Family Studies**

230 Marriage and Family Relationships

298 Contemporary Issues in Student Development

430 Family Interaction

432 Perspectives on Parenting

433 Family Life Education

437 Law and Families in U.S.

505 Human Sexuality and Counseling

559 Gender Issues in Therapy

**Kinesiology**

475 Gender Issues in Sport and Physical Culture (3)

555 Women in Sport: Issues and Controversies

**Nursing**

150 Human Sexuality

459 Perspectives on Male and Female Sexuality

**Philosophy**

210 Women and Moral Rights

**Political Science**

441 Women and Politics

**Psychology**

430 Intimate Relationships

466 Child Sexual Abuse

480 Psychology of Women

**Sociology**

212 Families in Society

242 Sex and Gender

403 Gender, Crime, and Justice

413 Gender Inequality

420 Family Violence

430 Intimate Relationships

**Textiles, Fashion Merchandising and Design**

224 Culture, Dress, and Appearance

*In addition, special topics may be offered by other departments.*

**Writing (WRT)**

*Chairperson:* Professor Reynolds

**100 Introduction to College Writing (2)**

Practice in topic development, research techniques, documentation and attribution, and process-based writing. Focuses on thesis statements, topic sentences, paragraphing, coherence, and syntax. (Lec. 2) Pre: admission to Talent Development's pre-matriculation program.

**104 Writing to Inform and Explain (3)**

Writing emphasizing the sharing of information. Varieties and strategies of expository writing for differing audiences and situations. Genres may include reports, proposals, letters, reviews, Web sites, academic essays. (Lec. 3) Not open to students with credit in 105 or 106. (ECw)

**105 Forms of College Writing (3)**

Practice in writing papers frequently assigned in introductory and general education courses across the curriculum. May include summaries, syntheses,

annotations, reaction papers, text analysis, documented thesis-support papers. Emphasizes disciplinary conventions. (Lec. 3) Not open to students with credit in 104 or 106. (ECw).

### 106 Introduction to Research Writing (3)

Introduction to working with sources and the research process. Guided help in conducting interviews, observations, and database searches. All assignments contribute to a major research report. Not open to students with credit in 104 or 105. (Lec. 3) (ECw)

### 201 Writing Argumentative and Persuasive Texts (3)

Concepts, methods, and ethics of argumentative and persuasive writing. Writing argumentatively to examine complex issues, define values, resist coercion, and seek common ground among diverse publics. (Lec. 3) (ECw)

### 227 Business Communications (3)

Basic business communications forms, group reports and presentations, effective use of electronic mail systems, and design of graphic aids for successful visual communication. (Lec. 3/Online) Open to business majors with sophomore or higher standing. Open to a limited number of writing majors with sophomore or higher standing. (ECw)

### 235 Writing in Electronic Environments (4)

Examine, investigate, and practice digital writing. May include Web design, blogs, wikis, social networking technologies, presentation software, and construction of a digital portfolio. Requires out-of-class technology practice. (Seminar 3, Practicum 2/Online) (ECw)

### 240 The Essay (3)

Contemporary and historical backgrounds. Explores rhetorical strategies, role of essayist literacy in identity and social formation, nonfiction reading and response techniques. Attention to language and style. (Lec. 3) (L) [D]

### 270 Writing Our Selves: Writing in the Expressivist Tradition (3)

Focuses on the expressivist tradition of writing, including memoirs, medical narratives, nature meditations, and informal essays. (Seminar)

### 302 Writing Culture (3)

Experience with noncanonical writings that sustain or reshape culture. May include profiles and biographies, reviews, food and fashion writing, liner and exhibition notes. (Lec. 3/Online) (ECw)

### 303 Public Writing (4)

Writing in the public sphere, emphasizing civic literacy, democratic discourse, and writing for change. May include letters, public documents, activist publications, and legislative texts. Requires sustained fieldwork. (Seminar 3, Practicum 2/Online) (ECw)

### 304 Writing for Community Service (4)

Study and practice of writing in community service organizations. Requires community service outside class, research, writing, and design. May include grant proposals, brochures, websites, or reports. Requires sustained fieldwork. (Seminar 3, Practicum 2) (ECw) [D]

### 305 Travel Writing (4)

Writing about places both new and familiar. Emphasizes descriptive techniques, the use of facts, and different cultural perspectives. May include travel essays, place journals, guidebooks, query letters. Requires sustained fieldwork. (Seminar. 3/Online, Practicum 2) (ECw) [D]

### 306 Writing Health and Disability (3)

Explores the ways we experience, label, and politicize health and disability in our culture. Writing may include narratives, cultural critiques, persuasive essays, and policy proposals. (Lec. 3/Online)

### 333 Scientific and Technical Writing (3)

Practice in specific forms of writing in the scientific and technical fields. (Lec. 3) Competence in basic skills required. (ECw)

### 353 Issues and Methods in Writing Consultancy (4)

Practice and theory of one-to-one instruction emphasizing varied situations and multiple learning styles. Covers approaches to collaboration, learning, writing, and responding. Requires sustained fieldwork. (Seminar 3, Practicum 2) Pre: permission of instructor or B or better in two WRT courses.

### 360 Composing Processes and the Canons of Rhetoric (3)

Examines historical and contemporary theories of composing and rhetorical canons: writing processes, style and arrangement, and relationships among writing, learning social contexts, technology, and publication. Field research on professional writers. (Lec. 3) Pre: 201 and another WRT course at the 200-level or above.

### 383 Field Experience in Writing Consultancy

Supervised field experience, tutoring in the Writing Center or in the undergraduate peer consultants program. Pre: 353 and permission of instructor. May be repeated for a maximum of 9 credits.

### 385 Field Experience with Writing Rhode Island (1–4)

Supervised field experience in the Writing Rhode Island Production Lab. Entails substantial field-based and/or qualitative research, collaborative drafting, document design, and client interaction. Requires final project and reflection. (Practicum) Pre: writing and rhetoric major with a minimum of 12 credits in WRT courses and permission of supervisor.

### 391, 392 Independent Study in Writing and Rhetoric (1–3)

Intensive study and practice of an approved topic in writing and rhetoric under the supervision of a faculty member. (Independent Study) Pre: permission of director.

### 415 Perspectives on Reporting

See Journalism 415.

### 435 (or EDC 435) The Teaching of Composition (3)

Philosophy, materials, and methods underlying the teaching of writing with emphasis on current approaches including the application of linguistics. Offers practice in writing workshop techniques, marking, constructing assignment sequences, and individualized instruction. (Seminar) Pre: junior standing or permission of instructor.

### 484 Internship in Writing and Rhetoric (1–3)

Practice and direct supervision in workplace writing. Placement options include community-based, governmental, technological, health services, military, educational, and nonprofit organizations. (Practicum). Pre: 60 credits with a minimum of 12 in WRT, 2.50 GPA, and permission of faculty advisor. May be repeated for a maximum of 6 credits. S/U only.

### 490 Writing and Rhetoric (3)

Study emphasizing audience, composing processes, and rhetorical theories, including issues relevant to writing professionally. (Lec. 3) Pre: 360.

### 495 Composing Electronic Portfolios (3)

Capstone for WRT majors. Readings in electronic writing technologies and portfolios. Preparation of a substantive collection of representative writings. Culminates in an electronic portfolio and a public writing showcase. (Lec. 3) Pre: 360 and an additional 300-level writing course. Not for graduate credit.

### 512 Studies in Rhetorical Theory (3)

Emphasis on written discourse and the relationships among language, epistemology, and subjectivity. Readings will range from classical to contemporary and will reflect the expanding canon of rhetorical theory. (Lec. 3) Pre: graduate standing or permission of instructor.

### 524 Histories and Theories of Writing Instruction (3)

Traces the origins and influences on current writing instruction, beginning with composition treatises of the 19th century and concluding with an analysis of contemporary practices. May include archival research. (Lec. 3) Pre: graduate standing or permission of instructor.

### 533 Graduate Writing in Life Sciences (3)

Graduate writing skills for the life and environmental sciences; writing and editing journal articles, proposals; rhetorical analysis of scientific writing. (Lec. 2,

Lab. 2) Pre: WRT 104, 105, or 106 or equivalent or permission of instructor; graduate standing or senior status.

**599 Master's Thesis Research in Rhetoric (1–6)**

Number of credits is determined each semester in consultation with major professor or program committee. Pre: permission of graduate director in writing and rhetoric.

**645 Seminar in Rhetoric and Composition (3)**

Critical and theoretical conceptions of rhetoric and rhetoricality with varying historical periods and/or connections to cultural studies, literature, and composition studies. (Seminar)

**647 Seminar in Research Methods: Rhetoric and Composition Studies (3)**

Advanced practice in the theory and design of research projects, emphasizing qualitative and quantitative studies. May include archival research, teacher-research, ethnographies, case studies, interviews, surveys, experiments, and discourse analyses. (Seminar) Pre: graduate standing or permission of instructor.

**691 Independent Study in Rhetoric (1–3)**

Advanced study of an approved topic in Rhetoric and Writing Studies under the supervision of a graduate faculty member. Pre: permission of WRT graduate director. May be repeated for a maximum of six credits.

**699 Doctoral Dissertation Research in Rhetoric (1–9)**

Number of credits is determined each semester in consultation with the major professor or program committee. Pre: permission of graduate director in writing and rhetoric.

**999 Methods of Teaching College Writing (0)**

Materials and multiple methods of teaching writing on the college level. Required of teaching assistants who will teach in Writing and Rhetoric unless waived by the director of English graduate studies, the supervisor of teaching assistants, and the director of Writing and Rhetoric. (Seminar)